

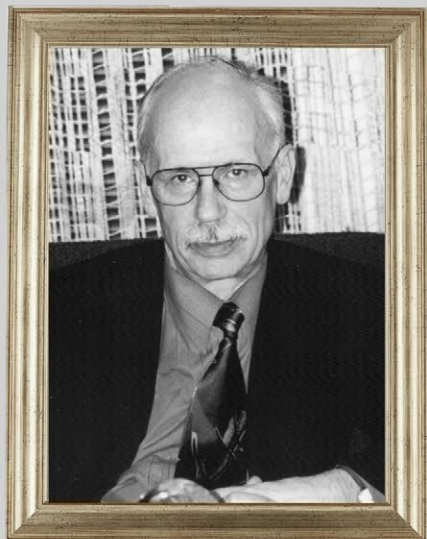
# WIADOMOŚCI KONSERWATORSKIE

JOURNAL OF HERITAGE CONSERVATION

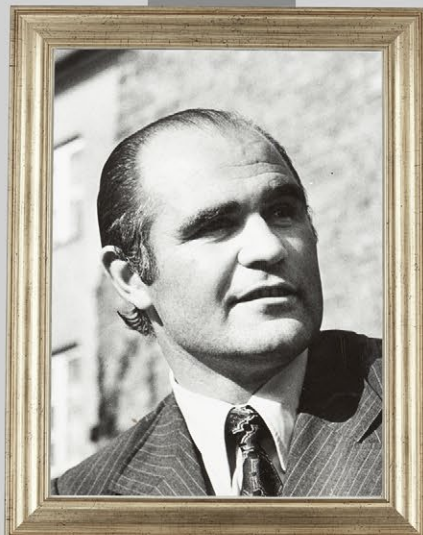




# PREZESI ZARZĄDU GŁÓWNEGO STOWARZYSZENIA KONSERWATORÓW ZABYTKÓW



Wawrzyniec Kopczyński  
I kadencja (1981-1984)



Bohdan Rymaszewski  
II i III kadencja (1984-1990)



Jerzy Kowalczyk  
IV kadencja (1990-1993)



## JUBILEUSZ 40-LECIA



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V i VI kadencja (1993-1999)



Jerzy Jasiołko  
VIII, IX i X kadencja  
(2002-2011)



Andrzej Kadłuczka  
VII (1999-2002) oraz XI, XII  
i XIII kadencja (2011-2022)



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## Szanowni Państwo,

przekazuję do rąk naszych Czytelników specjalny zeszyt czasopisma naukowego „Wiadomości Konserwatorskie – Journal of Heritage Conservation”, oznaczony numerem **68S**. Chcemy tym samym, jako redakcja, włączyć się w obchody czterdziestolecia powołania Stowarzyszenia Konserwatorów Zabytków, którego dokonano podczas Zjazdu Organizacyjnego w dniu 22 października 1981 w Warszawie. Jego zamierzeniem było stworzenie organizacji o charakterze interdyscyplinarnym, zrzeszającej konserwatorów oraz specjalistów z różnych dyscyplin naukowych związanych z ochroną i konserwacją zabytków. W roku 1985 Stowarzyszenie zaczęło wydawać własne pismo „Wiadomości Konserwatorskie”, które od razu stały się ważnym źródłem informacji nie tylko dla środowiska polskich konserwatorów, lecz także dla historyków sztuki i muzealników oraz miłośników zabytków.

Po 40 latach prowadzenia nieprzerwanych działań podejmowanych przez wspaniałych ludzi budujących organizację i jej prestiż, stowarzyszenie zyskało szerokie, niepodważalne uznanie społeczne, a „Wiadomości Konserwatorskie” ugruntowały sobie opinię wartościowego periodyku naukowego i opiniotwórczego na najwyższym poziomie, indeksowanym m.in. w bazie Scopus, uhonorowanego w roku 2021 stoma punktami przyznanymi przez MKiDN.

Zachęcamy naszych P.T. Czytelników do lektury specjalnego numeru „Wiadomości Konserwatorskich”, wydanego w języku angielskim, by – odpowiadając na wymogi i potrzeby Unii Europejskiej – stało się dostępne jak najszerszemu gronu czytelników pisma i wszystkim jego autorom.

**Redaktor naczelna**  
*Editor in chief*  
Maria Jolanta Żychowska



## Ladies and Gentlemen,

We would like to present to our Readers the special issue of “Wiadomości Konserwatorskie – Journal of Heritage Conservation” marked with the number 68S. By doing so, as the journal’s editorial team, we also contribute to the celebration of the fortieth anniversary of the founding of the Association of Monuments Conservators, which took place during the Organizational Assembly on October 22, 1981, in Warsaw. The Assembly’s intent was to create an interdisciplinary organization that would group conservators and specialists from various academic fields linked with the protection and conservation of monuments. In 1985, the Association began publishing its own journal, “Wiadomości Konserwatorskie,” which immediately became a prominent source of information not only for the Polish conservation community, but also for arts historians, museologists and monuments enthusiasts.

After forty years of unceasing activity engaged in by wonderful people who have been building the organization and its prestige, the Association has gained wide and unquestionable public recognition, and “Wiadomości Konserwatorskie” has earned the opinion of an influential academic journal of the highest order, indexed in the Scopus citations database and honored with a hundred-point score awarded by the MCNH in 2021.

We encourage our Readers to peruse the special issue of “Wiadomości Konserwatorskie,” published in English so that—following the requirements and guidelines of the European Union—it can be accessible to the widest possible readership and all of its authors.

**Przewodniczący Rady Naukowej**  
*Chairman of the Scientific Board*  
Jerzy Jasieńko







Jesienią roku 2021 minęło czterdzieści lat działalności Stowarzyszenia Konserwatorów Zabytków. Do jego powstania w pamiętnym czasie „karnawału Solidarności” doprowadził kilkusobowy komitet założycielski, który spotkał się po raz pierwszy 28 października 1980 w Lublinie. Dzięki zaangażowaniu, uporowi i konsekwentnym działaniom pomysłodawców 22 października 1981 odbył się w Warszawie Zjazd Organizacyjny. Stowarzyszenie stawiało pierwsze kroki w trudnym okresie stanu wojennego, ale przetrwało.

Stowarzyszenie Konserwatorów Zabytków, co podkreślam, jest organizacją społeczną, zrzeszającą konserwatorów oraz specjalistów z różnych dyscyplin związanych z ochroną i konserwacją zabytków. Wpisana w statut interdyscyplinarność jest gwarancją wszechstronności i rzetelności ocen oraz daje unikatową możliwość wymiany doświadczeń w ramach konferencji, sympozjów, warsztatów, cyklicznych spotkań w poszczególnych oddziałach. Wyjątkowym dla środowiska wydarzeniem, organizowanym przez Zarząd Główny, były międzynarodowe Kongresy Konserwatorów Polskich w roku 2005 i 2015. Ich cel stanowiła krytyczna refleksja nad stanem realizacji postulatów środowiska konserwatorskiego oraz zwrócenie uwagi na nowe wyzwania i problemy ochrony dziedzictwa kulturowego. W trakcie obrad wypracowano najważniejsze dokumenty programowe Stowarzyszenia – rezolucje I i II Kongresu Konserwatorów Polskich oraz tekst Rezolucji Warszawskiej.

Upowszechnianiu wiedzy służą publikacje Stowarzyszenia, których forma zmieniała się przez lata. Część była regionalnymi efemerydami, inne towarzyszyły zjazdom naukowym. Nieprzerwanie trwają prace nad *Słownikiem biograficznym konserwatorów polskich* – za co chwala i podziękowanie Koledze Henrykowi Kondzieli i jego zespołowi; regularnie ukazują się „Wiadomości Konserwatorskie”. Dziś, mając w rękach specjalny ich numer, wracamy pamięcią do długiego szeregu zasłużonych, pełnych zapału Redaktorów, do Autorów,

The autumn of 2021 marked the passing of forty years of the Association of Monuments Conservators’ operation. It was founded in the memorable time of the “carnival of Solidarity,” by a small group that formed the founding committee that first assembled on October 28, 1980, in Lublin. Thanks to the stubbornness and consistent actions of the founders, the Organizational Assembly took place in Warsaw on October 22, 1981. The Association took its first steps during the difficult time of the period of martial law, but it has survived.

It must be stressed that the Association of Monuments Conservators is a public organization that consists of conservators and specialists from various academic disciplines associated with the protection and conservation of monuments. The interdisciplinarity enshrined in its statute is a guarantee of comprehensiveness and reliability of assessments, and provides the unique opportunity to share experiences during conferences, symposiums, workshops, and cyclical meetings held at its various branches.

International Polish Conservators’ Congresses organized by the General Board in 2005 and 2015 are events seen as exceptional by the conservation community. The objective of the congresses was a critical reflection on the current progress in implementing the postulates of the Polish conservation community and casting a light on new challenges and problems faced by cultural heritage conservation. The Association’s most important programmatic documents were drafted during their proceedings—the first and second resolutions of the Polish Conservator’s Congress and the Warsaw Resolution.

The Association’s publications serve to disseminate knowledge and their form has evolved over the years. Some were regional ephemera, while others accompanied academic assemblies. Work continues without pause on *Słownik biograficzny konserwatorów polskich*—for which I would like to sincerely thank Colleague Henryk Kondziela and his team—and “Wiadomości Konserwatorskie – Journal of Heritage Conservation” is still regularly published. Today, with the journal’s special issue in our hands, we direct our thoughts to the long line

którzy bezinteresownie służyli swe materiały także w czasach, kiedy o akademickich punktach nikt jeszcze nie słyszał. Dzięki nim pismo trwało i przetrwało, stanowiąc ważny czynnik konsolidacji środowiska konserwatorskiego.

Na sukcesy Stowarzyszenia składa się społeczna działalność kilku pokoleń Koleżanek i Kolegów, którzy poświęcali i poświęcają swój czas i bogatą wiedzę, a także współpraca z bratnimi organizacjami, uczelniami, władzami państwowymi, wojewódzkimi konserwatorami zabytków i samorządami. Nasze działania finansowane są głównie ze składek członkowskich i środków pozyskanych od członków wspierających. Obecnie Stowarzyszenie liczy 450 członków skupionych w 12 oddziałach: bydgoskim, gdańskim, górnośląskim, lubelskim, małopolskim, mazowieckim, opolskim, podkarpackim, śląskim, szczecińskim, toruńskim, warmińsko-mazurskim. Nasz wspólny dorobek staraliśmy się przedstawić w jubileuszowym wydawnictwie *Pro publico bono. 40 lat Stowarzyszenia Konserwatorów Zabytków*, które ukaże się na początku roku 2022.

Z okazji Jubileuszu, w imieniu Zarządu Głównego i własnym, składam serdeczne podziękowania Koleżankom i Kolegom, członkom Stowarzyszenia Konserwatorów Zabytków, za ich dotychczasową, działalność na rzecz dobra publicznego, z nadzieją na dalsze, wspólne sukcesy. Wprawdzie pandemia Covid-19 zmusiła nas do przełożenia jubileuszowych obchodów, ale żywię szczerą nadzieję, że będzie nam dane spotkać się 19 października 2022 w Toruniu.

Z wyrazami uznania i szacunku,  
Jacek Rulewicz

Sekretarz Generalny Zarządu Głównego  
Stowarzyszenia Konserwatorów Zabytków

of the meritorious, the dedicated Editors, the Authors, who selflessly submitted their materials for publication, even in times when no one had even heard of academic points. It is thanks to them that the journal has continued to exist and survive, acting as a crucial factor in the conservation community's consolidation.

The successes of the Association comprise the public efforts of several generations of our Colleagues, who devoted and continue to devote their time and significant knowledge to its goals, as well as cooperation with sister organizations, universities, state authorities, voivodeship monuments conservators and municipal governments. Our operation is funded primarily from membership fees and donations from backing members. At present, the Association has 450 members grouped around 12 branches: Bydgoszcz, Gdańsk, Upper Silesia, Lublin, Lesser Poland, Masovia, Opole, Subcarpathia, Silesia, Szczecin, Toruń, and Warmia-Masuria. We have attempted to present our shared work in the anniversary publication entitled *Pro publico bono. 40 lat Stowarzyszenia Konserwatorów Zabytków*, which we plan to publish in early 2022.

On the occasion of the Anniversary, in the name of the General Board and my own, I would like to wholeheartedly thank my dear Colleagues, the members of the Association of Monuments Conservators, for their efforts towards the public good, with hope of further joint successes. While the Covid-19 pandemic forced us to reschedule the anniversary celebrations, I sincerely hope that we will be able to meet on October 19, 2022, in Toruń.

Best regards and compliments,  
Jacek Rulewicz

Secretary General, General Board,  
Association of Monuments Conservators



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## Guidelines and Instructions of the General Conservator of Historical Monuments: New Tools for Conservation Policy

## Wytyczne i instrukcje Generalnego Konserwatora Zabytków jako nowe narzędzia polityki konserwatorskiej

**Keywords:** conservation policy, conservation guidelines, monument protection policy

**Słowa kluczowe:** polityka konserwatorska, wytyczne konserwatorskie, polityka ochrony zabytków

### Introduction

Conservation bodies, due to the tasks they perform, constitute an important part of the Polish public administration system. Their operations are executive in nature, which means that the essence of their activities lies in construing and implementation and of the provisions laid out mainly in the Act of July 23, 2003, on the Protection and Preservation of Historical Monuments (hereinafter: the APCHM). Thus the competences of the conservation bodies became part of the definition of monument protection provided for in Article 4 of the APPHM which specifies the objectives of the public administration in this field. At the same time, most decisions of the Voivodeship Conservator of Monuments are based on the rule of administrative discretion, as well as regulations containing numerous under-defined notions. This stems from the very construction of the provisions of the APPHM and is, beyond question, an intended maneuver of the legislator.

What is more, the discretionary power of conservators is to serve not the conservatorship itself, but the monuments, for the benefit of which they are to act effectively. The subject of this article is to present the guidelines and instructions of the General Conservator of Historical Monuments, issued on the basis of the

APPHM, in accordance with its wording specified in the Act of June 22, 2017, on the Amendment the Act on the Protection and Preservation of Historical Monuments and some other acts, hereinafter referred to as the 2017 amendment.

### Legal and institutional position of the General Conservator of Historical Monuments

In order to analyze the competences of the General Conservator of Historical Monuments, a brief overview of how Polish conservation administration is organized is required first. Due to its position in the political system, they are considered part of the government (centralized) administration. At the local level, the conservation authority is the Voivodeship Conservators of Monuments, who are counted among the integrated services acting under the authority of the respective Voivode (i.e. provincial governor). At the central level, there is the Minister in charge of culture and national heritage protection, on behalf of whom the General Conservator of Historical Monuments performs its tasks and responsibilities. The legislator decided on dual subordination of the local conservation bodies: with respect to financial and organizational matters, the Voivodeship

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Conservators of Monuments are subordinated to the Voivode, but when it comes to substantive matters, the Voivodeship Conservators of Monuments are subordinate to the General Conservator of Monuments.

The scope of the subject-matter responsibilities of the General Conservator of Historical Monuments is set out in Article 90 of the APPHM. In light of the discussed issues, the most important tasks prescribed in the Act are those which concern the relations between the General Conservator of Historical Monuments and the Voivodeship Conservators of Monuments. The General Conservator of Historical Monuments supervises (art. 90.2.7 APPHM), coordinates (art. 90.2.7a APPHM), and controls (art. 90.2.7b APPHM) the activity of the Voivodeship Conservators of Monuments. Before the 2017 amendment to the APPHM, the position of the General Conservator of Historical Monuments was far more disadvantaged, as it was limited to supervision, yet devoid of any supervisory measures.

The aforementioned amendment to the APPHM equipped the General Conservator of Historical Monuments with substantive supervision measures (see Article 47a of the APPHM) and strengthened its position with regard to personal supervision measures (see Article 91(1–1a) of the APPHM). The provisions regulating control were also made more precise by explicitly referring this function to the provisions of the Act of 15 July 2011 on Control in Government Administration. However, key to these provisions is the clear assignment of the General Conservator of Historical Monuments' coordinating function.

Coordination refers to the harmonization of administrative action. B. Majchrzak pointed out that it serves the purpose of synchronization, agreement of partial activities in time and space, organization of activities carried out jointly by several (many) entities.

The aim of coordination is to boost effectiveness, which in the case of conservation bodies is to achieve the aims referred to in article 4 of the Act. However, coordination does not occur alone and is connected with other organizational arrangements. In this case, the coordinating function of the General Conservator of Historical Monuments is related to the substantive supervision function, this including the competent instance-type supervision.

When it comes to coordinating activities of the Voivodeship Conservators of Monuments, the General Conservator of Historical Monuments may define the general directions of their activities, issue instructions and guidelines defining the manner of their conduct and require their activity reports. However, Art. 90 par. 4 of the APPHM expressly provides that the instructions and guidelines may not relate to decisions on the merits of the case settled by way of an administrative decision. In other words, they cannot refer to the manner of resolving specific administrative issues.

### **Legal nature of guidelines and instructions of the General Conservator of Historical Monuments**

The General Conservator's instructions and guidelines are internal acts, which means that they are binding only on the authorities subordinate to the office. However, this does not mean that they are binding exclusively on the Voivodeship Conservators of Monuments and the heads of the delegations of the Voivodeship Conservators of Monuments acting on their behalf. These documents are also addressed to all the units and entities which are commissioned tasks within the scope of Voivodeship Conservators of Monuments on the basis of art. 96 of the APPHM. This means that the instructions and guidelines of the General Conservator of Historical Monuments are binding also for the local government related conservators.

Apart from the direct binding force, there is also an indirect possibility to influence organizations operating outside public administration. In practice, instructions and guidelines may, through the activities of conservation bodies, influence owners, designers or contractors involved in historical monuments: when treated as a premise for assessing the permissibility of certain works or activities on a monument, which is assessed every time in the course of proceedings for granting a permit under art. 36 par. 1 of the APPHM. It must be noted that when assessing the admissibility of activities covered by the application for a permit, the Voivodeship Conservator of Monuments is obliged in each case to meet the objectives of monument protection as set out in Article 4 of the APPHM, including primarily the prevention of threats that may cause damage to the value of monuments. Compliance with the guidelines and instructions cannot consist only in referring to them—the objectives of the enforcement decision must be precisely defined, i.e., operationalized, and therefore referred to a specific factual state. Bearing in mind that the binding guidelines and instructions of the General Conservator of Historical Monuments affect the interpretation and construal of the under-defined notions used, and consequently have an impact on the duties of the administrators of monuments. In this respect, therefore, one can speak of indirect binding by guidelines and instructions.

The General Conservator of Historical Monuments may enforce guidelines and instructions by applying both substantive (revoking or amending the decision—art. 47a of the Act) and personal (a motion for dismissal of the Voivodeship Conservator of Monuments) supervision measures. The guidelines and instructions of the General Conservator of Historical Monuments affect the quality of documentation, evaluation, and conservation efforts and the usage of historic monuments, by unifying the approach of the conservator's to selected issues, which may otherwise differ significantly from one another. Therefore, they make it possible to pursue a responsible, coherent conservation policy, which



intensifies and standardizes proceedings, also reducing the randomness or regional passivity, which is negatively diagnosed by the conservation community itself.

### **Guidelines and instructions as a tool of conservation policy**

By equipping the General Conservator with a tool in the form of instructions and guidelines, which define the directions of conservation policy, it became possible to create conditions for harmonizing the substantive activities of local conservation bodies. At this point, the manner in which the notion of conservation policy is understood should be clarified. To begin with, it is worth noting that a policy is generally treated as an ordered sequence of decisions and actions leading to the implementation of an adopted aim. In this sense, an administrative policy is “a program of action which aims to achieve certain objectives by means of the legal and other means available to the administration.” It rests on the creation of objectives, the setting of programs, which then leads to the application of appropriate measures and their evaluation.

A conservation policy is therefore a kind of administrative policy carried out by the conservation authorities. In particular, it is carried out at the central level by the General Conservator of Historical Monuments and at the local level by the Voivodeship Conservator of Monuments within their local jurisdiction. However, the conservation policy carried out by Voivodeship Conservators must be consistent with the policy determined at the central level—it may complement and expand on it, but cannot contradict the principles determined by the General Conservator.

Therefore, conservation policy is a model of strategic management referring to activities carried out to historical monuments and it includes a set of accepted principles of conservation practice, including the principles of conservation work and research, as well as praxeological directives, directing the attention of the conservation bodies to specific resources and problems with the indication of principles regulating the practice. The source of the principles adopted within the framework of a given conservation policy is the system of assumptions which normalize the conservation practice, formulated earlier in the so-called doctrinal documents developed by international organizations (UNESCO, ICOMOS, ICCROM), or at the national level (GKZ, NID). It should therefore be assumed that doctrinal documents formulate paradigms relating to both conservation theory and conservation practice. A vast majority of doctrinal documents are non-binding. However, as they become a part of policy-making acts, they also become binding on entities hierarchically subordinated to the entity issuing the act.

A conservation policy, understood in this way, sets out the tasks which, in a rapidly changing environment, correspond to the needs and emerging problems of contemporary conservation, the implementation of

which should be in the wider public interest. A conservation policy can be set forth in the acts related to this policy, which includes the guidelines and instructions of the General Conservator of Historical Monuments.

A conservation policy is an element of the broader monument conservation policy, which is defined by Ż. Gwardzińska as “the activity of public authorities aimed at protecting and caring for monuments or exerting a dominant influence on power by groups of citizens.”

The monument conservation policy is therefore a wider concept: on top of the pursuance of the historical monuments conservation objectives—effected by issuing conservation bodies’ decisions (conservation policy)—it also refers to other tools, such as those related to the financing of works on historical monuments, social and educational activities, as well as management efforts.

One act of monument protection policy is, undoubtedly, the National Program for the Protection and Preservation of Historical Monuments, referred to in art. 84–86 of the APPHM. It defines, in particular, the objectives and directions of activities and tasks in the field of monument protection and preservation, the conditions and methods of financing the planned activities, as well as the schedule of their implementation.

The monument protection policy is one of the policies for the protection of cultural heritage. It should be noted that the policy of cultural heritage protection is oriented at the needs and ideas of the contemporary user, covering both the issues of tangible and intangible heritage, while the monuments protection is based policy on the system of historic values.

The heritage assets are governed by restrictive conservation practices defined by the conservation policy. All the above policies fall into the broadest category of cultural policy (Figure 1). It is assumed that the cultural policy of each country is derived from its political system and concerns that part of the social policy of the state which relates to artistic creation, the promotion of diversity, the availability of cultural products, and the protection and preservation of cultural heritage. The publication *Kultura i rozwój*, which seeks to define this concept, specifies cultural policy to be “the influence of superior (decision-making) authorities on the course of things in culture,” indicating at the same time that it is “purposeful, systematic interference in the sphere of culture [...] carried out to achieve four basic objectives: to preserve the cultural identity of the nation; to ensure equal access to culture; to promote creativity and high quality of cultural assets and services; to diversify the cultural offer in such a way that each social group can find something for itself.” It is also important to stress that the main objective of cultural policy should be to help the formation of a civil society.

Thus, cultural policy has an indirect effect on cultural reality and consists rather in shaping conditions conducive to the realization of the assumed cultural values, “such conditions in which the development of the desired cultural values would be natural.”

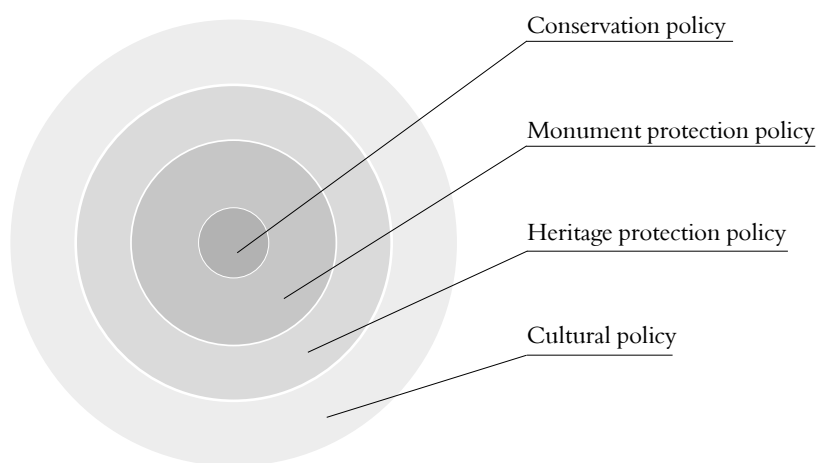


Fig. 1. Diagram showing the interdependence of conservation policy, monument protection policy, cultural heritage protection and cultural policy; by the authors.

Ryc. 1. Schemat przedstawiający współzależność polityki konserwatorskiej, polityki ochrony zabytków, ochrony dziedzictwa kulturowego oraz polityki kulturowej; oprac. autorek.

### Catalogue of guidelines and instructions issued between 2018 and 2021

The guidelines and instructions of the General Conservator of Historical Monuments, referred to in Article 90.3 of the APPHM, set out the basic principles which should be followed by the Voivodeship Conservators of Monuments in their activities.<sup>1</sup> However, not all of them will refer to conservation policy *sensu stricto*. The guidelines and instructions issued between 2018 and 2021<sup>2</sup> on the basis of Article 90.3 of the APPHM can be divided into four groups. The first group includes documents containing interpretations of selected provisions within the competence of the Voivodeship Conservator of Monuments, which are binding for monument protection authorities. Such guidelines include:

- 1) Guidance dated January 19, 2018, on the application of the regulations relating to the removal of trees and shrubs from listed properties;<sup>3</sup>
- 2) Recommendations of December 7, 2018, on the protection of historic small towns;<sup>4</sup>
- 3) Guidance dated June 13, 2019, on the procedure for issuing permits for the search for monuments, including archaeological monuments, on properties owned by various entities.<sup>5</sup>

Another group of guidelines and instructions relates to optimizing the work of the conservation administration and to increasing efficiency of interaction with other bodies:

- 1) Guidelines of September 21, 2018, on the actions of the Voivodeship Conservators of Monuments taken in relation to the legal protection of monuments;<sup>6</sup>
- 2) Guidelines of October 1, 2018, on the actions taken by the Voivodeship Conservators of Monuments in the procedure of issuing permission for permanent export of monuments abroad;<sup>7</sup>
- 3) Guidelines of November 19, 2018, on how to conduct monitoring of historical monuments and/or

world heritage sites carried out by the Voivodeship Conservators of Monuments;<sup>8</sup>

- 4) Guidelines of December 17, 2018, on cooperation with the General Directorate of National Roads and Motorways when issuing decisions on permission to conduct archaeological research carried out during the construction of national roads and motorways;<sup>9</sup>
- 5) Guidance dated December 3, 2019, on the conduct of the Voivodeship Conservators of Monuments in relation to the activities of the US government agency Defense POW/MIA Accounting Agency in our country.<sup>10</sup>

In this respect, the guidelines and instructions can be seen as part of the policy for the protection of monuments due to the fact that they focus on cooperation with other authorities and institutions for the implementation of the objectives of monument protection referred to in Article 4 of the APPHM.

The third group of documents are guidelines and instructions relating to conservation principles:

- 1) Guidance and recommendations dated October 4, 2019, on the application of the fundamental conservation principles for historic buildings;<sup>11</sup>
- 2) Guidelines of March 22, 2019, on the protection of monuments of technology;<sup>12</sup>
- 3) Guidance dated August 2, 2019, on standards of conservation practice for the development of market spaces.<sup>13</sup>

In this respect, the guidelines and instructions constitute a catalogue of principles which the Voivodeship Conservator of Monuments should follow in their administrative judgements. Therefore, they constitute a tool of conservation policy carried out by the General Conservator of Historical Monuments. They indicate, in particular, the standards of works, determine the acceptable methods and techniques, as well as issues related to the manner of use, i.e., giving the monuments a new function.

The fourth group of documents are guidelines and



instructions aimed at improving the quality of research, conservation design and work on monuments:

- 1) Guidance of March 6, 2019, on:
  - producing a base map for preparing study and project documentation in the field of conservation and restoration of parks, gardens and other forms of designed greenery entered in the register of historical monuments;
  - recommendations for the inventory of vegetation in parks, gardens and other forms of designed greenery, entered in the register of historic monuments;
  - recommendations for the development of a tree stand management projects in parks, gardens and other forms of planned greenery, which are listed in the register of historical monuments;
  - recommendations for dealing with damage caused by natural disasters to parks, gardens and other forms of designed greenery entered in the register of historical monuments;
  - recommendations for dealing with damage caused by natural disasters to parks, gardens and other forms of designed greenery entered in the register of historical monuments;
  - recommendations for the protection of trees and shrubs in the area of construction works in parks, gardens and other forms of designed greenery, entered in the register of historic monuments.<sup>14</sup>
- 2) Recommendations of July 23, 2020, on how to deal with developments of a reconstruction, revitalization, open-air museum on archaeological sites.<sup>15</sup>
- 3) Guidance of January 8, 2020, on setting standards for the conduct of archeological research pt.1 Intrusive investigations on land.<sup>16</sup>
- 4) Guidance of January 8, 2020, in setting standards for the conduct of archeological research pt. 2 Intrusive investigations on land.<sup>17</sup>
- 5) Guidance of February 28, 2020, on the protection of heritage in the process of energy improvement of historic buildings.<sup>18</sup>

The principles and standards formulated in this respect are to serve the improvement of the quality of works and research on historical monuments. It should be assumed that the guiding principles of the conservation practice, i.e., technical protection of selected groups of historic monuments, is a manifestation of a conscious conservation policy.

The guidelines and instructions of the General Conservator of Historical Monuments issued after 2018–2021 are crucial to limiting discretionary powers.<sup>19</sup> The introduction of numerous under-defined concepts, general clauses, as well as the institution of administrative discretion into the provisions of the APPHM fosters the so-called discretionary conservatory power.<sup>20</sup> The aforementioned guidelines and instructions, acts in conservation policy, contribute to the achievement of a greater uniformity of administrative decisions in the field of monument conservation, which in turn contributes to the increase of legal certainty.

## Conclusions

The internal nature of the guidelines and instructions means that they are not directly binding on entities which are not subordinate to the General Conservator of Historical Monuments. This does not mean, however, that they are not important for the remaining addressees of the historic monuments protection regulations. This applies in particular to guidelines and instructions which concern the principles of conservation protection or contain standards and rules which should be taken into account at the stage of planning works and design documentation. In all these cases they constitute a set of guidelines which the Voivodeship Conservator of Monuments is obliged to take into account when applying the law, e.g., when issuing a permit under Article 36 of the APPHM. This particularly relates to the assessment of the admissibility from the conservator's standpoint of a given program of conservation works or a construction project. As a result, they are also indirectly binding on entities outside the monument conservation authorities, as they determine the substantive limits of the decision in an individual case.

The guidelines and instructions of the General Conservator of Historical Monuments issued in 2018–2021 were a response to the current problems of the conservation bodies. Regarding the directions of conservation policy, the documents indicated focused on the assets that are most endangered, or that pose the greatest challenge to the system of monument protection today (greenery, technical monuments, wooden architecture, works of defensive construction). The guidelines and instructions issued so far constitute a heterogeneous group of documents. Only some of them can be seen as acts in conservation policy. In other cases, they are a source of standards for the implementation of the conservation policy, as well as documents which may be included in the more broadly defined policy for the protection of historic monuments. For example, documents aiming to optimize the activities of the conservation bodies and their cooperation with other entities, which then serves the implementation of the wider policy of historic monument protection.

The introduction, by the 2017 amendment, of the possibility of issuing binding guidelines and instructions addressed to local conservation authorities was an important element of the systemic changes. Together with the other changes referred to in the introduction, it significantly strengthened the position of the General Conservator of Historical Monuments. It was particularly important to strengthen its coordinating function, which leads, inter alia, to limiting the free action of public administration bodies, which has a significant impact on the legal situation of an individual. Undisputedly, a unified and publicly available interpretation of law, as well as conservation rules, strengthens the position of the conservation bodies.

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### Legal acts / Akty prawne

Act of July 15, 2011, on Control in Government Administration, Dz.U. 2020, item 224.

Act of June 22, 2017, on the Amendment the Act on the protection and Preservation of Historical Monuments and Some other acts, Dz.U. 2017, item 1595.

Act of July 23, 2003, on the Protection and Preservation of Historical Monuments, Dz.U. 2021, item 710, 954.

Act of July 23, 2003, on the Protection and Preservation of Historical Monuments (Dz.U. 2021, item 710, 954).

<sup>2</sup> T. Sienkiewicz aptly points out that the "planned slack in decision-making" is important at the stage of making decisions in monuments conservation as it allows for the flexibility of law and consequently choosing the most appropriate solution. T. Sienkiewicz, *Pozwolenie w ochronie zabytków*, Lublin 2013, p. 280.

<sup>3</sup> Act of June 22, 2017, on the Amendment of the Act on the Protection and Preservation of Historical Monuments and Some Other Acts, Dz.U. 2017, item 1595 (hereinafter: 2017 amendment).

<sup>4</sup> See W. Kupny, *Generalny Konserwator Zabytków jako organ ochrony zabytków. Pozycja prawno-ustrojowa*, [in:] *Segmenty dziedzictwa kulturowego – między ochroną dziedzictwa – materialnego a niematerialnego*, ed. P. Dobosz et al., Kraków 2020, p. 103.

<sup>5</sup> Unaddressed by said amendment were the statutory requirements concerning education and qualifications of the person holding the function of the General Conservator of Monuments. Ensuring the professional standard represented by such a specialized central body would undoubtedly foster its position as a substantive supervision body, although the actual strengthening of the conservation authorities should rather be seen in the separation of the General Conservator of Monuments as an independent central authority and in the performance of its tasks and competence in its own name and on its own account, and not, as it is currently the case, in the name and on behalf of the minister competent for culture and national heritage.

<sup>6</sup> At present, the Voivodeship Conservator of Monuments is appointed by the Voivode at the request of the General Conservator of Historical Monuments who nominates a candidate for the position. The Voivodeship Conservator is dismissed by the Voivode upon receiving a motion of the General Conservator of Historical Monuments or with their approval. The change in the mode of appointment of the Voivodeship Conservator of Monuments is particularly significant, as it grants exclusive competencies with respect to the candidate's indication to the General Conservator of Historical Monuments.

<sup>7</sup> Act of July 15, 2011, on Control in Government Administration (Dz.U. of 2020, item 224).

<sup>8</sup> B. Majchrzak, *System administracji publicznej (więzi pomiędzy organami)*, [in:] *Nauka administracji*, ed. Z. Cieślak, Warsaw 2017, p. 26.

<sup>9</sup> By some authors, guidelines and instructions are regarded as acts of internal management of a general nature (see R. Giętkowski, [in:] *Leksykon prawa administracyjnego*, ed. E. Bojanowski, K. Zukowski, Warsaw 2009, p. 90–91).

<sup>10</sup> Cf. E. Knosala, L. Zacharko, A. Matan, *Nauka administracji*, Kraków 1999, p. 65.

<sup>11</sup> B. Bielinis-Kopeć, *Propozycje założeń do systemu służb konserwatorskich – stanowisko wojewódzkich konserwatorów zabytków*, "Ochrona Dziedzictwa Kulturowego" 2016, No. 1, p. 8–13.

<sup>12</sup> Z. Leoński, *Nauka administracji*, Warsaw 2004, p. 17.

<sup>13</sup> M. Wincenciak, *Sankcje w prawie administracyjnym i procedura ich wymierzania*, Warszawa 2008, p. 252.

<sup>14</sup> Ż. Gwardzińska, *Egzekucja nadzoru konserwatorskiego*, Gdańsk 2019, p. 30.

<sup>15</sup> Act of 23 July 2003 on the protection and Preservation of historical monuments, Dz.U. 2021, item 710, 954, art. 3.1. and M.T. Witwicki, *Kryteria oceny wartości zabytkowej obiektów architektury jako podstawy wpisu do rejestru zabytków*, "Ochrona Zabytków" 2007, No. 1, p. 77–98, and B. Szmygin, *System ochrony zabytków w Polsce – próba diagnozy*, [in:] *System ochrony zabytków w Polsce – analiza, diagnoza, propozycje*, ed. B. Szmygin, Lublin–Warszawa 2011, p. 12.

<sup>16</sup> A. Böhm et al., *Report na temat funkcjonowania systemu ochrony dziedzictwa kulturowego w Polsce po roku 1989*, ed. by J. Purchla, Kraków 2008, p. 13.

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<sup>18</sup> Ibidem.

<sup>19</sup> B. Gierat-Bieroń, *Ministrowie kultury doby transformacji, 1989–2005*, Kraków 2009, p. 60.

<sup>20</sup> D. Ilczuk, *Polityka kulturalna w społeczeństwie obywatelskim*, Kraków 2002, p. 12.

<sup>21</sup> M. Golka, *Transformacja systemowa a kultura w Polsce po 1989*, Warszawa 1997, p. 21.

<sup>22</sup> A. Leśniewski, *Modele polityki kulturalnej Państwa Polskiego 1944–2015*, doctoral thesis written at the Cultural Studies Institute of Adam Mickiewicz University in Poznań, Poznań 2017, p. 15; E. Wnuk-Lipiński, *Rozumienie kultury. Szkice socjologiczne*, Warszawa 1979, p. 92.

<sup>23</sup> In addition, the preparatory, executive and disseminative work carried out on the occasion of the next conservation policy task is usually accompanied by soft action, e.g., consultations, workshops, seminars, trainings, leaflets or good practice guides, which also sensitize the participants, at the

- same time indicating areas of conflict and the need for further cooperation and analysis.
- <sup>24</sup> Currently, the guidelines of the General Conservator of Monuments concerning the standards for design issues in the field of historical greenery, protection of historic works of defensive construction, protection of wooden architecture, photovoltaics on monuments and historic areas, making monuments accessible to people with special needs, problems of monument protection in connection with climate change are being developed.
- <sup>25</sup> *Wytyczne w zakresie stosowania przepisów dotyczących usuwania drzew i krzewów z nieruchomości wpisanych do rejestru zabytków*, "Kurier Konserwatorski" 2020, No. 19, p. 17–18.
- <sup>26</sup> *Zalecenia w zakresie ochrony historycznych małych miast*, "Kurier Konserwatorski" 2020, No. 19, p. 32–33.
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- <sup>28</sup> *Wytyczne w zakresie działań wojewódzkich konserwatorów zabytków podejmowanych w związku z prawnokarną ochroną zabytków*, "Kurier Konserwatorski" 2020, No. 19, p. 19–22.
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- <sup>30</sup> *Wytyczne w zakresie sposobu prowadzenia monitoringu pomników historii i/lub miejsc światowego dziedzictwa, realizowanego przez wojewódzkich konserwatorów zabytków*, "Kurier Konserwatorski" 2020, No. 19, p. 29–31.
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- <sup>33</sup> *Wytyczne i zalecenia w zakresie stosowania podstawowych zasad konserwatorskich dotyczących zabytków*, "Kurier Konserwatorski" 2020, No. 19, p. 26–28.
- <sup>34</sup> *Wytyczne dotyczące ochrony zabytków techniki*, "Kurier Konserwatorski" 2020, No. 19, p. 71–75.
- <sup>35</sup> *Wytyczne w zakresie standardów postępowania konserwatorskiego w zakresie zagospodarowania przestrzeni rynkowych*, "Kurier Konserwatorski" 2020, No. 19, p. 78.
- <sup>36</sup> *Zalecenia do wykonywania mapy zasadniczej na potrzeby opracowania dokumentacji studialno-projektowych z zakresu konserwacji i restauracji parków, ogrodów i innych form zaprojektowanej zieleni, wpisanych do rejestru zabytków; Zalecenia dla inwentaryzacji szaty roślinnej w parkach, ogrodach i innych formach zaprojektowanej zieleni, wpisanych do rejestru zabytków; zalecenia dla opracowania projektu gospodarki drzewostanem w parkach, ogrodach i innych formach zaprojektowanej zieleni, wpisanych do rejestru zabytków; zalecenia dla postępowania w sytuacji zaistnienia szkód spowodowanych kłeskami żywiołowymi na terenie parków, ogrodów i innych form zaprojektowanej zieleni, wpisanych do rejestru zabytków*, "Kurier Konserwatorski" 2020, No. 195, p. 39–70.
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- <sup>40</sup> *Standardy termomodernizacji obiektów zabytkowych, Wytyczne GKZ dotyczące ochrony wartości dziedzictwa kulturowego w procesie poprawy charakterystyki energetycznej budowli zabytkowych, NID, Warszawa 2020.*
- <sup>41</sup> On administrative discretionary power, among others, Z. Duniewska, *Władza dyskrecyjna administracji publicznej a sytuacja prawna jednostki – kilka refleksji*, [in:] *Administracja publiczna pod rządami prawa. Pamiątkowa z okazji 70-lecia urodzin prof. zw. dra hab. Adam Błasia*, ed. J. Korczak, Wrocław 2016, p. 97; M. Jaśkowska, *Uznanie administracyjne a inne formy władzy dyskrecyjnej administracji publicznej*, [in:] *System prawa administracyjnego, T. I: Instytucje prawa administracyjnego*, ed. R. Hauser et al., Warszawa 2015, p. 219.
- <sup>42</sup> E. Kowalska, *Własność zabytku a dyskrecyjna władza konserwatorska*, Gdańsk 2018, p. 278–293; M. Węgrzak, *Zasady prawa ochrony dziedzictwa kultury w orzecznictwie sądów administracyjnych*, Gdańsk 2020, p. 164–171.

## Abstract

The Act of June 22, 2017, on the Amendment the Act on the Protection and Preservation of Historical Monuments and Certain Other Acts (Dz.U. 2017, item 1595) equipped the General Conservator of Historical Monuments with new competences, i.e., the right to issue legally binding guidelines and instructions. They serve as conservation policy tools as well as a form of building standards of conservation practice. This article defines the concept of conservation policy, its sources and the way it is created. Also discussed are the tools for implementing this policy, as well as its relationship to broader monument preservation policy and cultural policy. The article discusses the guidelines and instructions issued by the General Conservator of Monuments in 2018–2021, while defining their legal nature as forms of administrative action and their significance for the functioning of the system of monument protection in Poland.

## Streszczenie

Ustawa z 22 czerwca 2017 o zmianie ustawy o ochronie zabytków i opiece nad zabytkami oraz niektórych innych ustaw (Dz.U. 2017, poz. 1595) wyposażała Generalnego Konserwatora Zabytków w nowe kompetencje, polegające na wydawaniu wiążących wytycznych i instrukcji. Stanowią one narzędzie polityki konserwatorskiej, będąc jednocześnie formą budowania standardów postępowania konserwatorskiego. W artykule zdefiniowane zostało pojęcie polityki konserwatorskiej, a także jej źródeł oraz sposobu tworzenia. Omówiono ponadto narzędzia realizacji tej polityki, jak również jej relacji do szerszej rozumianej polityki ochrony zabytków oraz polityki kulturalnej. Artykuł przedstawia wytyczne i instrukcje wydane przez Generalnego Konserwatora Zabytków w latach 2018–2021, jednocześnie określając ich charakter prawny jako formy działania administracji oraz ich znaczenie dla funkcjonowania systemu ochrony zabytków w Polsce.



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## Architectural Heritage Virtual Models in Conservation Practice

### Wirtualne modele dziedzictwa architektonicznego a działalność konserwatorska

**Keywords:** virtual heritage models, hypothetical reconstruction, BIM, HBIM, digital survey, digital heritage, object modeling, semantic modeling

**Słowa kluczowe:** wirtualne modele dziedzictwa, hipotetyczne rekonstrukcje, BIM, HBIM, cyfrowa inwentaryzacja, cyfrowe dziedzictwo, modelowanie obiektowe, modelowanie semantyczne

#### Introduction

Digital models of historical buildings have played a crucial role in studying and protecting architectural heritage for nearly forty years. Their applications and the evaluation of their potential in widely understood conservation have evolved from purely popularization models, through research purposes, to design models. This article presents and discusses applications of architectural heritage digital models in the three above-mentioned main areas of use.

#### Architectural heritage virtual models

The initial interest in creating architectural heritage virtual models dates back to the 1980s. The work of the ABACUS team in Glasgow, under the supervision of Tom Maver, was where the creation of the 3D city model began in 1984.<sup>1</sup> The three-dimensional virtual model for a hypothetical reconstruction of the original Winchester Cathedral performed in 1984–1986 was among the first model activities related to histor-

ic buildings.<sup>2</sup> Also, earlier work related to the Roman Temple of Sulis-Minerva at Bath, from 1983–1984 was among the initial models of such type.<sup>3</sup> These works, particularly the Winchester Cathedral model presented as the animation, gained considerable publicity and resulted in further ambitious projects, such as the reconstruction of Cluny III Abbey under the supervision of Manfred Koob in 1989.<sup>4</sup>

The abovementioned examples (except Virtual Glasgow) were intended to create a visual story about no-longer existing historical buildings. These models served a particular purpose, which was a sequence of illustrations or a film. They were based on architectural, historical, and archaeological knowledge; however, the main scope was heritage popularization.

As available modeling and visualization techniques developed, the reception of the created virtual environments in relation to the simulated historical reality gained importance, both in terms of the presentation methods and the need for accessibility and interoperability of the developed models (also in the long run).<sup>5</sup> Moreover, the potential of these models in knowledge

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codification, space-time presentation, and semantic relations is also indicated.<sup>6</sup>

The creation and usage of digital heritage models pose a significant problem in terms of their reliability and research rigor observance, for instance, in the field of the uncertainty of a visualization or with regards to enriching the models semantically in the historical sources' context.<sup>7</sup> The adopted standards, such as the London Charter,<sup>8</sup> facilitate the preservation of these values, proposing the methods of conduct applied to modeling activities. Adequately prepared and documented digital models can be a valuable research tool.

The potential of digital heritage models can be considered to be the referencing of typological criteria based on the purpose for which the model is created and used. These goals include: popularizing, research, and design (alternatively related to facility management). Another criterion is the modeled object's status, namely whether it still exists or not. As stated above, digital models were initially associated with popularization purposes. They were also related to the reconstruction of no-longer existing objects. In this case, they are commonly referred to as virtual reconstructions. It is worth noting that the adopted terminology, initially based mainly on archeology,<sup>9</sup> may lead to some ambiguity in interpretation. Reconstruction is quite rightly associated with a faithful recreation of a monument. In the case of no-longer existing structures, modeling is based on sources and strongly depends on their quality and credibility; thus, it often refers to interpretation and hypotheses. Therefore, to maintain concept precision, such models should rather be seen as simulations of the past. According to the modeling and simulation theory, the latter is used for experimenting and testing systems that cannot be engaged at a given moment. Indeed, this understanding corresponds to cases of no-longer existing heritage objects, which belong to the past. M. Forte commented on this case: "We do not reconstruct the past anymore; we perform the digital past."<sup>10</sup> As the abovementioned term "reconstruction" is widespread and commonly used, it is probably not worth redefining it, but at the same time we must keep in mind the specificity of such models. To avoid misunderstandings, it is worth considering the term "hypothetical virtual reconstruction," which indicates the supposed nature of the presented solutions. A new quality in creating models of no-longer existing structures is offered by their parameterization, as it enables the dynamic encoding of the model's specific features with the account to the nature of the knowledge. In this way, such reconstructions become full-fledged simulations of the past, which clearly emphasizes their hypothetical nature.<sup>11</sup>

The popularizing and research applications of architectural monuments models (including their hypothetical reconstructions) increasingly refer to the conservation practice following the change of its doctrine. An increasing amount of attention is being paid to public education aspects and information concerning heritage.

In this way, such models may even constitute a requirement for effective action in the field of monument protection. In the light of successive declarations adopted by the ICOMOS and UNESCO, social awareness may be indicated as the essential criterion for the valuation of monuments,<sup>12</sup> whereas the dynamic changes in the surrounding reality require innovative thinking and unconventional actions. Gustavo F. Aroz,<sup>13</sup> the President of ICOMOS, called for such actions in his speech at the Second Congress of Polish Conservators in 2015. This approach applies, for instance, to the reconstruction of monuments damaged as a result of military hostilities. The admissibility of such a reconstruction was indicated in the Dresden Declaration<sup>14</sup> as strongly related to a sustainable sense of identity. Although nearly forty years have passed since the announcement of the abovementioned Declaration, discussions concerning the reconstruction of buildings destroyed during the Second World War are still intense in Poland. However, should these aspirations be interpreted in the light of the social reception of lost heritage, the hypothetical virtual reconstructions may at least partially assume this function, especially in the context of re-evaluations resulting from the pandemic crisis. The ubiquitous mediation of reality through virtual contacts (whatever its assessment as a substitute for direct relations, undoubtedly the technologies related to such communication have become popular and familiar) prompts an outlook on the role of virtual heritage models, particularly hypothetical reconstructions, also in this respect.

The usefulness of virtual (thus, intangible) heritage models in conservation practice is often juxtaposed with the characteristics of traditional conservation, which focus on preserving and protecting historical, physically existing substance. However, it seems that in addition to the abovementioned arguments regarding the public perception of monuments and research potential, other aspects of the evolving conservation doctrine are worth attention as well. Alongside the primary protection of the factual matter, the preservation of a monument's form and spirit should also be considered. Andrzej Tomaszewski discussed the protection issues related to these values and their characteristics.<sup>15</sup> In the case of virtual models, it is challenging to discuss the matter authenticity aspect. However, showing specific intangible values related to a monument may provide a discussion subject, especially regarding disseminating knowledge on heritage. Virtual models are often perceived as determined by characteristics of the digital tools used to create them, which force unambiguous precision and favorize explicit and specific knowledge at the expense of tacit knowledge. This aspect is, in fact, characteristic of the entirety of digital humanities. However, it would be wrong to assume that this "excessive" accuracy and sterility are characteristic exclusively for digital tools. As stated by, for example, Adam Miłobędzki's in 1973 (well before the era of virtual models), "however, it is worth warning against too realistic reconstructions that isolate the object from its

cultural context and its dynamics, thereby presenting architecture 'statically,' in shapes as clean and orderly as if they used to exist in the conditions of utopia.<sup>16</sup> Therefore, this may be a feature of all activities aimed at recreating a no-longer existing condition, whereas appropriate methodology of activities remedies this problem regardless of the tools used.

Digital models are also becoming an increasingly important element of the practice related to the transformation of historical matter and design in the historical context and the active protection of this resource. It happens, among other reasons, thanks to the application of BIM (Building Information Modeling) technology in modeling architectural heritage.

### **Semantically-enriched object modeling**

The application of BIM enables the creation of virtual building models. It also allows for the structuring and integrating of information sources, related data management, and interdisciplinary cooperation.<sup>17</sup> Since a significant part of the current building processes concerns the conservation, repair, and maintenance (CRM) of existing facilities, there is a growing demand for BIM technology development towards the surveying and recording of semantic information. The basis of the HBIM (Historic Building Information Modeling) approach is to determine the value, significance, and currently researched data about the structure under study.<sup>18</sup>

The model and its information are processed at different stages of the project, which allows for the integration of analyses, documentation, verification of existing conditions, technical details concerning the physical building's components, and facility management. At the same time, the BIM model maintains its structure and connections, enabling the elimination of information redundancy. It can also provide the basis for architectural and conservation works, as it may be used to make the right design decisions. Through an integrated system approach, appropriate filtering, and information use, the entire life cycle of a building<sup>19</sup> may be viewed and managed, which is essential for historic buildings.

The use of HBIM in architectural and conservation practice is still under research and experiments related to information techniques development. Among the issues under discussion, the insufficient functionality of BIM processes should be mentioned concerning the demand and the data used in cultural heritage.<sup>20</sup> The majority of the current commercial BIM platforms are based on object-oriented modeling. They use predetermined procedures to combine individual model elements and can be read by other information systems. Parametric information and data beyond the definition of geometry are used to create an object, which is then part of a library on BIM platforms. Libraries of objects, created according to global standards and classification methods, may solve the complexity of recording the historical objects.<sup>21</sup> Thus, such data forms the basis for

the interdisciplinary use of the model.<sup>22</sup> The universal approach to cooperation in BIM is also raised within the open BIM methodology.<sup>23</sup>

Procedural modeling allows creating complex geometric relationships and can be used as a recording and hypotheses testing means. Unlike traditional 3D modeling (MESH – mapping a given object's surface with a polygon mesh and NURBS – curves and surfaces created using control points), object libraries use variable parameters to define the volumetric properties of components, thereby simulating various assumptions in real-time. Parametric objects can be interpreted and transformed at a given detail level based on specific architectural analyses and studies.<sup>24</sup> Issues related to modeling with standards of detailedness were covered by R. Bruman.<sup>25</sup>

The complete mapping of the detailedness, heterogeneity, and variability of historical buildings over time is often impossible, despite the potential of predefined objects. Therefore, the models are significantly simplified in terms of visualizing reality and challenges appear regarding the reliability, quality, and understanding of data.<sup>26</sup> Research conducted under the DURAARK project<sup>27</sup> indicates that by enriching a BIM model with semantic information, the need for detailed geometry modeling may be reduced. Classification and assigning additional properties in HBIM enables evaluation at the level of individual elements by defining functions, determining the structure, assigning meaning, or linking external sources. Moreover, semantic enrichment allows for combining various heterogeneous sources, including historical data and conservation valorization.<sup>28</sup> J. Plume described the model created in this way as an Integrated Digitally-Enabled Environment (IDEE),<sup>29</sup> which can be used to understand the studied place fully, popularize knowledge and make the right design decisions.

### **An example of the HBIM model based on laser scanning of the Sztorch Tenement in Jarosław**

The study of the Sztorch Tenement in Jarosław provides an example of the potential of semantically-enriched object modeling. The building is subject to conservation protection based on an entry in the register of monuments No. A-850 of April 9, 1997. The building was erected at the beginning of the twentieth century (around 1910), and its technical condition was described as good. In the post-war period, the tenement was renovated several times. Currently, only a small percentage of the plaster in the lower parts of the facade is damaged. According to the monument's record sheet,<sup>30</sup> the most critical conservation postulates include the preservation of the facade décor and maintaining the body of the tenement house. Hence, the described model puts the most significant emphasis on the exact reproduction of these aspects.

The laser scanning method and photogrammetry were used to prepare the digital building survey of the



Fig. 1. Comparison of archive photo with the scanning data and HBIM model, from left to right: archival photo, laser scan, linear model view, visualization, photo source: Registration card of architectural and construction monuments no. A-850; by the authors.

Ryc. 1. Porównanie fotografii archiwalnej z danymi ze skanu i z modelu HBIM, od lewej do prawej: fotografia archiwalna, skan laserowy, model linearny, widok, wizualizacja, źródło: karta rejestracyjna zabytku architektury i budownictwa nr A-850; oprac. autorzy.

Sztorch Tenement. The obtained data was then used to create a highly detailed HBIM model (Fig. 1). It is crucial to plan measurement data acquisition and prioritization<sup>31</sup> when measuring monuments, as it helps determine the number of parameters necessary for registration. The constant development of laser scanners accounts for a reasonable compromise between the high accuracy of the record required in the case of works on the monument and the time spent making a model. Laser scanning extended by photogrammetry allows mapping reality at a very high level of detail (Fig. 2). This data provides the basis for creating 3D models filled with information. Thanks to the orthophotos recorded in color, it is possible to precisely visualize the object already at the stage of its survey. Such visualization can provide the desired amount of information to both an expert and a layman.

The point cloud database consists of combining the total data obtained from the laser scanner stations. Purging the object of undesirable elements (measurement errors, e.g., a reflection of the beam from glossy surfaces) constitutes an element of the process. Then, successive iterations of the point cloud are optimized for data size. The processing of point clouds is culminated by linking them to the BIM environment. Creating BIM models using point clouds helps to minimize the number of steps taken while inventorying an object and avoid losing accuracy, data quality, and mapping detail. Another advantage of this modeling method lies in the possibility of integration with other information systems, such as the GIS (Geographic Information System) environment or external databases.

For models of high visual quality (as in the case described), properly collected data is used to create com-



Fig. 2. Elevation view with sgraffito mapped using photogrammetry, against the background of a snapshot view of a model with a point cloud as a base; by the authors.

Ryc. 2. Widok elewacji ze sgraffito zmapowanym przy użyciu fotogrametrii, na tle widoku modelu wykonanego na podstawie chmury punktów; oprac. autorzy.



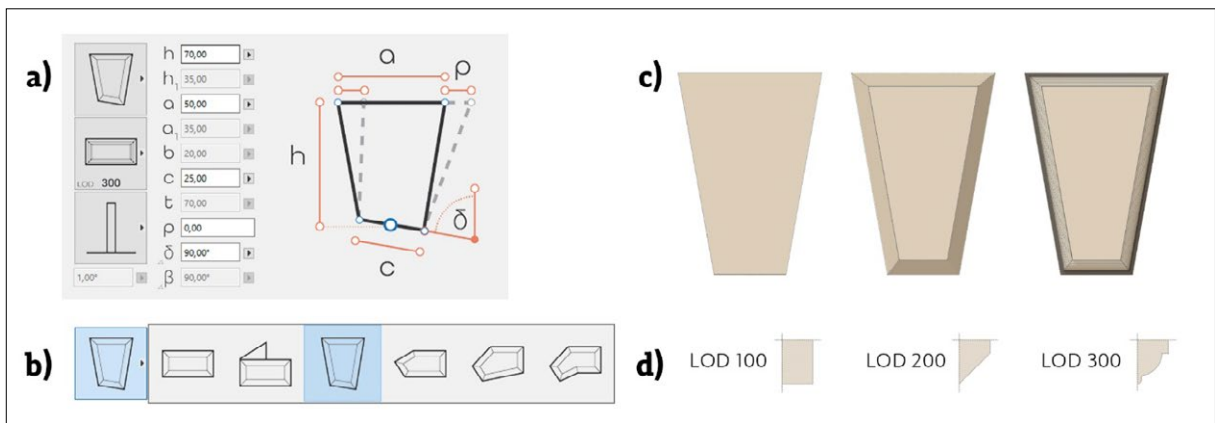


Fig. 3. A parametric object used to create rustication, developed for the project's purpose: a— interface for entering detailed dimensions of the element in the form of parameters, b—possibility of creating various shapes using a single object, c—possibility of changing the element's detailedness level depending on the needs, d—edge profile automatically adjusted to the detailedness level; by the authors.  
 Ryc. 3. Obiekt parametryczny użyty do wykonania boniowania, stworzony na potrzeby projektu: a – interfejs do wprowadzania wymiarów szczególnych w postaci parametrów, b – możliwość tworzenia różnych kształtów przy pomocy pojedynczego obiektu, c – możliwość zmiany poziomu szczegółowości w zależności od potrzeb, d – profil krawędzi automatycznie dostosowany do poziomu szczegółowości; oprac. autorzy.

plex library objects. The process of the HBIM model creation, in this case also a possibly complete data repository, has been automated by using object-oriented modeling. Thanks to the possibility of projecting the point cloud in each generated view (floor plans, elevations, sections, and 3D views) and modeling with BIM building objects (such as walls, columns, or windows) could be practical and precise. In the Sztorch modeling process, both the objects existing in the software library and the proprietary ones (Fig. 3) were used in the case of atypical elements or items requiring a higher level of detail. They were created using GDL (Geometric Description Language – ArchiCAD programming language) and Grasshopper visual programming to create variable library elements that constitute a parameterized object-oriented representation of scanning measurements.

The model elements were enriched with semantics, color-related information, and historical data combined with archival drawings and photos. Based on such entered data, it is possible to manage the facility and plan future activities for the monument. A virtual building may enable a wide range of analyzes regarding the geometry of a tenement house itself. It also contains data from archival documentation and publications, such as descriptive or photographic information. With the use of this data, the geometry of the elements may be enriched or recreated (Fig. 4). It becomes possible to valorize it properly, mark its authenticity, modifications, defects, or missing and damaged elements (Fig. 5). The semantic data used in this case can also be applied to aid the initial determination of construction parameters (e.g., wall bearing

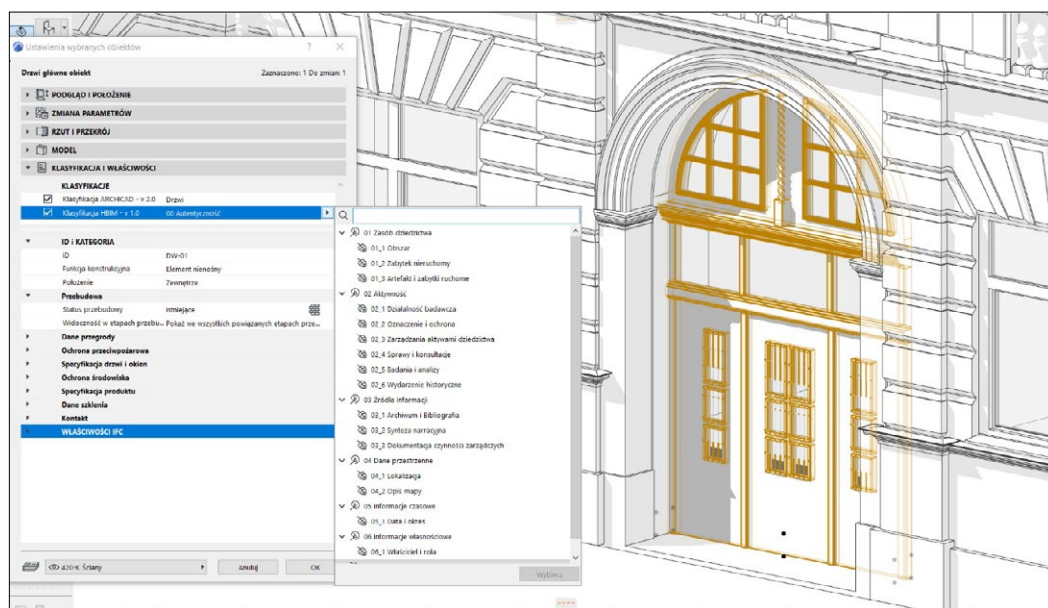


Fig. 4. Overview of the classification and historical properties of the modeled library element; by the authors.  
 Ryc. 4. Przegląd klasyfikacji i cech historycznych zamodelowanego elementu bibliotecznego; oprac. autorzy.



Fig. 5. Example of the possibility of filtering and visualizing information in the context of conservation valorization; by the authors.  
Ryc. 5. Przykład możliwości filtrowania i wizualizowania informacji w kontekście waloryzacji konserwatorskiej; oprac. autorzy.

capacity) if this is impossible based on geometric representation alone.

This contextual set of information can be linked to a specific element, such as using a CDE (Common Data Environment) platform and used for the subsequent management of the monument. Thus, the HBIM model is a comprehensive interdisciplinary data environment of particular use in conservation design. However, it can also be applied during the building's occupancy, including ongoing maintenance works.

As a result, an HBIM model was obtained with precise spatial dimensions, parameterized as efficiently as possible (with elements such as walls, windows, ceilings, details of cornices). Rather than being only a record of geometry, these objects carry material and physical properties, defined at the classifying and defining stage of each objects' properties. Hence, the applied software can identify a specific geometry (modeled window or wall) within object specifications created for selected parameters. In the case of HBIM modeling, the classification of historical and conservation aspects is particularly extensive, as it comprises information on such aspects as the state of preservation, integrity, or individual element dating.

The issue of interoperability arises when data is used multiple times in various systems. As it is possible to exchange data and use open formats (such as IFC – Industry Foundation Classes), each subsequent user will not be confined to specific software to view the properties and classification of objects. It also enables long-term model development with geometric and semantic data, enriching it with new information, for example, data obtained as a result of further research.

As the semantic data is present in the classification and properties, integrated HBIM models facilitate effective conservation and design analysis (Fig. 5), facility

management (thanks to the CDE platform mentioned above), and heritage popularization. Above all, modeling the monument information is characterized by a high detailedness of geometric and semantic information. This facilitates substantively appropriate and effective implementation of the design process and the precise planning and management of the various stages in conservation design.

### Conclusion

Architectural heritage models may constitute a source database for the potential transformation of historical substance and active protection of this resource. Understanding the examined object, together with planning and managing design works, is likely accelerated and facilitated by integrating semantic information with parameterized 3D geometry. The integrated HBIM digital environment enables flexible modification and application of related resources, supporting the monument's protection in popularization, research, design, and documentation.

It should be emphasized that the documentation activities are in line with Andrzej Tomaszewski's predictions. As he stated in 1997, "Apart from preventive and integrated maintenance, the future of our discipline will be determined by conservation through documentation."<sup>32</sup> In a broader sense, this documentation can also be applied to virtual models, i.e., hypothetical reconstructions, being research tools.<sup>33</sup>

In architecture and conservation, HBIM models offer a new quality and allow the multi-faceted integration of activities and information in the design process. As such, the models require further research and discussion on developing information exchange standards and methods.

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## Abstract

The article presents the issues concerning architectural heritage digital models' applications in conservation practice. These considerations are discussed in the context of the commencement of creating virtual models regarding no-longer existing historical buildings in the first half of the 1980s. Such models' applications and possible uses are analyzed within the adopted criteria that distinguish the following model types. Firstly, the popularization, research, and design models can be determined depending on the planned application. Secondly, depending on the status of the modeled object, models related to existing or no-longer existing buildings can be identified. The virtual models potential in the context of cultural heritage societal values is also discussed in the article. In such context, the authors discuss the creation of HBIM (Historic Building Information Modeling) models for the conservation activities purposes. The potential of semantically enriched object modeling is indicated based on the example of the Sztorch Tenement in Jarosław, for which a laser scan and its model were prepared.

## Streszczenie

Artykuł przedstawia problematykę zastosowań cyfrowych modeli dziedzictwa architektonicznego w kontekście działalności konserwatorskiej. Jako tło rozważań przedstawione zostały początki tworzenia wirtualnych modeli nieistniejących budowli historycznych, sięgające pierwszej połowy lat osiemdziesiątych XX wieku. Zastosowanie i możliwości wykorzystania takich modeli analizowane są w ramach przyjętych kryteriów wyróżniających ich rodzaje: w zależności od planowanego zastosowania modelu – popularyzatorskiego, badawczego, projektowego oraz w zależności od statusu modelowanego obiektu – istniejący bądź nieistniejący. W tekście omówiono także potencjał wirtualnych modeli w kontekście społecznych wartości dziedzictwa oraz tematykę tworzenia modeli w technologii HBIM (Historic Building Information Modeling) na potrzeby działań konserwatorskich. Na przykładzie Kamienicy Sztorcha w Jarosławiu, dla której wykonany został skan laserowy obiektu oraz jego model, wskazano potencjał modelowania obiektowego wzbogaconego semantycznie.

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## The Aesthetic Geometry of Holy Places: A Case Study of Intrinsic Relations through Traces

### Estetyczna geometria miejsc świętych – wewnętrzne relacje poprzez odwzorowania

**Keywords:** architectural proportions, heritage, church, traces, metric relations, geometry, measurements, architectural research, Gothic architecture, Gothic aesthetic, Santos Juanes (Valencia, Spain)

**Słowa kluczowe:** proporcje architektoniczne, dziedzictwo, kościół, odwzorowania, relacje modularne, geometria, pomiary, badania architektoniczne, architektura gotycka, estetyka gotycka, Santos Juanes (Walencja, Hiszpania)

#### Introduction

Heritage of such importance as that of the Santos Juanes Church in Valencia, Spain, awakens a myriad of questions jealously hidden behind the masonry of a building with more than 700 years of history.

The building, located in the Ciutat Vella district, is one of the most important religious spaces in the city. However, when entering its interior, the last thing imagined is that the building was erected according to pre-established geometric relations in both plan and elevation terms. Merely contemplating its architectural space does not suffice to intuit the existence of the mathematical reason behind the building's constructive "magister operis."<sup>1</sup>

For this reason, and without leaving aside the other peculiarities that have occurred to the building, which largely define its current personality, this work aims to explore the features defining its character, configuration and aesthetics. These features were the basis of its construction, and are fundamental to undertake any heritage intervention today.

In order to examine the harmonic relations between the different compositional elements that make up the architectural space, and beyond a simple visual analysis, a study based on the planimetric drawings of the building is much more appropriate. However, this is not a matter of the drawings and layouts, as we understand them today, rather representations of the plan and elevation of the fundamental parts required for construction.

Therefore, given the widespread nature of the compositional solution chosen, and used in the Santos Juanes Church and other contemporary works, this work aims to analyze the geometric relations on which the construction of this church was based. This research work was carried out by measuring the building itself, reading the construction principles, and establishing the thresholds that rationalized them and guided the construction process.

However, this work would not have been possible without the help of the research works conducted by prestigious scholars of medieval design: a design based entirely on drawing, as a fundamental tool in the build-

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Fig. 1. Santos Juanes Church, floor plan with wall layers in chronological order (upper legend); and descriptions of distinctive structural elements (bottom legend); by the authors.

Ryc. 1. Kościół Santos Juanes: rzut z warstwami ścian w porządku chronologicznym (górną legendą), opisy charakterystycznych elementów konstrukcyjnych (dolną legendą); oprac. autorzy.

ing's compositional ideation process, which shapes the building's aesthetics, as we know it today.

### The church's historic-constructive evolution

The history of the Santos Juanes Church in Valencia is long. The original church was founded during Reconquest period outside the city's walled enclosure and next to one of the gates to the city, La Boatella. However, this original hermitage was burnt down in 1311, when building the new church on the site where the church we know stands today was decided. This new construction was built in line with the Catalan Gothic style with a single nave and a magnificent, large light vault. At this time, and as Galarza reported, the floor plan consisted of five modules and a straight apse without a front door or a communion chapel.<sup>2</sup> The adopted solution was typical of the churches of that period. Figure 1 shows the chronological evolution of the church's construction.

In 1592, as indicated by Gil Gay in the book *Memories of the Vicaria*, the church suffered a second fire that completely destroyed the front of the church.<sup>3</sup> This fact would not only involve the rehabilitation of damaged parts, but also the enormous rebuilding and transformation of the church. The original building was extended by one module and a hexagonal apse was added to the posterior facade. Moreover, this intervention was also characterized by the emergence of a new artistic trend: the Baroque. Its influence led to most churches being completely transformed by adapting the initial Gothic complex to the aesthetics of that time. At the Santos Juanes Church in Valencia, this fact left the

Gothic ensemble barely visible on the outside because it was very much hidden inside.

Of the first exterior transformations that the church underwent to adapt it to the new style, we highlight the construction of the facade over the Market Square. At that time, this facade hardly featured any ornamentation. This new element was built to open up and show the presence of the church to an urban environment dominated by the Lonja (Silk Exchange) since its construction in the fifteenth century. For this reason, and given its lack of functionality, and its meaningless accesses service spaces, and this element was created for the sole purpose of showing and maintaining the importance that Santos Juanes had until that time in the aforementioned square and its neighborhood.

In the seventeenth century, the last body was added to the building: the Communion Chapel (Fig. 1). Its construction focused on the construction treaties of that time, guidelines that came about to solve specific construction problems, such as damp and humidity, and the proposed measures to solve them. It was built between 1644 and 1653 after expropriating several annexed houses.<sup>4</sup> This represented a significant change in the proportions that had been maintained since the times of the original church.<sup>5</sup> For this reason, this volume is not included in this analysis. Also in the seventeenth century, the body of the bell tower was built over the original lateral chapel. A Baroque vault was also built at this time in the central nave, in addition to the ones in the side chapels that obscured the original Gothic structure. Finally, the *porxets*, or porches, were built.

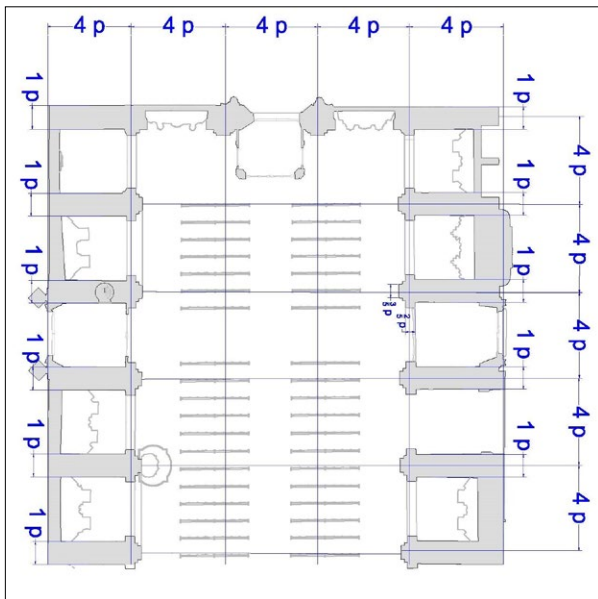


Fig. 2. Modulation of the Santos Juanes Church's original plan; by the authors.

Ryc. 2. Modulacja pierwotnego rzutu kościoła Santos Juanes; oprac. autorzy.

### Composition and architectural measurements

The difficulty in obtaining the original Santos Juanes Church traces, as in other cases, is preceded by two facts: lack of knowledge about the architect because no documents exist; and the many changes that it has undergone.<sup>6</sup> However, thanks to the obtained graphic documentation and the building's construction analysis, we carried out a study of the building's traces. This analysis allowed us to obtain the traces used to construct the church, and to gain insight into its intrinsic properties, which are of vital importance to understand its aesthetics and its current *raison d'être*. The study was conducted according to the following working hypotheses: directly measuring the building itself, reading the construction principles, and having to establish thresholds that rationalize them and that had guided the execution process.

The study of the traces focused on defining the original building design that the master builder or architect had followed.<sup>7</sup> To this end, this work considered the compositional and spatial organizational schemes of the geometric system in the proportions assumedly used. In addition, it took into account the intrinsic geometric shapes that defined its origin.<sup>8</sup> In this way, the used method followed the guidelines set by the historic context of that period, which was essential for establishing the architectural reasons applied by the master builder. Then we applied the same resources that were used and adopted in the established compositional processes of that time.<sup>9</sup>

The process involved searching for the traces that defined the church based on studying treatises, together with analyzing the geometric figures applicable to the obtained graphic documentation that, in this case, came from a laser scan of the building. In this way, the meth-

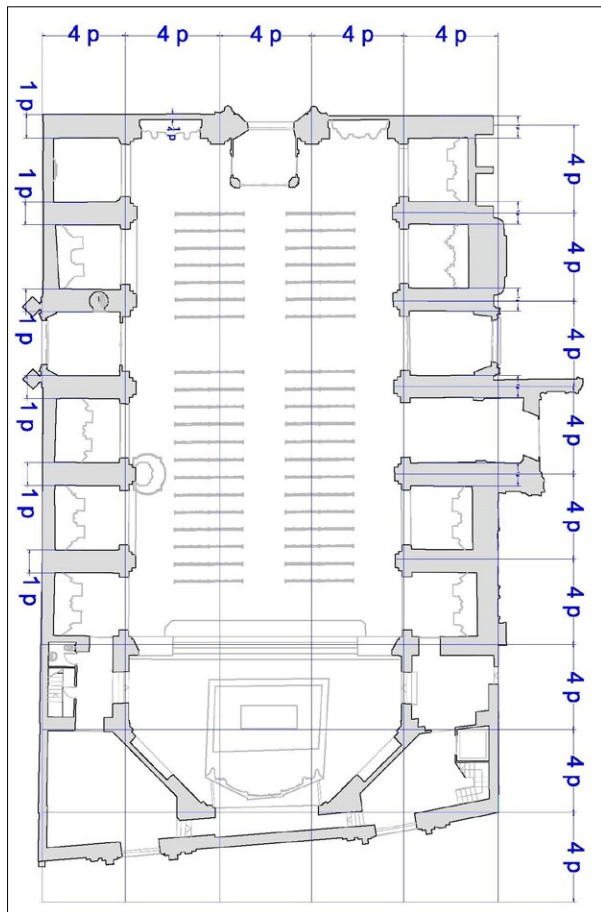


Fig. 3. Modulation of the current main Santos Juanes Church body; by the authors.

Ryc. 3. Modulacja stanu współczesnego głównej bryły kościoła Santos Juanes; oprac. autorzy.

od focused on the guidelines set by the most important ancient and medieval treatises. The interpretation of one of the most important treatises in architecture, Vitruvius' treatise, was fundamental.<sup>10</sup> Vitruvius reflected the fundamental principles of constructions of ancient times. Based on this, the present work sought the common premises of the Santos Juanes Church with the guidelines proposed in it by comparing them to other similar studies performed in churches and basilicas.

Vitruvius's treatise collected and analyzed the architectural concepts of the theory of proportion, which served as a guide in this research work; e.g.: *ordinatio*, *dispositio*, *symmetria*, *eurythmia*, and *decor*.<sup>11</sup> These criteria marked the analysis and justified its conclusions. For this reason, the description of each concept proposed by Vitruvius was essential to understanding the analysis. The first of these, *ordinatio*, refers to the search for the right size, construction based on a specific modulation that facilitates the temple's architectural development by offering canons of the correct proportion between different building parts.

*Compositio*. Although it was not explicitly mentioned in the treatise, it is constantly referred to in several of its books about the search for the proportion of architectural pieces. Accordingly, Vitruvius proposed taking



a module from the base of the temple as a reference to serve as the basis for the temple's composition.<sup>12</sup>

"Composition arises from symmetry and this from the proportion of reason (quotient)."<sup>13</sup>

Vitruvius defined *dispositio* as the set of ideas based on the geometric explanations and reasons that determine a building's intrinsic relations, understood as a project. Similarly, he defined *eurythmia* as follows: "*Eurythmia* is the beautiful and pleasant aspect that results from the arrangement of all the parts of the work, such as the correspondence between height and width and length so that the whole has the proper proportions."<sup>14</sup>

As its name suggests, *decor* is translated as the adaptation of form to function, understood as that which follows the customs of the construction site.

The different concepts presented by Vitruvius define some of the characteristic guidelines of constructions of that time. These terms, which he analyzed in his books, allowed us to gain insight into and understand the reasons behind the constructive solutions of many historic heritage buildings that we know today.<sup>15</sup> Therefore, based on these established guidelines, the research in this work focused on two clearly marked lines: studying the measurement system and studying the temple's geometric system. The aim was to obtain as much data as possible about its construction relations in an attempt to discern the reasons for its origin by highlighting the initial premises that shaped the temple, which should be the basis for future interventions.

### Studying the measurement system

Before beginning a more detailed study of the church's measurements, a more specific analysis of the systems used at the time it was constructed was performed. To do so, we had to go back to the fourteenth century when, according to all the hypotheses, construction on the church began. In this century and later, and mainly because available means were scarce, a different measurement system was applied to the current one. Consequently, the first proposition was to know the followed system according to the location, specifically in the area where the church is located in Valencia (Spain).

The measurements taken mainly as a basis for constructions during this period did not date to the fourteenth century; instead these systems had been used since the times of the Roman Empire. Their evolution was constant and resulted in many variants depending on geographical location.<sup>16</sup> Although different procedures were followed, there were similarities between them. The importance of the location of the applied system should be emphasized. In Valencia, the measurement system set at that time, used as a reference for construction, was *vara* or *alna*, *palmo* and *codó*. The characteristics of these measurements had certain limitations and, consequently, they could not be used for large-scale measurements, such as air, land and sea, which had a different measurement system. However, it is not relevant for this work.

Table 1 shows the most significant measures applied at the time the Santos Juanes Church was built and their current equivalence.<sup>17</sup>

Table 1. The units of measurement used in Valencia and their equivalents in the international metric system, by the authors.

| Unit of measurement    | Equivalent |                             |
|------------------------|------------|-----------------------------|
| Valencian Vara         | 0.91 m     | 3 feet = 4 Valencian palmos |
| Pie (foot)             | 0.30 m     | 1/3 Vara                    |
| Valencian palmo (span) | 0.23 m     | 1/4 Vara                    |
| Codo (ell)             | 0.45 m     |                             |

Knowing these equivalences, and according to the graphic documentation of the laser scan carried out inside the temple, their correspondence to the existing reality in the Santos Juanes Church was analyzed.<sup>18</sup> To modulate the temple's traces, researchers accepted a maximum 1% error and not exceeding 10 cm. A tolerable error of 5 mm was considered for those lower than this 1%.

Based on this, and to make the study as complete as possible, a decision was made to carry out a measurement study of two different plans: an original first plan and the current plan that has undergone modifications and extensions. For this approach, it was essential to analyze the layout corresponding to the original one (Fig. 2), and to subsequently study the current plan to find out its possible subsequent evolution. For this reason, and to gain a better understanding of the measurement system applied, Vitruvius's contributions had to be applied again. In them, he affirmed that the module to obtain the ground plan traces must equal the diameter of the column of the temple's central structure, and its height will depend on the building's intercolumniation.

At the Santos Juanes Church, the plan follows a clear modulation of four spans.<sup>19</sup> Its module is the equivalent to 1.38 m in the current metric system. It corresponds to the construction base of the longitudinal and transversal design of the lateral chapels. This module is repeated five times in both length and width to form the central nave and to define what is considered to be the church's first layout. This confirms that the module repeated in the original plan coincided with the column's diameter, as Vitruvius pointed out, to seek symmetry in both directions.

In order to check whether the subsequent building extensions faithfully followed the original modulation, the researchers repeated this module on the current floor plan. For the first extension of the plan carried out years later, the module in the original one was used to build it (see Fig. 3). The last side chapel and the hexagonal apse that we know today were built as a part of this extension.

On the contrary, the subsequent extensions did not follow a fixed pattern. These include the construction of the facade over Market Street, which was added centuries later. Maintaining the established

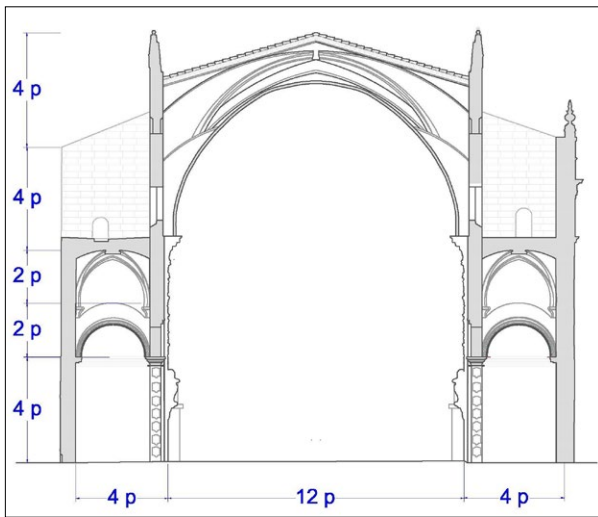


Fig. 4. Cross-section of the Santos Juanes Church displaying modular relations; by the authors.  
Ryc. 4. Przekrój kościoła Santos Juanes przedstawiający relacje modułarne; oprac. autorzy.

modulation was not a concern, but highlighting its urban character and its presence in the square was. Similarly, the Communion Chapel, which was the result of purchasing adjoining houses/dwellings, does not match any pattern with the original one. This is due to the concern for isolating the building from the other blocks rather than following the planned growth patterns. Thus, the modulation is located on the longitudinal facades and the front wall of the apse if we consider that this perimeter corresponds to the original building and its first extension built some years later. This area corresponds consistently with the Gothic part of the church.

However, according to Vitruvius, not only does the plan have to comply with the premises set out in proportion and symmetry terms, but also the cross-section has to clearly correspond to it. The same modules reflect this correlation in the section system of the ground plan employed (Fig. 4). The first module (4 p) marks the beginning of the arches in the lateral chapels. At that time, they firstly showed Baroque arches, and not the original Gothic ones. Hence, it is interesting to note that

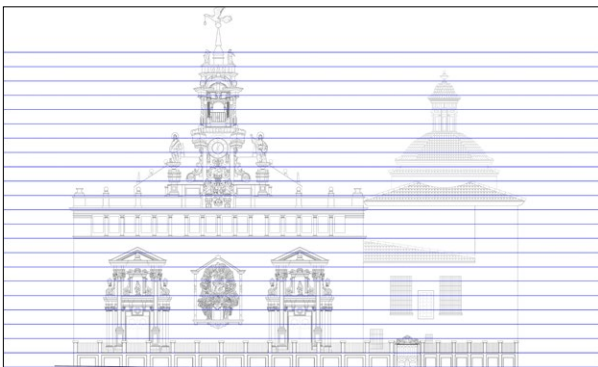


Fig. 6. Modulation of the elevation facing the Market Square; by the authors.  
Ryc. 6. Modulacja elewacji od strony rynku; oprac. autorzy.

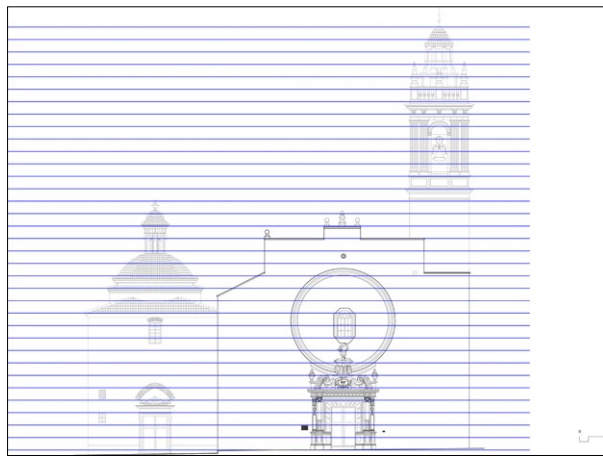


Fig. 5. Modulation of the elevation facing the San Juan Cemetery Square; below: modulation detail in the walled rose window; by the authors.  
Ryc. 5. Modulacja elewacji od strony placu Cmentarza San Juan, poniżej: modulacja detali w rozecie; oprac. autorzy.

these arches comply with the modulation set out so far in advance of their construction. This fact denotes the importance of this construction system and how, in later interventions, it was taken advantage of, by respecting them as much as possible, and maintaining them even at completely different times three centuries later.

The second module is drawn in two parts to improve its understanding. This is due to the interest in highlighting two clearly modulated parts. On the one hand, the first half defines the start of the Gothic arches of the chapels and (2 p), on the other hand, the second half coincides with the keystone or the highest arch point (2 p). The last two upper modules of the section also reflect important information. The third indicates the height of buttresses, and the last denotes the church's total height in the central nave. Both have a modulation of 4 spans (4 p).

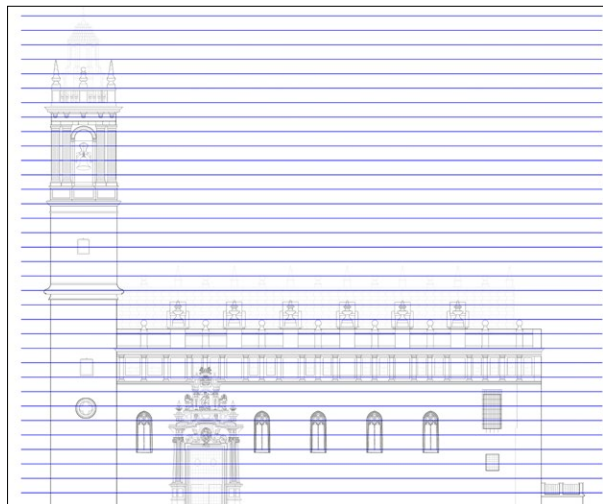


Fig. 7. Modulation of the elevation facing Calle del Peso de la Paja; by the authors.  
Fig. 7. Modulacja elewacji od strony Calle del Peso de la Paja; oprac. autorzy.

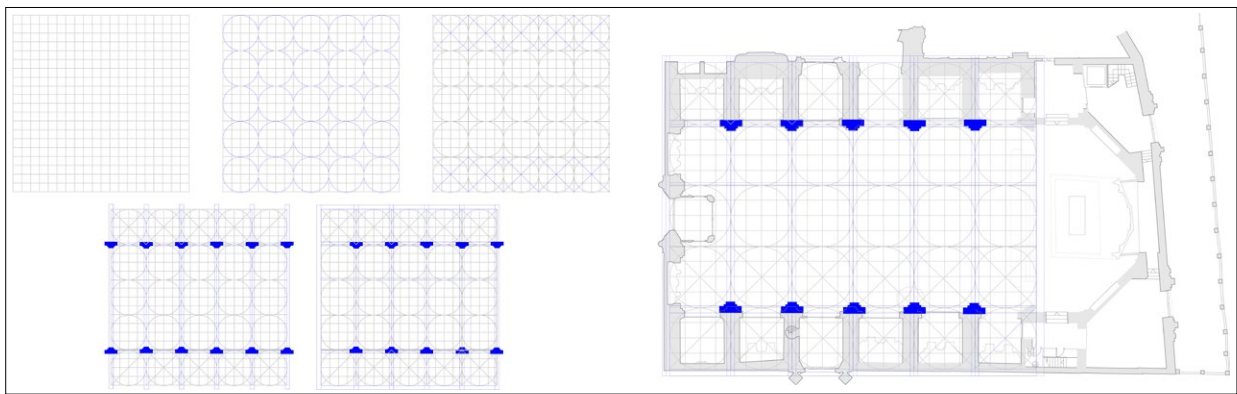


Fig. 8. M steps proposed to obtain the geometric layout; by the authors.

Ryc. 8. M kroków mających odtworzyć układ geometryczny; oprac. autorzy.

It is also interesting to study elevations to search for the unity of the architectural ensemble. Of them, the elevation of the facade facing the San Juan Cemetery Square, located at the foot of the church, is that which has undergone the fewest interventions throughout its history. So it perfectly complies with the established modular grid of 1 Valencian span, i.e., 1 p (see Fig. 5). We highlighted the height of the door, the lintel, the window where the famous Santos Juanes “O” is (a walled rose window),<sup>20</sup> the total facade height and, surprisingly, the height of the bell tower, whose construction is dated to after the original structure. Also shown in figure 5 is the walled rose window, which also follows the 1 p modular grid, with a total height of 8 Valencian spans (8 p).

Similarly, the elevation facing the Market Square (Fig. 6), located at the head of the church, once again follows the pre-established constructive modularity. Once more, it marks most of the heights of the key elevation points but, as discussed in Section 2, this was done later.

The same operation was repeated in the two remaining elevations. However, unlike the previous ones, these two elevations have undergone the most modifications throughout the church’s history. That corresponding to the Communion Chapel was built later and, given its sobriety, did not allow any clear conclusions to be reached. It is impossible to state when it was built exactly, and whether the master builder applied the pattern that is followed throughout the temple.

Despite undergoing numerous modifications, in the elevation facing Calle del Peso de la Paja (shown in Fig. 7), the height of the facade, the door, and that of the most important parts of the bell tower, all coincide with the proposed modulation. Once again, the results showed the importance of the grid, which was even respected in later constructions.

### Geometric study

Having verified the existence of a measurement system, this section aims to develop the binding geometric system that was taken into account in both the con-

ception and execution of the building. Authors from this period felt that this system was more successful, and more accurate than the metric one. This is because the system relies on some known basic figures, which facilitate the unification of criteria and allow disparate measurements to be ruled out according to the geographical location where the temple was built.

The procedure focuses on obtaining a regulatory layout based on composition and design through easily describable architectural figures. Its application provides the location of the singular points and its layout of the temple. The most frequent shapes are defined by simple figures, such as square, circle, triangle, etc. Employing simple instruments, which were the only ones available at the time, facilitated using this elementary configuration to trace or measure them. Of these, we find measuring stick, square, compass and surveyor’s chain, of which the last one was employed to define rooms.

Of all the architectural figures, square is considered to be the most important form, and cube or hexahedron derives from it. When these last two figures overlap the circle, the ratio between their diameters defines wall thickness or the area of interior spaces. It consists of intentional and logical beauty, in addition to the practicality that its implementation offers as it can be easily drawn with a string or compass. The circle and arches of the circle, used mainly for the formation of the ribbed vaults and ornamentation, are drawn based on previous ones, and are one of the most widely used figures.<sup>21</sup>

However, the main advantage of this system is the ease with which simple geometric figures could be dealt with without having to possess extensive mathematical and drawing knowledge. It is a much simpler method than the metric one and is perfectly applicable as a basis for laying out and constructing the church. Consequently, a detailed study of the ground plan was carried out by checking the geometric relation of the different parts of its layout to the basic proposed figures. As in the previous case, we first analyzed the ground plan and then examined the section to extract as much information as possible about the construction guidelines

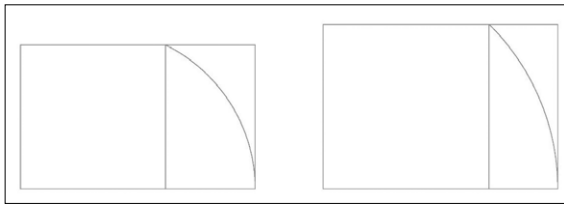


Fig. 9. Representation of the auron and the diagon; by the authors.  
Ryc. 9. Przedstawienie auronu i diagonu; oprac. autorzy.

that were followed to build the church. Figure 8 shows the hypothesis put forward about the possible geometric traces, which could have been carried out to design the ground plan of the Santos Juanes Church. It shows the steps followed during its evolution until the overall layout was obtained.<sup>22</sup>

This study was only done on the original church floor, which responds to the original temple layout. However as the measurement analysis showed, the church faithfully follows this regulatory layout up to the apse, which was added a few years later during the first extension. Therefore, the geometric study was carried out using a grid with the module obtained from the measurement study. This led us to think that the first layout could have been done on a square, typical of Reconquest churches, and could correspond to the ratio of  $\sqrt{2}$ .

The second layout corresponds to the layout of a series of circles that are circumscribed within 25 squares. This responds to a modulus of five by five. If the diagonals are drawn in the respective squares, they delimit the side chapels. In addition, the meeting points of the diagonals mark the central point of the axis of the main structure's pilasters. Similarly, the band corresponding to the church pillars coincides with the outer façade limit by outwardly tracing a module. Finally, the layout overlaps the general plan to include all the steps carried out in a single hypothesis.

Having obtained the general lines that would define the hypothetical geometric layout in the plan, and to verify the relation of the patterns followed throughout the building as a whole, all that remained was to analyze their correspondence in the elevation. To establish the bases that could form it, the harmonic development of the base geometry had to be known, as shown in Figure 9: the *auron* and the *diagon*.<sup>23</sup>

With these geometric patterns, and given the basis of the layout of most churches from that period, this research work verified their coincidence with the Santos Juanes Church. Figure 10 shows a section in which the *diagon* and the *auron* coincide with the temple's central nave width. The height of the *diagon* defines the start of the Gothic arches of the central nave and the *auron* defines the keystone of the Gothic structure of the chapels. In addition, if three circles with the same diameter as the plan's traces are arranged on the plane that defines the *diagon*, the tangent point between the central one and the two lateral ones marks the center of the arch that defines the pointed shape of the sash arches (barrel arches).

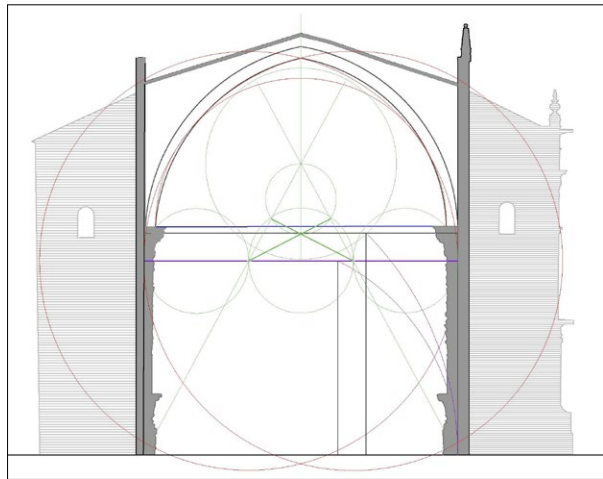


Fig. 10. Geometric cross-section of the Santos Juanes Church; by the authors.  
Ryc. 10. Przekrój geometryczny kościoła Santos Juanes; oprac. autorzy.

However, the current church view hides this original main nave structure under a Baroque vault. To build this Baroque vault, the original Gothic structure was used by anchoring it to the sash arches and resolving the upper meeting with an oval shape. Once again, the original geometric system was used as a basis for finishing the baroque vault. To execute the oval shape of the upper finish, the point that resulted from the intersection of the diagonals that originated at the central nave ends, by passing through the tangent of these first three defined circles, was utilized. In turn, these diagonals were in charge of defining the two points of tangency of the original layout with the baroque oval finish.

Finally, both the measurement and geometric study reflect the search for common proportions throughout the building to achieve a common whole through the temple's traces. In both systems, there is a latent concern to find and indicate the critical and important points based on an established pattern by bearing in mind the five premises established by Vitruvius to achieve highly desired beauty.

From the constructive point of view, this analysis showed the existence of an original, clear layout, composed of a 5x5 modulation, which corroborated the premises set out in Section 2. However, it also demonstrated that the first extension followed the same growth pattern as the original building, at least up to the apse, which denotes the relevance of these systems as the basis for correctly executing the buildings of that period. To a certain extent, the Baroque transformation also centered the layout and position of the new churches' singular points on these geometric patterns.

## Conclusions

By taking the Santos Juanes Church in Valencia, Spain, as an example, whose construction was carried out during the Gothic period, this work shows a methodolo-

gy to study the traces and proportions of temples. The proposed methodology considers that the preserved information on this regard is practically non-existent. For this reason, the researchers propose a systematic method of analyzing traces by two studies: the measurement system of the temple and the geometric system of traces.

The measurement study defines the proportion and area of the original plan by corroborating that it fulfils the hypotheses set out at the beginning. In this way, it is possible to verify the symmetric modulation in both directions, defined as spans, whose pattern coincides with the width of columns as indicated by Vitruvius. It also verifies that the first church extension was built based on the original modulation. Thanks to this, its scope can be determined, which includes the construction of another identical module to previous ones and walls delimiting the apse.

Furthermore, this research corroborates a direct relation in terms of the measurements of the ground plan, the section and elevations. It verifies that the pattern established for the plan vertically defines the most important points of the church: the start and keystone of the Gothic arches of the lateral chapels, the height of

the buttress, and the total church height. In the section, the height of doors and the total facade height; in elevations, the most relevant parts of the bell tower.

Geometrically, the church follows the guidelines established for other Reconquest churches. Thus, its ground plan perfectly defines the shape and dimensions of the central nave and side chapels. Likewise, it verifies that the temple's section has a geometric relation in defining the elements composing it. The *auron* and the *diagon* mainly define the start of the transverse arches and the center of their layout. The application of modern technologies will allow the formulation of precise research hypotheses and a more in-depth understanding of historical construction techniques. This study can serve as a confirmation of the mastery of historical masters.<sup>24</sup>

These conclusions demonstrate the vast importance of these systems for construction projects at that time, to the extent of them acting as a basis for later extensions or transformations, which is what occurred at the Santos Juanes Church in Valencia. In this way, these studies prove their correspondence with the construction elements executed during the Baroque period, such as the vaults of side chapels and the upper oval top of the central vault.

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## Abstract

The Santos Juanes Church in Valencia, Spain, is one of the most important religious buildings in the city. Based on this church, this work proposes an analysis that can be extrapolated to other historic buildings where, like this one, no detailed documents on constructive measurement reasons exist. Hence the present work outlines the unpublished hypothesis of how the sequential process of traces on both the plan and section might have been based on the different ancient and medieval architectural treatises. All this will allow the existing intrinsic relations between the shape of the building and its current aesthetics to be obtained through a metric and geometric analysis of the church.

## Streszczenie

Kościół Santos Juanes w Walencji jest jednym z najważniejszych budynków sakralnych miasta. Na podstawie tej świątyni artykuł proponuje analizę, która może być przeniesiona na inne budynki historyczne, nieposiadające – podobnie jak ona – szczegółowej dokumentacji dotyczącej wymiarów konstrukcyjnych. W związku z tym tekst przedstawia niepublikowaną hipotezę odnośnie do sekwencyjnego rozmierzania zarówno rzutu, jak i przekroju, które mogło być oparte na różnych starożytnych i średniowiecznych traktatach. Wszystko to pozwoli ustalić relacje pomiędzy kształtem budynku i jego obecną estetyką poprzez metryczną i geometryczną analizę kościoła.

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## Heritage, Concrete and Symbolism in Carlo Scarpa's Architecture

## Dziedzictwo, beton i symbolika w architekturze Carlo Scarpy

**Keywords:** architecture, concrete, Carlo Scarpa, heritage, symbolism

**Słowa kluczowe:** architektura, beton, Carlo Scarpa, dziedzictwo, symbolika

### Introduction

At present, the definition of the term cultural heritage has a wide range of meanings, and as in the case of architectural heritage, it significantly shapes the identity, culture and history of certain states, nations and communities. Continuing with this approach, the modern architecture of the twentieth century and the use of concrete as an expressive material became the protagonists of our cities which, on many occasions, obviated the inherited architecture.<sup>1</sup>

On the other hand, there were also architects who, immersed in modernity, managed to find a symbiosis between modern and classical architecture by exploring the possibilities of the new material by excellence: concrete. One of the main figures in the use of concrete was Italian architect Carlo Scarpa who, with an attitude of respect for what already existed and continuous experimentation with concrete, constantly tested in his own works the search for a plastic and sincere communication through materiality.

As it did with Scarpa, this curiosity continues to preoccupy many of the avant-garde architects who continue to experiment with the use of appropriate materiality when faced with the reuse of historic buildings in

order to adapt them to the new contexts of today. The aim of this paper is to present the results of the research conducted on Scarpa's work in this quest, leading to elevate the use of concrete in art in the architecture of his works by the mastery of its execution.<sup>2</sup>

### Methodology

The present study responds to the interest in the symbolic consideration given by Scarpa towards concrete, and its consideration as a noble material. The process followed, began with a historical-documentary analytical method, through a bibliographical and documentary search on the author, making visits to his personal archive in order to analyze his drawings and documents first-hand.

Regarding the state of the art of the topic, the following should be specified: It is not our intention to delve into the dosage of the concrete mass, but rather to show the variability and experimentation with it. For more details on the first, it is appropriate to review the title *Il calcestruzzo nelle Architetture di Carlo Scarpa, forme, alterazioni, interventi*.<sup>3</sup> The analysis of the work *A Lezione con Carlo Scarpa* by Franca Semi is essential, where the master tells us about his architectural ap-

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Fig. 1. Detail of the broken concrete wall, Querini Stampalia Foundation, 2014; photo by M. Twardowski.  
Ryc. 1. Detal przełamanej ściany betonowej, Fundacja Querini Stampalia, 2014; fot. M. Twardowski.

proach and his project strategy as well as his sensitivity towards issues of respect for the historical in parallel with integration with modern architecture and the use of concrete for that aim.<sup>4</sup>

Furthermore, what is stated in this article has been possible after the analysis of 329 projects cataloged by the MAXXI Museum in Rome and their original documents, consulted in the Treviso Archives. Of these 329 cataloged projects, 9 correspond to the restoration of historic buildings.<sup>5</sup> The study was completed with an optical analysis of concrete elements, taking into detail the textures and patinas. Fundamental to this objective was the analysis work carried out by Greta Bruschi on the compositions and the state of conservation of the concrete textures used by Scarpa.<sup>6</sup>

### **Intervention in the architectural heritage: Synchrony between the classic and the modern**

The current transformation of cities must consider the recovery of built heritage that, when rehabilitated, can work as a catalyst to rehabilitate urban areas. This recovery and preservation of the architectural past contributes to consolidating the identity of the places.<sup>7</sup> During the second half of the twentieth century, an

experience on the intervention on architectural heritage was developed and promoted, trying to integrate into it the modern standards established during the first half of the century. After the Second World War, a large amount of architectural heritage in some European cities was damaged or destroyed. In other cases, the architectural heritage had been forgotten by the warlike economic priority. In Italy, during the second half of the twentieth century, Carlo Scarpa interpreted the classic-modern symbiosis by exploring the inclusion of materials such as concrete. The details thus designed proposed a dialogue between modern materials and old-fashioned elements. This creates a contrast resolved through abstraction in the design of elements that are part of the detail—between the old and the new.

The topic of the connection between materials was discussed by Frampton who explored the so-called adoration of the joint. The coexistence of different materials gives value to their union that is established by means of a caved joint that at the same time separates and links the materials<sup>8</sup> Scarpa pursued the integration of modern architecture in architectural heritage. His knowledge of history of architecture and art and his great sensitivity towards the essential characteristics of architectural elements, allowed him to integrate the old with the new in the modern details. As he said; “Modern architecture cannot be made without the knowledge of the architectural values that have always existed.” Since the realization of his first works, Scarpa had dealt with the problem of interventions on historical buildings, such as the Aula Magna of the Cà Foscari University, in Venice in 1951 or years before with his museology interventions in the Gallerie dell’Accademia from Venice between 1945 and 1959. In Scarpa’s intervention in the Querini Stampalia Foundation, designed in 1961, we find the integration of concrete with solutions that are not out of tune with the old. They appear expressively molded, and despite the brutality and authority of concrete, Scarpa was able to delicately control the material. In this way also in the back garden we find the plasticity of a concrete wall that from a poetic reading is decomposed by the source of the water (Fig. 1).

Subsequently, a relevant case is found in Scarpa’s design of the access to the Università IUAV di Venezia, designed in 1966 and executed years after his death. The project consists of the intervention on the space adjacent to the Church of San Nicola di Tolentino and prior to the entrance to the refectory of the old monastery with the same name, transformed into an academic space for the school of architecture. A large concrete mass barrier designed by Scarpa conditions the passage towards the interior. This closing piece was designed to be arranged in such a way that it does not touch either the facade of the church, nor the dividing walls of the buildings between which it fits, leaving a gap that disconnects it from the bordering walls, thus highlighting its autonomy and respecting the heritage of existing buildings.

The result is an abstract composition of separated elements, which enter into a dialogue with each other

through the lines that form them. The orthogonal lines contrast with a single diagonal line running through the sliding door, mutilating one of the vertices of the large rough-looking Istrian stone. In this way, Scarpa introduced the debate on orthogonality and the aggression of the diagonal, which in its day had sparked controversy between Theo Van Doesburg and Piet Mondrian (Fig. 2).

After crossing the threshold, we reach the garden and discover another decision that speaks to us of the sensitivity for heritage and the subtle dialogue with it. The arrangement of the original door of the convent's refectory raises this reading. Scarpa described the placement of the ruins found, arranging the door horizontally on the garden floor, thus not respecting its original placement but the memorial connection of the ruins with respect to the place and the building. In San Vito di Altivole, Scarpa developed the Brion Tomb project. Although it is a new construction project, it relates and converses with the old cemetery both physically and metaphorically. Here the concrete, as a symbol, acquires different poetical meanings. Scarpa made concrete speak. The symbiosis is more formal in the case of the concrete access element, which reproduces the dimensions of the noblest niches or commemorative tombs of the old cemetery (Fig. 3).

The aim of harmonizing the modern and the ancestral through art is a strategy used by Scarpa. His project in Castelvechio is an example of the consideration of architectural performance as one more element of an artwork exhibited in a museum. He added art to art. On an urban scale, we can find the same idea in recent research on the rehabilitation of heritage. The humanization of the urban environment demands the absence of conflicts between the new and the old. This humanization of urban space is achieved through two aspects; aesthetic and artistic—something that can be extrapolated to Scarpa's work. This artistic aestheticism must preserve the characteristics of the patrimonial and historical through strategies of unity, differentiation or contrast, and control of visual perception.<sup>9</sup>

### Experimentation with matter

A relevant aspect of Carlo Scarpa's architecture is the extremely careful and artisanal treatment of concrete. It is necessary to go back to the beginning of his professional activity as a designer of the Venetian glass industry in the first half of the twentieth century, to understand that the essence of Scarpa's architecture is indebted to his previous training in those years. During this period, Carlo Scarpa discovered the light and expressive possibilities of glass, experiencing the ability to transmit sensations; visual, acoustic, and tactile stimuli through the material and the shape. This previous experience would later be implemented in his architecture, resulting in the paradigm of careful design and a taste for the nuances of architectural details. A tireless elaboration process due to his dedication; scientific due



Fig. 2. View of the entrance to the Instituto di Architectura di Venezia, 2017; photo by M. Twardowski.

Ryc. Widok wejścia do Instituto di Architectura di Venezia, 2017; fot. M. Twardowski.

to his experimentation method; and intellectual due to his message and results, the result of a deep knowledge of history and an alignment with the modern theories of the twentieth century. In 1926, Scarpa began working for the MVM Cappellin company, dedicated to the craftsmanship of Venetian glass, and six years later, for the Venini firm until 1946. These twenty years of experience with master glassmakers, transmitted to him the philosophy of continuous experimentation and respect for the material with which he was working.<sup>10</sup>

Immersed in the process of designing and manufacturing glass, he acquired the need to seek and know the ancestral techniques already used by the Romans, exploring processes that were sometimes forgotten, introducing personal contributions such as the insertion of additives in the mass or small alterations in the process. All was manufactured, in order to achieve more



Fig. 3. Detail of the access to the Brion funerary complex, 2015; photo by A. Ros Campos.

Ryc. 3. Detal wejścia do kompleksu cmentarnego Brion, 2015; fot. A. Ros Campos.





Fig. 4. Detail of the concrete facade of the Venezuelan pavilion for the Venice Biennale, 2008; photo by M. Twardowski.  
Ryc. 4. Detal betonowej elewacji pawilonu wenezuelskiego na Biennale w Wenecji, 2008; fot. M. Twardowski.



Fig. 5. Details of the south wall of the Brion funerary complex, 2015; photos by A. Ros Campos.  
Ryc. 5. Detale ściany południowej kompleksu cmentarnego Brion, 2015; fot. A. Ros Campos.

expressive and unique effects. Over time, this research on the subject would be applied to architecture and in particular to the concrete.<sup>11</sup> Consequently, it is understood that for his architecture, Scarpa transferred all his concerns to the materials. The experimentation with the dosages in the stucco coatings or in the concrete mass allowed him to alter the color, the texture or the glossiness of the walls. He explored solutions that allowed altering the aging of the material's surfaces, where time and exposure to humidity would generate characteristic chromatic changes that would give his works a characteristic identity.

As previously cited, the analysis in the work of Greta Bruschi delves into the study of the macroscopic description of the concrete mix of some of Scarpa's project; the composition of the mixture; the technique of building; the texture of the concrete (rough, formwork footprint, irregularity and macroporous arid, stratified, vibrated, etc).<sup>12</sup> Hence, the taste for exposed concrete, fostered by architectural modernity and in particular by Le Corbusier, would be reinforced by Scarpa, giving it the leading role in his architecture. Le Corbusier had coined the term "béton brut" to refer to the constructive sincerity that the main material showed during the construction of the Unité d'Habitation in Marseilles, France, in 1952.<sup>13</sup> The term began to spread widely after British architectural critic Reyner Banham used it in the title of his 1955 article *The New Brutalism*.<sup>14</sup> Consequently, after the experiences of the 1950s in Great Britain led by Alison and Peter Smithson, this idea of material and formal sincerity was renamed Brutalism.<sup>15</sup>

Alluding directly to this expression, Scarpa would declare: "There is an expressiveness in reinforced concrete: the mark left by the wooden planks of the formwork, even if it is brutally arranged, can sometimes even be suggestive."<sup>16</sup> However, and despite this apparent defense of texture, in his architecture the explicit sincerity of the material is delicately resolved, reinforcing the idea that the nature of Brutalism is not contradictory to elegance or to the intervention in elements of architectural heritage.<sup>17</sup>

But the achievement of Brutalism is not exclusive to a single material. On the contrary, steel is also used as an expressive element (Fig. 2, 4, 7, 8). During his classes at the Venice Institute of Architecture, Scarpa stated: "Iron costs a lot, but it solves many problems. I use it easily because it seems hard, solid, even brutal, and in its brutality, it has great elegance." This statement gives us an idea that for Scarpa, Brutalism, beyond providing a formal and material sincerity, was a means to achieve beauty, and ultimately, distinction and originality.<sup>18</sup> On this allusion and taste for metal, in some of its details we can see the use of linear metallic elements that will be used to separate the vertical walls of the interior concrete pavement or the façade openings, as occurs in the Venezuela Pavilion in the Gardens of the Venice Biennale (1953–1956; Fig. 4).

This subtle monochromatic metallic combination, which also accompanies the Brutalist idea of raw materials, is a detail that he will later use again in the project of the Canovian Gipsoteca Museum in Possagno (Treviso, 1955–1957). In this case, the concrete is evidenced only in the diaphragmatic elements in the skylights that Scarpa had configured on the ceiling. These Brutalist-looking concrete beams, even more so in contrast to the plastered finish of the rest of the room, were arranged perpendicular to the proposed initial access, generating overhead lighting reminiscent of the later solution of the Nordic pavilion at the Venice Biennale in 1962, by Sverre Fehn.<sup>19</sup>

Throughout Scarpa's career, concrete details occupied a preferential place in the expressiveness of his designs, with the aim of proposing different expressive qualities. This process can be observed by analyzing some of the architect's works, in which concrete is presented as a means of plastic communication. For this, Scarpa explored the possibilities of the surface of the material investigating textures depending on the dosages and compositions, or depending on its manufacturing process (precast, in situ) or by varying the formwork (smooth, rough, in vertical or horizontal arrangement) or with treatments on the surface, or through differ-





Fig. 6. Series: Details of the Brion tomb, 2015; photos by: A. Ros Campos.  
Ryc. 6. Seria: detale grobowca Brion, 2015; fot. A. Ros Campos.

ent formwork techniques obtaining different textures, such as washing, to reveal the aggregates.<sup>20</sup>

He also used to make concrete by strata, generating joints in the finished material, at the same time that it took care of different solutions of edges such as; sharp edges, finished with wooden or stone slats, finished with a metallic element or finished with glass tesserae (Fig. 4, 6, 8).

In the aforementioned Venezuelan Pavilion at the Venice Biennale, Scarpa experimented with a radical Brutalism with which he dealt with the external appearance of the pavilion. He accompanied the material roughness with the roundness of the building's forms. The main facade is resolved with exposed concrete configuring different textures and taking care of the detail of the edges. The name of the pavilion appears imprinted in the mass of the concrete (nowadays hidden). The textures used are in turn reminiscent of the works of Frank Lloyd Wright, for whom he professed great admiration.<sup>21</sup>

The structural calculation sheets that can be seen among the original documents of the Venezuelan pavilion are proof of Scarpa's dedication to detail, and especially to concrete. This interest of Scarpa in calculating and sizing the elements of reinforced concrete, demonstrates the concern for the precise study of the details.<sup>22</sup> It is necessary to stress the delicacy with which Scarpa worked to define the concrete details. Examples of that, are the stone rings embedded in the concrete mass of the pillars of the Ottolenghi house.<sup>23</sup>

In Venice, we can find similar examples in the combination of stone and concrete. In the monument to the Partisana he assembled pieces of Istria combined with the concrete mass to solve the design of the sculpture bed, while in the Querini Stampalia Foundation he reinforced the corners of the garden fountain with a subtle piece of stone embedded in the mass of the concrete.<sup>24</sup>

But beyond the technical solution, Scarpa exercises his taste for the categorical and expressive nuances of concrete, carefully thought out and resolved. His words help to understand this defense for material sincerity; "A plastered reinforced concrete is a beast, no matter how good the bricklayer is. In its essence, reinforced concrete has the idea of force. When it is plastered, nobody knows if it is made of reinforced concrete or of twenty-six-size bricks. I mean that it is necessary to be authentic, to try to exalt a given matter as much as possible."<sup>25</sup>

### Concrete as a metaphor

Scarpa adopted constructive sincerity in search of greater expressiveness, but at the same time, he could not be oblivious to the meaning of his architecture and introduced metaphor in his works. That is why, in the poetic content of his works, the materials will assume a decisive role in the symbolic interpretation of his architecture. The influence of his past experience



Fig. 7. Details of the concrete staircase of Scarpa's new intervention in Castelvecchio in Verona, 2015; photos by: A. Ros Campos.  
Ryc. 7. Detale betonowych schodów po interwencji Scarpy w Castelvecchio w Weronie, 2015; fot. A. Ros Campos.

made him deepen the relationship between glass, as a distinguished and precious material, and concrete, as a new source of visual expressiveness, giving it a noble character. He generated a rich dialogue between materials, which allowed him a dual game in his architecture through dichotomies such as delicacy and brutality, bright and matt reflections, polychrome and monochrome, or between different materialities: glass and concrete.

In the relationship between glass and concrete, he gave the latter the condition of support for the former, which he considered a precious material. This relationship between the two materials will be reflected in several of his works. This is the case of the concrete walls of the garden of the Querini Stampalia Foundation in Venice (1961) or those of the Brion Tomb in San Vito di Altivole in Treviso (1969–78). In both projects, the concrete acts as a setting for inlays of vitreous mosaics that, forming polychrome tessellated lines, run through the wall in an elaborate recreation of colors, textures and shine, embraced by the roughness of the raw and monochromatic concrete (Fig. 5).

In this description, Scarpa defined the chromatic subtleties of the golden glass tesserae in the arcosolium of the Brion Tomb “This is the interior of the arcosolium with the mosaics. I have explained to you before that the mosaic has a protective covering, made of thin glass that covers the gold that is otherwise lost; Usually, it is made of clear glass, and if you make it colored, you can have a green gold, a blue gold, a red gold, a purple gold, a yellow gold. Here is blue gold and green gold” (Fig. 6).<sup>26</sup>

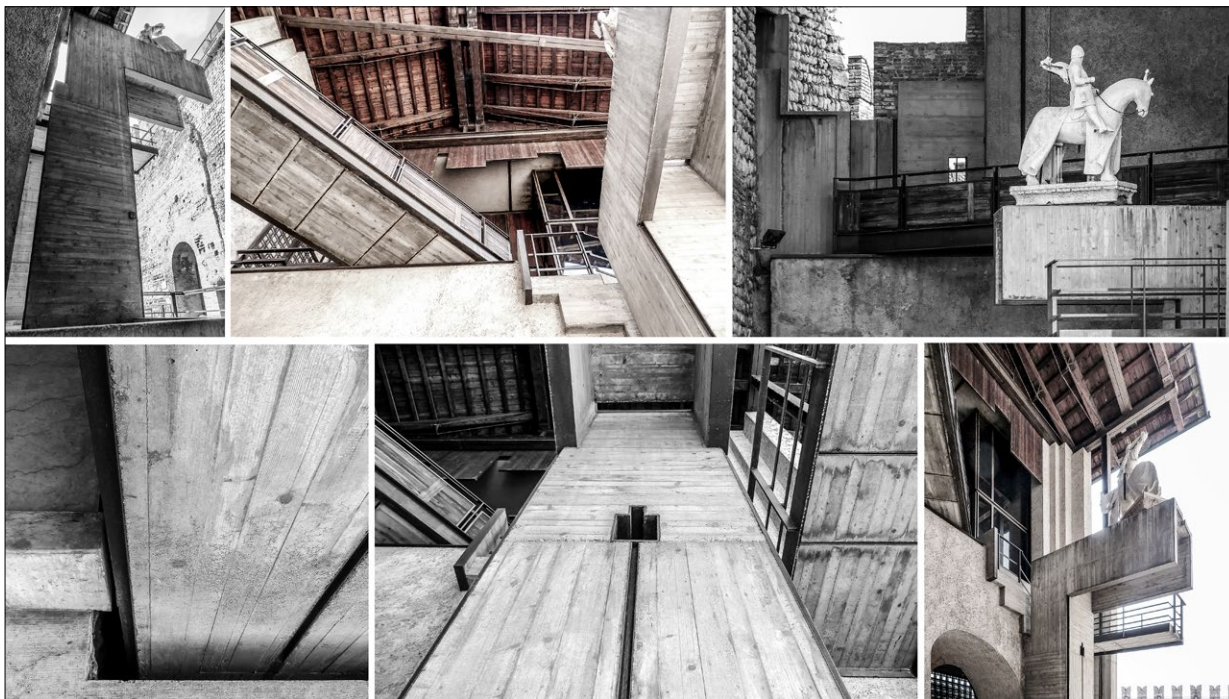
At the same time, it would also give concrete the difficult task of serving as a link with the pre-existing, attending to the harmony between the new and the old. Thus, in some interventions on heritage architecture, Scarpa employs the concrete to resolve the union between historical areas and new interventions. This relationship between materials establishes a contrast between the new and the old that helps to recognize the value of the historical and to show the respect of the new for the heritage. Scarpa resolved the coexistence between new and old materials by establishing a sep-

aration between them. The joint acquired an essential role, separating the new element from the old one in evidence of its autonomy. This concordance between pre-existing materials and the new concrete is visualized in some examples. In the aforementioned Querini Stampalia Foundation in Venice, you can see on its ground floor, the exquisite coexistence between the Renaissance moldings of the sixteenth-century palace and the new concrete walls that respond to the extension of the Foundation in 1961. In the Museo di Castelvecchio, in Verona (1957–1964, 1967–1970, 1974) concrete made its appearance in different staircases. In the one attached to the eastern wall, adjoining the Scaligero bridge, in order to show the different chronologies of the materials, brick in the wall and concrete in the staircase, Scarpa separated both elements by means of a dark joint, which allows an independent reading of both of them (Fig. 7).

However, the most remarkable point of the intervention in Castelvecchio is the museology solution that Scarpa proposes for the *Cangrande de la Scala* sculpture. This sculpture, which represents the most valuable piece in the museum's collections, is placed on a huge exposed concrete pedestal, whose formwork consisted of wooden boards oriented in different directions, in a symbiosis that shows the consideration of modern material in dialogue with the historical piece (Fig. 8).<sup>27</sup>

As previously mentioned, after Scarpa's death, the new entrance to the Venice University Institute of Architecture (1966–1978, 1984) was finalized. The access threshold, designed by him, is separated from the pre-existing buildings in order not to alter them and to show respect for their integrity. A ribbed concrete wall on its sides acts as a reflection of the steps of the neighboring Church of San Nicola di Tolentino and even the fluted shafts of its columns. Despite its rough appearance, concrete is a message of the delicacy with which the new separates itself from the old, respecting it. Another evident proof of this delicacy is the break that allows the entrance, emphasized by a heavy concrete slab, doubly inclined, delicately supported at the top of the wall (Fig. 2, 9, 10).





*Fig. 8. Details of the concrete support made with wooden formwork of the Cangrande della Scala sculpture in the Castelvecchio museum, 2015; photos by A. Ros Campos.*

Ryc. 8. Detale podpory betonowej wykonanej w drewnianych szalunkach: rzeźba Cangrande della Scala w muzeum Castelvecchio, 2015; fot. A. Ros Campos.



*Fig. 9. Details of the access door to the IUAV, 2015; photos by: A. Ros Campos.*

Ryc. 9. Detale drzwi wejściowych do IUAV, 2015; fot. A. Ros Campos.





Fig. 10. Detail of access to the IUAV, 2018; photo by: A. Ros Campos.  
Ryc. 10. Detal wejścia do IUAV, 2018; fot. A. Ros Campos.

We can interpret the use of concrete with another symbolic intention. Scarpa would explore the Brutalist characteristics of concrete to emphasize the stereotomy interpretation of space and an allusion to the return to the cave, as an ancestral housing myth. In the Ottolengui house in Bardolino (Verona, 1974–1978), the use of concrete reaches a high degree of sophistication. The delicate work with the material and its textures shows the recreation in the search for the expressionist aspect.

Consequently, the materiality of the house both exterior and interior, uses concrete to solve floors, ceilings and vertical walls. The structure of the house, also made of reinforced concrete with stone inlays as rings in the pillars, shows us the traces of its formwork. Moreover, the house acquires a stereotomic character when it is half buried, as a strategy to create an uncovered access corridor, like a trench, made entirely of concrete and that Scarpa called the access street. This corridor is reached after descending from the path through an irregular concrete staircase with a certain fortuitous character, as if it were the result of nature's own randomness.

However, the Brion Tomb in the San Vito di Altivole cemetery in Treviso is the project that best represents Scarpa's idea of materials and symbols. It constitutes the synthesis of his architecture and the legacy of his ideas. We find allusions to the artistic avant-gardes.

He honored De Stijl by the compositions of orthogonal lines and subtly introducing virtual diagonals, generated thanks to the grooving and setback in the edges of the concrete walls. They provide an effect of shadows that generates the appearance of the aforementioned diagonals, as we can see in the elevation of the access to the complex. As mentioned above, they invoke the De Stijl polemic between the orthogonal and the diagonal (Fig. 3). However, in this project concrete is not limited to concepts such as Brutalism or

De Stijl. The patina acquired by the passage of time, by aging, proposes a metaphor that we could interpret as a parallelism with human nature and the inevitable reality of death. An encounter with destiny and the depletion of living matter, turning the complex into an allegory of life and death, where concrete focuses both meanings.

In the walls, the color acquires a main role by causing a chromatic contrast between the gray of the cement and the colored glass tesserae, which are arranged horizontally along one of the walls or highlighting the edges of the edges of the termination of these. These tiles in ochre and gold tones further emphasize the noble nature of the support material and the transcendental connotation of the place, allowing the horizontality introduced by the line of tiles to reinforce the idea of the wall's boundary (Fig. 5).

But at the same time, in other walls of the enclosure it has vertical thin gaps. The horizontality of the wall will represent the finite, the end of life, while the verticality represents continuity. Additionally, Scarpa designed another mechanism that can be interpreted, a dark joint at the base of the south wall, through which the water from the pond is lost and falls generating a noise when overflowing, and which also causes a dichotomy between the solid mass of the concrete and the liquid. This is how the dualism of life and death appears in the Brion Tomb. Life flows, in watery matter, against the inert, which prevents continuity in the form of a wall.

At the same time, and as a nod to modernity and the American master Frank Lloyd Wright, Scarpa proposed the idea of breaking the corner, being appreciated in the detail of two of the corners of the enclosure, resolved with a concrete element as a lattice that allows to visualize the countryside. Observing carefully this detail, we can recognize the meticulousness with which the supports of it are solved, through a metallic support piece.

The stereotomy allusion of the arcosolium to the early Christian tombs is evident, as the last link between tradition and modern interpretation. In order to complete the sensory experience and move us to a primitive interpretation of the architecture, Scarpa alluded to the cavern as a refuge archetype, by creating a resonance cavity in the access corridor. For this, the concrete surfaces are filled by the sounds of the pavement pieces that move when stepped on, emitting a low rumbling sound, reverberating and emphasizing the concept of a cavity, as a refuge for the mother's womb, in a metaphor of the life.

## Conclusions

The presence of concrete in Carlo Scarpa's work constitutes the paradigm of experimentation with the solid material of architecture. Scarpa, through a meticulous abstraction, develops the meaning in the symbolic content of his work, enhancing a deep interpretation of his intentions. This abstraction allowed him to synchro-

nize Modernity with the architectural historical heritage. His proposal is an intellectual architecture.

Concrete will become the fundamental material used in many of his works, and should be preserved as a sign of identity and value of modern architecture, preventing it from being lost or distorted as in other cases of modern architecture. It will give it an exclusive role, even anticipating the behavior of the material, predicting the result of its aging and giving it the character of a symbol of modernity, but also, giving it a profuse expressiveness. Texture, perception and persistence over time, are some parameters that we could link to the use of concrete in Scarpa's architecture, presenting this material as a way of plastic and sincere communication.<sup>28</sup>

The results obtained in the materiality of Scarpa's work are the result of a tireless elaboration process, achieved both by his dedication through a scientific method of experimentation, and by the intellectual nature of his message. All this was possible thanks to deep knowledge of the history and an alignment with the modern theories of the twentieth century. His respect for architectural heritage did not prevent him from experimenting with new solutions in a modern interpretation.

Obviously, experimentation in the use of materials for his works is not a consequence of immediacy. On the contrary, the knowledge acquired after twenty years of testing in the design of glass elements, allowed Scarpa to acquire a taste for naked material and to recognize its expressive possibilities. This path led him to work Brutalist solutions, almost primitive, that allowed him

to convey the raw material of his architecture with sincerity. The slow design process in the details, attest to the meticulousness with which Scarpa elaborated his architecture.

It would be necessary to evoke again the Brion Tomb, which can be interpreted as the conclusion to a life of architectural design and experimentation, a masterful lesson in architecture full of details, meanings, dualities, metaphors and contrasts, with a prominent presence of concrete in the resolution of the complex. All of this focuses on a scientific project method, where research on history, matter, space, light, modernity, abstraction and the intellectual character of architecture are the protagonists of originality.

Finally, among his legacy two examples of the parallelism in his work should be highlighted; the permanent duality that we appreciate in the aforementioned Brion Tomb, where the dualism between concepts such as; modern-ancestral, new-old and life-death. The second example is the stereotomy-tectonic vision of the architecture in the Ottolengui house but also in the Brion complex. Both projects, carried out in the last year of his life, return us to the theme of the origin of architecture. A debate from the Enlightenment on the dilemma of the cave or the cabin as an inflection of the intellectuality of architecture.

As a conclusion, we could qualify his architecture as a permanent dichotomy of meanings and the continuous search for expressiveness under the domain of the material. In the intellectual, the primitive and the modern are entangled as in the details do the concrete and the ancient elements.

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- <sup>5</sup> Palazzo da Mula, Murano, Venezia (1925–1926); villa Velo, Fontaniva (1926–1927); Ca' Foscari, Venezia 1935–1937; casa (Sacerdoti), Venezia (1940–1943); Museo di Castelvecchio, Verona (1958–1974); chiesa di Santa Caterina per il Museo Civico, Treviso (1973–1975); villa Matteazzi-Chiesa, località Ponte Alto, Vicenza (1974–1975); villa Loschi Zileri, Monteviale (1975–1976); Castel Grande di Bellinzona, Bellinzona (1978–1979).
- <sup>6</sup> F. Semi, op. cit.
- <sup>7</sup> E. Węclawowicz-Gyurkovich, *To Demolish or Preserve for Posterity*, "WK" 2020, No. 62, p. 85–96.
- <sup>8</sup> K. Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture. Carlo Scarpa and the Adoration of the Joint*, Cambridge 1995, p. 299–333.
- <sup>9</sup> O. Kashchenko et al. *Revitalization of the Urban Environment and Contemporary Trends of Its Humanization via the Means of Art*, "WK" 2020, No. 61, p. 31–34.
- <sup>10</sup> Venini is a company dedicated to the design of Murano glass products, where glass has been manufactured for more than 900 years. In this link you can consult the designers who at some point have collaborated for the firm. <http://venini.com/en/authors/>.
- <sup>11</sup> M. Barovier, *Carlo Scarpa: Venini 1932–1947*, Milano 2013.
- <sup>12</sup> Ibidem.
- <sup>13</sup> W. Boesiger, *Le Corbusier – Œuvre Complète Volume 6: 1952–1957*, Berlin–Basel 2015.
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- <sup>15</sup> Peter Smithson (1923–2003) and Alison Smithson (1928–1993). English architects who studied brutalist architecture during the 1950s and 1960s.
- <sup>16</sup> F. Semi, op. cit., p. 89.
- <sup>17</sup> R. Banham, *The New Brutalism: Ethic or Aesthetic?*, New York–London 1966.
- <sup>18</sup> F. Semi, op. cit., p. 67.
- <sup>19</sup> Sverre Fehn, a Norwegian architect (1924–2009).
- <sup>20</sup> *Bocciardato, martellinato, scalpellato* – bush hammered, hammered, chiseled.
- <sup>21</sup> Reference is made to the multiple concrete details designed by Frank Lloyd Wright. Storer House, Los Angeles, California, USA, 1923. Ennis House, Los Angeles, California, USA, 1924. Or the Imperial Hotel in Tokyo, Japan, 1923.
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- <sup>25</sup> F. Semi, op. cit., p. 97.
- <sup>26</sup> Ibidem, p. 270.
- <sup>27</sup> Alberto I Canfrancesco della Scala, known as Cangrande della Scala, lord of Verona between 1308 and 1329.
- <sup>28</sup> N. Antonenko, O. Deriabina, *Preservation of Monuments of Modern Architecture in Ukraine (1990–2010)*, "WK" 2020, No. 62, p. 7–15.

## Abstract

In the intervention of architectural heritage since the second half of the twentieth century, the need for coexistence between historical or traditional materials, with those derived from the latest architectural movements, has been experienced. This is the case of concrete, the material par excellence of the Modern Movement and which has come to acquire its own prominence from the hand of architects such as Le Corbusier or Scarpa. The latter explored the expressive possibilities of the material, drawing inspiration from ancestral customs and trying different solutions in its composition, which made Scarpa an original innovator. The result was the use of matter as a means of transmitting meanings in its architecture, where concrete is the protagonist of this action and in which any current intervention must be subject to the maximum respect for this lexicon. This text aims to reflect on the symbolism and interpretation of the use of concrete in Scarpa's work.

## Streszczenie

W interwencyjnych pracach konserwatorskich w obrębie dziedzictwa architektury podejmowanych od drugiej połowy XX wieku dostrzegano potrzebę współistnienia materiałów historycznych czy tradycyjnych z wywodzącymi się z najnowszych nurtów architektonicznych. Tak jest w przypadku betonu, materiału *par excellence* Ruchu Nowoczesnego, który zyskał na znaczeniu w rękach takich architektów jak Le Corbusier czy Carlo Scarpa. Ten ostatni, badając różnorodne rozwiązania składu masy betonu, dodatków i technik szalunkowych, eksplorował ekspresyjne możliwości materiału, czerpiąc inspirację z pradawnych zwyczajów i próbując różnych rozwiązań w jego kompozycji, co uczyniło z niego oryginalnego innowatora. Efektem jest wykorzystanie tego materiału w jego architekturze jako środka przekazu znaczeń i szacunku dla każdej bieżącej realizacji artystycznej. Artykuł ma na celu refleksję nad symboliką i interpretacją użycia betonu w twórczości Scarpy.

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## A Voice on Polish Socialist Brutalist Architecture: Protection of Concrete Element Surfaces in the Context of Sustainable Development

### Głos w sprawie polskiej socjalistycznej architektury brutalistycznej – ochrona powierzchni elementów betonowych w kontekście zrównoważonego rozwoju

**Keywords:** Brutalism, concrete, reinforced concrete, conservation, corrosion, surface protection, sustainability

**Słowa kluczowe:** brutalizm, beton, żelbet, konserwacja, korozja, ochrona powierzchniowa, zrównoważenie

#### Introduction

Since the promulgation of the *Nine Points of Monumentality* manifesto in 1942 by Josè L. Sert, F. Lèger and S. Giedion, the construction of the Unité d'habitation by Le Corbusier in 1953 and the promulgation of the ideological theses of New Brutalism by Rayner Banham<sup>1</sup> in 1955—the new architecture was treated as a continuation of thinking about a building that could clearly show all the elements without hiding their purpose and what it is made of. Thus, the building blocks of Brutalist theory and aesthetics emerged from the post-war works by Le Corbusier, Team X, and Alison and Peter Smithson. At the same time, a surge in corporate purchasing power, low labor costs, and a stubborn belief in progress after the Second World War led to an astonishing acceptance of the idea of Brutalism that resulted in the creation of a succession of monumental works of architecture that were significant in the landscape of many European and world cities.

With the new concept of architecture reflecting the symbolism of sincerity and openness in its matter and

meaning, the founders of Brutalism proclaimed that the use of concrete in architecture should be rethought, but only to give expression to its pure materiality, in which all context and metaphor had to be rejected. Brutalism made concrete the main content of architecture for the first time in modern architecture. The stylistics of the raw concrete formula began to account for the overtones and essence of the meaning of monolithism—a structural principle in which an idea is created in a homogeneous, visible material. Thus, the creators began to achieve the effect of a certain aesthetic formal structural-material domination, the essence of architecture consisting in the form “outgrowing” its internal organization. The program of finding the basis of architectural art thus defined, initiated by Le Corbusier in discovering the meaning of *béton brut* and defining concrete as the indivisible and irreplaceable essence of architecture, found its full meaning in the form of architecture innovative in thought. Brutalism and New Brutalism postulated in the British Isles became an idealized “discovery” of the qualities of structure and natural texture of concrete that had been hidden for decades.

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Fig. 1. Forum-Orbis Hotel by J. Ingarden, Cracow, 2003, source: [https://commons.wikimedia.org/wiki/File:Forum\\_Krak%C3%B3w\\_10-2003.jpg](https://commons.wikimedia.org/wiki/File:Forum_Krak%C3%B3w_10-2003.jpg); photo by B. Pindor.

Ryc. 1. Hotel Forum-Orbis projektu J. Ingardena, Kraków, 2003, źródło: [https://commons.wikimedia.org/wiki/File:Forum\\_Krak%C3%B3w\\_10-2003.jpg](https://commons.wikimedia.org/wiki/File:Forum_Krak%C3%B3w_10-2003.jpg); fot. B. Pindor.

Observers highlighted the efforts of key artists in bringing out individualism in the postulate of using building materials “as found”—in the slogan of exposing the structure in the architectural form and in the imperative of its sincerity and literalness. The naturalness and authenticity of the solutions were dictated by the idea of architecture as a representation of a way of life. The building was not supposed to pretend that masses of reinforced concrete are something more than just a building material. Brutalist buildings are therefore devoid of any finishing—only the basic technological process, the layout of the interior, its circulation areas and installations are reflected in the walls. In defining the characteristics of Brutalist architecture, it is important to emphasize the overarching relationship between structure and its meaning, becoming the meaning of *decorum* for which architects try out different forms, always seeking plastic expression in physical construction.<sup>2</sup>

The narrative surrounding Brutalism changed radically. Initially, it was seen as something spectacular in its innovative and expressive language of Modernism, but in the 1970s it began to be perceived as a symbol of a lack of understanding of the existing context and as the picture of the architecture favored in countries perceived as totalitarian.<sup>3</sup> By that time, lack of maintenance had already become a major problem, which quite quickly led to the destruction of many buildings and damaged their image even further. Over the past decades, many Brutalist buildings have been demolished without regard to their qualities and original intentions. In recent years, we have seen a revival of interest in Brutalism thanks to the international mission of Docomomo International which records modernist buildings, books and research projects<sup>4</sup> and a surprising renaissance of Brutalism on social media and among architects referring to this aesthetic in their projects.

### Utility (wear) of the architectonic thing

Architecture is applied art. Physical wear of an object is inevitable and usually means the end of its life. If a utilitarian object is made to provide sensual and emotional experience, its life span is related to both its pragmatic and aesthetic functions. The case of brutalist architecture is not unique to a utilitarian object produced to please the eye and not necessarily in response to demand. Dariusz Kozłowski wrote: “The nature of architecture makes the physical and moral wear, [...] much longer, uneven, and this process can be—surprising.”<sup>5</sup> Physical utility can be prolonged by changing, supplementing, adapting, and rebuilding those structures of things that are amenable to it. But the question must be asked whether the fulfilment of these three factors—the physicality of the work, its utility as well as its meaning—are the three independent functions of the duration of architecture?

Kozłowski’s argument leads to the conclusion that physical wear can mean either restoration (a monument) or termination of a structure through demolition (the case of the St. Louis blocks). Functional wear can be replaced by a new more adequate function in an old or expanded physical structure (a factory converted into apartments, a cinema converted into a shopping mall). In all cases, the symbolic layer most often appears worn out—or sometimes merely “unfit for use”—its meaning remains relevant over time through official protection or user sentiment. Thus, it is the purely useful thing that perishes faster in time than the thing endowed with meaning and having its symbolic message, “the usefulness passes away completely and irrevocably, while the form that has lost its meaning may condemn the thing to oblivion, but its resurrection and return of a second life, of an existence sometimes quite different, is not excluded.”<sup>6</sup>

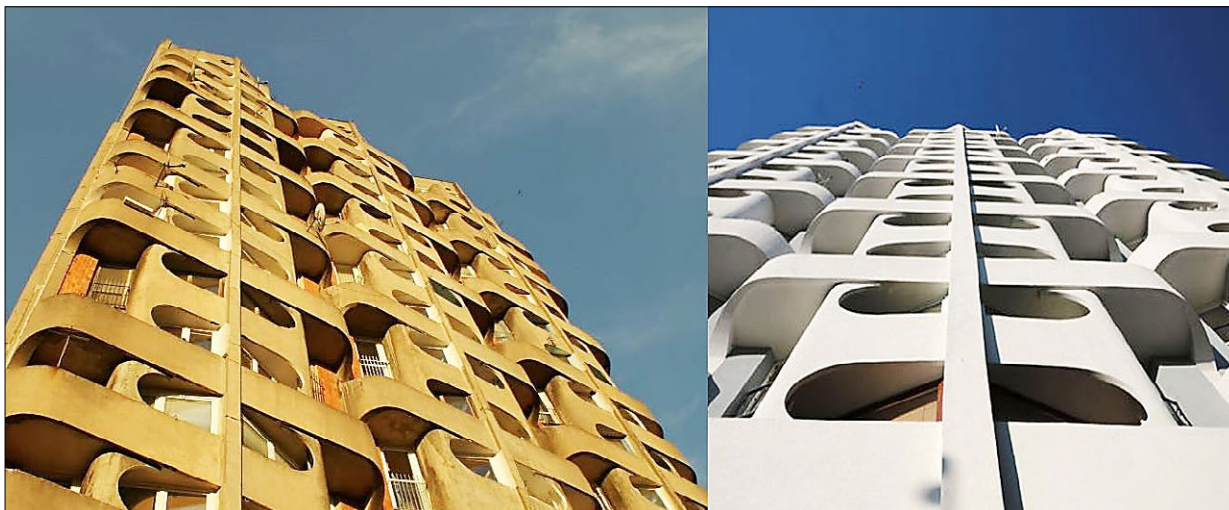


Fig. 2. J. Grabowska-Hawrylak, Residential complex at Grunwaldzki Square in Wrocław, 1970, view before and after renovation in 2016; source: wp.pl (accessed: 13 VI 2021).

Ryc. 2. J. Grabowska-Hawrylak, zespół mieszkaniowy przy placu Grunwaldzkim we Wrocławiu, 1970, widok sprzed renowacji i po renowacji w roku 2016; źródło: www.wp.pl (dostęp: 13 VI 2021).

The authors of the article *Dobra kultury współczesnej. Zarys problemu ochrony*<sup>7</sup> provide a different opinion in their analysis of the duration of the Modernist architecture, drawing from sociological foundations, examining the reasons for the acceptance or lack of social recognition for the heritage of Modernism and late Modernism. The authors divide them into four groups—the first one includes the preserved “wanted” buildings (these are most often important and iconic structures). The second group includes “unwanted” projects that were demolished despite their undoubted architectural value (Super Sam in Warsaw). The third group includes “ignored” buildings whose existence was not recorded and which are deteriorating. The last, significant group of projects, are the “tolerated” resources, whose existence is unquestionable. These are, for example, modernist housing estates, which still constitute an important part of residential construction. Their urban and architectural values are beginning to be recognized, but not to a sufficient extent yet.

### The continuance of ideas through the preservation of matter

Unlike in Western Europe, the Polish example of Brutalist architecture is not associated with the progression of the modernist style, the liberation through the expression of creative freedom from the principles of socialist realism and Gomulka’s functionalism. Few see in them a post-Corbusierian architecture, an attempt to arrange the future along the lines of English New Brutalism, in which there would be no hierarchy or simply a protest against the rigid corset of communist norms and typifications. Despite the recent renovation of buildings such as Spodek (1971—by M. Krasieński, M. Gintowt, A. Żórawski, W. Zalewski, J. Hryniewicz) and Superjednostka (1972—by M. Król), the

housing estate at Plac Grunwaldzki in Katowice (1973—by J. Grabowska-Hawrylak), the Jagiellonian University’s Kolegium Polonijne in Przegorzały (1975—by T. Mańkowski, Z. Nowakowska, D. Kozłowski, K. Bojanowski), many examples of Brutalism in Poland must be considered endangered. These buildings are at best abandoned, at worst replaced by commercial developments. Barring a few exceptions, the visible and undying enthusiasm applies only to complexes that are difficult to demolish, such as housing estates. Such iconic buildings as Hydrotrest in Cracow (1999—by W. Obtulowicz) or Hotel Forum (1988—by J. Ingarden) are still threatened with demolition because the owners of the properties want to build a new hotel or housing estate in their place.<sup>8</sup> Even though the building has become part of the cultural and recreational landscape of Cracow, there are many signs that it will suffer the fate that befell the station in Katowice less than a decade ago. The popular Brutal, as the residents of Katowice used to call it, was one of the most interesting and valuable modernist monuments in Poland. After long battles between the investor and the city conservator, it was replaced by a shopping mall, which is part of the restitution (commemoration) of the old reinforced concrete cup-shaped pillar structures and their adaptation to the new function. Polish brutalist religious architecture<sup>9</sup> is in a better situation as its legal nature and ownership makes it seem unthreatened and it survives in the landscape of Polish cities.

Examples of conservation projects undertaken in Britain are perhaps an interesting point of reference for Polish brutalist architecture. Many post-Second-World-War buildings have been legally protected in the UK since 2000, including the monumental 1982 Byker Wall in Newcastle, designed by Ralph Erskine, which received prestigious Grade II\*12 protection, and the striking London residential high-rise buildings, Trellick

Tower and Balfron Tower, designed by Ernő Goldfinger and built between 1966 and 1972 (which received the least restrictive Grade II protection). The same is true of Sir Denys Lasdun's buildings—London's National Theatre (1967), the University of East Anglia (1970) in Norwich or the superb complex of monolithic terraced housing at the Alexandra Road Estate (1978) designed by Neave Brown in London's Camden.

By contrast, the Birmingham Central Library building (1974, by John Madin) was denied protection and was demolished in 2016 after public criticism by Prince Charles in the 1990s. The same happened to the 1972 Robin Hood Gardens complex designed by Alison and Peter Smithson. Due to the poor state of maintenance, the local authorities decided not to list Robin Hood Gardens on the register of protected historic buildings in 2015. In doing so, they opened the way for the demolition and replacement of the estate with new development projects. The story of Robin Hood Gardens demonstrates the full complexity of the problem of preserving post-war Modernism. The poor condition and rapid ageing of the complex facilitated discussion of the need to demolish rather than renovate it. However, the negative end of the Robin Hood Gardens dispute does not change the fact that every year more and more brutalist buildings and complexes from the 1960s and 1970s are granted protection in the UK.<sup>10</sup> One of the most outstanding buildings of German Brutalism, The Central Animal Laboratory of the Free University in Berlin (by Gerd Hänska, 1971–1980), is under great threat because the university wants to demolish it, arguing that the building is not suitable for new scientific and teaching functions.<sup>11</sup>

Thus, the experience of Western European countries teaches us a rational approach to brutalist structures. Undoubtedly, they should be placed under conservator's protection, but it seems that the best way for these cultural assets of the second half of the twentieth century is the general idea of balancing the parties (investor-conservator), balancing often contradictory reasons. In her article entitled *Polska architektura późnego modernizmu – kategorie stanu zachowania, syntetyczne studia przypadków i dylematy konserwacji*, Marta Urbańska wrote that “in the case of any heritage under discussion, it is a matter of finding an appropriate modus operandi between the extremes of conservation: ‘freezing’ the buildings by absolute prohibitions on superstructures or extensions, and their complete, destructive reconstruction or even demolition. Practice shows that an indisputable prerequisite for the preservation of structures is their functional, usable value from the perspective of the owner/investor.”<sup>12</sup>

### **Protection and conservation of reinforced concrete in the era of sustainable development**

Another important topic related to the argument for the preservation of the architectural and structural fabric is the problem of the durability of the concrete/re-

inforced concrete used in brutalist buildings. Most of the time, architects have been overly optimistic in their predictions about preservation. Both in Europe and Poland, the cost of maintaining large, often poorly insulated residential and public buildings has decreased and the quality of the concrete has deteriorated rapidly. It was not uncommon for ongoing renovations to rely on the cheapest way to deal with ageing concrete—namely, by merely painting over it. By forgetting the essence of raw exposed concrete and the details of its texture, such actions are part of a series of fatal mistakes in the protection of the top layer of concrete—actions that most often deviate from the essence of Brutalist and monolithic designs. To make matters worse, some projects are wrapped in layers of insulation (the example of the housing estate at Plac Grunwaldzki in Wrocław from 2018), which further interferes with the original design intent. The technology for the proper restoration of exposed concrete surfaces has come a long way in recent years, and it is now easier and cheaper than ever to stay true to the original design.

Concrete is still considered to be the most durable material due to its high chemical and physical resistance to various exposures. Reinforcing steel has played a key role in expanding the use of concrete in twentieth-century architecture, but corrosion of reinforcement is the primary culprit in the deterioration of many historic reinforced concrete structures. Reinforcing steel embedded in concrete must be surrounded by a sufficiently thick layer of concrete which not only ensures proper interaction of the two materials but also protects the steel from heating up too quickly during a potential fire. In addition, the alkaline environment of properly compacted concrete (a pH above 10.5) is the most effective protection against corrosion of the reinforcement. Design requirements for minimum concrete cover thickness have changed over the years—while in the 1950s it was possible to make 15 mm thick concrete covers, nowadays the minimum requirements usually oscillate within the range of 25–45 mm.

The reduction of the protective properties of concrete in relation to steel is mainly due to the carbonation phenomenon occurring over a long time, i.e., the action of carbon dioxide on the hardened cement slurry.<sup>13</sup> Therefore, to ensure increased durability of reinforced concrete structures, it is necessary to pay great attention to proper concrete compaction which guarantees impeded penetration of rainwater and moisture into the concrete structure. Taking into account that in the period when the most important buildings of Polish Brutalist architecture were constructed, the technologies of shaping the properties of concrete and the methods of its compaction were poorly developed and the quality of workmanship was very low, it must be stated that the durability of many buildings constructed in monolithic technology was lowered by insufficient concrete covers (sometimes as thin as several millimeters), sloppy execution of construction joints during concreting and excessively porous or even cancerous external surface



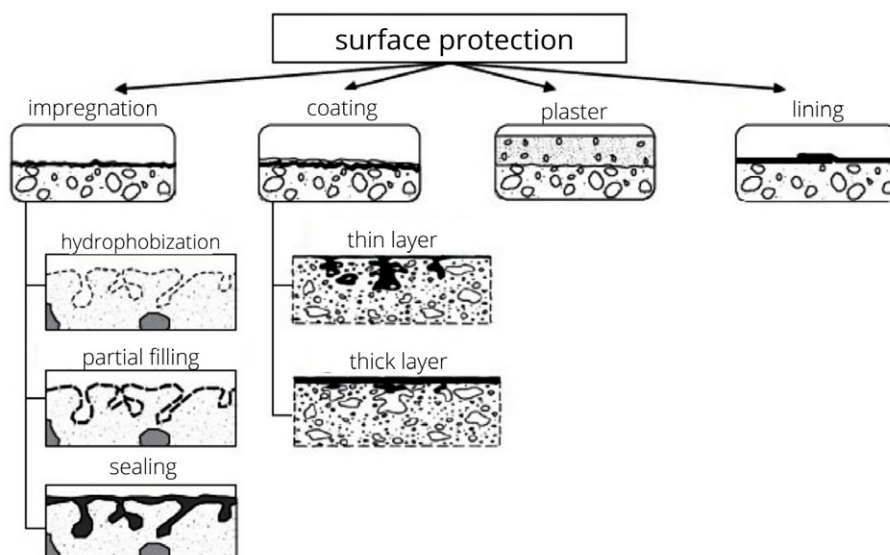


Fig. 3. Methods of surface protection according to PN-EN1504-2; source: L. Czarniecki, *Praktyczne reguły napraw konstrukcji z betonu*, "Builder" 2018, No. 6, p. 50–52.

Ryc. 3. Metody ochrony powierzchniowej według PN-EN1504-2; źródło: L. Czarniecki, *Praktyczne reguły napraw konstrukcji z betonu*, "Builder" 2018, nr 6, s. 50–52.

of the concrete. Corrosion of reinforcing steel can be significantly accelerated in concretes containing increased chloride ions. Chlorides in concrete may be the result of the popular addition of calcium chloride to the concrete mix at that time, mainly to increase the setting temperature of cement, accelerate the hardening of concrete during the initial period and lower the freezing point of concrete. They can also come from the exposure of concrete surfaces to seawater or de-icing salt solutions. Also, the use of unsuitable aggregates contributes to the reduced durability of many structures. Alkali-silica reactions (ASR) occur in concrete when alkalis in cement react with certain aggregates, leading to the formation of an expansive crystalline gel that increases in volume when exposed to moisture and causes the aggregate and concrete matrix to crack. Degradation of concrete surfaces is also caused by erosion of the cement slurry that exposes the aggregate grains under the influence of wind, precipitation or even fog. This phenomenon was much more intense in regions with acid rain as a result of high sulfur dioxide content in the air—such was the case in many Polish cities back in the 1980s. Erosion can also be caused by the mechanical action of water flowing through the concrete, for example from damaged gutters or downpipes or high-pressure cleaning of the facade.

We are now more likely to see that protecting the existing built environment is beneficial not only for preserving cultural heritage, but also for limiting urban sprawl, aiding economic development, and other arguments that together fit into the goals of broadly defined sustainable development. Lech Czarniecki wrote that "sustainable development is a civilizational necessity as well as a legal imperative."<sup>14</sup> According to this Regulation – Construction Product Regulation, CPR – UE 305/201, one of the ways to ensure sustainable

use of natural resources is to ensure the sustainability of buildings. The protection of the structure directly serves to ensure this durability, while repairs, depending on the moment at which they are undertaken and their extent, serve either to maintain or restore serviceability and consequently contribute to restoring or extending the expected durability. In this way, conservation and repair activities become an important tool for shaping sustainable construction.<sup>15</sup>

Globally, the principles of architectural conservation inherent in environmental, economic, and social sustainability were shaped relatively long ago. In the 1987 UN Brundtland Commission report *Our Common Future*, sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."<sup>16</sup> As early as 1966, the US Congress stated in the text of the NHPA that "the spirit and direction of the Nation" are founded upon and reflected in its historic heritage, including its architectural heritage, and its preservation is in the public interest.<sup>17</sup> At the beginning of this century, the Heritage Canada Foundation formulated a compelling voice for future discussions about desirable scenarios for dealing with existing buildings: "Currently, the challenge is to prove that an old building is so valuable that it ought to be saved; rather the owner/developer should be required to prove that an old building cannot be adapted to new use."<sup>18</sup> In other words, the first option that should be considered is the preservation of the building, and other solutions, such as demolition, should be properly documented with attention to environmental concerns as well as architectural heritage.

No special measures for active protection of concrete building surfaces (such as protection against the ingress of moisture or contaminants and anti-corrosion

measures) were envisaged for buildings designed and constructed in the second half of the twentieth century. Therefore, the most sustainable approach to managing these buildings is to perform periodic technical inspections (which includes not only a cursory visual inspection but also several structural tests, including chemical testing of the concrete) and to apply preventive maintenance to avoid or at least minimize the need for major renovations or demolition. Such maintenance may include the use of:

- coatings, usually in the form of resin emulsions or cement-resin preparations, characterized by a high diffusion resistance to CO<sub>2</sub>, watertightness, but also permeability to water vapor, the ability to bridge cracks, good adhesion to the concrete substrate, and resistance to environmental factors and ageing. However, coatings are often unsuitable for use on historic buildings because they tend to alter the color and appearance of the surface;
- deeply penetrating impregnates or hydrophobic materials that do not change the porosity but only reduce the absorbability of the concrete. These may be considered for use on historic concrete, but one should be aware that the areas thus protected have a different appearance after rain than the more saturated fragments of the original concrete;
- protection of reinforcement in the form of re-alkalization of concrete cover (soaking of carbonated concrete cover in alkaline solution) or introduction of cathodic protection consisting in the creation of galvanic cell in which a reinforcing bar serves as a cathode, the loss anode is a specially introduced material with the potential lower than that of iron (e.g., zinc, magnesium, aluminum), and the water solution in the pores of concrete constitutes an electrolyte.

Maintenance treatments are undoubtedly much more effective in extending the service life of concrete structures than allowing degradation to spread and only making sporadic repairs, often of poor quality. Each subsequent renovation contributes to the creation of new waste, further consumption of natural resources, and despite this, often does not restore the desired durability of the facility. A cost analysis of a life cycle of a given building can easily show how much financial impact is created by a lack of maintenance and deferred repairs.

The proclamation that the repair of concrete is “the ultimate act of sustainability”<sup>19</sup> seems hugely relevant to the social meaning of developmental sustainability in this context—but it cannot be overstated. Rehabilitation of buildings has an increasing share in construction activity, but it should not be expected to become a total means of meeting ever-increasing societal needs. Building structures are often transformed from office buildings to residential ones, from factories to restaurants, from old houses to museums, etc. The adaptation of existing buildings—combined with its repair—to new needs is, of course, not only a natural transformation of the architectural function but also the most important principle of sustainability.

## Conclusion

It is important to remember that “words pass away, architectural objects remain and last.”<sup>20</sup> Mieczysław Porębski’s statement reminds us that the image of architecture that surrounds us is not permanent, that many of its contents and meanings are forgotten, and that new and more current phenomena describing the existing architectural reality take their place. It is worth asking whether the undeniable change in the meaning of architecture does not cause the disappearance of manifestations of material culture along with words, ideas and meanings? Doesn’t the original sense of the idea, concept, or proposal used by the architect get lost over the years, and does the visual sphere retain merely the material quality of the architecture, characteristics of the style, proportions, scale, texture used, etc.? It turns out that the destruction of ideas and matter in architecture is accompanied by the destruction of human memory. It seems that the survival of architecture is related to its ideological and formal indifference, to its ability of rational and logical continuity. We keep some things in our memory and unconsciously push out others. Modern civilizations that understand the words of a rational approach to their past try to preserve the most valuable examples of their own identity as evidence of the persistence of material and ideological culture. It does not help in protecting Brutalism as a “thing of the past” to be aware of the problem, natural for the entire twentieth century, of the passing of an architectural idea as a discontinuous fact of events, which was—simply—a programmatic avant-garde negation of previous achievements.

The statement by an expert in contemporary iconology about the transience of words and the permanence of the material is a pretext for tackling the problem of the disappearance of formal meanings and contents of the idea of architecture through the conservation of concrete. Paradoxically, it may seem that it is the matter of the work that wins the battle for the survival of architecture. The phenomenon of the permanence (memory) of a material shape contains both the potency of information recall and evidence of an attachment to the importance of architecture as material culture. This is confirmed by the practice of attributing the power of full reconstruction of the ideological essence of architecture to ruins. Another important source of this belief is the conviction that objects, as opposed to words, “do not lie.” Everything may seem to be recorded in the matter as a medium of information because material culture is believed to be truer than the written one. Is architecture, then, a vehicle for memory, or is it merely a means of actualizing an idea that defines an extra-moral, inexhaustible repertoire of technical and aesthetic solutions devoid of the spirit of the times? According to Robert Krier, architecture is simply a treasury of the art of building and the resulting ideas.<sup>21</sup>

In recent years, concrete has gained increasing recognition as a historic material. Preservation of such con-

crete requires a thorough understanding of the causes and types of deterioration, as well as a good knowledge of repair materials and methods. It is important to allocate sufficient time in the planning stage of repair work for a thorough analysis of the causes and extent of concrete degradation (mere visual assessment of surface quality, or a simple examination of the depth of the carbonated concrete layer using phenolphthalein, is certainly not sufficient) and for making test fields for trial repairs to assess the effectiveness and aesthetics of the technology applied. It is also of great importance to choose a contractor and project supervisors who possess adequate knowledge and experience in the repair of concrete surfaces since many treatments involved in this type of work are irreversible. Unfortunately, experience shows that repairs to concrete structures that are not properly carried out can have the opposite effect and accelerate their deterioration.

Why, then, is it vital to save brutalist buildings? This collection of structures cannot be enriched today because systems, times, technologies and materials have changed. Modernism and Brutalism created today is different from the one seventy years ago. One cannot claim that the cup-shaped pillars of the Katowice train station are recreated as we simply received mere copies of them. The authenticity of this architecture disappeared when the twenty-one-day demolition took place on January 11, 2011. The original structure of the old reinforced concrete, its composition and the way it was made were characteristic of its period, and we neither know how nor want to replicate it today. Brutalism defined a significant point in architectural history that will not return. By tearing down Brutalist buildings, we risk repeating the mistakes of the past.

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<sup>1</sup> R. Banham, *The New Brutalism: Ethic or Aesthetic?*, New York, 1955.

<sup>2</sup> M. Charciarek, *Związki idei i materii w architekturze betonowej*, Kraków 2015.

<sup>3</sup> As early as the late 1960s, Brutalism was under attack not

only from the general public—both from steadfast supporters of post-Bauhaus modernism in the style of Walter Gropius and from Nikolaus Pevsner, who called Brutalism "postmodernism." The critic regarded the new style as too "expressionistic," "narcissistic," and "sculptural." For him,

Brutalism represented “the self-expression of the artist-architect,” an “ardent avoidance of lightness and anything that could be called elegant, as well as anything that could be explained by purely rational means”; N. Pevsner, *Architecture in our Time: the Anti-Pioneer*, “The Listener” 1967.

- <sup>4</sup> One of the first major projects concerning the restoration of concrete Modernist buildings is the European program InnovaConcrete. It is a grant addressing and highlighting the importance of the heritage of twentieth-century concrete architecture, ways to preserve both technical and more ideological elements, and to raise public awareness of the value of the heritage of twentieth-century concrete architecture. In Poland, the Centennial Hall in Wrocław and the stops of the cross-city route in Warsaw designed by Arseniusz Romanowicz were restored as part of this renewal program.
- <sup>5</sup> D. Kozłowski, *Figuratywność i rozpad formy w architekturze doby postfunkcjonalnej. Projekty i budynki 1982–1992*, Kraków 1992, p. 11–12.
- <sup>6</sup> Ibidem, p. 12.
- <sup>7</sup> A. Bialkiewicz et al., *Dobra kultury współczesnej. Zarys problemu ochrony*, “Wiadomości Konserwatorskie – Journal of Heritage Conservation” (hereinafter: “WK”) 2020, No. 63, p. 152–163.
- <sup>8</sup> In July 2020, according to the decision of the Lesser Poland Voivodship Heritage Conservator Monika Bogdanowska and the provisions of the Study of Spatial Development Conditions and Directions for the City of Cracow such Modernist buildings as the former Forum Hotel building should be protected as cultural assets.
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- <sup>10</sup> M. Wiśniewski, *Moderna – modernizm – socmodernizm: burzyć czy chronić?*, “Autoportret – pismo o dobrej przestrzeni” 2015, No. 3/215, <https://autoportret.pl/moderna-modernizm-socmodernizm-burzy-czy-chronic>; (accessed: 23 V 2021).

- <sup>11</sup> Frankfurt’s Deutsches Architekturmuseum (DAM) is one of the institutions doing the most to promote, document, and study architecture today, not just in Europe. The German curators have an excellent sense of current topics, an ability to develop discussions about them and to collect the data necessary to do so. In 2015, the museum, together with the Wüstenrot Foundation, launched a campaign to protect brutalist buildings. It was promoted with the slogan “SOS Brutalism – Save the Concrete Monsters!”
- <sup>12</sup> M. Urbańska, *Polska architektura późnego modernizmu – kategorie stanu zachowania, syntetyczne studia przypadków i dylematy konserwacji*, “WK” 2016, No. 48, p. 56.
- <sup>13</sup> When dissolved in water, contained in the capillaries of the concrete, carbon dioxide chemically reacts with the various phases of the cement slurry, most commonly with portlandite or the C-S-H phase.
- <sup>14</sup> L. Czarnecki et al., *Budownictwo zrównoważone budownictwem przyszłości*, “Inżynieria i Budownictwo” 2012, No. 1, p. 72–73.
- <sup>15</sup> Idem, *Praktyczne reguły napraw konstrukcji z betonu*, “Builder” 2018, No. 6, p. 50–52.
- <sup>16</sup> World Commission on Environment and Development, *Report of the World Commission on Environment and Development: Our Common Future*, Oxford 1987.
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- <sup>20</sup> M. Porębski, *Ikonafera*, Warszawa 2015, p. 156.
- <sup>21</sup> R. Krier, *Modernizm i pamięć*, Warszawa 2001, p. 72.

## Abstract

Half a century after the dominance of Brutalist architecture, the majority of discussions about these buildings concern their continued existence. Sadly today, there is more talk about the demolition of Brutalist buildings than about their protection and preservation. And yet, many Brutalist buildings expressed a progressive vision of community living and sustainable public ownership. The effort to preserve them, therefore, is not merely a fight to defend heritage, but also the idea that through the necessary process of adaptive reuse, maintenance, and preservation of existing buildings, the trend of constant “replacement of the fabric of the building” should be halted. In the era of seeking “sustainable” solutions in architecture, this kind of re-evaluation of the meaning of Brutalism and its concrete matter seems to be more than a will to preserve the legacy of the past. One may say that restoring or even prolonging the life of these valuable reinforced concrete structures, primarily in the form of properly selected protection of the concrete surface, is the core of activities aimed at their conservation.

## Streszczenie

Pół wieku dominacji architektury brutalistycznej sprawiło, że dyskusję o takich realizacjach zdominowała kwestia dalszego ich istnienia. Niestety, obecnie więcej się mówi o wyburzaniu budynków brutalistycznych niż o ich ochronie i zachowaniu. Należy jednak pamiętać, że wiele obiektów brutalistycznych prezentowało nader istotną w połowie XX wieku ekspresję postępowej wizji życia społecznego i zrównoważonej własności publicznej. Trud ich zachowania nie jest więc jedynie walką o obronę dziedzictwa formalnego, lecz także ochroną konkretnej kulturowej idei. Poprzez konieczny proces readaptacji, utrzymania i zachowania istniejących budynków, należy położyć kres trendowi ciągłego „wymieniania tkanki zabudowy”. W erze poszukiwania „zrównoważonych” rozwiązań w architekturze ten rodzaj ponownej ewaluacji znaczenia brutalizmu i jego materii betonowej zdaje się czymś więcej niż wolą zachowania spuścizny przeszłości. Można powiedzieć, że rewaloryzacja lub przedłużanie życia tych cennych żelbetowych obiektów, głównie w formie odpowiednio dobranej ochrony ich betonowych powierzchni, jest podstawą działań zmierzających do ich konserwacji.

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## Underground Mining Heritage Sites: Preservation and Safeguarding

### Podziemne dziedzictwo górnicze – zarys problematyki ochrony

**Keywords:** underground mining heritage, safeguarding of heritage sites, protection of historic sites, sustainable development

**Słowa kluczowe:** podziemne dziedzictwo górnicze, przestrzeń podziemna, ochrona dziedzictwa, zrównoważony rozwój

#### Introduction

The history of the mining industry in Poland bears witness to human creativity, being an empirical example of linear civilizational development as evidenced by advancements in mining and extraction techniques, roof stabilization and support methods and implementation of technologies for the maintenance of engineering infrastructure and sites. Mining has become the driving force behind the development of towns, villages and entire regions, enriching local communities and entire states, ensuring their prosperity. In well-preserved underground excavations we can still recognize retrospective values, such as integrity, authenticity, uniqueness as well as historical, symbolic and aesthetic values; in some cases prospective aspects are present as well, related to educational and economic features when these sites are still adaptable and can be put to commercial, use thus promoting the social development of the entire region.<sup>1</sup>

Studies and programs developed with a view to restore and bring to a new use the underground sites in the Wieliczka salt mine are of primary importance to present-day interdisciplinary research projects and development of conservation principles and schemes. Collaboration between the conservation officers and

experts on roof stabilization and support of the rock strata has resulted in the development of an intervention model by mining methods yet in consideration of the conservation principles. In the period 1984–1986, the team of experts: Jerzy Grzesiowski, Antoni Jodłowski, Roman Kędra, Robert Kurowski, Ignacy Markowski, Józef Piotrowicz, Janusz Wiewiórka, Janusz Wójcik and Andrzej Gaczoł, recalling the expertise of the Mining and Conservation Council headed by Professor Aleksander Garlicki,<sup>2</sup> developed the “Fundamental Principles of Conservation,”<sup>3</sup> which summarize formal and legal aspects of restoration works and the methodology and procedures to be implemented during mining, technical and restoring intervention projects. Of primary importance is the fact that a red line for mining interventions has been established, postulating the respect for heritage values and adoption of the major principle whereby “the excavations ought to be preserved in their original and authentic form.”<sup>4</sup> These problems were also addressed during regular international and national-level Conferences of Mining and Underground Open-Air Museums held by the Cracow Saltworks Museum. It is worthwhile to mention that the UNESCO World Heritage Sites List in Poland, grouping sites and landmarks considered to be of outstanding “value to humanity,”<sup>5</sup> with world-

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wide significance and, unique features, includes four old mines:

- The Royal Salt Mines in Wieliczka and Bochnia (Ref. No. 32, 1978, 2008, 2013), World Heritage Listing criterion IV,
- Tarnowskie Góry Lead, Silver and Zinc Mine and its Underground Water management System (Ref. No. 1539, 2017), World Heritage Listing criterion IV,
- Krzemionki Prehistoric Striped Flint Mining Region (Ref. No. 1599, 2019), World Heritage Listing criterion III and IV.<sup>6</sup>

It is not a haphazard selection, instead it illustrates well the significance of mining heritage on the regional level and world-wide.

Presently in Poland that are 22 old coal, salt or metal mines (including 3 open-pit mines) that have been put to a new use. In addition, 24 old excavations of historic interest have been identified and penetrated; depending on their condition they too should be open to public, or, if it is not possible, should be exhibited in the form of artefacts either in the natural landscape or in the urban settings.

### Legal aspects

The interest in safeguarding of industrial heritage, including old mining sites, dates back to the early 1990s. The significance of this heritage, as the driving force behind social and economic transformations in the history of communities and societies, was emphasized in official documents issued by international institutions, such as: The Council of Europe, European Committee and UNESCO (ICOMOS, TICICH). The first document having relevance to mining heritage was the recommendation of 1990 by the Council of Europe: *On the Protection and Conservation of the Industrial, Technical and Civil Engineering Heritage in Europe*<sup>7</sup> which states in the preamble that “the technical industrial and civil engineering heritage constitutes an integral part of the historic heritage of Europe.”<sup>8</sup> This document (section II) emphasizes the need for the identification, survey and academic analysis of the technical, industrial and civil engineering heritage,<sup>9</sup> focusing our attention on “significant sites and places whose geographical situation makes access difficult (small hydraulic works, small dams, disused mines etc.), which are harder to protect.”<sup>10</sup> One of the key aspects is “the protection of not only archives which retrace their history, but also plans and other data concerning the construction of technical and industrial buildings, civil engineering works and production processes.”<sup>11</sup> This postulate is of key importance in the context of the protection of underground mining heritage. The lack of archival documentation, excavation plans, as well as business documents of disused mines (production levels) adds to the difficulties involved in restoration works aimed as adaptation of old excavation to be used either for research purposes or as tourist attractions.

Of particular interest in the context of heritage safeguarding and protection was the protocol to the The Nizny Tagil Charter for the Industrial Heritage of July 2003,<sup>12</sup> published by The International Committee for the Conservation of Industrial Heritage (TICCIH), where the definition of industrial heritage is expanded to include “places used for social activities related to industry such as housing, religious worship or education”<sup>13</sup> and it is suggested that industrial archaeology ought to incorporate historical research on manufacturing technologies and techniques.

In the context of the preservation of underground mining heritage, of particular importance is protection of local communities in industrial areas “threatened by sudden structural transformations.”<sup>14</sup> This postulate is of key importance in Poland in the light of the continuing process of reducing coal production, resulting in closures of old mines. In response, programs should be developed to “preserve and safeguard the industrial heritage, which ought to be incorporated in an overall strategy of economic development and economic plans, both on the regional and national level,”<sup>15</sup> to prevent uncontrolled and irreplaceable loss of material objects of mining heritage as well as of non-material (intangible) aspects—local dialects, family relations, personal and social attitudes, literature etc. In the document entitled *The Industrial Heritage in Europe* issued in 2013, the Standing Committee of the Council of Europe reaffirmed the significance of industrial heritage protection, as an integral element of the common European background.<sup>16</sup>

In the above mentioned paper discussing the fundamental types of preservation and safeguarding activities, the authors included the following points:

- the need to develop social awareness;
- the need to define clearly the elements of the heritage—administrative aspects;
- introduction of preservation and safeguarding programs to the land development plans for the given regions;
- creations of multiple and variable options as to the functional use of the social heritage sites;
- applying new models of funding—private financing, state subsidies, others (crowdfunding, revolving funds, public guarantee schemes, tax break schemes);
- introduction of informative policies—presenting the inventory of resources in the context of exchange of the international information using digital platforms;
- developing education while cooperating with specialists from different fields, artistic schools and schools of design;
- supporting interdisciplinary cooperation with the volunteer organizations participating in the process of the preservation of the cultural and natural heritage.<sup>17</sup>

One of the consequences of starting the process aimed at preservation of the post-industrial heritage in

Europe, referring mainly to the preservation of mines of the post-industrial heritage, is the need to incorporate proper legal regulations in the Polish legislation. In the Regulation on the Preservation and Safeguarding of Historic Monuments and Heritage Sites, in Article 6, the authors formulated a catalogue of objects that could be referred to as monuments and heritage sites. In the catalogue being open in its character, the authors enumerated monuments and relics of industrial culture that are: “technical objects, especially mines, steel-making companies, power plants and other industrial plants” (immovable monuments);<sup>18</sup> “technical (engineering) creations especially technical devices, means of transport / machines / and tools giving a picture of the material culture characteristic of the old and the new forms of state-controlled economy documenting the level of science and civilization” (immovable monuments).<sup>19</sup>

In the process of preservation of the underground heritage, legal acts and regulations referred to as The Geological and Mining Laws<sup>20</sup> as well as the Act having relevance to the operation plan of the mining plants, have some significant meaning.<sup>21</sup> First of all, the problem of mine closures is addressed.<sup>22</sup> This aspect is raised in the regulation of the Ministry of the Environment of 2017 referring to operation of mining plants introducing a regulation whereby the mine operators are obligated to define the ways of “safeguarding objects, machines, installations or excavations regarded as archaeological heritage, as well as other objects of historic interest.”<sup>23</sup>

The issue of preservation of the geological heritage was addressed for the first time in 1988 by the European Association for Conservation of Geological Heritage-ProGeo. In 1996, the project “Global Geosites was launched,”<sup>24</sup> under the auspices of UNESCO, as the Global Geosites Work Group (GGWG) and the detailed criteria were defined to support the assessment and evaluation of geological heritage.

The most fundamental criteria of the assessment of the geological heritage are the characteristic features of geosites, their usefulness for interdisciplinary studies, scientific and practical usefulness in relation to geodiversity of the analyzed area. The representativeness of geosites and usefulness for interdisciplinary studies are connected with geological exposure and the preservation of the most important lithological, geomorphological and hydrological features that constitute an element of evaluation of geodiversity in the given geological.<sup>25</sup>

The Act referring to the Preservation of Natural Resources defines the scope and range of resources and sites to be preserved and safeguarded, providing for *ex situ* preservation of the species of plants, animals and fungi being separated from the place of origin, preservation of rocks, fossil and minerals in places of their natural occurrence and protection *in situ* of species of plants in places of their natural occurrence.<sup>26</sup> That means that protection of underground excavations is of a synergetic character representing the existing cultural and natural resources regarded as equivalent.

## Resources to be preserved – evaluation and valorization

This process should be understood as the defined program of the so-called synchronic presentation.<sup>27</sup> These are mining and geological procedures coordinated at various levels with the methodology of preservation.

This system allows us to define the elements of the heritage representative of the given underground object or site and provides the analysis of the retrospective resources not only referring in the strict sense to underground excavation but also to complex cultural heritage (containing architectural, urban, landscape, cultural, non-materials elements).

Evaluation in the aspect of preservation and adaptation is a cognitive process “comprising of real values involving analytical sequence of identification, research, interpretation, defining, redefining and evaluation of separate individual values.”<sup>28</sup> It should be emphasized that underground structures display the features that are characteristic of the given architectural areas; not only because of their geometrical form, but also because of the presence of architectural and engineering structures implemented in the excavations and integrated with their interior. These include systems of safeguards protecting the integrated part of the production process, representing not only a progressive character of the production process in this branch, but they are also an example of high quality woodwork (framework and door lining systems, chock systems).

Evaluation of the mining heritage evaluation ought to rely on the following criteria: technology of creation (exploration of geological works); forms and geometry of space; stabilization of galleries, entries, caverns, drifts, shafts; systems of linings—the support structures, egress routes—the evacuation plan; methods of elimination of environmental hazards (dehydration, ventilation, primitive and traditional systems of warning: *Serinus canarius* and mobile objects (lighting, mining and haulage equipment, transport). It is worthwhile to mention the paper by Professor Antoni Jodłowski which addresses these issues in the context of the need to systemize the analysis and evaluation of man-made heritage geodiversity in the Wieliczka Salt Mine. Basing on these criteria, the maximum amount of information and observations can be registered that have relevance to a particular heritage site in the given region.<sup>29</sup> The author postulates “that historical and conservation studies of the old excavations in the salt mine in Wieliczka”<sup>30</sup> are fully merited and should be supported by technical and economic analysis to ensure the implementation of preservation and conservation works with the use of state-of-the-art technologies.<sup>31</sup>

This evaluation should be complemented by the analysis of the cultural heritage, its functional use and its historical background (economical, cultural and social aspects), of artistic heritage (sculpture, small archi-

texture, interior decorations) as well as non-material aspects (traditions, habits, literature).<sup>32</sup> These are values of social identity. In the context of natural heritage, the evaluation should comprise: rock types, tectonic features, geodiversity and new biological environments that came into being in the process of exploration.

Particular underground excavations may exhibit features corresponding to several criteria listed above, which further highlights their significance as historical sites. While selecting the underground heritage sites for preservation and safeguarding, it is suggested that their informative, educational and marketing aspects should be taken into account as well.

### **Intervention by mining methods**

Depending on their stability, underground excavations can be categorized into two groups: sites in continuous use, where rock strata and ground surface are either naturally stable or stabilized and reinforced by supporting or bolting structures; sites that have suffered damage, are buried under rubble or partly collapsed as a result of man-made and natural processes involved in mining exploitation, leading to disintegration and physical transformations of the surrounding rock media.<sup>33</sup> The key aspect of interventions in underground excavations by mining methods is maintaining their stability, i.e. the ability to retain shape geometry and spatial configuration within the rock strata. Identification of the primary state of stress, i.e., stress concentration and de-concentration zones within the surrounding geological settings is the top priority task. The state of stress is determined by factors associated with mining exploitation, such as the adopted mining method or implemented support systems. One has to emphasize the role of environmental degradation, revealed by chemical, electromechanical, microbiological or physical processes. This negative aspect is of key importance particularly in old salt mines whilst in mines where metal ores or coal were extracted it is of less significance. Another aspect to be considered, though often neglected in analyses and studies, is the way the surroundings interact with and impact on the behavior of the rock strata, particularly in the context of the existing civil engineering structures, infrastructure or agricultural production (presence of chemical substances). As a result, the state of stress within the rock strata can be changed and the suffusion effect will be observed (leaching the components from construction materials and the existing stabilizing structures by inflow of penetrating water). In interpretation of interactions between the rock strata and stabilizing systems of particular importance is the assessment of the working condition of the existing old structures, their mining and conservation stratigraphy profile, evidencing the back history of stabilization and rock support technology. These structures exhibit a variety of geometric configurations, are made of various materials and represent a diversity of engineering components, yet from

the standpoint of conservation officers, they constitute a homogeneous structure.

In the context of technical aspects of research investigations, a specific feature of support systems in underground excavations is that they are accessible on one side only, that applies to both brick and wooden structures. Obviously, that restricts the scope of works and a range of available research methods because of the one-way system of penetrating the studied structure and material (from the interior of an excavation towards the rock surface). Of particular interest is the fact that present-day mining interventions in the context of rock strata stabilization are often implemented by traditional methods, providing wooden supports though using modern-day technologies (Fig. 1, 2).<sup>34</sup> Selection and implementation of state-of-the-art mining technologies, such as adhesive and injection systems, anchoring systems or industrial steel supports is determined on one hand by the condition of the underground site, on the other-by the need to preserve original artefacts found in the existing supports. In such cases proper anchoring should be considered top priority so as to minimize the extent of interference with the structure and spatial configuration of the excavation and to better display its biodiversity. It is worthwhile to mention that stabilizing and safeguarding the old excavations using state-of-the-art technologies has become a subsequent step in the existing structure of man-made mining constructions, thus maintaining the historical continuity of technological advancements (Fig. 3).

### **Conservatorial intervention**

Old excavations of historic interest exhibit the natural and cultural attributes giving a coherent image of underground sites. It is required, therefore, that at the stage of research analyses, the diagnostic methods should be coordinated with the conservators' practices, taking into account the synergy effect. It means that the heritage studies-based evaluation analysis is just one element in the process of formulating conclusions and establishing conservation priorities in the light of safeguarding the retrospective values. In this case the major consideration is a hierarchically superior conclusion resulting from technical diagnostics of stability of mining excavations. Underlying all programs prompting the natural and man-made heritage preservation is the collaboration between engineering and conservation experts at the stage of preliminary and final diagnostic procedures. Generally, the concept of intervention by mining and conservation methods should incorporate a strategy for safeguarding of an underground site taking into account the projected changes of its functional features and adaptation requirements based on prospective values of the site before it can be open to the public.

The account of profits and losses involved in restoration of underground sites reveals that there are three main categories of sites:



Fig. 1. Sandstone mine in Nagórzycze (Nagórzyckie Grottos)—an example of a modern support structure based on traditional props with cross binding; photo by T. Wieja.

Ryc. 1 Kopalnia piaskowca w Nagórzycach (Groty Nagórzycskie) – przykład nowoczesnej konstrukcji wsporczej opartej na tradycyjnych podporach z wiązaniem krzyżowym; fot. T. Wieja.

- unique objects with outstanding natural and cultural values—limited accessibility—adaptation works for the purpose of preservation and safeguarding;
- objects which may profit by providing continuity of use or by bringing them back to use after it was discontinued—individually tailored scope of intervention works;
- objects which, unless adapted, would deteriorate, leading to annihilation of natural and cultural features and structures.

The top priority in heritage evaluation analyses should be retaining the original function of the building or site. Retaining the original function of heritage sites is recommended in the reports issued by the Ministry of Culture and National Heritage in Poland, whereby buildings and sites are classified into several categories.<sup>35</sup> A similar approach was adopted in the documents issued under the National Program for Heritage Conservation and Preservation of Historic Monuments for the years 2013-2016, providing the list of thus categorized objects and sites.<sup>36</sup> Alas, these documents make no direct reference to old underground excavations, so they have to be included in the “Other sites” category.

Preservation of the natural and cultural heritage sites as a top priority ought to be subject to clear-cut conservation principles, such as: maintenance or restoration of their original condition and function; maintaining the spatial and structural authenticity; maintaining the integrity of the building or sites; preservation of aesthetic integrity and of the period character; non-intrusive interventions, without destroying the heritage fabric and disturbing original strata profiles; reversibility of implemented alterations being the result of intervention by mining methods; highlighting the historic and symbolic aspects; maintaining the artefacts of technical infrastructure and geo-diversity in the form of in-situ exhibitions; evaluation of the proposed functional project, in the context of preserving the retrospective values; evaluation of artificial lighting provided in underground sites.



Fig. 2. Podgórze uranium mine in Kowary—conservation works inside the shaft through implementation of polygonal wooden support to the space reinforced and secured with a concrete arched support; photo by T. Wieja.

Ryc. 2. Kopalnia uranu „Podgórze” w Kowarach – prace konserwatorskie wewnątrz szybu w postaci zastosowania poligonalnego podparcia przestrzeni wzmocnionej i zabezpieczonej łukową podporą betonową; fot. T. Wieja.

The issue associated with artificial lighting in natural and man-made heritage sites is of key importance in the context of preserving their character (smell or micro-climate or acoustic phenomena), exhibiting



Fig. 3. Wieliczka Salt Mine—reconstruction of truss support in the “Gołuchowski” cavern, using modern anchoring support; photo by AMC.

Ryc. 3. Kopalnia Soli w Wieliczce – rekonstrukcja podparcia kratownicowego w grocie „Gołuchowski” przy użyciu współczesnego podparcia kotwionego; fot. AMC.





Fig. 4. Gold and arsenic mine in Złoty Stok—application of color light system (LED RGB diodes) in line with the guidelines relating to exposing rocks rich in iron compounds (ochre) in the Ochre Shaft open to the public; photo by T. Wieja.

Ryc. 4. Kopalnia złota i arsenu w Złotym Stoku – zastosowanie systemu oświetlenia kolorowego (diody LED RGB), według wytycznych ekspozycji kamieni bogatych w związki żelaza (ochra), w Sztolni Ochrowej otwartej dla publiczności; fot. T. Wieja.

the structure of stabilizing systems (multiplication of doors in galleries, 3D truss structures and the fiber and material of brick wall sections) as well as artefacts of technical infrastructure. This applies also to presentation of litho-diversity (texture and structure of minerals, tectonic features, flora and fauna specimens) or the formation process (diastrophism, magmatism, metamorphism) (Fig. 3). The selection of artificial lighting systems (spot lighting, flood lighting or mix light systems) and physical parameters of light (luminance or chrominance) is in the domain of light engineering. Yet these aspects ought to be coordinated under the supervision of conservation officers, with the main focus on reintegration of lighting systems within underground sites (Fig. 4). Conservation intervention is of primary importance in the context of adaptation of underground sites when they are to be brought to a new use. In many cases the only chance to preserve the site is through opening them to the public as underground tourist routes coordinated with the functions of a museum, or a spa center that would utilize available natural resources for therapeutic purposes (Fig. 5, 6).

### Social and economic aspects

Revitalization projects of underground heritage sites, launched by local communities, should incorporate the plan of introducing the new functional use, in line with the land development plans in a city or rural area, or in entire regions, protecting the interests of local communities.<sup>37</sup> The risk involved in such approach is that new functions of the objects and sites being made open are



Fig. 5. Liczyrzepa uranium mine in Kowary—present-day view of the spa hotel; photo by T. Wieja.

Ryc. 5. Kopalnia uranu „Liczyrzepa” w Kowarach – obecny widok hotelu uzdrowiskowego; fot. T. Wieja.

imposed *a priori*, neglecting the entire spectrum of urban development, architectural, technological or aesthetic considerations, which came to light in its entire history. Obviously, making accessible the spaces or sites which hitherto remained inaccessible for majority of inhabitants will enhance the landscape quality, through clearing up the grounds, creation of architectural aesthetic features in the town and also through changing the social attitudes when inhabitants begin to identify themselves with the region and its back history. A change in the functional use of underground excavation sometimes appears to be the only chance to preserve and retain the natural and cultural values. Professor J. Zachwatowicz stated that “Each historic building or site has to find the new role, more appropriate and such as to ensure its further existence and protection.”<sup>38</sup> The current expertise allows this postulate to be expanded to incorporate aspects associated with the public awareness of the value and history of the site.<sup>39</sup> The preservation and opening of old underground excavations to the public encourages inhabitants to identify themselves with the history of their region.

“Acquainting the readers with the history of their region, highlighting the links between the historic events and present-day natural and cultural landscape has become a vital component of 3D communication involving knowledge, images, feelings and emotions and based on exposing unique features of the region, which furthers the development of its specific and unique image.”<sup>40</sup> This means that mining heritage structures and sites should become the moving force behind land development and economic growth, promoting urban and regional development and growth. Basing on studies conducted by the induction method,<sup>41</sup> natural and man-made heritage sites to be adapted and re-opened as tourist routes may be regarded as a counterpoint to other natural, architectural or urban attractions, generating natural-cultural settings which interact with the visitors utilizing the synergy effect.<sup>42</sup> One excellent example of revitalization is the old arsenic and gold mine in Złoty Stok, Poland. A project was undertaken





Fig. 6. Gold and arsenic mine in Złoty Stok—contemporary sandstone portal completed when the Ochre Shaft was opened; photo by T. Wieja.

Ryc. 6. Kopalnia złota i arszeniku w Złotym Stoku – współczesny portal z piaskowca wykonany w chwili otwarcia Sztolni Ochrowej; fot. T. Wieja.



Fig. 7. Gold and arsenic mine in Złoty Stok—open-air exhibition of reconstructed traditional mining equipment; photo by T. Wieja.

Ryc. 7. Kopalnia złota i arszeniku w Złotym Stoku – wystawa zrekonstruowanego tradycyjnego sprzętu górniczego na wolnym powietrzu; fot. T. Wieja.

and successfully completed, resulting in revitalization of the system of underground excavations, the old disused mine buildings and its immediate surroundings where a medieval mining settlement was built and furnished (Park of Medieval Technology) (Fig. 7).

The preservation and safeguarding of natural and man-made heritage is in line with the principles of sustainable development. On the intentional level, the principles of sustainable development promote certain human behaviors and activities as the basis for interdisciplinary and equivalent social, economic and ecological processes. They require a thorough understanding of the links between retaining the retrospective values for the future generations, and initiating prospective values by those living here and now. Consequently, aesthetic, social, economic, ecologic processes are thus maintained, and developed, at the same time land and urban development is promoted. Thus initiated ecological processes, such as reclamation of degraded land and substance and their utilization as well as urban development and land development processes through clearing up the surroundings with the view of making them accessible to the public, foster the economic development of local communities. Thus, local communities tend to engage in grassroots initiatives and activities, particularly in areas affected by economic restructuring, resulting in increased unemployment levels. The utilization of the locally available human and material resources helps the local communities maintain their identity, for example through arousing the awareness of the uniqueness of the site, recreation of old crafts and technologies, recovery of traditional social relations, etc.

## Conclusions

Old underground excavations are an immanent component of cultural and natural heritage, a non-transferrable value added during the transformations of geological structures and impacting on the process of formation of architectural space, urban development and natural land features in the neighborhood of underground sites. Many of these sites used to become starting points for mining settlements, or towns which, in consequence, furthered the development of the entire regions and sometimes ensured the prosperity of the states. It is worthwhile to mention the significant contribution of conservation and mining organizations in Poland to preservation, safeguarding and opening the old underground excavations to the public. Synergic programs developed by the conservation and mining agencies to protect the retrospective values and expanded to incorporate the prospective values give credit to achievements of Polish specialists as a model of interdisciplinary collaboration, in the light of legal, educational and economic considerations.

On account of the vast scope of analytical studies on technical and conservation intervention works undertaken to safeguard and preserve underground heritage sites, it is suggested that multi-criterial methods should be used to support decision-making. On this basis, a master plan should be created at the preliminary stage, to define the adopted strategy of preserving the sites and opening them to the public that would account for the social and economic effects of this process.

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- <sup>18</sup> Ustawa z 23 lipca 2003 o ochronie zabytków i opiece nad zabytkami, Dz.U. 2018 as amended.
- <sup>19</sup> Ibidem.
- <sup>20</sup> Ustawa z 9 czerwca 2011 prawo geologiczne i górnicze, Dz.U. 163, item 981.
- <sup>21</sup> Rozporządzenie Ministra Środowiska z 8 grudnia 2017 w sprawie planów ruchu zakładów górniczych, Dz.U. 2017, item 2293.
- <sup>22</sup> Mining plant—a technically and organizationally autonomous complex of means used directly to perform activity regulated in the Act in terms of the extraction of minerals from deposits, and underground mining plants that extract coal, and the preparation of the mined materials for sale, which remain in a technological relationship of mineral mining, and an underground mining plant without tank-based substance storage, or the underground storage of waste, including mining excavations, buildings and installation machinery (art. 5, section 1, point 18, Geological and Mining Law Act).
- <sup>23</sup> Ibidem.
- <sup>24</sup> Z. Aleksandrowicz, *Ochrona dziedzictwa geologicznego Polski w koncepcji europejskiej sieci geostanowisk*, “Przegląd Geologiczny” 2003, vol. 51, No. 3, p. 224–230.
- <sup>25</sup> Eadem, *Geochrona w ujęciu narodowym, europejskim i światowym (ze szczególnym uwzględnieniem polski)*, “Biuletyn Państwowego Instytutu Geologicznego” 425, Warszawa 2007, p. 19–26.
- <sup>26</sup> Ustawa z 16 kwietnia 2004 o ochronie przyrody, Dz.U. 2004, item 880.
- <sup>27</sup> T. Wieja, *Ochrona i adaptacja podziemnych wyrobisk*, Kraków 2019, p. 122.
- <sup>28</sup> W. Affelt, *Metoda TECHNITAS wartościowania dziedzictwa techniki*, <http://konserwatorstwo.umk.pl> (accessed: 8 V 2021).
- <sup>29</sup> A. Jodłowski, “Problematyka ochrony zabytkowej Kopalni Soli w Wieliczce oraz aktualny stan i program badań naukowych”, [in:] “Zasady postępowania konserwatorskiego przy konserwacji zabytkowej Kopalni Soli w Wieliczce” (typescript), problem session, Stowarzyszenie Konserwatorów Zabytków o/Kraków, Wyd. Ochrony Zabytków UMK, Muzeum Żup Krakowskich, Wieliczka 1986, p. 33–34.
- <sup>30</sup> Ibidem, p. 37.
- <sup>31</sup> Ibidem, p. 38.
- <sup>32</sup> UNESCO Convention for the Safeguarding of Intangible Cultural Heritage, <https://www.coe.int/en/web/conventions/full-list> (accessed: 10 V 2021).
- <sup>33</sup> T. Mikoś et al., *Górnictwo-geotechniczne metody adaptacji i rekonstrukcji zabytkowych podziemi*, Kraków 2014, p. 91.
- <sup>34</sup> M. Bartos, T. Wieja, *Zastosowanie drewna w zabezpieczeniu i aranżacji podziemnych tras turystycznych w Polsce*, [in:] *Drewno w architekturze*, ed. J. Kurek, Kraków 2016, p. 15–32.
- <sup>35</sup> Dane Krajowego Ośrodka Badań i Dokumentacji Zabytków, *Raport o systemie ochrony dziedzictwa kulturowego w Polsce po roku 1989*, Warszawa 2007, p. 74.
- <sup>36</sup> Krajowy Program Ochrony Zabytków i Opieki nad Zabytkami na lata 2013–2016, <http://bip.mkidnis.gov.pl> (accessed: 10 V 2021).
- <sup>37</sup> IV Konferencja Muzeów Górniczych i Skansenów Podziemnych, Muzeum Żup Krakowskich, Wieliczka 2018.
- <sup>38</sup> J. Zachwatowicz, *Program i zasady konserwacji zabytków*, “Biuletyn Historii Sztuki i Kultury” 1946, No. 1/2, p. 48–52.
- <sup>39</sup> A. Czyżewska, *Zakres opracowywania i wdrażania programów rewitalizacji. Dobre praktyki*, Przykłady rewitalizacji miast, Kraków 2010, p. 305–307.
- <sup>40</sup> T. Bogacz, *Kulturowe konteksty turystyki uzdrowiskowej*, [in:] *Turystyka uzdrowiskowa w gospodarce regionu i kraju*, ed. T. Iwanek, Wrocław 2006, p. 41–48.
- <sup>41</sup> It is based on an analysis of individual facts and on this basis, general conclusions are drawn.
- <sup>42</sup> W. Kosiński, *Aktywizacja turystyczna małych miast (aspekty architektoniczno-krajobrazowe)*, Kraków 2000, p. 76.

## Abstract

Old underground excavations are an immanent component of cultural and natural heritage. Bearing in mind the fact that each space formed as an underground excavation has unique features, the author of this study explores the fundamental principles having relevance to retrospective values represented by mining heritage created through formation and exploration of underground excavations, and recognizes the priorities for modern intervention schemes in the context of heritage preservation and safeguarding. Revitalization of old disused underground excavations gives rise to social, economic and ecological mechanisms at the stage of investment planning, implementation and operation and maintenance. That determines the continuation and development of aesthetic, social, economic and ecological processes, as well as land and urban growth being inherent components of sustainable development of towns and entire regions.

## Streszczenie

Podziemne wyrobiska górnicze są immanentnym składnikiem dziedzictwa kulturowego i naturalnego, niezbywalną wartością dodaną w procesie przekształcania struktur geologicznych; mają także wpływ na kształtowanie przestrzeni architektonicznej, urbanistyki i krajobrazu naturalnego wokół realizowanych podziemnych obiektów. Mając świadomość, że każda przestrzeń uformowana jako wyrobisko podziemne ma indywidualne i niepowtarzalne cechy, w artykule sformułowano podstawowe zasady odnoszące się do oceny wartości retrospektywnych reprezentowanych przez dziedzictwo górnicze. Określono również priorytety dla współczesnej interwencji antropogenicznej w procesie jego ochrony i adaptacji. Rewitalizacja podziemnych nieczynnych wyrobisk generuje zachowanie i rozwój procesów estetycznych, społecznych, ekonomicznych, ekologicznych, krajobrazowych i urbanistycznych będących immanentnym składnikiem zrównoważonego rozwoju miast i regionów.

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## To Live Better: The Sonnenland Estate in Jelenia Góra against the Backdrop of the Activities of the Schlesische Heimstätte

### Mieszkać lepiej: osiedle Sonnenland w Jeleniej Górze na tle działań Schlesische Heimstätte

**Keywords:** Silesia, Jelenia Góra, Schlesische Heimstätte, architecture, interwar period

**Słowa kluczowe:** Śląsk, Jelenia Góra, Schlesische Heimstätte, architektura, XX-lecie międzywojenne

#### Introduction

The activity of the Schlesische Heimstätte, which lasted more than twenty years, had a significant impact on the urban and architectural landscape of Silesian cities, towns and villages, at the same time improving living conditions of hundreds of thousands of Silesians. In the times of the primacy of Modernist aesthetics, the residential architecture created in the studio of the Silesian association quite clearly referred to the building traditions of previous epochs, smoothly combining them with the functional requirements of modern times and the imposed economy of means. By any means, this aesthetic conservatism and modern practicality, combined with the typification of formal solutions for social housing, did not contribute to the creation by Schlesische Heimstätte of serial, uniform houses, identical from Zielona Góra to Brzeg and from Jelenia Góra to Milicz. On the contrary, the example of the Sonnenland estate in Jelenia Góra shows that it is indeed possible to achieve individualization within the scope of typified houses, among others by incorporating it into the local historical and natural landscape.

#### The present state of research

The activity of the Schlesische Heimstätte has been mentioned many times in academic studies, but has not been given a monographic or synthetic approach.

So far, researchers have focused mainly on the first years of the society's operation, when it was headed (1919–1925) by Ernst May.<sup>1</sup> The construction activity of the Schlesische Heimstätte after 1925 remains poorly known. The exceptions are the society's projects in the Wałbrzych mining and industrial district.<sup>2</sup> Both the Sonnenland estate in Jelenia Góra, which is the subject of interest to the author of this article, and influence of the local building tradition on the architecture of the Karkonosze in the interwar period, have not been a subject of scientific research so far. A work devoted to the housing estate in Szczawno-Zdrój may constitute a certain analogy for the discussion on including housing construction of the beginning of the twentieth century in the cultural and natural landscape.<sup>3</sup>

#### Schlesische Heimstätte and the housing reform in Germany after the First World War

In March 1918, a new housing law was passed in the Weimar Republic, which was to solve the following pressing problems: lack of hygienic housing for the poor and middle-class population, and the overcrowding of cities.<sup>4</sup> One of the weapons in the fight to improve the housing situation of Germans were local housing care associations established on the basis of the above-mentioned act. Their tasks included building functional, hygienic flats of small and medium volume for less wealthy citizens, designing typi-

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fied single and multi-family houses using standardized elements and promoting modern, small interior furnishings.<sup>5</sup> One such association was the Schlesische Heimstätte, provinzielle Wohnungsfürsorgegesellschaft mit beschränkter Haftung (Silesian Houses, a provincial housing association with limited liability) with its headquarters in Wrocław, operating in Silesia in the years 1919–1941.<sup>6</sup> The statutory tasks of this organization, apart from the abovementioned ones, related to construction of apartments, and included, inter alia, promoting the establishment of building societies or cooperatives in the District of Wrocław and Legnica, advising and supporting local construction societies, cities, and districts as well as private persons in the field of the functional construction of small apartments, including giving opinions on building plots, assistance in preparing construction cost estimates, promoting construction cost reduction by the unification of buildings and standardizing construction materials, support in obtaining financing, including loans for construction projects and brokerage in ordering functional, cheap equipment for small apartments.<sup>7</sup> The mission of popularization and education was carried out by Schlesische Heimstätte in the magazine “Schlesisches Heim,” published by the association in the years 1920–1930 and, mainly at the beginning of its activity, through participation in local exhibitions, where both design and implementation achievements were presented, even featuring model buildings with complete equipment specially prepared for this occasion. Demonstration houses were presented, among others at the Breslauer Technische Messe (Breslau Construction Fair) in 1922 and at the Bau- und Betriebstechnische Ausstellung (Construction and Building Techniques Exhibition) in 1924. At the first of the above-mentioned exhibitions, Schlesische Heimstätte exhibited the so-called Selbsthilfehaus (self-help house)—a wooden, cheap and easy-to-build house that could be built by rural settlers with only basic craftsmanship skills. It was a small, two-story building on a rectangular plan, covered with a gable roof, falling almost to the ground level. Inside there was an exhibition of small-area home furnishings, which included both furniture and handicrafts of local manufacturers, as well as simple home appliances designed by Heinrich Tessenow and Peter Behrens.<sup>8</sup> Two years later, at the following May edition of the Breslau Construction Fair, Schlesische Heimstätte again presented its show house defined as a middle-class house for self-development (*Mittelstandhaus für Alleinbewirtschaftung*). It consisted of three cubic blocks set together—one single-story main building and three one-story outbuildings (garage and utility space) covered with a flat roof. The interior of the building was also used for exhibition purposes, where wall-mounted furniture was presented.<sup>9</sup>

Already in the first years of the operation of building societies, it turned out that the profile of activity adopted by them was extremely effective. Despite

the unfavorable economic situation after the First World War—the hyperinflation raging in the Weimar Republic and the crisis on the building materials market—thanks to social construction, over 160,000 apartments were built in the years 1918–1923 in Prussia alone.<sup>10</sup> Schlesische Heimstätte could also boast of considerable success in the first years of its activity. As stated by May, until 1924 the society was involved in the construction of small apartments in most cities and in many smaller communes of the Silesian Province,<sup>11</sup> which also resulted in the opening of its local branches, first in Jelenia Góra and Legnica, and then in Zgorzelec and Wałbrzych.<sup>12</sup> By the end of 1923, 699 apartments were built in single and multi-family buildings.<sup>13</sup> In the second half of the 1920s, after receiving guarantees in 1926 from the state and provincial authorities for granting more low-interest loans for housing construction, the activities of the Schlesische Heimstätte intensified, as a result of which at the end of 1929, the society could boast of over 5,200 rental apartments and over 1,500 houses for farmers built under its supervision.<sup>14</sup> This result was achieved despite the fact that the initial situation in Silesia was worse than in the western part of Germany. While population density in this area did not differ from the average in the Weimar Republic,<sup>15</sup> the housing conditions were much worse, as indicated in the occasional article by Leon Dunaj, the next chairman of the Schlesische Heimstätte after Ernst May.<sup>16</sup> This is also confirmed by statistical yearbooks: in 1924, almost 100,000 apartments in Wrocław (out of all 136,788) had a maximum of two heated rooms, including a kitchen, of which over a quarter consisted of just one—the so-called residential kitchen (*Wohnküche*).<sup>17</sup> Also, both the income from taxes on the use of the house (*Hauszinssteuer*), which were a source of financing for new housing projects, and the workers’ earnings, lower in Silesia than the national average, did not contribute to the improvement of living conditions.<sup>18</sup>

After the Nationalist Socialist German Workers’ Party (NSDAP) took power in 1933, housing construction was harnessed for ideological purposes. As Johann Wilhelm Ludowici, the Reich Commissar for German Settlement (*Reichskommissar für das Siedlungswesen*) announced in May 1933, “settlement (*Siedlungswerk*) is the most urgent, most important and most difficult task faced by the Reich government.”<sup>19</sup> Local building societies operating throughout the country, with an established structure and many years of experience, turned out to be an ideal tool for the implementation of these plans, therefore they were subordinated to the Reichsiedlungskommissariat.<sup>20</sup> The mission of building societies to create cheap and hygienic housing for low-income workers, farmers and lower-ranking officials perfectly matched the ideological assumptions of the NSDAP. Similarly, the siting of settlements on the outskirts of cities, due to the low cost of land, began to be justified in a doctrinal manner after 1933. Large cities were perceived as unhealthy for the body and spirit,



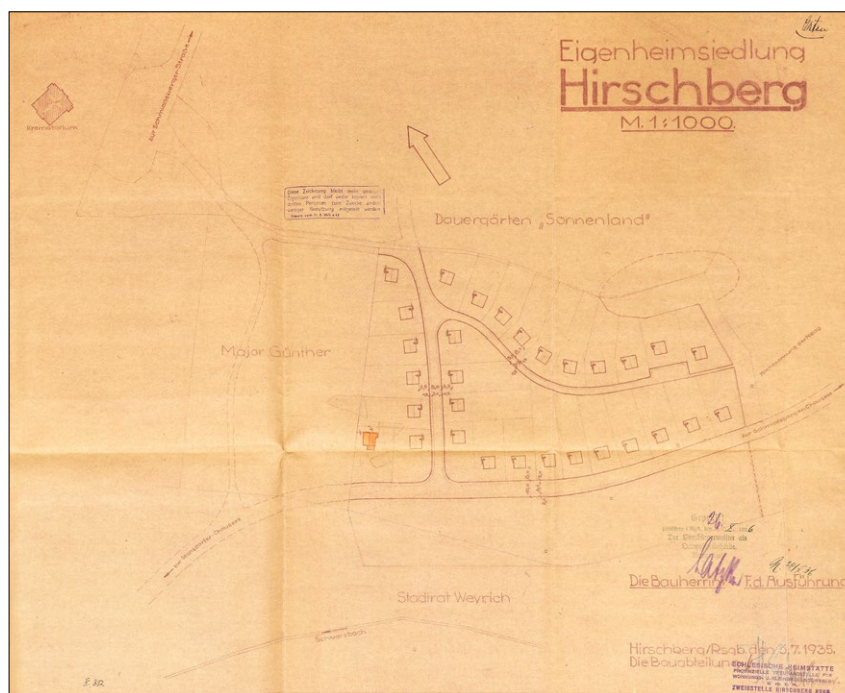


Fig. 1. Hans Höpfner, site plan of the Sonnenland estate in Jelenia Góra; source: APW o. JG.  
 Ryc. 1. Hans Höpfner, plan sytuacyjny osiedla Sonnenland w Jeleniej Górze; źródło: APW o. JG.

and therefore their urban layouts were to be reformed, and the population (120,000 to 180,000 people annually) from downtown districts was to be moved to newly built housing estates in small and medium-sized cities, which was the opposite of the nineteenth-century migration trends.<sup>21</sup>

### The Sonnenland housing estate in Jelenia Góra

The construction of the Sonnenland housing estate in Jelenia Góra began in 1935.<sup>22</sup> There were two institutions behind this undertaking: the Nationalsozialistische Schlesische Siedlungsgesellschaft mbH. Breslau (investor) and the Schlesische Heimstätte (contractor). The design of the entire complex and the typical “Rübezahl” house<sup>23</sup> was prepared by Hans Höpfner, an architect from Jelenia Góra (*Regierungsbaumeister*).<sup>24</sup> Twenty-nine detached single-family houses were erected on land purchased from the city, located south-east of the city center, on edge of the urban development area, between the then Schmiedebergerstraße (currently Sudecka Street) and Stonsdorfer Chaussee (currently Adama Mickiewicza Street). In the previously undeveloped area, new streets with a picturesque, curved course were marked out, and the remaining area was divided into plots of approximately 1,200 m<sup>2</sup>. The same “Rübezahl” type houses were erected along three streets (Lerchernweg, currently Skowronków Street, Rotkelschenweg, currently Dziecinna Street, and Pirolweg, currently Wesola Street), at the front edge of the plot, thanks to which there was a lot of space at the rear for establishment of home vegetable and ornamental gardens and orchards promoted by the state at that time, but also by the Schlesische Heimstätte.<sup>25</sup>

Interestingly, in order to adapt the catalogue design to the optimal insolation of the interior, houses along Dziecinna Street and Wesola Street were gable fronted, as opposed to the houses along Skowronków Street with ridge parallel to the street (Fig. 1).

The house in the “Rübezahl” type (Fig. 2) was a brick structure, with a basement on a square plan, with an added skeleton porch, covered with a high gable roof, with two residential floors (ground floor and attic) with a total living area of 88.10 m<sup>2</sup> and a usable attic. The building had a plinth pierced with windows illuminating the basement partially recessed in the ground, plastered facades with boarding on the gable walls and small, irregularly arranged windows with narrow, beveled window trims, adapted to the use of the interior. Clear and functional organization of the interior was determined by the division into two routes and two axes of different width. The passageway system, reduced to a minimum, was based on small corridors located in the extreme, narrower axis of the front staircase, adjacent to it on each floor, and on the ground floor additionally on the hall. Thanks to this solution, with such a small living space, it was possible to design two large rooms in the front section, on the ground floor (18 m<sup>2</sup> and 15 m<sup>2</sup>) and in the attic (16 m<sup>2</sup> and 13.5 m<sup>2</sup>)—one of the rooms was walk-through room. In the back section, in the axis of the main entrance, there were other utility rooms: a laundry room (in the basement), a kitchen and a toilet (on the ground floor) and a storage room (in the attic). Considering the size of the living space of the houses on the Sonnenland estate, it is surprising that the bathroom was not included in the design. Perhaps it was due to the desire to reduce construction costs. At the same time, the presence in

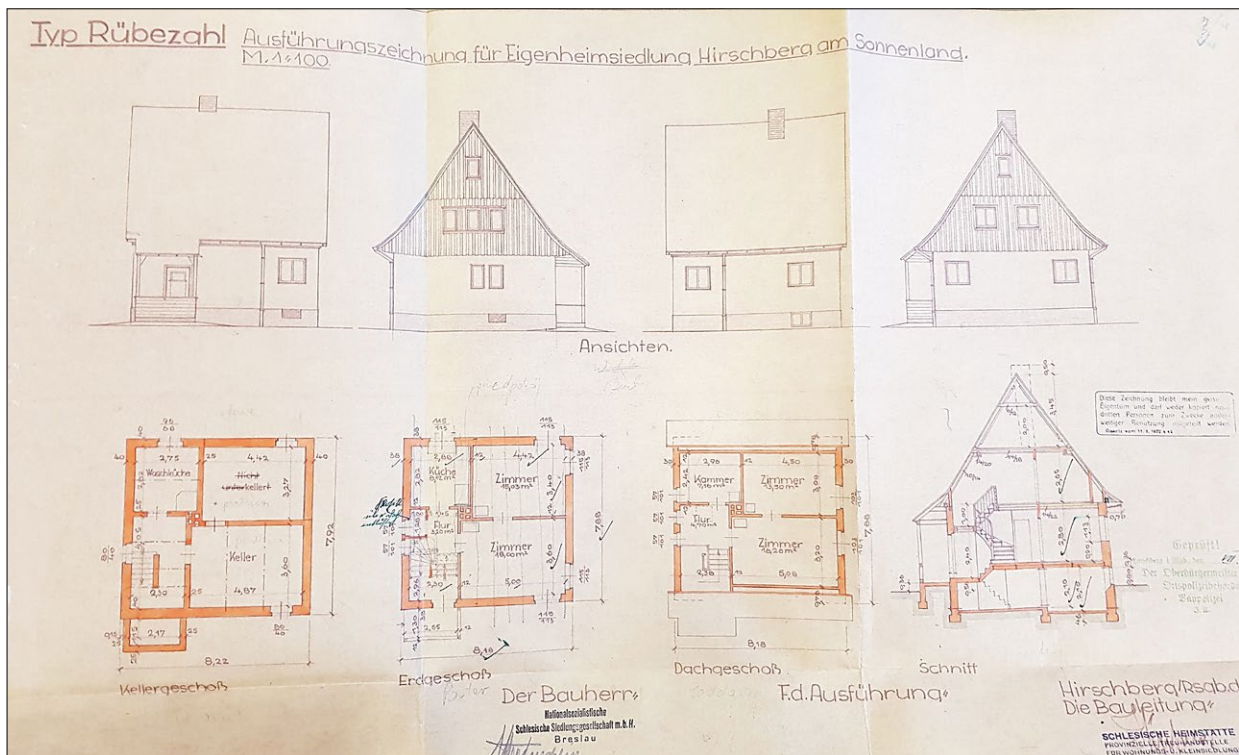


Fig. 2. Hans Höpfner, "Rübezahl" house design: facade view, basement, ground floor and attic floor plans, cross-section; source: APW o. JG.

Ryc. 2. Hans Höpfner, projekt domu „Rübezahl”: widok elewacji, rzuty piwnicy, przyziemia i poddasza, przekrój; źródło: APW o. JG.

the attic of a room described as *Kammer*, located in the vertical of the laundry room and kitchen, made it possible to adapt it to a bathroom. It is also possible that the laundry room had a bathtub for both washing and bathing. This type of solution, indicated already at the design stage, was found, among others in a "Borsig" type house<sup>26</sup> developed by the Schlesische Heimstätte in 1924, or in one of the model houses erected in the Munich-Ramersdorf estate.<sup>27</sup>

The cubic volume of the "Rübezahl" type house, compared to the single-family houses erected in the early 1930s in other housing estates, appears to be medium-sized. This is confirmed, inter alia, by division introduced at Munich's Deutsche Siedlungsausstellung (German Settlement Exhibition) in 1934. As part of this exhibition, the Munich-Ramersdorf estate was created with 192 houses built according to 34 different designs selected in a competition. These buildings, depending on their size, are divided into three types: small (basement, ground floor with a usable attic, three rooms, kitchen (*Wohnküche*), bathroom, restroom—a total of 65 m<sup>2</sup> of living space), medium (basement, two-story, four rooms, kitchen, additional room (*Kammer*), bathroom, restroom—a total of 86 m<sup>2</sup> of living space) and large (basement, two-story, five rooms, kitchen, additional room, bathroom, restroom—129 m<sup>2</sup> in total).<sup>28</sup> It cannot be ruled out that the houses presented at the Munich exhibition set the standards for residential construction around the mid-1930s, especially as they were popularized by both national (including "Deutsche Bauzeitung")

and regional press (in the Silesian Province, among others by the "Ostdeutsche Bauzeitung"). In this context, houses in the Sonnenland estate seem to be medium-sized, but slightly more economical than their exhibition counterparts, which were assessed as not too cheap.<sup>29</sup> The main differences were that in Jelenia Góra, the second floor is located in the attic and there is no bathroom, which in the Munich-Ramersdorf estate was a standard even in the smallest type of houses. Considering the use of solutions aimed at reducing costs, it should be emphasized that a fairly large and well-planned living space was obtained.

In 1924, the Schlesische Heimstätte prepared a catalogue of 16 types of houses: detached, semi-detached, terraced, single-, two-, four- and six-family houses, with a residential floor space of 47.60 to 184 m<sup>2</sup>, named after famous people, mainly related to Silesia: "Herhard Hauptmann," "Karl Hauptmann," "Langhans Vater," "Langhans Sohn," "Willmann, Borsig" etc.<sup>30</sup> Each house type differed not only in form and size, but, above all, were adapted to the needs of various social and professional groups, which manifested in their spatial and functional layout. For example: a house of the "Eichendorf" type, intended for rural or suburban settlers, was a modest detached house, for which a number of projects of additional farm buildings with the possibility of connecting them were developed, while the "Dahn" type house, intended for the middle class—doctors, lawyers, merchants, had additional rooms that could be turned into an office with a waiting room, and rooms for servants, because the



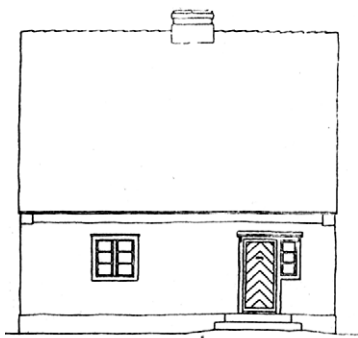


Abb. 2. Typ Eichendorff M. 1:200

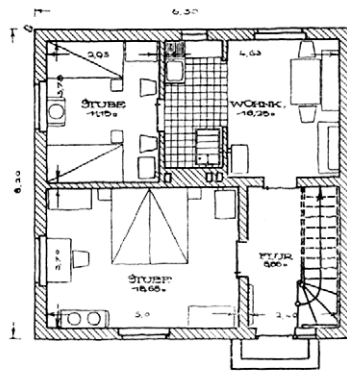


Abb. 3. Typ Eichendorff Erd-  
geschoß M. 1:200.

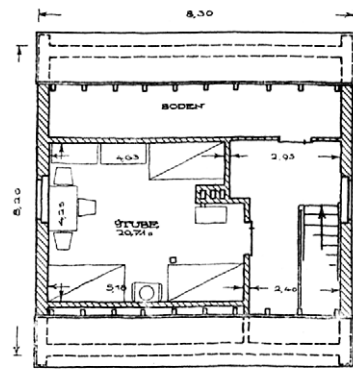


Abb. 4. Typ Eichendorff Dach-  
geschoß M. 1:200.

Fig. 3. House of the “Eichendorff” type, designed by Schlesische Heimstätte; source: “Schlesisches Heim” 1924, vol. 5, b. 3, p. 73.  
Ryc. 3. Dom typu „Eichendorff”, zaprojektowany przez Schlesische Heimstätte; źródło: “Schlesisches Heim” 1924, Jg 5, z. 3, s. 73.

size and rank of the house required additional help in running it. Of course, the design activity of the society in the following years was not based solely on these 16 types of buildings. Contrary to May’s declarations about the desire to reduce the number of typical houses, with time they were joined by new ones, including but not limited to “Waldenburg,” “Landau” or “Dammn” built in Wałbrzych.<sup>31</sup> To a large extent, they were variants of the types developed in the first half of the 1920s.<sup>32</sup> As Beate Störtkuhl noted, after May’s departure from the Schlesische Heimstätte in 1925, the society lost “contact with new trends in architecture,”<sup>33</sup> which also translated into a much smaller share of projects in which the authors undertook formal and stylistic experiments. Therefore, until the end of the 1930s, the designs from the beginning of Schlesische Heimstätte based on a simple shape, functional interior design and formal and stylistic motifs taken from the rural buildings enjoyed unflagging success in single-family housing, both in the case of the Lower Silesian and Upper Silesian provinces. This was also what the “Rübezahl” house looked like. Like most catalogue houses by the

Schlesische Heimstätte, it was a rectangular block covered with a gable roof, divided into two sections along the ridge. Layout of the ground floor suggests that it was a variant of the “Eichendorff” house—without outbuildings, but with a wooden porch added at the front and extended with a residential attic story (Fig. 3). Perhaps these modifications were aimed at adapting a modest house intended for workers or small farmers to the needs of a slightly wealthier social class. Indirect confirmation of this thesis is provided by the Jelenia Góra address book from 1939, from which it can be read that the overwhelming majority of the inhabitants of the Sonnenland estate were officials, teachers, senior police and railway employees, and sporadically qualified workers or merchants.<sup>34</sup>

While the formal issues of the “Rübezahl” type house do not constitute a major analytical and interpretative challenge and have been exhausted in the paragraphs above, the regional context is an interesting issue. The topic of a modern residential house, which fits in with the natural and architectural landscape of the Karkonosze Mountains, appeared regularly from around the mid-nineteenth century, which resulted not only in a number of ethnographic works, but also in specific construction implementations.<sup>35</sup> The exhibition facility, Heimathäusel in Karpacz, was established almost simultaneously with the Jelenia Góra housing estate in the spirit of regional architecture.<sup>36</sup> It uses solutions typical for a cottage in the Karkonosze region: layout plan of an elongated rectangle, a half-timbered structure, timbering of the upper tier of the gable walls. Of course, it is impossible to expect such a literal reference to regional architecture in the case of houses from the Schlesische Heimstätte catalogue, but in many cases the society incorporated local rural building motifs into its typical projects in order to fit them into the local natural and architectural landscape. How, then, can the relationship between the “Rübezahl” type house and the Karkonosze region architecture be defined? The name of this project comes from the name of the hero of the local



Fig. 4. Jelenia Góra, view of the gable wall of the house at 2 Skowronków Street, 2020; photo by M. Ostrowska-Bies.  
Ryc. 4. Widok ściany szczytowej budynku przy ul. Skowronków 2 w Jeleniej Górze, 2020; fot. M. Ostrowska-Bies.

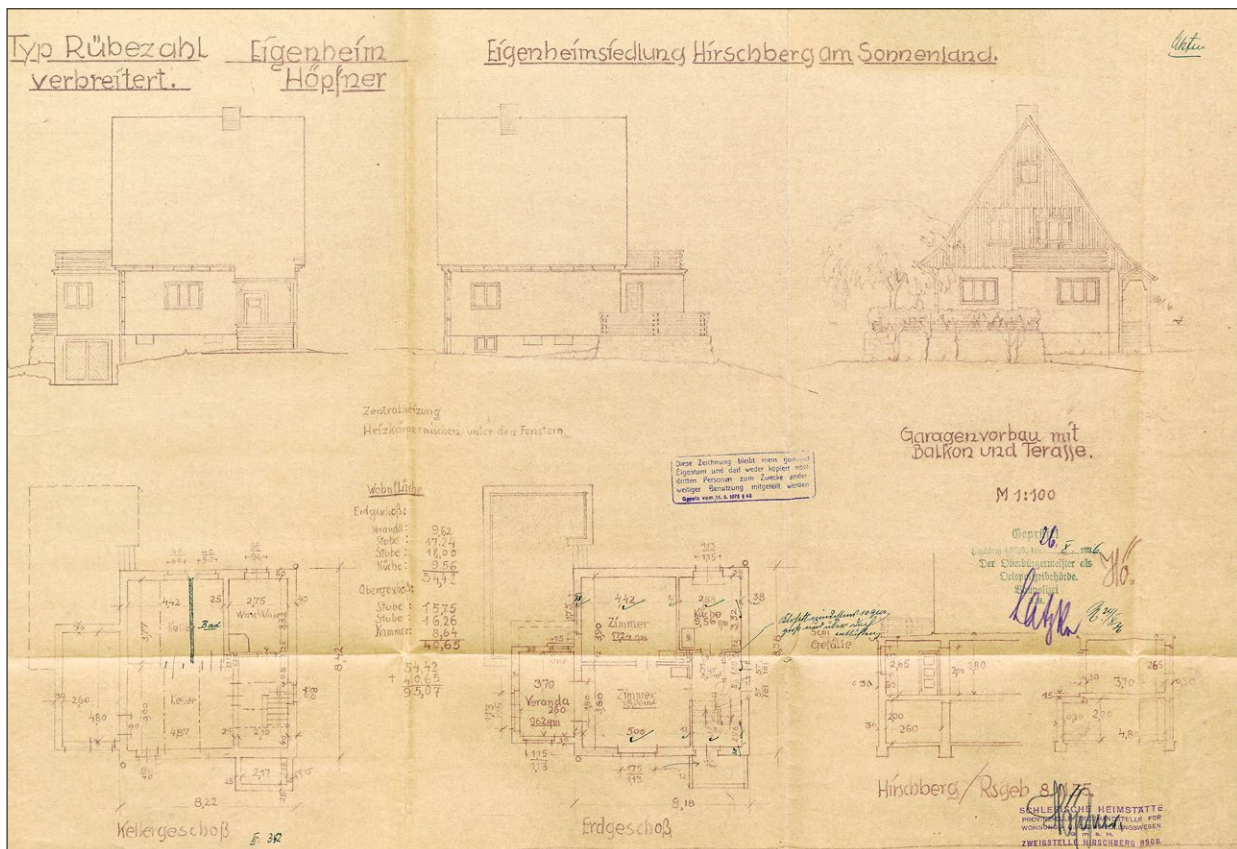


Fig. 5. Hans Höpfner, design of a modified house of the “Rübezahl” type, Jelenia Góra, 23 Wesola Street, 2020; photo by M. Ostrowska-Bies. Ryc. 5. Hans Höpfner, zmodyfikowany projekt domu „Rübezahl” w Jeleniej Górze, przy ul. Wesolej 23, 2020; fot. M. Ostrowska-Bies.

legend—Liczyrzepa, which may indicate that it was created for the needs of local construction, perhaps for the Sonnenland estate. Regional motifs appearing in it are: timbering of the gable walls with planks arranged vertically with sealing strips and a characteristic recess between the floors (Fig. 4),<sup>37</sup> or a wooden porch. Certainly, the name and wooden elements are not enough to consider this house as part of the traditions of local construction, especially since the timbering was often used in the construction of housing estates of that time,<sup>38</sup> similarly to the outbuildings in the timber frame technology. However, in the case of typified buildings, where the overarching goal was to reconcile low construction costs with obtaining a functional and hygienic building, both of these elements, and especially the use of a specific, regionally rooted form of timbering, can be considered a deliberate attempt to fit the building into the local natural and cultural landscape. It was also possible because it corresponded to the formal and stylistic assumptions adopted by the Schlesische Heimstätte and their counterparts from other parts of Germany of creating houses with a simple, cubed body, devoid of elements not resulting from their construction (as May wrote: “Every addition to the form of a small house, which is not organically needed is a lie”),<sup>39</sup> yet cozy and picturesque in their expression. This effect was achieved thanks by referencing old rural architecture, especially from the eighteenth century, popularized,

among others, by Heinrich Tessenow, the multi-volumework *Kulturarbeiten* by Paul Schultze-Naumburg published in the years 1901–1917, or publications devoted to the Frederick Colonization published in the 1930s. With these stylistic assumptions, it was possible to reconcile in the “Rübezahl” house the strict recommendations of the Schlesische Heimstätte with a discreet reference to the local building tradition of the Karkonosze region.

In addition to 29 houses in the Sonnenland estate, in its south-west corner, at what is now 23 Wesola Street, one more house of the “Rübezahl” type was built<sup>40</sup> It was built in 1936 by the author of the entire complex, Hans Höpfner, for himself and his family. Although the starting point was the Schlesische Heimstätte catalogue design, it was slightly modified (Fig. 5). A single-axis, one-story extension (described on the design as a porch) with a terrace and a large terrace extending far beyond the western facade was added to the rectangular block. The latter was faced with stone blocks, which could be a reference to the high stone plinths of traditional Karkonosze cottages. In addition, the window openings on the ground floor were enlarged. Minor changes were also made to the interior: in the basement, a part of the room adjacent to the laundry room was separated and adapted for a bathroom.

Höpfner, just like May in the case of his own house in Wrocław,<sup>41</sup> chose one of the Schlesische Heimstätte catalogue designs. The building, facing the street with





*Fig. 6. Houses at Skowronków Street, in the foreground a building in its original condition, Jelenia Góra, 2020; photo by M. Ostrowska-Bies.*

Ryc. 6. Budynki przy ul. Skowronków w Jeleniej Górze, w przedpolu widoczny budynek w stanie pierwotnym, 2020; fot. M. Ostrowska-Bies.

a timbered gable wall, with a characteristic, high, gable roof with a curved slope at the bottom, became part of the estate's landscape and formed a uniform formal and stylistic concept with it. However, unlike other houses, it is situated deep inside the plot, at its highest point, and stairs lead to it from the street level. In 1937, at the front edge of the plot, a garage was built, partially recessed into the elevation of the plot. The picturesque location of the building, the decorative garden stretching on the slope and the connected terrace with a view of Śnieżka mountain gave this modest house the character of a comfortable suburban villa.

### Conservation postulates

The current state of preservation of the estate and, more broadly, the problem of conservation protection of social housing of the 1920s and 1930s, are a separate issue. Neither the discussed establishment itself, let alone its individual buildings, are entered in the register of monuments, and were entered into the municipal record of monuments as late as in 2010. There is a local development plan for this area, but it was adopted in 2002, so it does not contain recommendations taking into account the presence of registered buildings, and no updated version has been adopted. Currently, the Sonnenland estate does not function as a separate urban layout, but, together with detached single-family buildings, erected on plots marked out at the extended sections of Skowronków and Wesoła streets, it is part of the Skowronków housing estate. The expansion towards the west does not significantly affect the nature of the original layout, and seems even to be provided for in the plans drawn up by Höpfner. The plan from 1935 shows a continuation of the curvilinear route of the streets mentioned above with a dashed line, which



*Fig. 7. Houses at Dziecinna Street, Jelenia Góra, 2020; photo by M. Ostrowska-Bies.*

Ryc. 7. Budynki przy ul. Dziecinnej w Jeleniej Górze, 2020; fot. M. Ostrowska-Bies.

is in line with the contemporary one. On the other hand, a deviation from the original, compact plan of the estate is the chaotic development of a large area located between parallel routes of extended streets, which began as early as 1937 and continued after the Second World War. While urban changes did not significantly affect the landscape values of the entire complex and its picturesque character, the formal and stylistic integrity of the former Sonnenland estate is much worse. Few of the 29 "Rübezahl" houses there have retained their original appearance (Fig. 6).<sup>42</sup> Construction interference concern both the change of building shape (adding one and/or two-story outbuildings, extension of the porch, opening the roof with dormer windows) and the facade (removal of horizontal divisions as a result of covering with polystyrene, removal of timbering of the gable walls, inserting windows without muntin bars) (Fig. 7). In this case, it seems unrealistic to restore the buildings to their original state. Preparation of a new local spatial development plan with provisions indicating the possibilities of dealing with bodies of buildings and material and color solutions for the facade or including the urban layout of the estate in an entry in the register of monuments could stop these changes. The lack of statutory protection and a low awareness of the value of estates built according to typical designs of that time may contribute to further degradation of the historic building stock. And the loss of formal and stylistic homogeneity of the entire complex, which, apart from the traditional, rural character of the houses, is the most recognizable feature of the Schlesische Heimstätte architecture, contributes to the greatest extent to the loss of this type of heritage.

### Conclusion

While the topic of unification of houses designed by or under the supervision of the Schlesische Heimstätte has



received numerous studies, the problem of individualization of particular implementations still requires a more in-depth analysis. As shown in this article, a possible strategy to give distinctiveness to buildings or their complexes within the framework of a far-reaching typification could be urban planning taking into account natural geographic conditions, technological and material adaptation to local

climatic requirements, or the regional construction tradition.<sup>43</sup> Although the above-mentioned measures, used in the Schlesische Heimstätte implementations, usually resulted from the economy or the theoretical framework outlined by Ernst May, they made the typified architecture take on individual features and perfectly fit into the existing cultural and natural landscape.

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<sup>6</sup> At the time of its establishment, until 1922, the Schlesische Heimstätte was combined with a slightly older institution—the Schlesische Landgesellschaft.

<sup>7</sup> State Archive in Wrocław, Jelenia Góra Branch (hereinafter: APW o. JG), Files of the City of Jelenia Góra (hereinafter: AMJG), ref. 3905, k. 1.

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<sup>11</sup> Ibidem, p. 406.

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<sup>22</sup> Design of the estate is dated July 1935, while the "Rübezahl" type house is dated June 1933. APW o. JG, AMJG, k. 2, 3.

<sup>23</sup> Although it is a typical house, at the current stage of research, it has not been possible to find implementation of this design in a different location. This topic requires further inquiries.

<sup>24</sup> APW o. JG, AMJG, ref. 5422, k. 1, 7.

<sup>25</sup> Promotion of horticulture by the Schlesische Heimstätte took place, inter alia, with the help of a multi-page guide "Die grüne Illustrierte," which was an add-on to the "Schlesisches Heim" magazine, where gardening, plant care and vegetable cultivation were taught, and examples of garden arrangements were presented. In addition, with participation of the Schlesische Heimstätte, the Niederschlesische Gartenfürsorge GmbH was established, whose task was to advise on gardening for the needs of the Schlesische Heimstätte; E. May, *Die Grundtypen der Schlesischen Heimstätte mit Finanzierungstabelle*, "Schlesisches Heim" 1924, vol. 5, b. 4, s. p. 411.

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<sup>30</sup> E. May, *Die Grundtypen der Schlesischen Heimstätte*, p. 109–117.

<sup>31</sup> B. Ludwig, *Osiedla mieszkaniowe*, p. 51–52.

<sup>32</sup> This thesis is also confirmed by the alternative nomenclature of typical houses based on numbers: types from 1 to 12 defined additionally by variants a, b, c etc.

<sup>33</sup> B. Störckuhl, *Ernst May i Schlesische Heimstätte*, p. 30.

<sup>34</sup> *Hirschberger Einwohnerbuch 1939*, Hirschberg 1939.

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<sup>36</sup> In Heimathäusel, the regional artifacts were presented—local crafts, interior furnishings, etc. The idea to build this facility was born in 1924, but its implementation was not started until 1934; M. O.u., *Das Heimathäusel in Krummhübel*, “Der Wanderer im Riesengebirge” 1936, vol. 56, No. 12, p. 201–202.

<sup>37</sup> This motif appears throughout the Sudetes region; E. Trocka-Leszczyńska, *Wiejska zabudowa mieszkaniowa w regionie sudeckim*, Wrocław 1995, p. 208.

<sup>38</sup> Timbering of the gable walls of houses can be found, among others, in houses in the Langenhorn-Herzmoor estate in Hamburg (1934/1936), Ahrensburg in Hagen (1933/1937), or Eigenheimsiedlung Wolbuch II in Stuttgart (1933/1934).

<sup>39</sup> E. May, *Wohnungsfürsorge*, p. 406.

<sup>40</sup> APW o. JG, AMJG, ref. 5696.

<sup>41</sup> Reference to the house at current 6 Moniuszki Street in Wrocław, erected in 1920.

<sup>42</sup> In this context, the houses at 2 and 8 Skowronków Street with the preserved original window and door joinery as well as window trims are worth paying attention to.

<sup>43</sup> In addition to the above-mentioned strategies for individualization of typified establishments used in the Sonnenland estate, one can distinguish one more, used in the design of early modernist housing estates, also by architects associated with the Schlesische Heimstätte, namely: individualization by shaping green surroundings. More on this subject was written by B. Ludwig, *The Greenery of Early Modernist Housing Estates: The 1919–1927 Wałbrzych Agglomeration, “Sustainability”* 2021, Vol. 13, issue 3921, p. 3921.

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## Abstract

Building societies operating in the region were to be the solution to the housing problems prevailing in the Weimar Republic after the First World War. One of them was the Schlesische Heimstätte, carrying out its mission of building small, cheap, standardized houses in the Silesian Province. One of them was the Sonnenland estate of single-family houses in Jelenia Góra, completed in 1935. For this purpose, the architect from Jelenia Góra, Hans Höpfner, developed a new type of house—“Rübezahl.” The considerations contained in the paper are intended to show how this catalogue design fit into the standards of social housing at that time and to what extent it was possible, in the case of unified and standardized architecture, to include the themes of the style of the Karkonosze region. The problem of the statutory conservation of this type of buildings and contemporary attempts to include it in the local cultural and natural landscape is another, separate subject discussed in this paper.

## Streszczenie

Rozwiązaniem problemów mieszkaniowych w Republice Weimarskiej po I wojnie światowej miały być działające regionalnie towarzystwa budowlane. Jednym z nich było Schlesische Heimstätte, realizujące budowę niewielkich, tanich, standaryzowanych domów w Prowincji Śląskiej. W początkach działalności, w pierwszej połowie lat dwudziestych XX wieku, pod kierownictwem architekta Ernsta Maya towarzystwo wypracowało teoretyczne i praktyczne ramy działania, m.in. opracowało katalog 16 typów budynków nawiązujących stylistycznie do architektury wiejskiej. Zrealizowane w roku 1935 osiedle domów jednorodzinnych „Sonnenland” powstało we współpracy z Schlesische Heimstätte. Na potrzeby tego założenia jeleniogórski architekt Hans Höpfner opracował nowy typ domu – „Rübezahl”. Artykuł ukazuje, jak ów katalogowy projekt wpisywał się w ówczesne standardy domów socjalnych i na ile możliwe było, w przypadku architektury typizowanej i standaryzowanej, włączenie wątków stylu regionu Karkonoszy.

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## Theoretical Analysis of Static Behavior of Masonry Pillars with Geometric Imperfections

### Analiza teoretyczna pracy statycznej filarów murowych z imperfekcjami geometrycznymi

**Keywords:** masonry pillars, geometric imperfections, numerical analysis, static behaviour, historical structures

**Słowa kluczowe:** filary murowe, imperfekcje geometryczne, analiza numeryczna, praca statyczna, konstrukcje historyczne

#### Introduction

The assumption of ideal geometry for historical structures is a simplification which can result in incorrect conclusions related to failure modes of the main members of the load-bearing structure. Deformations of masonry structures may be caused by a number of factors, including, inter alia, changes in the subsoil (uneven settlement, as subsoil and groundwater conditions change) or structural errors (unfavorable static behavior).<sup>1</sup> One example of such deformations is the tilting and damaged bases of free-standing stone pillars of the Temple of Apollo in Bassae, which had been analyzed with reference to the effects of seismic impact. It was concluded that the negative impact of different imperfections on load-bearing capacity was additive.<sup>2</sup> The impact of the tilting of the pillars on their load-bearing capacity was also studied by Gurel et al.,<sup>3</sup> who presented an analytical solution for a deformed column, which involved the use of a model with an ideal geometry and equivalent horizontal loading. Results obtained from

calculations indicated an immense susceptibility of columns with a tilting imperfection to seismic impact. Aside from deformations involving flexure, tilting or damage to the base of the column, there are also torsional and flexural—torsional imperfections. Examples of such deformations can be seen in some of the structural members of St. Mary's Church in Ostrow Tumski in Poznań. Rapp and Sielicki<sup>4</sup> performed a numerical analysis of a brick pillar with deformations in the form of reciprocal torsion of its cross-sections and flexure. The horizontal deflection in the extreme case reached  $\Delta l=0.023$  and was linked to a concurrent torsion. This non-axial geometry resulted in 20% decrease of load-bearing capacity. This proved that analysis of a joint impact of these two types of deformation was reasonable. Consideration of the actual geometry in the case of masonry structures is particularly important due to their brittle response to tensile stresses. As previously mentioned, the issue of load-bearing capacity of pillars subject to seismic loading is already extensively covered in literature<sup>5</sup>.

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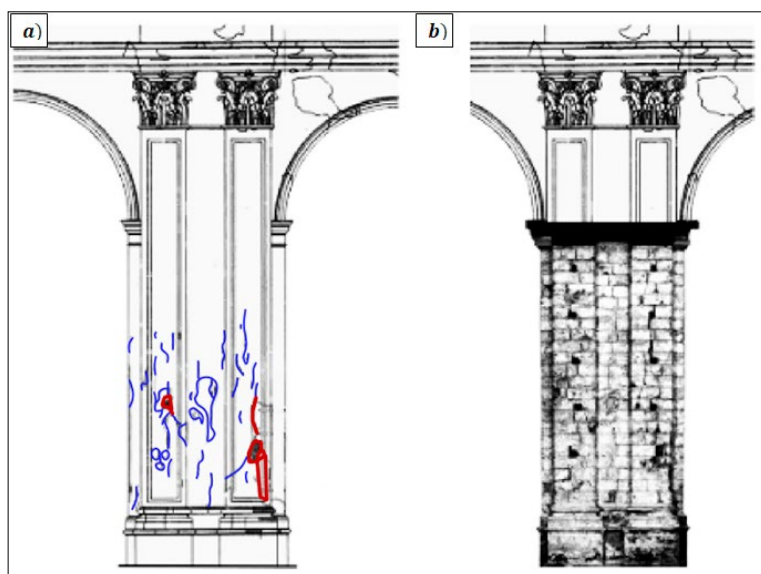


Fig. 1 Damage to the pillars in Noto Cathedral: a) image of the damage (blue—scratches, red - cracks), b) view of the damage; source: L. Binda et al., *Non destructive testing techniques applied to masonry and timber structures of the Crocifisso Church in Noto*, [in:] *Retrofitting of Heritage Structures: Design and Evaluation of Strengthening Techniques*, ed. S. Syngellakis, Ashurst 2013, p. 75–87.

Ryc. 1. Uszkodzenia kolumn w katedrze Noto: a) obraz uszkodzeń (niebieski – zarysowania, czerwony – pęknięcia), b) widok uszkodzeń; źródło: L. Binda et al., *Non destructive testing techniques applied to masonry and timber structures of the Crocifisso Church in Noto*, [w:] *Retrofitting of Heritage Structures: Design and Evaluation of Strengthening Techniques*, red. S. Syngellakis, Ashurst 2013, s. 75–87.

An example of damage to historical pillars is the partial catastrophe of the Noto Cathedral in 1996, which was preceded by an earthquake, which clearly damaged the main load-bearing structure. The research<sup>6</sup> showed that some of the damage was formed before the above-mentioned seismic impact, and the cracks were filled with gypsum mortar. Based on the non-destructive tests, it was estimated that the collapse could also occur due to the poor structure of the pillars (the interior was filled with rock rubble and mortar, and the outer layer was not carefully connected

with the pillar core) and damage related to long-term effects. Images of cracks and scratches in one of the pillars are presented in Fig. 1. Among the earthquake-related damage, the collapse of the dome and the two main pillars in the Basilica Santa Maria di Collemaggio in L'Aquila should also be noted. The analyses of the load capacity<sup>7</sup> showed, inter alia, stress concentration in the base of the structure, related to the interaction of horizontal forces, which was confirmed by the observed cracks (Fig. 2). The analysis of the technical condition of the pillars in the Castle and Manor Farm

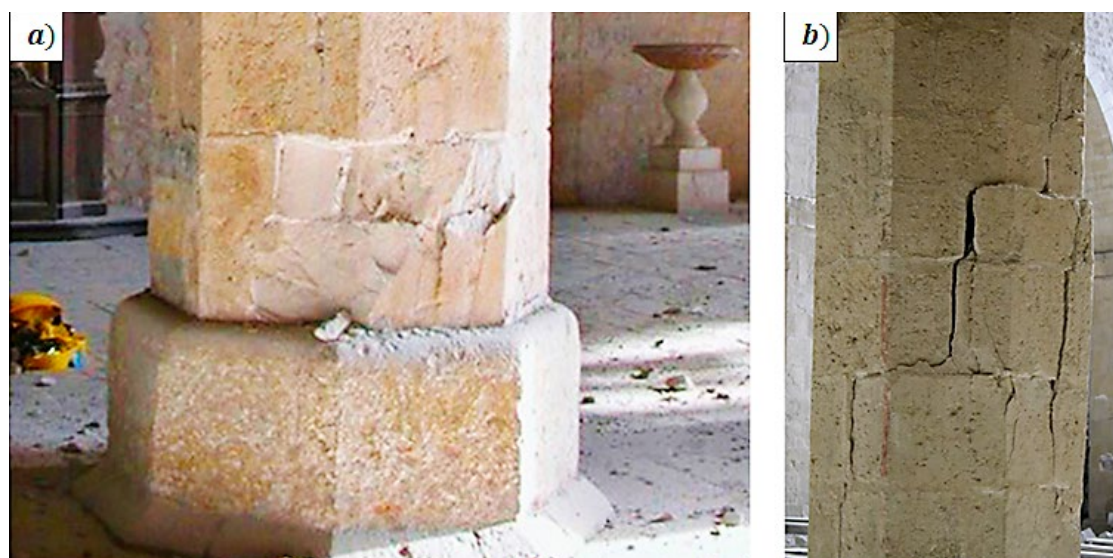


Fig. 2. Damage to the pillars in Basilica Santa Maria di Collemaggio in L'Aquila: a) cracks at the base, b) vertical cracks; source: P. Crespi et al., *Structural analysis of stone masonry columns of the Basilica p. Maria di Collemaggio*, "Engineering Structures" 2016, No. 129, p. 81–90.

Ryc. 2. Uszkodzenia kolumn w bazylice Santa Maria di Collemaggio w L'Aquili: a) pęknięcia u podstawy, b) pionowe pęknięcia; źródło: P. Crespi et al., *Structural analysis of stone masonry columns of the Basilica p. Maria di Collemaggio*, "Engineering Structures" 2016, nr 129, s. 81–90.



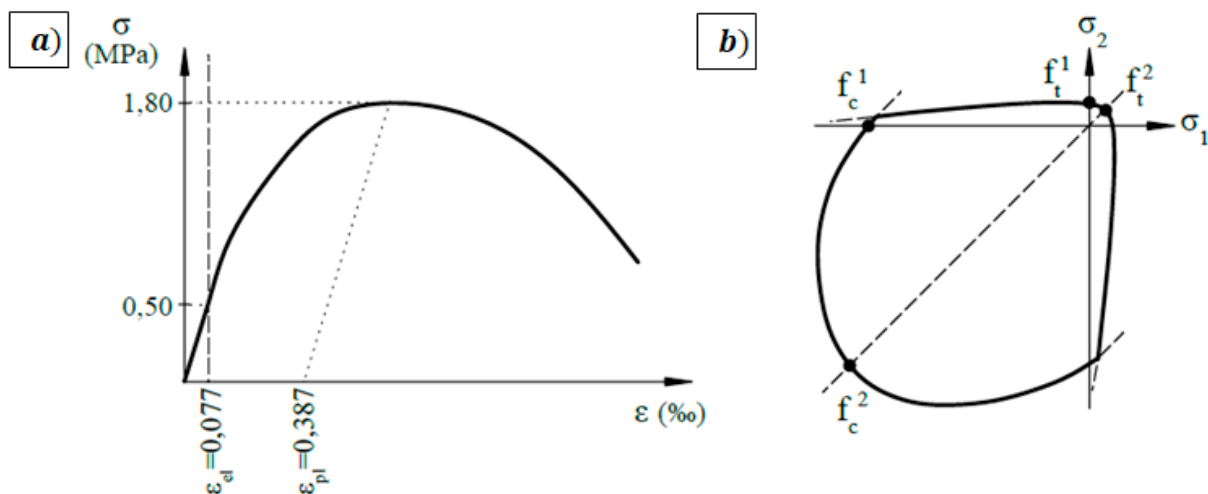


Fig. 3. Smeared cracking model definition: a—static equilibrium path, b—failure surfaces; by the authors.  
 Ryc. 3. Definicja modelu rys rozmazanych: a – ścieżka równowagi statycznej, b – powierzchnie uszkodzenia; oprac. autorzy.

in Krzyżowa in connection with the expansion planned at that time was performed by Jasieńko and Stawiski.<sup>8</sup> Based on ultrasonic measurements, the internal structure was reconstructed, and it was determined that the cracks that occur were probably caused by corrosion of steel elements that increased their volume causing internal damage. Particular attention should also be paid to the catastrophe at the Pomeranian Dukes' Castle in Szczecin in 2017, in which the pillars collapsed as a result of unfavorable processes occurring in the ground under the foundation.

Analysis of the static behavior of masonry pillars is a complex issue, even if one assumes the ideal geometry of members analyzed. It is necessary also to take into account the stability, susceptibility to second-order effects and nonlinear, non-homogeneous and anisotropic parameters of the material used. This has been extensively discussed in literature but a number of issues still remain to be resolved. Fossetti et al.<sup>9</sup> suggested analysis of pillars exposed to eccentric loading using a numerical procedure which took into account the second-order effects. The procedure correlated well with numerical calculations obtained in the ATENA3D environment. The authors pointed to the need to verify the method against the results of experimental testing. Mura<sup>10</sup> investigated cantilever pillars subject to axial and eccentric loading, which included second-order effects and cracking and made use of the Finite Difference Method. La Mendola and Papia<sup>11</sup> proposed a model for analysis of prismatic cantilever pillars subject to eccentric loading, which assumed the material was characterized by a zero tensile strength and linear-elastic response to compression. The model was subsequently adapted for the purpose of analyzing walls exposed to transverse loading<sup>12</sup> and extended with a nonlinear constitutive relation under compressive loading.<sup>13</sup> The analysis of these issues were later developed for members with a circular cross-section.<sup>14</sup> Broseghini et al.<sup>15</sup> analyzed the stability of masonry pillars with a circular cross-

section using two methods: semi-analytical (based on the assumption that the masonry does not have tensile strength) and numerical using macro-modeling in the LUSAS environment. Libecajtova<sup>16</sup> carried out numerical simulations of the load-bearing capacity of the pillars, using micromodeling, consisting in assigning a constitutive plastic model with a damage plasticity to the masonry elements and mortar. The results of the analyzes were compared with the experimental studies, obtaining a satisfactory convergence. The model based on plasticity with failure, however, for the whole homogenized medium, was also used by Ombres and Verre,<sup>17</sup> analyzing the pillars before and after strengthening with composite materials. The above examples and many others prove the topicality of the problem of static behavior of pillars, and a summary of the state of art on strengthening pillars is also presented in Jasieńko et al.<sup>18</sup>

The analysis conducted by the authors of this paper aimed at assessing the impact of torsional, flexural and flexure-torsional imperfections on the static behavior of pillars, which are subjected to loading by a force concentrated at the center of gravity of the upper cross-section.

### Methods of analysis

Numerical analyses of masonry structures use different strategies to model the material. In general terms, these can be categorized as micro-modelling and macro-modelling. In the case of existing structures, where the mechanical parameters of masonry components are known, it is possible to determine the global characteristic features of the continuum using homogenization methods.<sup>19</sup> This is why a uniform and homogenized masonry model was assumed appropriate for analytical purposes. Anisotropy of the material was not factored in and the material parameters were adopted arbitrarily based on the literature.<sup>20</sup>

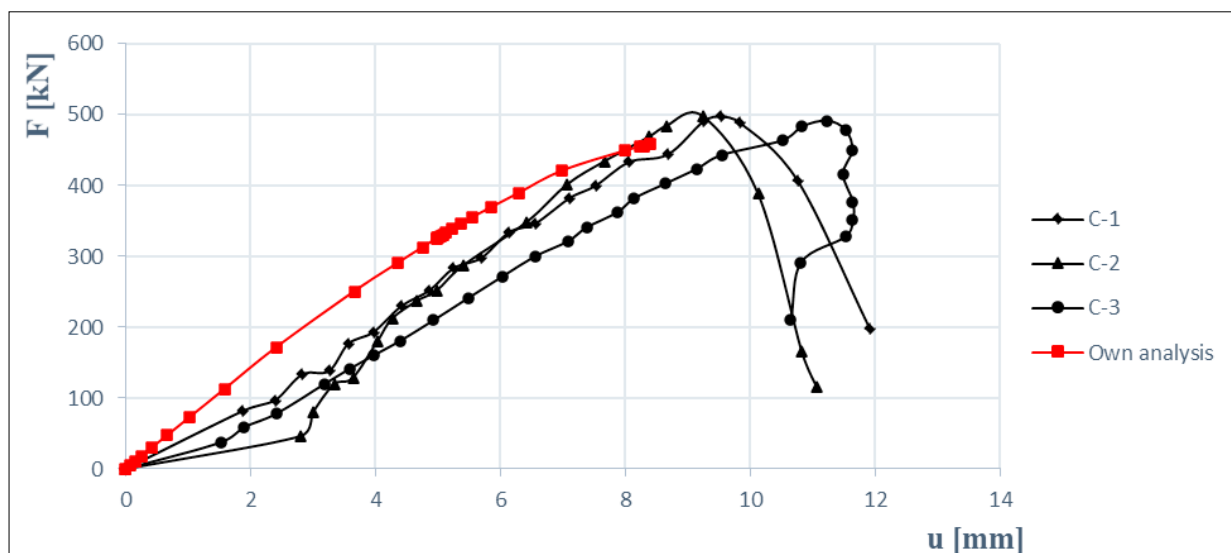


Fig. 4. Comparison of static equilibrium paths for pillars C-1, C-2, C-3 with numerical analysis; by the authors.  
Ryc. 4. Porównanie ścieżek równowagi statycznej dla słupów C-1, C-2, C-3 z analizą numeryczną; oprac. autorzy.

Nonlinear behavior of masonry, resulting from masonry cracking, can be factored in by describing discrete and smeared cracking. The use of the latter method is more favorable in situations where the global behavior of the structure is being investigated and there is no need to track cracking. For this reason, the smeared cracking model<sup>21</sup> was used, which is available in the ABAQUS environment. The model assumes an initial linear-elastic behavior of the material, based on preselected values of Young's modulus and Poisson's ratio. The Rankine criterion was used to detect cracking formations. When cracking appears, the stiffness is reduced, which leads to a nonlinear behavior consistent with the defined curve. In the analysis, the boundary conditions are described by four failure ratios listed in Table 1. The effects of tension stiffening and shear retention were not included in the analysis.

The parameters of historical material modelled using the smeared cracking method, were defined in accordance with Fig. 3 and Table 1.

Table 1. Model parameters.

|                    |                        |
|--------------------|------------------------|
| $f_k$ (MPa)        | 1.8                    |
| E (GPa)            | 6.5                    |
| $\nu$ (-)          | 0.167                  |
| Failure ratios (-) | 1.12; 0.08; 1.33; 0.28 |

In order to verify the assumptions adopted, numerical analysis was carried out for the pillars which had also been investigated in experimental tests by Chunyi et al.<sup>22</sup> Next, the convergence of the results obtained in both analyses was compared. The static equilibrium path in the analysis was defined using the following equation:

$$\sigma/f_k = 2(\varepsilon/\varepsilon_0) - (\varepsilon/\varepsilon_0)^2 \quad (1)$$

with an assumed value of  $\nu = 0.002$ . The compressive strength of masonry was determined based on the tests results using the following formula:<sup>23</sup>

$$f_k = 0.45 f_b^{0.7} f_m^{0.3} \quad (2)$$

A short term Young's modulus, consistent with records, was adopted as follows:

$$E = 600 f_k \quad (3)$$

The values of the parameters obtained for the material model are listed in Table 2. The pillar investigated was assumed to have the geometry of a cuboid with the height of  $h=4365$  mm and a rectangular cross-section with dimensions  $360 \times 240$  mm. The results obtained from the authors' analysis were compared to the results of experimental testing of the three elements: C-1, C-2, C-3. The static equilibrium path obtained indicated a satisfactory level of accuracy of the approximation method, which was selected to conduct further numerical analyses (Fig. 4).

Table 2. Parameters of the masonry material model.

|                    |                        |
|--------------------|------------------------|
| $f_k$ (MPa)        | 6                      |
| E (GPa)            | 3.6                    |
| $\nu$ (-)          | 0.167                  |
| Failure ratios (-) | 1.12; 0.08; 1.33; 0.28 |

### Assumptions for authors' analysis

A cantilever static diagram of a 14 m high pillar was adopted for analytical purposes. The pillar was subject to loading with a vertical force  $F$ . Vertical displacements  $u$  (Fig. 5a) were observed. Numerical models were con-

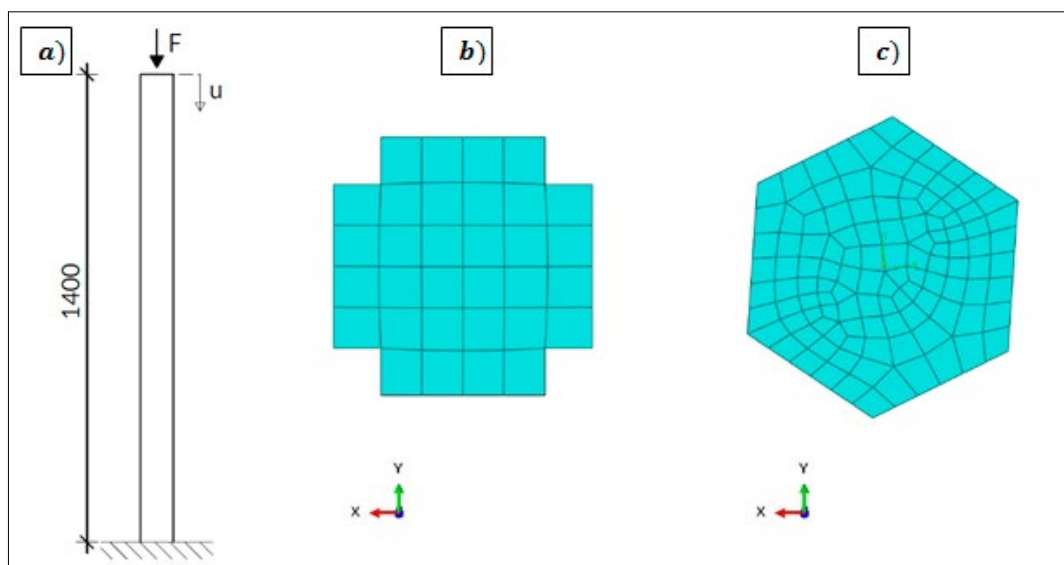


Fig. 5. Calculation models: a—static diagram, b—numerical model (hexagonal cross-section), c—numerical model (cruciform cross-section); by the authors.

Ryc. 5. Modele obliczeniowe: a – schemat statyczny, b – model numeryczny (przekrój heksagonalny), c – model numeryczny (przekrój krzyżowy); oprac. autorzy.

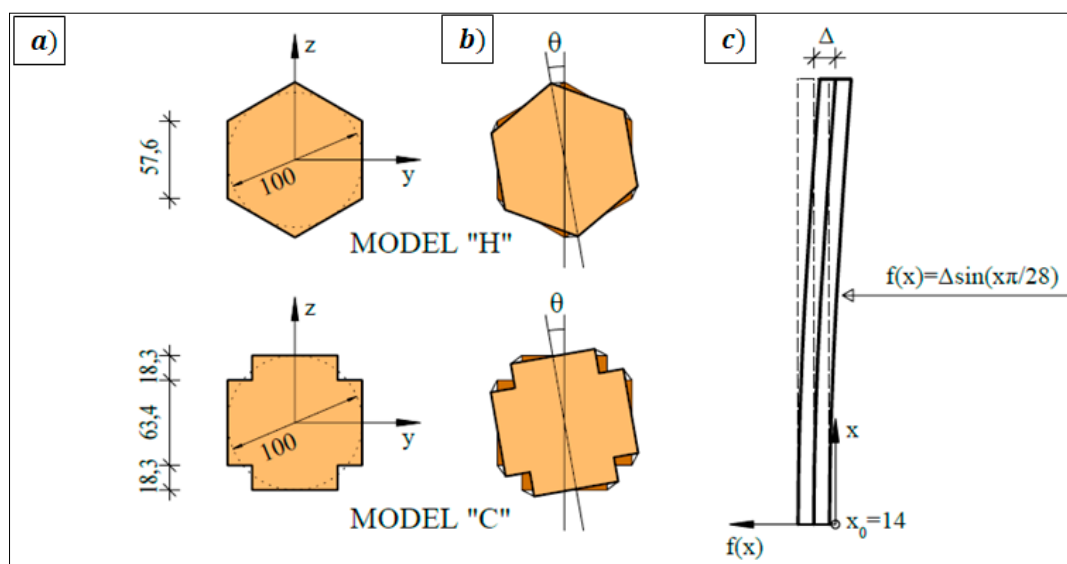


Fig. 6. Models adopted for analysis: a—cross-sections, b—definition of torsional imperfection  $\theta$ , c—definition of flexural imperfection  $\Delta$ ; by the authors.

Ryc. 6. Modele przyjęte do analizy: a – przekrój, b – definicja odkształcenia od skręcania  $\theta$ , c – definicja odkształcenia od zginania  $\Delta$ ; oprac. autorzy.

structured using homogeneous *Solid* type blocks, divided into a hexagonal grid of node finite elements of C3D8R type (Continuum, 3-D, 8-node, Reduced integration) (Fig. 5b, 5c). Two types of cross-sections most commonly found in historical structures were used—hexagonal cross-sections and cruciform ones, circumscribed around a circle with the diameter of 1 m (Fig. 6a). Aside from analyses of straight pillars, the calculations were also made for models of pillars with geometric imperfections. A torsional imperfection was introduced using a reciprocal rotation by the angle of the two extreme

cross-sections (Fig. 6b). The shape of a member with a flexural deformation was adopted as consistent with the form of the buckling of the cantilever schema, that is it constitutes a quarter of the period of sine function (Fig. 6c). The slenderness of pillars was defined as follows:

$$\lambda = l_w / i_{min} \quad (4)$$

The effective buckling length was adopted as  $l_w = 2l_0$ . Geometric parameters of the pillars are listed in Table 3.

Table 3. Geometric parameters of the pillars.

| Cross-section | A [m <sup>2</sup> ] | [m <sup>3</sup> ] | [m]   | [-]    |
|---------------|---------------------|-------------------|-------|--------|
| H             | 0.865               | 0.0446            | 0.227 | 123.13 |
| C             | 0.866               | 0.0470            | 0.233 | 120.02 |

Numerical analyses were conducted for 14 models, seven with a hexagonal cross-section and seven with a cruciform one. The symbol of each model indicates the type of the model's cross-section and the value of its imperfection, e.g., C20/10 describes a pillar with a cruciform cross-section and with a torsional imperfection of  $\theta = 10^\circ$  and a flexural imperfection of  $\Delta = 10$  cm. Parameters for all the pillars are listed in Table 4. The following members were analysed:

- straight pillars ( $\theta=0, \Delta=0$ ),
- pillars with torsional imperfections ( $\theta>0, \Delta=0$ ),
- pillars with flexural imperfections ( $\theta=0, \Delta>0$ ),
- pillars with flexure-torsional imperfections ( $\theta>0, \Delta>0$ ).

### Results

Six numerical models, three with hexagonal and three with cruciform cross-sections, were prepared to assess the impact of the preliminary torsion of the pillar's cross-section on its static behavior. Geometric imperfections of these pillars were graded every  $10^\circ$  (H 0/0, H10/0, H20/0, C 0/0, C 10/0, C 20/0). Behavior of pillars with ideal geometry (H 0/0, C 0/0) is universally

Table 4. Models used for analysis.

| Item | Model symbol | $\theta$ (°) | $\Delta$ (cm) | Cross section |
|------|--------------|--------------|---------------|---------------|
| 1    | H 0/0        | 0            | 0             | hexagonal     |
| 2    | H 10/0       | 10           | 0             | hexagonal     |
| 3    | H 20/0       | 20           | 0             | hexagonal     |
| 4    | H 0/10       | 0            | 10            | hexagonal     |
| 5    | H 0/20       | 0            | 20            | hexagonal     |
| 6    | H 20/10      | 20           | 10            | hexagonal     |
| 7    | H 20/20      | 20           | 20            | hexagonal     |
| 8    | C 0/0        | 0            | 0             | cruciform     |
| 9    | C 10/0       | 10           | 0             | cruciform     |
| 10   | C 20/0       | 20           | 0             | cruciform     |
| 11   | C 0/10       | 0            | 10            | cruciform     |
| 12   | C 0/20       | 0            | 20            | cruciform     |
| 13   | C 20/10      | 20           | 10            | cruciform     |
| 14   | C 20/20      | 20           | 20            | cruciform     |

acknowledged—the distribution of stresses is almost completely uniform along the height of the member, whereas abnormalities and concentration of stresses occur in the support zone. A pillar with a  $20^\circ$  torsion is characterized by a similar static behavior, but some irregularities occur especially in the area where the loading is applied and in the support zone. First cracking zones of pillars with torsion (Fig. 10c, 10d) are nearly identical as in the case of straight pillars (Fig. 10a, 10b).

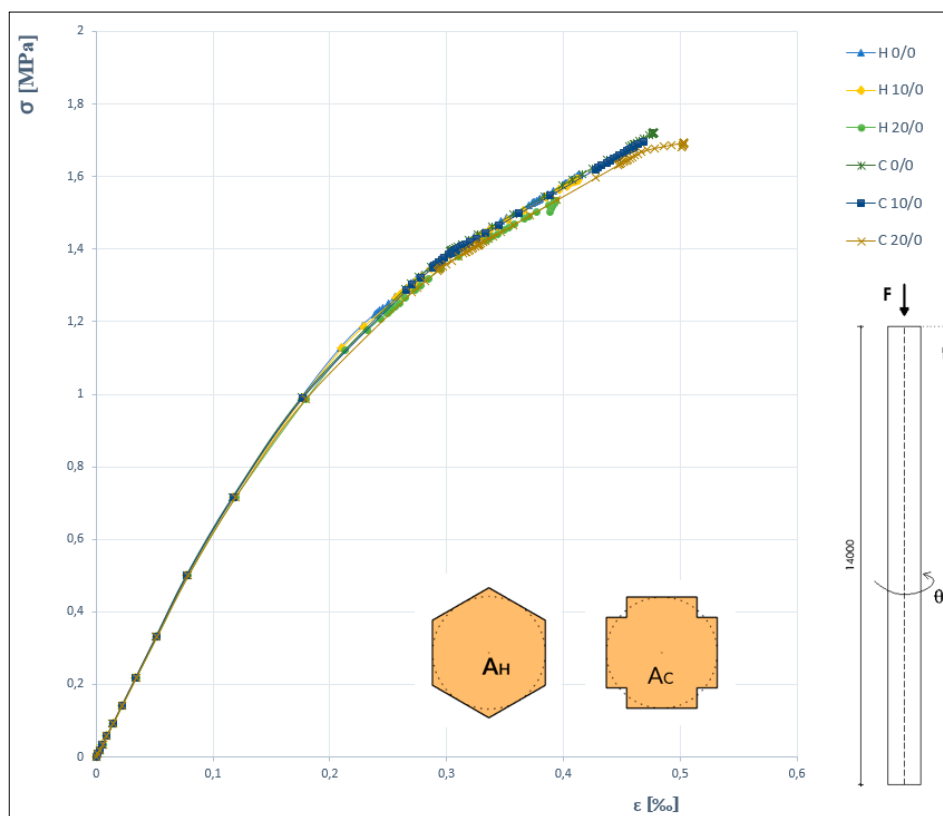


Fig. 7. Static equilibrium paths for models: H 0/0, H 10/0, H 20/0, C 0/0, C 10/0, C 20/0; by the authors.

Ryc. 7. Ścieżki równowagi statycznej dla modeli: H 0/0, H 10/0, H 20/0, C 0/0, C 10/0, C 20/0; oprac. autorzy.



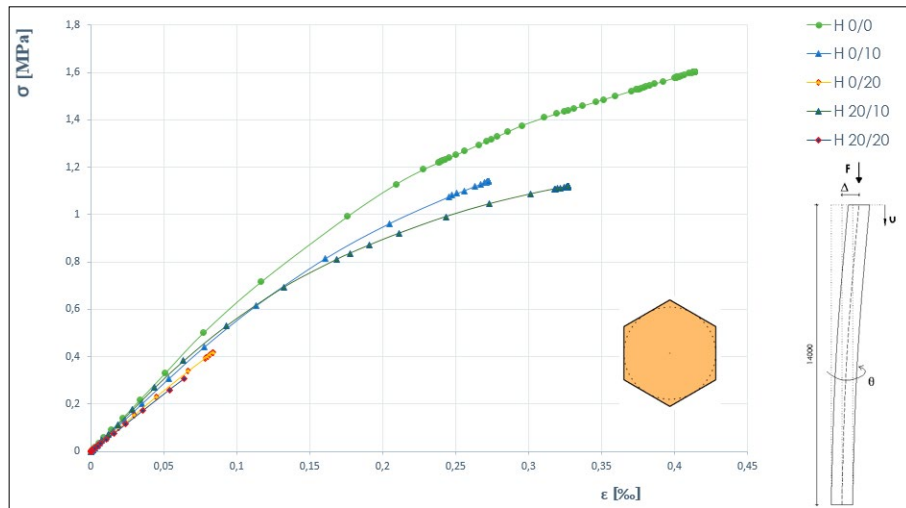


Fig. 8. Static equilibrium paths for models: H 0/0, H 0/10, H 0/20, H 20/10, H 20/20; by the authors.  
Ryc. 8. Ścieżki równowagi statycznej dla modeli: H 0/0, H 0/10, H 0/20, H 20/10, H 20/20; oprac. autorzy.

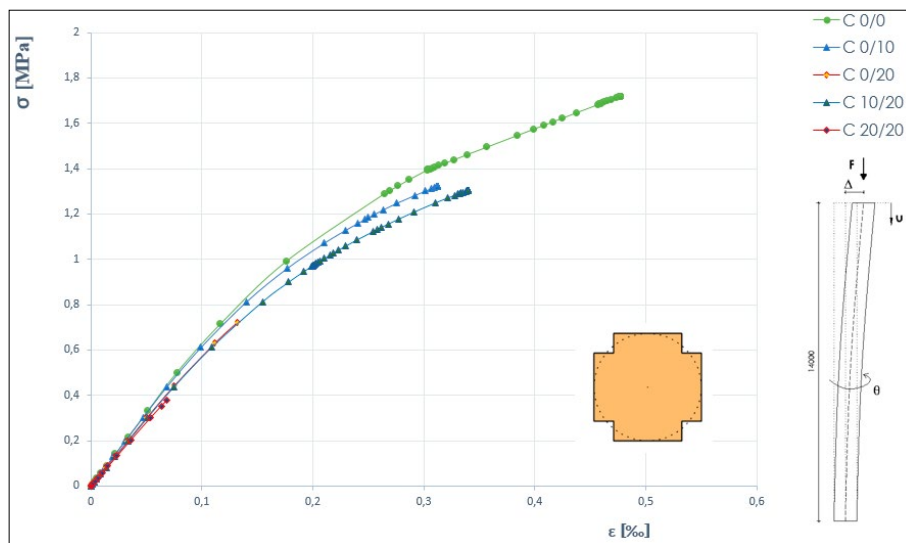


Fig. 9. Static equilibrium paths for models: H 0/0, H 0/10, H 0/20, H 20/10, H 20/20; by the authors.  
Ryc. 9. Ścieżki równowagi statycznej dla modeli: H 0/0, H 0/10, H 0/20, H 20/10, H 20/20; oprac. autorzy.

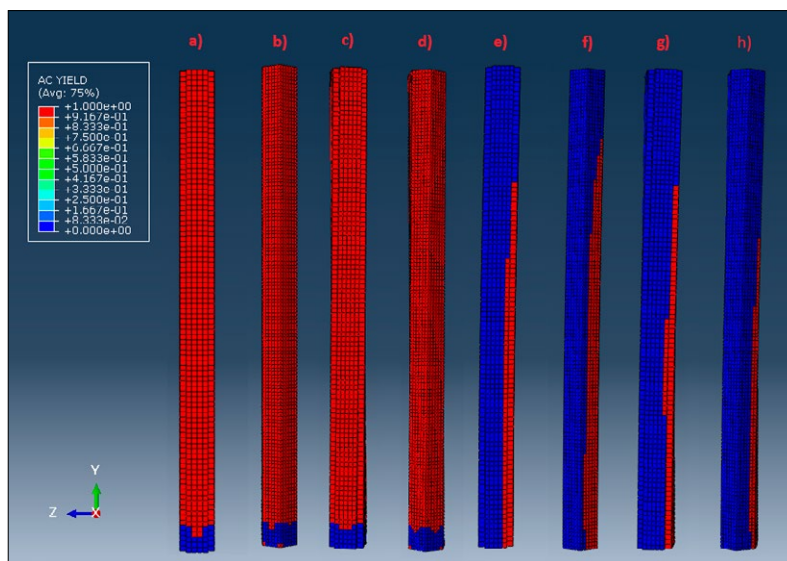


Fig. 10. First reduction of stiffness pictured for models: a—C 0/0, b—H 0/0, c—C 20/0, d—H 20/0, e—C 0/20, f—H 0/20, g—C 20/20, h—H 20/20, the stiffness reduction area marked in red; by the authors.  
Ryc. 10. Pierwsza redukcja sztywności zobrazowana dla modeli: a – C 0/0, b – H 0/0, c – C 20/0, d – H 20/0, e – C 0/20, f – H 0/20, g – C 20/20, h – H 20/20, obniżenie sztywności oznaczono kolorem czerwonym; oprac. autorzy.

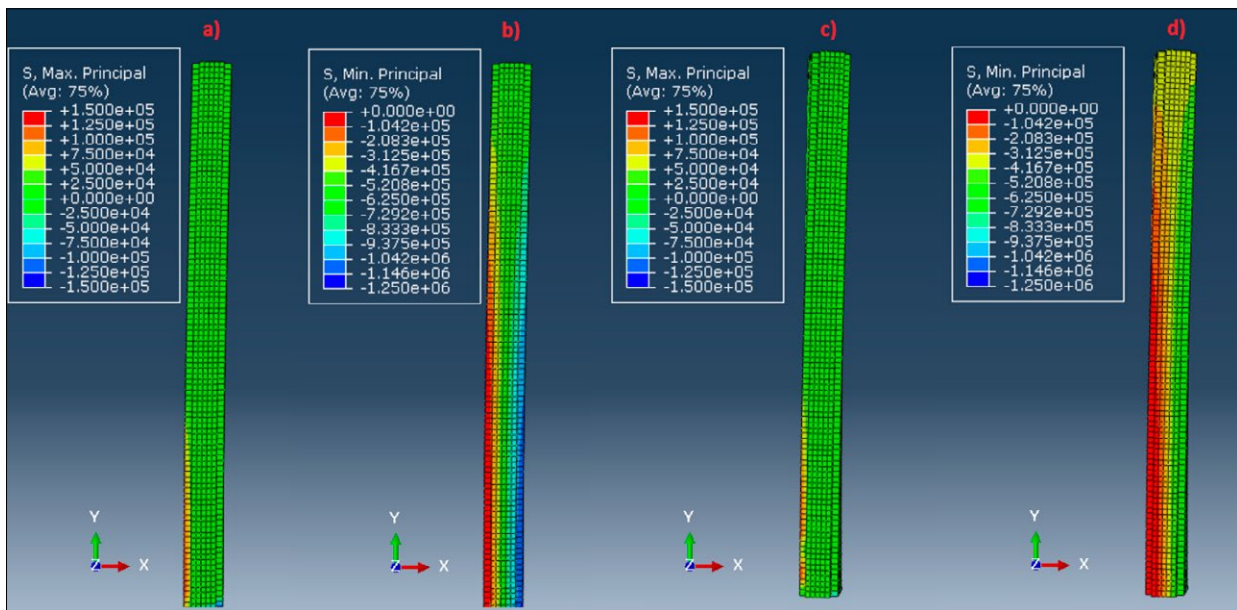


Fig. 11. Distribution of the main stresses: a—tensile stresses C 0/20, b—compressive stresses C 0/20, c—tensile stresses C 20/20, d—compressive stresses C 20/20; by the authors.

Ryc. 11. Rozkład głównych obciążeń: a – obciążenia zginające C 0/20, b – obciążenia ściskające C 0/20, c – obciążenia zginające C 20/20, d – obciążenia ściskające C 20/20; oprac. autorzy.

Models for assessing the impact of flexural deformations on the load-bearing capacity and static behavior of pillars were also prepared. These were similar to those used for the numerical testing described above. In contrast to the case of torsional imperfections, the introduction of a preliminary flexural imperfection had a significant impact on the stress distribution in a pillar. The main compressive stresses and cracking (Fig. 10e, 10f) concentrate along the plane consistent with the direction of the displacement applied. The largest values are attained in the support zone and decrease along the height of the member in the direction of the loading plane. Compressive stresses on the opposite side of the member reach ten times smaller values, which makes them negligible in relation to the compressive strength of masonry (Fig. 11b). The main tensile stresses are also generated in this zone (Fig. 11a), leading to the destruction of the member. This means that the failure mode in the case of pillars with a flexural imperfection is strictly related to the propagation of cracking along the plane consistent with the direction of the preliminary deformation.

Based on the analysis of pillars H 0/10, H 0/20, C 0/10, H 0/20 it was concluded that the introduction of a flexural imperfection results in a concentration of stresses in the plane consistent with the direction of the deflection of the member. A similar effect can be observed in the distribution of main compressive stresses in a pillar with a flexure-torsional imperfection (Fig. 11d). The difference is that in the latter case the effect is of an irregular character. The impact of torsional imperfections is clearly demonstrated in the distribution of the main tensile stresses (Fig. 11c). The comparison of stress distribution in pillars with a flexural imperfection and pillars with a flexure-torsional

imperfection indicates that the failure mode remains unchanged, but a significant flexure-torsional imperfection considerably accelerates its occurrence. The first cracking mode remains similar to the models with a flexural imperfection but the irregularity of cracking distribution is much higher (Fig. 10g, 10h). The failure mode for pillars with a flexure-torsional imperfection is based on the advancing process of cracking along the plane consistent with the direction of the preliminary deformation, but the impact of tensile stresses increases together with the increase of the imperfection, leading to brittle cracking in the support zone.

## Conclusion

Based on the analysis conducted, the following conclusions were drawn:

- the introduction of a torsional imperfection into a model of a pillar with a hexagonal cross-section leads to increased stress concentrations but does not change failure mode;
- cruciform pillars with a torsional imperfection are exposed to the effect of propagating cracking along the internal corners, in which stresses concentrate;
- static equilibrium paths (Fig. 7) indicate a negligible influence of torsional imperfections (reduction in load-bearing capacity by less than 5%) on the load-bearing capacity of pillars with hexagonal as well as cruciform cross-sections;
- static equilibrium paths (Fig. 8, 9) indicate a high susceptibility of pillars to flexural imperfections (reduction in load-bearing capacity of up to more than 70%), which is also confirmed by the analysis carried out by Rapp and Sielicki<sup>24</sup> (decrease by 20% with flexural imperfection equal 2.3 cm);

- cumulative impact of torsional and flexural imperfections is significant when compared to straight pillars. The effect of reduced load-bearing capacity due to the torsional deformation depends on the size of the flexural imperfection (Fig. 8, 9);
- the presented analyzes of the impact of imperfection of masonry pillars on the state of stresses and

crack propagation are the basis for the assessment of the effort of structural elements in real objects and the adoption of appropriate strengthening techniques, among which the methods that meet the conservation requirements, based on the use of FRCM<sup>25</sup> materials and cords,<sup>26</sup> deserve special attention.

Symbols:

|                 |  |
|-----------------|--|
| $\Delta l$      | horizontal displacement to member heights ratio                            |
| $\theta$        | the rotation angle between the top and the bottom cross-section of a model |
| $\Delta$        | pillar deflection  |
| $u$             | vertical displacement  |
| $h$             | height   |
| $F$             | loading  |
| $f_c^1$         | uniaxial compressive strength  |
| $f_c^2$         | biaxial compressive strength   |
| $f_t^1$         | uniaxial tensile strength  |
| $f_t^2$         | biaxial tensile strength   |
| $E$             | Young's modulus  |
| $\nu$           | Poisson's ratio  |
| $l_w$           | effective buckling length of a member                                      |
| $i_{min}$       | the minimum radius of the section inertia                                  |
| $l_0$           | theoretical length of a member   |
| $\varepsilon_0$ | strain equivalent to compressive strength of masonry                       |
| $f_k$           | compressive strength of masonry  |
| $f_b$           | compressive strength of a masonry unit                                     |
| $f_m$           | compressive strength of mortar   |

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## Abstract

The paper discusses issues related to the static behavior of masonry pillars with geometric imperfections on the basis of numerical analyses, which were carried out. The main types of deformation and damage of historical masonry structures are described along with the impact of such deformations on the load-bearing capacity of a structure, as well as on the failure mode of the main load-bearing members. The authors underline the necessity of including geometric imperfections in the analysis of historical masonry pillars, with a special emphasis on flexural, torsional and flexure-torsional imperfections. The homogenized and isotropic continuum model was used for numerical testing. Physical nonlinearity of masonry members was obtained using the smeared cracking model. Cracking modes linked to particular types of geometric nonlinearity were also described as they could prove useful in selecting appropriate methods for strengthening historical masonry pillars with geometric imperfections.

## Streszczenie

W artykule, na podstawie przeprowadzonych analiz numerycznych, omówiono zagadnienia związane z pracą statyczną filarów murowych z imperfekcjami geometrycznymi. Opisano uszkodzenia filarów oraz podstawowe typy deformacji, które występują w historycznych konstrukcjach murowych, a następnie zwrócono uwagę na znaczący wpływ tych odkształceń na nośność i mechanizm zniszczenia głównych elementów nośnych. Podkreślono konieczność uwzględniania imperfekcji geometrycznych w analizie historycznych filarów murowych, zwłaszcza deformacji giętnych, skrętnych oraz giętno-skrętnych. Do przeprowadzonych doświadczeń numerycznych wykorzystano zhomogenizowany i izotropowy model ośrodka ciągłego, a nieliniowość fizyczną muru uzyskano przy użyciu modelu rys rozmytych. Przedstawiono także obrazy zarysowań towarzyszące poszczególnym typom nieliniowości geometrycznych, które mogą być przydatne przy doborze metody wzmacniania historycznych filarów murowych z imperfekcjami geometrycznymi.

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## The Consolidation Project of Vicente Lampérez after the Demolition of the Archbishopal Palace of Burgos Cathedral

## Konsolidacja projektu Vicente Lampéreza po wyburzeniu pałacu arcybiskupiego katedry w Burgos

**Keywords:** consolidation, restoration, reintegration, masonry

**Słowa kluczowe:** konsolidacja, rewaloryzacja, reintegracja, konstrukcje murowane

### Introduction

Burgos Cathedral is a national Historic-Artistic Monument since 1885<sup>1</sup> and was declared a World Heritage Site in 1984 (Fig. 1). Being one of the most important Gothic works in Spain,<sup>2</sup> it has been collecting the different artistic trends throughout the centuries. Ever since Alfonso VI gave away his royal palace in 1075 for the construction of the Romanesque church, the subsequent construction of the cathedral began in 1221 by Bishop Don Mauricio following Gothic patterns. Even being this the predominant style (in two clearly identifiable phases: the classic Gothic style of the thirteenth and fourteenth centuries and a second flamboyant Gothic style starring the Colonia family), also has important Renaissance and Baroque elements.<sup>3</sup> The Burgos Cathedral is the only Spanish cathedral that has the distinction of UNESCO independently, without being linked to a historic city centre or together with other buildings. The Archbishop's Palace might coincide with the former royal palace and was an important part of the cathedral complex, residence of bishops and the kings of Castilla, place of important historical events,

and full of symbolism. The Burgos Cathedral is situated on a hillside that descends towards the south, and the palace is located on its western lower front (Fig. 2).

### Architectural transformation of the Cathedral

For centuries, the transformations undertaken in the cathedral were aimed at the growth and expansion of the spaces. First, the cathedral was built in the thirteenth century according to the trends of the time, keeping in mind the aims of Bishop Don Mauricio. Then, in the fifteenth and sixteenth centuries it underwent major changes. During the second half of the nineteenth century important works of extension and improvement were undertaken in the southern part of the cathedral, within the archbishop's palace. At the end of that century and during the first years of the twentieth century, with the coming of Ricardo Velázquez Bosco as architect in charge of the cathedral and later with the designation of Vicente Lampérez y Romea, important restoration work was carried out in the cathedral. It is precisely at this time when, instead of adding new elements, the elimination of the accessory parts that were

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Fig. 1. South elevation of the Cathedral of Burgos from the Plaza Rey San Fernando; photo by I. Mora Moreno.  
Ryc. 1. Południowa elewacja katedry w Burgos od strony Plaza Rey San Fernando; fot. I. Mora Moreno.

not necessary was sought in an ideal search for a unitary image of the monuments (Fig. 3).

### The isolation of the monuments

The elimination of the constructions annexed to great churches was a current widespread throughout Europe and that in Spain especially affected the Gothic temples of León and Burgos. The search for a total vision of the monument was one of the main conditions of this movement. One of the voices that rose in Spain against this movement was that of Leopoldo Torres Balbás (continuing what was started years before by Gustavo Giovannoni),<sup>4</sup> who in 1919 charged opposing the promoters of the idea in an article.<sup>5</sup> For Torres Balbás, the search for the isolated monument had nothing to do with the context and the perception with which they were designed and built. But in the case of Burgos, this idea was unstoppable, and would be carried out from the last years of the nineteenth century until the 1920s.

### Modifications in the Archbishop's Palace

Since the thirteenth century, prelates have been engaging in extension projects, by the purchase or transfer of buildings and lands, which turned the palace into an excessive and formless building. Bishop Luis de Acuña had already proposed to move the palace and wanted to proceed with its demolition in 1486, so that the church remained clear to the door of Sarmental. Subsequently, there were been numerous attempts to make the palace disappear completely. The difficulties encountered in carrying it this out were best summarized by Martínez Sanz:<sup>6</sup>

“But the project had no result, it is neither convenient nor possible to ever be carried out, since the link of that part of the cathedral has its connection with some places of the palace, and the irregular dependencies of the church that it conceals would present an unpleasant aspect, and undoubtedly after the demolition it would

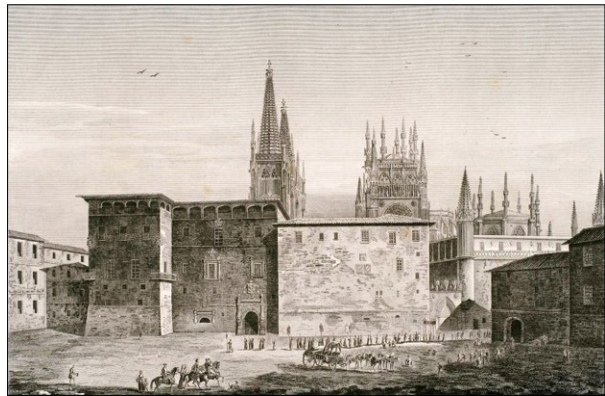


Fig. 2. View of the Cathedral of Burgos; engraving by Du Hamel; source: A. de Laborde, *Voyage pittoresque et historique de l'Espagne*, Paris 1820.

Ryc. 2. Widok katedry w Burgos, rycina autorstwa Du Hamel; źródło: A. de Laborde, *Voyage pittoresque et historique de l'Espagne*, Paris 1820.

be necessary to raise a wall that would cover what now conceals the archbishop's palace.”

### The restoration theories of Lampérez

Vicente Lampérez y Romea (1861–1923) was an architect, historian, and an expert and disseminator of Spanish architecture. Lampérez's attitude about architectural restoration, as a follower of the theories of Viollet-le-Duc, is clear throughout his career and remains almost immovable until this project, which makes him doubt and change, with an approach to theories of Camillo Boito. For Lampérez, restoring “means redoing a building or one of its parts, just as it was originally.”<sup>7</sup> Lampérez was the first in Spain to write down a range of criteria of the Restoration school, defending them and attacking the Anti-Restoration movement. His historicist character was reflected in his works and interventions.

### Previous restoration work of Lampérez

He began in restoration (being still a student at the School of Architecture of Madrid) with Demetrio de los Ríos in 1886 in the cathedral of León, a violetian project initiated by Juan de Madrazo. His restoration practice extended to other monuments such as the cathedral of Cuenca, the Casa del Cordón (also in Burgos), the castle of Manzanares el Real (Madrid), and the church of Nuestra Señora de la Antigua (Valladolid).

With the resignation of Velázquez Bosco, he took the direction of the work of the cathedral of Burgos in 1891, carrying out numerous amounts of work in the cathedral before the demolition of the palace: restoration of the cloister,<sup>8</sup> restoration of the towers, demolition of the houses next to the chapel Santísimo Cristo for its restoration and other minor works. In the 1899 project to reconstitute the cathedral of Burgos, he tried to repeat what was done in León. But neither the architecture nor the context was similar. These projects

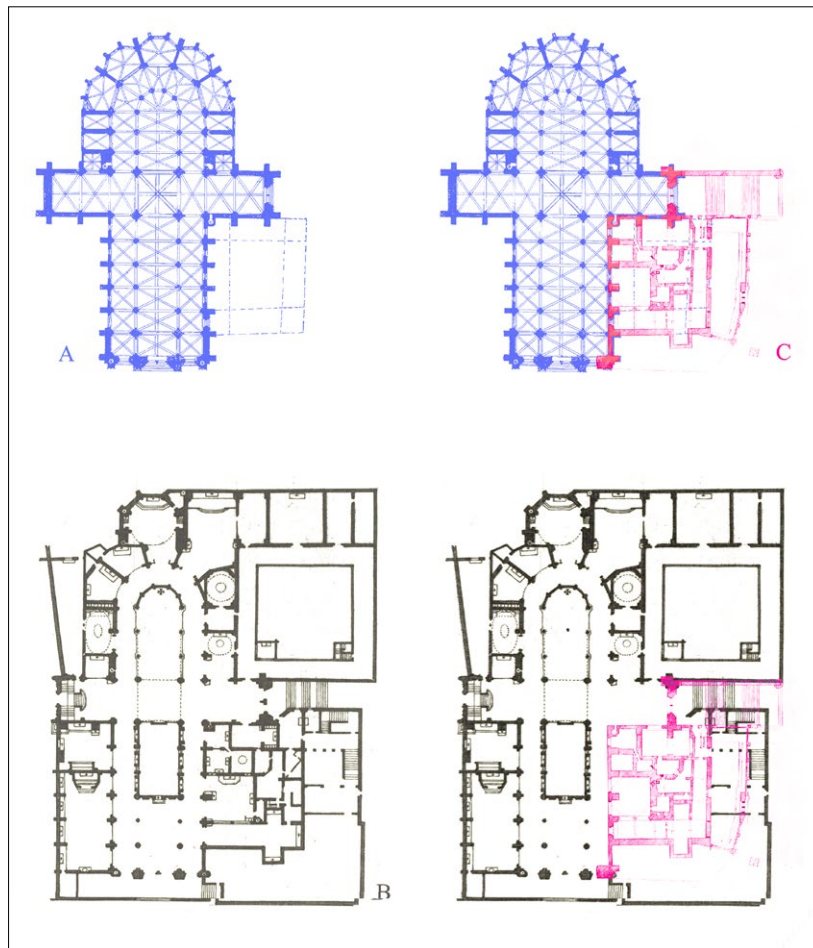


Fig. 3. Floor plans of the Cathedral of Burgos; sources: legend A—sketch of the supposed original plan of the Cathedral of Burgos, source: V. Lampérez y Romea, *Historia de la arquitectura cristiana*, Barcelona 1904, p. 44, B—plan of the cathedral with the palace, source: A. Ponz, *Viage de España: en que se da noticia de las cosas mas apreciables y dignas de saberse que hay en ella*, Madrid 1781, p. 26, C—plan after the demolition of the palace, source: V. Lampérez y Romea, *La Catedral de Burgos (Obras últimamente ejecutadas)*, "Arquitectura y Construcción" 1918, p. 10; by I. Mora Moreno.

Ryc. 3. Rzuty katedry w Burgos: A – szkic domniemanego pierwotnego rzutu katedry w Burgos (źródło: V. Lampérez y Romea, *Historia de la arquitectura cristiana*, Barcelona 1904, s. 44), B – rzut katedry z pałacem (źródło: A. Ponz, *Viage de España: en que se da noticia de las cosas mas apreciables y dignas de saberse que hay en ella*, Madrid 1781, s. 26), C – rzut po wyburzeniu pałacu (źródło: V. Lampérez y Romea, *La Catedral de Burgos (Obras últimamente ejecutadas)*, "Arquitectura y Construcción" 1918, s. 10); opr. I. Mora Moreno.

allowed him to gain the affection, love and respect of the authorities and the people of Burgos.

### Vicente Lampérez in the Cathedral of Burgos

Lampérez's knowledge, not only of the cathedral of Burgos, but of the history of the architecture of numerous cathedrals is indisputable, it would be enough to review the general bibliography of the architect and the specific one dedicated to this cathedral.<sup>9</sup> In these writings, referring to the cathedral of Burgos, he recognized the historical, documentary and artistic value not only of the church, but also of its modifications and additions. Lampérez also highlighted the strong transformation of the cathedral in the last quarter of the fifteenth century, when numerous works of artistic importance were carried out, including the construction of a new lantern after the previous one collapsed on March 4, 1539. The period covered until the end of the sixteenth century, up to a time that Lampérez con-

sidered the important works to have been finished (the following will be for him rather to regret).<sup>10</sup>

The work of Lampérez, although it was always supervised by the Academia de San Fernando,<sup>11</sup> which even rejected some of Lampérez's interventions, was strongly opposed by José María de Palacio y Abarzuza, Conde de las Almenas.<sup>12</sup> These were attacks that had more to do with taste and style than with the criteria of the practice of restoration (although at that time in discussion and unconsolidated) or with technical aspects. Yet again, history would repeat itself a century later with the proposal of the Cabildo de Burgos to replace the current Classical Revival wooden doors on the main facade of the cathedral with a new design proposed by the artist Antonio López (Fig. 4).

### Attempts to demolish the Palace

In addition to the previous purposes of the late fifteenth century, in 1816 there was yet another attempt



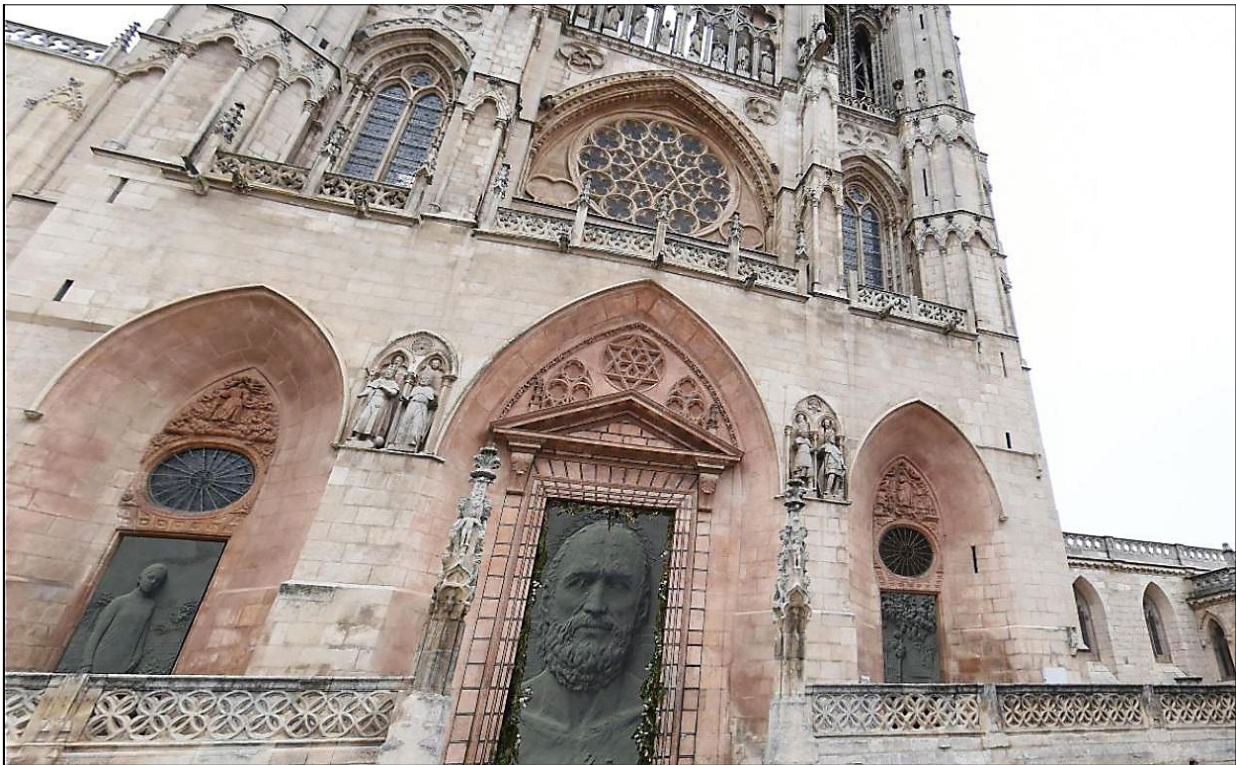


Fig. 4. Sketch of the design of the new doors by Antonio López, 2021; Cabildo de Burgos.  
Ryc. 4. Szkic projektu nowych drzwi wykonany przez Antonio Lópeza, 2021; Cabildo de Burgos.

to demolish the palace by the City Council. Various reports of architects, engineers, and academics of the Real Academia de Bellas Artes de San Fernando supported or disapproved the elimination of the palace, with the state of ruin as justification, always counting on the bishop's opposition to its demolition. It was taken up in 1822 and 1849, but again without any success. In the second half of the nineteenth century, renovation works were carried out inside the palace by Archbishop Don Fernando de la Puente. In these works, he eliminated the chapel of San Pablo, and Romanesque remains continued to appear, attributed to the palace of Alfonso VI of the eleventh century.

In 1895, the town hall, with the support of writers and journalists, together with the people of Burgos,<sup>13</sup> took up the idea of demolition with the main purpose of isolating the temple. There was the idea of reconstruction of a new palace on the same site, but it was contrary to the general opinion. The pressure now on the bishop was so intense and unanimous, that he ended up giving in and accepted the isolation. To support the idea, they added the opinions of technicians. Velázquez Bosco was in favor of elimination for the beautification of the Cathedral,<sup>14</sup> while Lampérez proposed some assumptions, among which the following stand out: not lowering the demolition to the level of the square to avoid any danger in the foundation of the monument; building a strong retaining wall; filling in the remains of the 'polygon' that was at the level of the pavement of the church with an atrium or elevated square. Although the demolition was finally approved in 1895, work did not begin until 1914.<sup>15</sup>

#### The initial restoration project: Lampérez's premises

Lampérez's position is ambiguous in relation to demolition. On the one hand he was in favor of the disappearance of the Palace in what corroborates his theories, but he also anticipated the problems that would occur because of the demolition. At no time he vetoes the elimination, but he is limited to give observations, highlighting the problems that would appear with the demolition, and that a valid solution cannot be given for everyone.

Although it was possible to consider the reconstruction of the palace, for Lampérez architecturally possible and limited by the economy and time, it was decided to consolidate and reintegrate that part after the demolition. For all these reasons, the demolition would involve different artistic and structural problems. From the structural point of view, as the cathedral is located halfway up a hill, there is a great difference between the level of the pavement of the cathedral and that of the square. The solution would be to build a strong retaining wall, with the perimeter marked by the staircase and the south facade of the cloister and forming an elevated platform (level with the cathedral) with access from the square. Regarding the artistic part, although in the upper part different elements would stand out and would be better shown ("torn windows, slender buttresses and openwork windows"), the lower part would bring to light chapels and sacristies never intended to be seen from the outside, "a heterogeneous whole, without unity or beauty."

He argued that it was possible to beautify all this (there are modern means for this), but that it could be a “palliative” solution to conserve the wall of the old claustra and restore it in the same way that he had already proposed for the chapel of the Santísimo Cristo. It was also possible to save a part (Lampérez mentioned everything) of the existing elements from the first three centuries after the construction of the cathedral. Lampérez, although not in favor, was not able to stop the demolition. At least, he gave guidance, volunteered, and took the initiative to save, as much as possible, the void that would remain, and above all, saved the static of the monument without forgetting the aesthetics.

### Modification of the project after the demolition

Lampérez described the demolished parts and the actions to be carried out later in the report of the restoration project. He recognized, for the first time, both the importance of the Palace and the original condition of the cathedral. The idea of total isolation and complete demolition was a reality because he explained that he saved certain parts of the palace from demolition. As some areas had been revealed in the south wing of the cathedral (chapels and old claustra), work to reintegrate these parts was unavoidable. For this purpose, he determined a series of assumptions that can be divided into techniques, artistic and archeological, based on respect for the old, using sobriety, simplicity, and harmony as criteria.

Lampérez established respect for all the remaining parts: for their “archaeological value,” for their “outstanding merit” and for their “historical and cult” meaning (the last one could be equated with use or functional value). The lower parts of the cathedral on the south side, acted as a bracket for the parts of the upper levels, as is the example of the tunnel, which Lampérez now dated to the end of the twelfth century. As it served to contain the land where the chapels settled, the elements to be conserved from a technical, archaeological, and economic point of view (Fig. 5).

The outer wall of the tunnel, which would remain visible, did not present a good state in the facing although the core presented a good quality. Lampérez proposed, introducing a major innovation in this regard, to improve solidity (consolidation) while recovering the image (reintegration). When the palace was demolished, inside a wall there appeared supposedly solid, twin arches of a Romanesque transitional style, dated by Lampérez to the time of Alfonso VIII in the Huelgas of Burgos (twelfth century). What Lampérez identified was that they were a facade, because of the walls in which they were found. Although the remains of the arches are insignificant, he devoted to them a great deal of historical and archaeological interest, and decided to subject them to conservation.

This led to another series of minor adjustments: conservation of certain parts of the wall of the old



Fig. 5. Exterior view of the Cathedral of Burgos with the Archbishop's Palace in demolition, from Archivo Municipal de Burgos FO-154; photo by Alfonso Vadillo, 1914.

Ryc. 5. Widok zewnętrzny katedry w Burgos z pałacem arcybiskupim w trakcie rozbiórki; materiały z Archivo Municipal de Burgos FO-154; fot. Alfonso Vadillo, 1914.

claustra by eliminating recently added modern brick walls; a lateral access to the lower part of the stairway of the Sarmental; resolving the southwest corner where the ovens are located and the replacement of the heating by removing the chimney; the reparation of the holes that were supporting the floors of wood and the roofs of the chapels of Lerma and Cartagena; different roof and parapet finishes. For all this, Lampérez already raised the future appearance of complementary projects. The platform over the tunnel, as it was intended to make it accessible and crossable, he proposed to protect it by copying the stone railing that terminated the cathedral's nave, keeping the old arches that appeared in the great hall. He also designed the placement of a stone slab in the basement to justify all of his interventions.

He consolidated, as he had proposed, the wall of the old claustra. When the plaster was removed, masonry was found up to a height of 5.50 m, which required preserving due to its age (demonstrated by irregular cutting and stonework marks). From the height of 5.50 m, the brick and rubble masonry continued, so he proposed its demolition and to have it rebuilt with stone courses, cutting similar to the lower ones and “to mark them with a sign or letter that indicates their modernity.” To finish this wall, he designed a cornice and par-

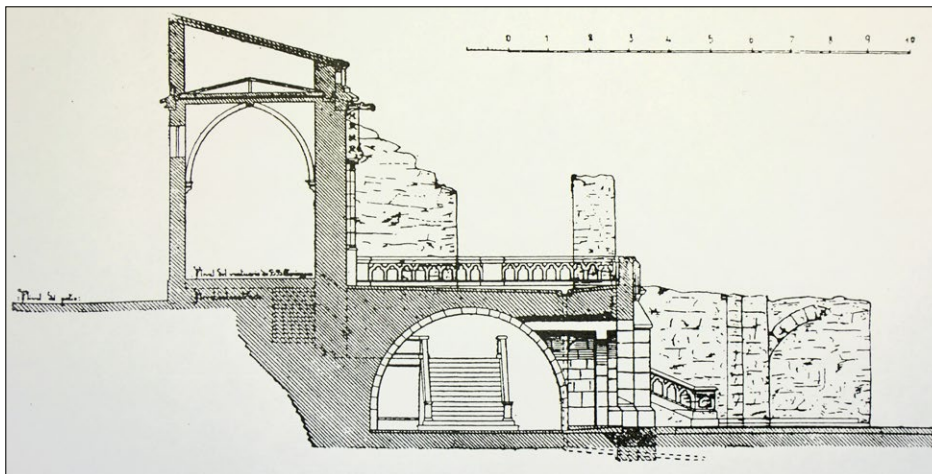


Fig. 6. Section of the intervention project of Vicente Lampérez after the demolition of the Archbishop's Palace; source: V. Lampérez y Romea, *La Catedral de Burgos (Obras últimamente ejecutadas)*, "Arquitectura y Construcción" 1918, p. 9.  
 Ryc. 6. Przekrój projektu interwencyjnego Vicente Lampéreza, stan po wyburzeniu pałacu arcybiskupiego; źródło: V. Lampérez y Romea, *La Catedral de Burgos (Obras últimamente ejecutadas)*, "Arquitectura y Construcción" 1918, s. 9.

apet similar to that of the other cloister. On this wall, Lampérez initially believed it was necessary to place two extreme buttresses as reinforcement, although he later recognized that they were not needed because the consolidation was successful (Fig. 6). Regarding the new roofs, he established as a premise to leave as much visibility as possible. To do this, he proposed a lowered iron truss, with brick boards and slate roof.

#### Final acknowledgments of Lampérez

Lampérez wrote a report justifying the demolition and subsequent intervention.<sup>16</sup> His intention was to "historicize" the works, to record what was found and what was left. He justified the demolition with the pursuit of displaying the cathedral isolated. He recognized that after the demolition there were amorphous parts (walls, roofs) as well as "artistic and valuable remains." Therefore, he not only organized this chaos but proposed a restoration project. He now recognized both the existence of the palace at least since the beginning of the thirteenth century (prior to the construction of the Gothic cathedral) and that the palace had been a habitual and frequent residence of the kings, at least until the fifteenth century. The demolition brought to light hidden elements, poorly known or underappreciated: the tunnel and a large hall on the upper floor. He therefore recognized the great importance of the remains found and their value as a historical and artistic document (Fig. 7).

For all these reasons, he embarked on a purely architectural work ("putting order and decorum in everything"), marking three principles (which will end up being four): paucity of interventions; respect for the existing; the harmony between parts; and ended by adding: inventing the absolutely indispensable. The shortage of decorations and additions had a more economical than technical justification. Respect for the existing, rather than as conservation, was motivated by the cathedral's stability. The solutions that he proposed

for the conservation of the existing and the repair of the damage repeated similar elements of the cathedral, but in many cases eliminated materiality. To improve the composition, he added ornamental elements to the new facades (pinnacles, statues).<sup>17</sup> His initial idea of leaving the upper wall smooth, was modified by the appearance of a window with tracery and fence in a demolition. According to his new premises, it now had to be preserved. The impossibility of doing it in the same place forced him to replicate the window in the elevation, with compositional purposes.

By way of explanation of the intervention, he decided to leave in the same work (in the lower wall, under the double window) a plaque with the historical data (it is currently illegible). Lampérez proposes the following text: "Year of 1914. Being Archbishop Mr. José Cadena y Eleta, and Mayor of the City Mr. Manuel de la Cuesta, the Episcopal Palace, located here, was demolished. And having found architectural remains of the old building, they have been preserved in their place, as venerating historical and artistic memories of the building that housed the Kings of Castilla and the Prelates of Burgos." As he claimed, he did not perform a simple restoration, but an intervention that totally changed the perception of the monument. But also, its functionality, its use, and the elimination of one of its originally constituent elements.

#### Conclusions

With the removal of the palace, there is a clear search to isolate the cathedral and remove the buildings that "prevent" the vision of perspectives (that never existed). But for this reason, a building that originated with the cathedral, with found elements dating to the eleventh century, was destroyed. An important testimony of its history was destroyed, and urban environmental conditions were modified. Another reason given for the demolition of the palace was the search for a uni-



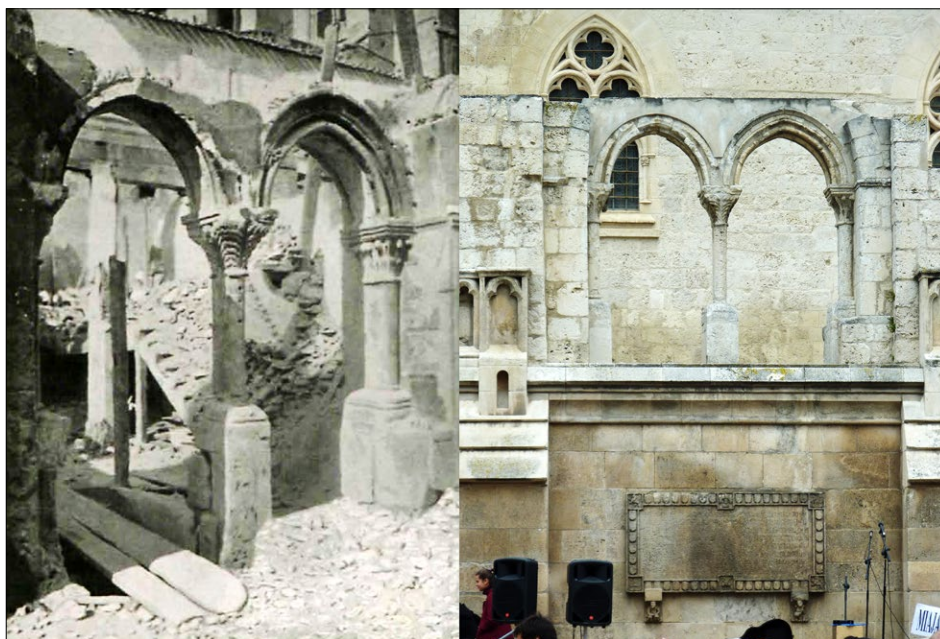


Fig. 7. Detailed image of the double window preserved by Lampérez; left—remains found in the demolition of 1914, in V. Lampérez y Romea, *La Catedral de Burgos (Obras últimamente ejecutadas)*, “Arquitectura y Construcción” 1918, p. 14; right—current state of the double window and the stone slab; photo by I. Mora Moreno.

Ryc. 7. Szczegółowe przedstawienie podwójnego okna zachowanego przez Lampérez; po lewej – pozostałości odnalezione po rozbiórce z roku 1914 (V. Lampérez y Romea, *La Catedral de Burgos (Obras últimamente ejecutadas)*, “Arquitectura y Construcción” 1918, s. 14), po prawej – obecny stan podwójnego okna i płyty kamiennej; fot. I. Mora Moreno.

tary vision of the cathedral, given that the cathedral was contemplated in pieces, in fragments. It was not possible, contrary to what was intended at the end of the nineteenth century with the isolation of monuments, to understand a large space (such as a cathedral) as a whole. A cathedral is not only composed of a temple, but also surrounded by necessary elements. The spaces around the temple are related to it and have a mission and a functionality, including the palace. Therefore, the isolation implied the elimination of elements of the cathedral. The growth and expansion of these monuments was normally motivated by a political and power component, always dependent on economic cost. In addition, they have undergone multiple modifications over the centuries. For this reason, it is critical to contemplate and understand all these changes, as well as the reasons that caused them.

Values shown a posteriori should have served to preserve the palace and not tear it down. At least, to detect the parts of it to conserve, but never to completely demolish it. This search for the isolation of the monument leads to a pursuit of the enhancement of the values of artistry and unity, but in return erased those of historicity, documentation and structure. Once he had realized his initial mistake, Lampérez gave in and changed his initial design idea. He incorporated the remains found, placed an explanatory plate, and disseminated the intervention in articles and exhibitions. Despite maintaining a stylistic posture, there was a change in Lampérez’s mindset, introducing innovative aspects in restoration. He sacrificed his design to record what he found, seeking harmony with the old, choosing consolidation over the idealization of the (supposed) past.

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- <sup>9</sup> V. Lampérez y Romea, *Historia de la arquitectura cristiana*, Barcelona 1904; idem, *Arquitectura civil española de los siglos I al XVIII*, vol. 1, Madrid 1922.
- <sup>10</sup> Idem, *La Catedral de Burgos*, Barcelona 1913.

- <sup>11</sup> Academia de Bellas Artes de San Fernando, *Boletín de la Real Academia de Bellas Artes de San Fernando*, Madrid 1916–1923.
- <sup>12</sup> They exchanged harsh accusations in several articles in the "Diario de Burgos" in 1914 and the Count published a book in 1916 where he attacked the mistakes made by Lampérez in Burgos: J. M. de Palacio y Abarzuza, Conde de las Almenas, *Demostración gráfica de los errores artísticos de Don Vicente Lampérez en Burgos*, Madrid 1916.
- <sup>13</sup> A subscription is requested through the press to thank Mayor Manuel de la Cuesta and Archbishop José Cadena y Eleta ("Diario de Burgos", July 28, 1914).
- <sup>14</sup> For Velazquez Bosco, with the demolition of the palace, the cathedral would also gain a lot in solidity.
- <sup>15</sup> The demolition began on July 20, 1914, coinciding with the 693rd anniversary of the laying of the first stone of the cathedral.
- <sup>16</sup> V. Lampérez y Romea, *La Catedral de Burgos (Obras últimamente ejecutadas)*, p. 5–20.
- <sup>17</sup> It is curious that he does not respect a previous intervention by Juan de Colonia because Lampérez himself dedicates a very complete and even awarded study to it: V. Lampérez y Romea, *Juan de Colonia: Estudio biográfico crítico*, Valladolid 1904.

## Abstract

The 1914 demolition of the Archbishop's Palace, which was built in the thirteenth century, on the sets of Burgos Cathedral, a World Heritage Site, is currently a topical issue due to the cathedral's 800th anniversary being celebrated in 2021. In the light of the debate surrounding the proposal of a new door for the main facade by Antonio López, UNESCO has warned it may withdraw its protection. A similar controversy took place a century earlier, and it would be good to learn from Lampérez's consolidation. Chief Architect of the Cathedral Vicente Lampérez y Romea had to collect all attempts on the demolition that had taken place since the mid-nineteenth century, according to defenders, embellishing the Cathedral and getting new perspectives of the monument; joining the restoration criteria; dealing with major problems of the consolidation and the emergence of important elements that modified the project. It demonstrated how Lampérez avoided and corrected initial errors, introduced new criteria in the history of restoration, resulting in a better understanding of the behavior of the masonry.

## Streszczenie

W roku 2021 obchodzono 800-rocznicę rozpoczęcia budowy katedry w Burgos, obiektu znajdującego się na Liście Światowego Dziedzictwa UNESCO. Przy tej okazji doszło do kontrowersji wokół wymiany drzwi w głównej elewacji. Projekt, który zaproponował Antonio López, spowodował pojawienie się groźby usunięcia zabytku z prestiżowej listy. Do sporu doszło również w 1914, kiedy Vicente Lampérez y Romea, kierujący restauracją katedry, zaproponował wyburzenie XIII-wiecznego pałacu arcybiskupiego, stojącego w jej sąsiedztwie. Według jego zwolenników, zabieg ten uczynił świątynię piękniejszą i umożliwił odsłonięcie jej monumentalnej bryły. Lampérez starał się łączyć kryteria konserwatorskie z potrzebą estetycznego i widokowego scalenia detali tak, by uzyskać ekspozycję dającą jednoznaczne przekonanie o znaczeniu i wartości katedry. Architekt musiał udokumentować wszelkie zmiany, jakie zaszły w otoczeniu, by przekonać oponentów o celowości swego pomysłu. Obecny spór o drzwi katedry jest reminiscencją tamtego, kolejną próbą określenia stopnia nasycenia obiektu zabytkowego nowymi elementami, które – choć śmiało – mają za zadanie scalać, znajdując w kreacji uzupełnienie dla konserwacji.

Mariusz Mierzwiński\*

## Building and Conservation Works in the Castle Church in Malbork (2014–2016) As the Culmination of Half a Century of Its Restoration

### Prace budowlano-konserwatorskie w kościele zamkowym w Malborku w latach 2014–2016 jako zwieńczenie półwiecza jego odbudowy

**Keywords:** Castle in Malbork, Gothic art, war damages, conservation project, protection of monuments

**Słowa kluczowe:** zamek w Malborku, sztuka gotycka, zniszczenia wojenne, projekt konserwatorski, ochrona zabytków

#### Introduction

The first chapel was one of the earliest rooms in Malbork castle. It was the main interior of the oldest building erected here, which, as the castle was extended, became the northern wing of the four-sided structure, called the High Castle from the sixteenth century onwards. It was built in the 1280s at the latest as a three-span, single-nave church covered with a cross-ribbed vault, occupying half the length of the wing, situated according to the Teutonic tradition on its first floor.

The situation changed significantly in 1309 when the main seat of the Grand Master of the Order was moved from Venice to Malbork. Typically, the commander's castle became the main administrative center of the Teutonic state and was therefore subject to a great expansion, which lasted practically throughout the entire fourteenth century.

In the years 1331–1344, the first chapel was also extended, and transformed from a small chapel located in a compact square of the former castle into the main church of the monastic state in Prussia. The single-nave, polygonally enclosed space was extended

twofold to the east, supporting the termination of its new chancel on the outer line of the defensive walls.

The entirety was covered with a stellar vault, supported by decorative angles, the lower parts of which are sculpted in the form of figures of the apostles standing under decorative canopies.

The main element of the external decoration of this religious complex was a huge (about 8 m high) statue of Mary with the Child in her hand in the eastern niche of the presbytery, cast with segments of artificial stone and initially covered with polychrome, and with time covered with a colorful mosaic.<sup>1</sup>

Since its construction, the architecture of the religious complex has remained without major transformations for six centuries. Only the interior design and furnishings were changed. In the early modern period, the Jesuits took care of the church, who founded new equipment in the spirit of the Baroque. At the end of the nineteenth century, during the extensive restoration of Gothic forms of the castle, German conservators, under the supervision of Konrad Steinbrecht, restored the interior consisting mainly of replacing the Baroque equipment with pseudo-gothic one, as well as the conservation and reconstruction

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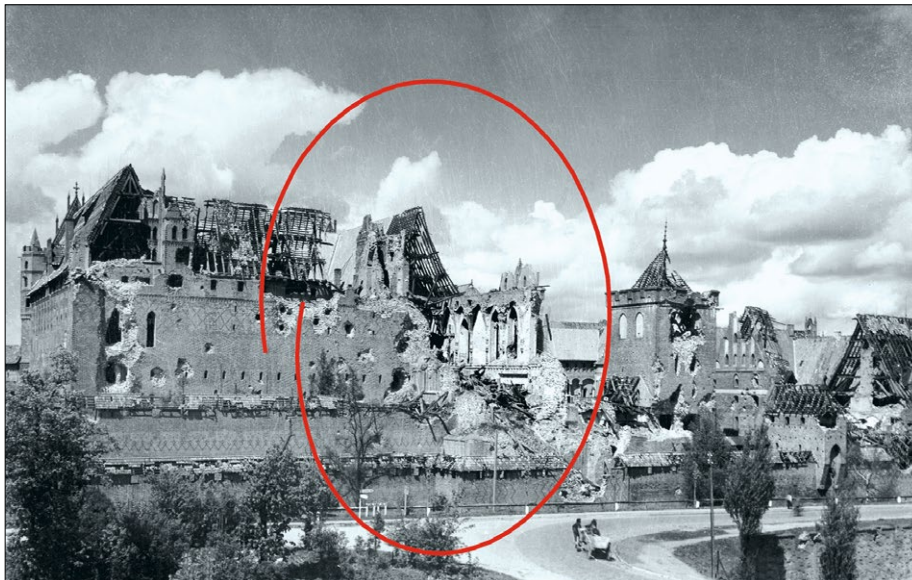
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*Fig. 1. Panorama of the castle after war damages; photo by W. Hodakowski; the place of the Church and the main tower is marked in red; reprod. by L. Okoński.*

Ryc. 1. Panorama zamku po zniszczeniach wojennych; fot. W. Hodakowski; lokalizacja kościoła i głównej wieży oznaczone na czerwono; reprodukcja L. Okoński.

of wall polychromes. At that time, major projects related to the architecture itself included the reconstruction of a high roof in line with the medieval dimensions and the replacement of the limestone floor with a colored ceramic tile with a decorative pattern. The part of the church choir, expanded in the fourteenth century, received decorative crowns on two levels of the facade, which were to add more splendor to the religious complex.

Due to the fact that until 1945 this fragment of the stronghold had preserved—apart from the Palace of the Grand Masters—most of the medieval substance, its destruction in January 1945 was the most painful loss suffered by the castle in Malbork during the last war. Artillery fire caused enormous damage to the entire

eastern facade of the High Castle. Falling fragments of the main tower shattered the vault of the church and the chapel of St. Anne.

The figure of the mosaic Madonna from the outer niche of the presbytery broke up into a dozen or so segments that were buried in the rubble of the church complex together with a number of medieval elements and sculptural details constituting the decor of the castle church.

The remains of wooden roof trusses, hanging over the walls, threatened to collapse at any moment. Damaged roofs and broken windows made it possible to adversely affect the weather on the remnants of the surviving décor and interior equipment (Fig. 1, 2).



*Fig. 2. The interior of the Church, view of the presbytery after war damages, 1945; reprod. by L. Okoński.*

Ryc. 2. Wnętrze kościoła, widok prezbiterium po uszkodzeniach wojennych, 1945; reprodukcja L. Okoński.



Only part of the northern wall, up to the height of the defensive porch, and a fragment of the lower part of the southern wall have survived from the body of the temple. Luckily, three Gothic portals survived, protected by a mass of thick walls—the Golden Gate and two portals of the Chapel of St. Anne. A mass of rubble filled the interior of the church to the height of the window-sills and went down to the breach in the defensive wall of the eastern moat.<sup>2</sup>

For several years after the war, the crippled monument was left without protection and exposed to the destructive influence of weather conditions. In August 1945, Branch No. 1 of the Polish Army Museum in Warsaw was created in the castle.<sup>3</sup> At that time, the initial cleaning of some interiors was started, debris was removed from the courtyards and the demining of its available parts was completed. The future fate of the castle remained unclear for years. The development of events was accelerated only by a tragic event in the fall of 1959. A faulty electrical installation, hastily installed for the needs of a summer scouts' rally in the castle, led to a great fire on the night of September 7/8, which destroyed the roofs of the west and north wings of the Middle Castle. It was a peculiar turning point in the history of the castle. The Minister of Culture came to the conclusion that the best form of ensuring proper care for such a large and important monument would be to organize a museum in it and had one established in September 1960.

The first assumptions for the reconstruction of the damaged monument, formulated in 1960 by a team led by Professor Bohdan Guerquin, provided for the preservation of the Church of the Blessed Virgin Mary and the Chapel of St. Anne—after securing it—in the form of a permanent ruin to commemorate the cataclysm of war. The director of the newly established museum, Henryk Raczyniewski, considered it advisable to develop new assumptions for the reconstruction, which became the basis for the new concept of the future restoration of the castle.<sup>4</sup>

This new program was specified in September 1964 by a team led by Eng. Arch. Zygmunt Wysocki from PKZ Gdańsk, determining the scope of reconstruction and adaptation necessary for the basic functioning of the museum. The new study already provided for the reconstruction of the body of the church and chapel, which was dictated by the permanent protection of the ruins of these valuable religious interiors and the need to organize the silhouette of the building from the city side.<sup>5</sup>

Based on the new assumptions, in 1966, the concept of rebuilding the church itself and building a permanent roof over it was started. On the polygonal closure of the chapel, reconstructed in the years 1958–1961, the walls of the presbytery of the church were erected with four sacristies located in the thickness of the wall. After the main walls were brought out to their full height, they were fastened at the top with the preserved fragments of the former northern



Fig. 3. The Church and the main tower after reconstruction in 1968; reprod. by L. Okoński.

Ryc. 3. Kościół oraz główna wieża po odbudowie w roku 1968; reprodukcja L. Okoński.

wall, with a reinforced concrete rim poured over the crown. The surface of the ceiling above the interior of the church was covered with reinforced concrete slabs. The last element of recreating the body of the church was the erection of a high saddle roof based on a metal truss and covering the roof with monk-nun tiles. The works were completed by 1968. Practically from that moment the church ceased to be practically a war ruin (Fig. 3). At the same time, it must be assumed that a multidirectional conservation project was initiated at that time, aimed not only at the liquidation of war damages, but also to restore the former shape of a unique historical and architectural monument. The project ended in 2016.

In the 1970s and 1980s, various construction and conservation works continued inside the interior. It should be noted, however, that the second half of the 1980s and 1990s was a period in which the problem of the reconstruction and development of the church complex of the Blessed Virgin Mary was not the main subject of interest for the management of the Museum, which had to focus on a different issue. Most of the forces and resources were then involved in the urgent problem of rescuing the western wall of the Middle



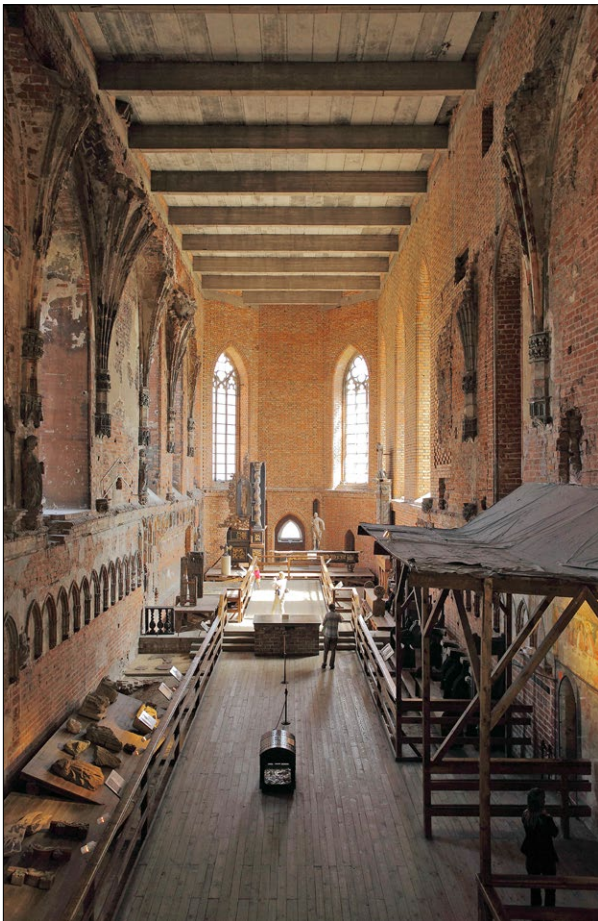


Fig. 4. The interior of the Church, view of the presbytery after temporary restoration and opening to the public, 2001; photo by L. Okoński.

Ryc.4. Wnętrze kościoła, widok prezbiterium po tymczasowej renowacji i otwarciu dla publiczności, 2001; fot. L. Okoński.

Castle, which was threatened with structural failure, with the invaluable Great Refectory. Only after solving the problems in the Middle Castle, it was possible to return to the question of the castle church and its further fate.<sup>6</sup>

### Preparations

In 2000—in order to show the scale of the problem of restoring the interior of the church and its conservation complexity to a wide audience—the Museum decided to make the interior of the church available in its contemporaneous state. After carrying out the necessary protection and adaptation works, an exhibition presenting the old, surviving and preserved décor and elements of the church equipment was arranged there (Fig. 4).<sup>7</sup>

The entire project was also prepared with a view to the planned meeting of the body initially called the International Advisory Committee for the Reconstruction of the Church of the Blessed Virgin Mary in Malbork, to which the Museum invited the most outstanding specialists in the field of monument protection from various European countries.

The meeting was held in May 2001 and was attended by, among others, professors from Germany: Manfred F. Fischer (chairman of the Association of National Conservators of Germany), Ernst Badstübner from Greifswald, Gottfried Kiesow from Wiesbaden and Dethard von Winterfeld from Mainz, and also Professor Manfred Wehdorn from Austria, Professor André de Naeyer from Belgium, Professor Knut Drake from Finland, and from Poland: Professors Andrzej Tomaszewski, Marian Arszyński, Jan Tajchman, Andrzej Kadłuczka, Szczyński Skibiński, Stanisław Latour, Edmund Małachowicz and others. In the intention of the management of the Museum, the meeting was to provide information about the preferences of specialists in this particular case as to a future-oriented solution, and on the other hand, to “internationalize” the problem, which could have a positive impact on the subsequent acquisition of external funds. An interesting result of the meeting was the opinion on the future appearance of the interior of the temple, in which the same number of votes supported the full reconstruction of the medieval space, as well as leaving the building in its current state.

Since then, the problem has appeared in numerous discussions both inside the Museum and with representatives of the conservation world during their numerous study visits to Malbork.<sup>8</sup>

Meanwhile the museum was successively restoring the remains of the pre-war mobilizer and expanding the exhibition of the preserved decorations and equipment of the church.

In 2003, the exhibition inside the church was extended to include dormitory rooms in the eastern and southern wings of the first floor of the High Castle and supplemented with photograms showing the interior of the church before its destruction in 1945. At the same time, intensive research and study works were carried out, aimed at obtaining the maximum information necessary for future decisions regarding further proceedings. Architectural studies of the northern wing were carried out, as well as comprehensive technological analyses of polychromy, mortars, stone elements and ceramic glazes. A photogrammetric survey of the walls prepared earlier was supplemented with 3D laser scanning of the interior of the northern wing, necessary for further action, especially crucial to determining the scope of conservation intervention in the monument.<sup>9</sup> The problem was discussed several times in the forum of the Museum Council operating at the Castle Museum. A permanent discussion forum on, among others these issues became the annual meetings of the members of the International Association of Baltic Castles and Museums, bringing together representatives of fifty museum institutions based in monuments in nine countries surrounding the Baltic Sea.<sup>10</sup> Several general meetings of this organization were devoted to their own experiences in dealing with the preserved cultural heritage of the region. Generally speaking, each community that had recently gained independence (mainly

the Baltic states) tried to restore their respective historic seats of government to their former glory (e.g., the residence of the Duke of Courland in Bauska, Latvia, or Lithuanian objects: the Trakai castle and the Grand Ducal Palace in Vilnius). In turn, German colleagues explained the numerous reconstructions of monuments mainly with the pressure of the public opinion (the Church of Our Lady in Dresden, the town hall in Augsburg or the Church of St. George in Wismar).<sup>11</sup>

In the meantime, an additional important element has emerged in the discussion of the future appearance and functions of the castle church. In May 2007, on the initiative of the guides guiding around the castle, the “Mater Dei” Foundation was established with the main goal of recreating the mosaic figure of the Madonna in the outer niche of the presbytery of the Church of the Blessed Virgin Mary. The Foundation began to promote this idea in various ways and in various environments, and to collect funds to support the work (including by selling specially issued donations, looking for sponsors and donors). Undoubtedly, it became an important forum for the Museum in the social debate on the reconstruction of the castle church and the role of the figure as a symbol of the castle and town of Malbork, defining the spiritual heritage of the creators of the Malbork stronghold. On the Foundation’s initiative, in 2010, the outer niche of the presbytery was decorated with a banner with the image of a figure in a 1:1 scale, reproduced from a pre-war photograph, which made viewers aware of what the eastern end of the church looked like prior to 1945.<sup>12</sup>

### The last stage

In 2012, the Museum began developing a program of restoration works for the entire northern wing of the High Castle. Archival iconographic materials were ordered and analyzed. Selected archival photographs were digitally processed. Other sources and literature were systematized. The team of custodians prepared Assumptions for the future function of the Church of the Blessed Virgin Mary, then a group of conservators formulated the assumptions for the program of conservation and construction works in the complex of the Church of the Blessed Virgin Mary and the chapel of St. Anne.<sup>13</sup> These studies became helpful materials in the discussion at the Museum Conservation Council, which was to work out a decision on the future of dealing with the interior of the north wing and the church complex of the Blessed Virgin Mary (Fig. 5).<sup>14</sup>

Regarding the interior of the church itself, four possibilities were considered:

- leaving the interior in its present condition and carrying out only conservation works, possibly with the reconstruction of the floor from before 1945;
- reconstruction of a mock vault in the form of a light suspended structure;<sup>15</sup>
- reconstruction of the old interior in a virtual form using computer-laser techniques;<sup>16</sup>



*Fig. 5. The Castle Museum Conservation Council in 2015, seated: Professor Marian Arszyński (University of Toruń—chairman), standing from the left: Mariusz Mierzwiński (Museum’s director), Professor Andrzej Kadłuczka (Cracow University of Technology), Professor Michał Woźniak (chairman of the Museum Scientific Council), Marek Rubnikowicz (Museum in Toruń) and Mirosław Jonakowski (Museum’s curator for the conservation of architecture); photo by L. Okoński.*

Ryc. 5. Rada Konserwatorska Muzeum Zamkowego w roku 2015, siedzą: prof. Marian Arszyński (Uniwersytet Toruński – przewodniczący), stoją, od lewej: Mariusz Mierzwiński (dyrektor Muzeum), prof. Andrzej Kadłuczka (Politechnika Krakowska), prof. Michał Woźniak (przewodniczący Rady Naukowej Muzeum), Marek Rubnikowicz (Muzeum w Toruniu) i Mirosław Jonakowski (kurator Muzeum od spraw konserwacji architektury); fot. L. Okoński.

- reconstruction of the state from before 1945 with the omission of elements of the nineteenth-century restoration or only with their correction.

The intermediate option between the two extreme ones was adopted as the target course of action—it was decided that the historical architectural space of the interior should be restored in the shape it had before its destruction, showing all the richness of architectural details, in a way that does not differ drastically from the form of conservation procedures in the castle over the last fifty years. The argument for the continuation of the previous method of dealing with the castle turned out to be one of the most important when choosing the target procedure.

The increasing number of opinions voiced by representatives of the European cultural world in favor of recreating the old form using traditional methods, as well as the voice of public opinion in favor of such a solution, were also important. It was also in line with the opinion of the legendary conservator of the castle, Maciej Kilarski, expressed back in 1988: “It cannot be said that there is only one, most appropriate solution for the future appearance of the church interior, from the point of view of conservation; a model, correct solution. In general, however, it can be said that what we should aim at is to solve the problem in such a way that those who will enter the renovated church in the future, regardless of the degree of preparation, would not be shocked, that, without taking a disapproving attitude out of hand, they would want to consider why this and that were done the way it was, why it looks like this.”<sup>17</sup> This meant, inter alia, closing the





Fig. 6. Scaffolding working meeting (from the left: head of the executive consortium Marcin Kozarzewski, Mirosław Jonakowski, Mariusz Mierzwiński and Museum's conservator Bernard Jesionowski), 2015; photo by L. Okoński.

Ryc. 6. Spotkanie robocze w sprawie rusztowania, od lewej: Marcin Kozarzewski (kierownik konsorcjum wykonawczego), Mirosław Jonakowski, Mariusz Mierzwiński, Bernard Jesionowski (konservator Muzeum), 2015; fot. L. Okoński.

interior to give it integrity (i.e., execution of the vault and flooring).

Based on the commission's findings, in 2013 the program that was the basis for the development of the construction design was detailed.<sup>18</sup> The museum prepared an application entitled: *Conservation and construction works in the complex of the Church of the Blessed Virgin Mary in the Castle Museum in Malbork* and submitted it to European Funds. The project was approved and implemented under the program entitled Conservation and revitalization of cultural heritage based on the funds of the Financial Mechanism of the European Economic Area for 2009–2014. It must be admitted that already during the implementation, some changes and modifications were made in relation to the original design, aimed at improving some solutions in order to obtain an optimal end result. Let us add that the flexible formula of the program allowed for such a procedure, and all corrections were made upon approval, and sometimes at the request of the aforementioned Conservation Committee. Conservation contractors participated in the works on the modifications to the project from the very beginning, and many solutions were developed after performing tests, which were jointly assessed and adopted (Fig. 6).<sup>19</sup> Attention was focused on four essential elements of the church that require careful consideration and a justified decision: the vault, the floor, the stained glass windows and the statue of the Madonna.

The result of the project carried out in 2014–2016 was the maintenance and partial restoration of the entire northern wing of the High Castle, as well as—as part of tasks carried out in parallel by various teams—the restoration of Klesza Tower and Ringer's House, and the maintenance of movable equipment.

The following works were then carried out:

- the preserved, original parts of the walls with the remains of vaulted ceilings and the remains of polychrome were subjected to conservative conservation, limiting interference to the necessary minimum;
- the brick stellar vault was reconstructed by removing the ribs from the remains of the original and reconstructed vault caps. The proposal to apply the theoretical concept of Bartel Ranisch regarding the reconstruction of the vault and the method of calculating its geometry was not reflected in the actual condition of the preserved elements of Malbork vaults and could not be used in the reconstruction.<sup>20</sup> The works were carried out following medieval construction techniques, raising the ribs on traditional centrings and filling the vaults manually (Fig. 7);
- the new parts, i.e., those rebuilt in the 1960s and 1970s, and the vault were covered with plaster harmonized in color and features with historical plasters;
- the stone slab floor was reconstructed in the manner of the stone slab demolished by Steinbrecht in 1889, based on the results of tests of Gothic limestone slabs from the castle area (also fragments of those dismantled from the church);<sup>21</sup>
- the structure of the western gallery was reinforced and its polygonal part was secured, next to which the damaged southern wall was reconstructed with the use of original fragments. Modern technical solutions were used to save the original substance as much as possible;
- all the preserved Gothic architectural details, which were subjected to conservation in previous years and kept in the Museum's collection, were put back in their original place. The possible additions to the sculptural forms were limited to the damage affecting the structural stability;
- new stained-glass windows in the form of quarters with a rhombic pattern made of tinted glass framed with lead were designed and installed;
- the preserved fragments of wooden equipment ("post-Jesuit" and from Steinbrecht's times) were preserved and stored in the museum collections;
- the interior was fitted with the necessary utilities, enabling its multifunctional use;
- the facades of the building were jointed.

One key feature of the works was the method, tested earlier during the restoration of the Great Refectory, consisting in the ongoing assessment of the aesthetic effects of the newly created value and its possible immediate correction (Fig. 8).

In the case of the chapel of St. Anne, Klesza Tower and Ringer's House, previous positive experiences were used, tested on the Chapter House, the Convent Refectory, the Infirmary or the Great Refectory, the restoration of which, generally consisting in a return to the nineteenth-century version of Steinbrecht's,



Fig. 7. Installation of centring for the reconstruction of the vault under the existing reinforced concrete ceiling, 2015; photo by L. Okoński.

Ryc. 7. Instalacja krążyn pod rekonstrukcję sklepień pod istniejącym stropem żelbetowym, 2015; fot. L. Okoński.

proved to be a method. Naturally, it was not an exact reconstruction of the state before 1945, but only a general course of action—each element was treated individually. As the restorers who carried out the works put it, the method of reconstruction was adopted, which was an attempt to “remain faithful without being literal.” In Klesza Tower, where the pyramidal roof was restored in 2002 and the battlement was preserved, the damaged vaults of two floors were rebuilt and the medieval cellar interiors were restored. Comprehensive conservation work was also carried out on the basements of the entire northern wing of the High Castle.

The pre-1945 appearance of the burial chapel of St. Anne was restored. Using the cardboard of the historical painter Herman Schaper, preserved in the Malbork collection, illustrating the scene of the bowing of Teutonic dignitaries who fell at Grunwald in front of the enthroned Madonna, a painting covering the entire shield area of the western wall of the chapel was recreated using the contour technique. A new passage through the interior was also made, connecting the northern and eastern terraces, in the form of a metal and glass structure, which replaced the existing wooden pier. On the other hand, during the research work under the floor below the aforementioned painting, a tomb crypt known from sources was discovered, hiding the remains of the Jesuits, as well as the last starost of Malbork, Michał Ernest Rexin and his family. After the artifacts found in it were recovered, the interior of the crypt was tidied up and the human remains were reburied in their original place.<sup>22</sup>

The final and one of the most difficult undertakings of the whole program was the reconstruction of the colossal figure of the Madonna with the Child in the outer niche of the church presbytery.<sup>23</sup> The very idea of recreating the figure in its former place resulted from the necessity to both restore the ideological message—resulting from its enormous importance as a symbolic, religious and architectural sign—and the restoration of aesthetic values (obtaining a new artistic

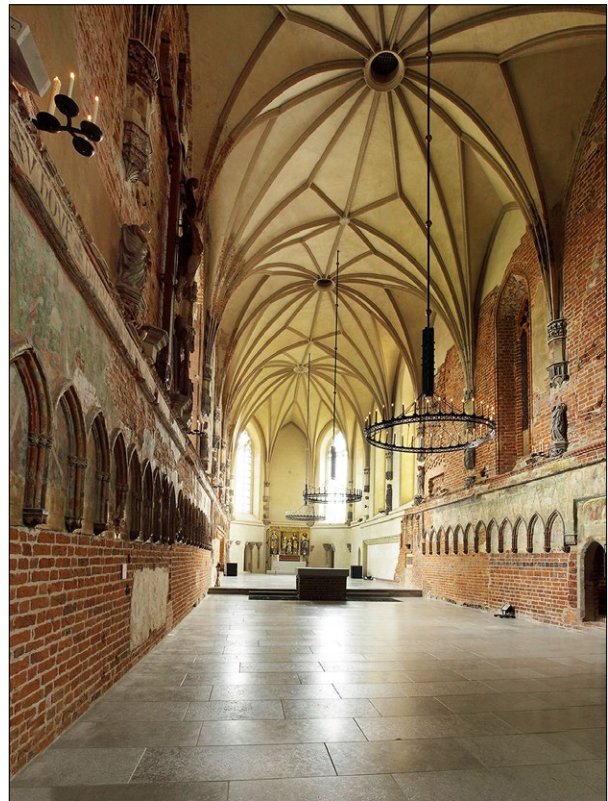


Fig. 8. Interior of the Church, view of the presbytery after the completion of the works, 2016; photo by L. Okoński.

Ryc. 8. Wnętrze kościoła, widok prezbiterium po zakończeniu prac, 2016; fot. L. Okoński.

work with an artistic effect as strong as the original). Let us add that the reactivation of this element was—as in the case of the entire church—a matter of course for our predecessors. Already in 1957, Maciej Kilarski wrote: “The right understanding of the people in managerial positions in the management of the castle and in the PRN will ensure, however, that the recovery of the maximum amount of data for the reconstruction of the figure, a unique sculpture of this size and covered with a mosaic it will not remain only a conservation dream, but it will be fully realized.”<sup>24</sup> Thus, the reconstruction of the mosaic statue, which from the moment of its creation was the ideological and formal axis of the church’s silhouette and the central element of the eastern panorama of the castle, did not raise any doubts from the very beginning of the reconstruction works. The only thing that was debatable was the way in which this project was carried out.

The project accepted for implementation assumed the construction of a figure from a new, light material, and the preserved original fragments were to be shown in the form of an assembly displayed in a display case at the entrance to the castle grounds. Already at the stage of implementation of works on the body of the church, the author of this article expressed the opinion that due to the fact that as much as 60% of the original substance was preserved, all original preserved fragments of the figure should be included in the creation of a new statue in situ. In this way, the image of





Fig. 9. Transport of the finished segments of the Madonna statue to its place in the outer niche of the presbytery, 2015; photo by L. Okoński.

Ryc. 9. Transport ukończonych segmentów figury Madonny na jej miejsce w zewnętrznej niszy prezbiterium, 2015; fot. L. Okoński.

the Madonna, a kind of model—a reconstruction of an old sculpture, will not appear in the presbytery niche, but an object with most of the original substance and thus carrying the ideological value associated with this particular place—the castle-monastery. Despite the fact that it caused complications and the necessity of changes in the implementation itself, with time everyone agreed to this concept. In preparation for this challenge, modern research techniques were implemented, and tests were carried out on historical mortars, stones, paint layers and glass elements. Comparative research was carried out on medieval mosaics in Kwidzyn (St. John's Cathedral) and Prague (St. Vitus Cathedral in Hradčany).

The final position developed by the Museum in the course of numerous discussions assumed the anastylosis of all the preserved elements of the statue and putting them in appropriate (original) places for the figure to be re-cast in segments. The exception was the original right hand of the Madonna with fragments of the mosaic preserved in situ, which was left in the museum lapidarium for research and exhibition purposes. The remaining original fragments, excavated from the



Fig. 10. View of the Church from the east, 2016; photo by L. Okoński.

Ryc. 10. Widok kościoła od wschodu, 2016; fot. L. Okoński.

rubble after the war and surviving to this day, became part of the statue again (Fig. 9). After the statue was assembled on the spot, in the recess of the church, the whole thing was covered with a colorful glass mosaic, the technology and colors of which were developed on the basis of studies of surviving tesserae, and which were made in Italian and Polish workshops (Fig. 9). In this way, not only the most important element of the external decoration of the church was restored, but one of its most important elements, necessary for understanding this unique place and the cultural values protected in it, was reclaimed for the castle (Fig. 10).

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<sup>1</sup> The medieval history of the Church of the Blessed Virgin Mary is rich in literature, recent entries include: T. Torbus, *Architektura zespołu kościoła NMP jako centralnej świątyni państwa krzyżackiego*, [in:] *Kościół Najświętszej Marii Panny na Zamku Wysokim w Malborku. Dzieje – wystrój – konserwacja*, ed. J. Hochleitner, M. Mierzwiński, Malbork 2016, p. 9–26.

<sup>2</sup> War damage and the first years of reconstruction were discussed in: M. Kilarski, *Odbudowa i konserwacja zespołu zamkowego w Malborku w latach 1945–2000*, Malbork 2007, p. 36–41.

<sup>3</sup> The fate of the monument in the fifteen years after the war was discussed here: M. Mierzwiński, *Zamek Malborski w latach 1945–1960*, „Studia Zamkowe” 2004, vol. 1, p. 7–54.

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- <sup>6</sup> After the change of management of the Castle Museum in the second half of the 1980s, the new management team immediately took up the problem of the failure of the western wall, which had not been properly emphasized before. This was the largest—so far—technical and engineering project in the history of the Museum, carried out until the second half of the 1990s; see: M. Mierzwiński, *Zabezpieczenie zachodniego skrzydła Zamku Średniego w Malborku*, „Ochrona Zabytków” 1994, No. 2, p. 123–136; M. Mierzwiński, *Prace ratownicze i konserwatorskie w zachodnim skrzydle Zamku Średniego w Malborku w latach 1990–2010* [in:] *Wielki Refektarz na Zamku Średnim w Malborku. Dzieje – wystroj – konserwacja*, ed. J. Trupinda, Malbork 2010, p. 169–214.
- <sup>7</sup> The exhibition in the interior of the church and in the dormitories was prepared by a team of employees of the Castle Museum under the supervision of the curator for research and art collections, Professor Michał Woźniak.
- <sup>8</sup> His opinion in favor of the reconstruction of the temple in its former shape, expressed among others Chairman of the International Council for the Protection of Monuments ICOMOS Michael Petzet during his visit to Malbork in 2002. A similar situation was encountered by Professor Udo Arnold, President of the International Commission To Study Of Teutonic Order, which formulated it in the official version to the museum.
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- <sup>14</sup> They were members of the Museum’s Conservation Council at the time: Professor Marian Arszczyński (chairman), Professor Andrzej Kadłuczka, Professor Michał Woźniak, Doctor Marek Rubnikowicz and two representatives of the Museum: managing director Mariusz Mierzwiński and curator Mirosław Jonakowski.
- <sup>15</sup> The concept of some type of reversible arrangement of the apparent vault was considered by Professor Andrzej Tomaszewski during the discussion.
- <sup>16</sup> Such a solution was proposed by Professor Andrzej Kadłuczka, see: *Opinia na temat odbudowy kościoła NMP na Zamku Wysokim w Malborku*, Kraków 2012, Museum Archives.
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- <sup>20</sup> A. Kulig, op. cit., p. 141–181.
- <sup>21</sup> Petrographic studies of the slabs dismantled by Steinbrecht in 1885 and the copies preserved in situ at the Palace of the Grand Masters to this day allowed to identify the source of their origin from deposits in present-day Estonia (Reval limestone), which were also used in the current works.
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## Abstract

This paper presents the last stage of the reconstruction of the religious complex at the castle in Malbork, consisting of the Church of the Blessed Virgin Mary, the burial chapel of St. Anne and Klesza Tower, which suffered significant damage during the Second World War in 1945. First, the post-war history of the religious complex and its reconstruction from the end of the 1950s, through construction activities recreating the body of the temple in the 1960s, to restoration works on the interior design and furnishings in the 1970s, are discussed briefly. The main focus was placed on the final stage of the reconstruction of this important fragment of the Malbork Castle (implemented in 2014–2016), which ended over five decades of efforts to restore it to its proper form. The paper discusses the criteria and reasons that guided the creators of the reconstruction from the point of view of one of them. The final works were carried out thanks to the support of external funds from the European Financial Mechanism. During the reconstruction, the colossal statue of the Madonna with the Child was also reconstructed, standing in an outer niche of the presbytery, which has not existed since 1945.

## Streszczenie

W artykule przedstawiony został ostatni etap odbudowy zespołu sakralnego na zamku w Malborku, złożonego z kościoła Najświętszej Marii Panny, kaplicy grzebalnej św. Anny i Wieży Kleszej, w znacznym stopniu zniszczonych podczas II wojny światowej w roku 1945. Najpierw w wielkim skrócie omówiono powojenne dzieje zespołu sakralnego i jego odbudowy, począwszy od końca lat pięćdziesiątych XX wieku, poprzez działania budowlane odtwarzające bryłę świątyni w latach sześćdziesiątych po prace konserwatorskie przy wystroju i wyposażeniu wnętrza w latach siedemdziesiątych. Główną uwagę skupiono na końcowym etapie odbudowy tego ważnego fragmentu zamku malborskiego (zrealizowanym w latach 2014–2016), kończącym półwiecze starań o przywrócenie mu należytej formy. Omówiono powody, jakimi kierowali się twórcy odbudowy, z punktu widzenia jednego z nich. Prace końcowe zostały wykonane dzięki wsparciu funduszy pochodzących z Europejskiego Mechanizmu Finansowego. W trakcie odbudowy odtworzono również kolosalny posąg Madonny z Dzieciątkiem stojący w zewnętrznej niszy prezbiterium, nieistniejący od roku 1945.



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## Redevelopment of the Old Waste Incineration Plant in Poznań: Contribution to the Discussion on the Approach to Post-Industrial Cultural Property

### Przebudowa Starej Spalarni w Poznaniu. Głos w dyskusji na temat zasad postępowania z zabytkami budownictwa poprzemysłowego

**Keywords:** architecture, conservation, industrial architecture, waste incineration plant, Poznań

**Słowa kluczowe:** architektura, konserwacja, budownictwo przemysłowe, spalarnia, Poznań

#### Introduction

The Old Waste Incineration Plant is one of the few post-industrial buildings from the period of the Second Polish Republic which have survived to this day in Poznań. Plans to build a waste processing facility were made shortly after Poland regained independence in 1918. Subsequent to the requirement for solutions that would ensure a higher level of cleanliness in the growing city, an idea was put forward to build an incineration plant which would manage the waste that had previously been disposed of on barren areas outside the city limits.<sup>1</sup> The construction of the incinerator in Poznań, like many other municipal investments, might have also been related to the organization of the General National Exhibition in 1929.<sup>2</sup> The cleanliness of the city was one of the concerns of the then mayor, Cyryl Ratajski, whilst the animated development activity aimed to improve the urban infrastructure, as well as the difficult housing situation of Poznanians on the eve of the exhibition.<sup>3</sup>

The construction of the incinerator, designed by Stanisław Kirkin, commenced in 1926 (consuming a considerable amount of PLN 3.8 million) and was completed in December 1927.<sup>4</sup> Along with the actual

incinerator, homes were also provided for employees, as well as an administration building in Szelaż Street, a waste reloading facility in Przepadek Street and garages in Bergera Street.<sup>5</sup> At the time, the building was very modern and in line with the latest international trends. The technological design of the incinerator was developed by the British Heenan & Froude engineering company, which had extensive experience in the field and boasted a portfolio of 250 similar plants around the world. The waste was incinerated using a Babcock & Wilcox water-tube boiler built by Fabryka H. Cegielskiego of Poznań and L. Zieleniewski S.A. of Cracow (Polish factories producing machines and train carriages).<sup>6</sup> To start up the plant, eight thousand galvanized iron 110-liter waste containers were purchased, in addition to a fleet of vehicles for collecting and transporting waste to an out-of-town storage site, as well as equipment for dust-free waste transfer. Waste from individual premises was collected on rubber-coated wheelbarrows and was subsequently loaded onto five-ton trucks with a tipping mechanism on the side. Furthermore, fourteen special motorized vehicles and two tractors with trailers were used to transport waste to the plant. This was ventilated by a so-called *ekshauser*, a ventilator with an air intake capacity of

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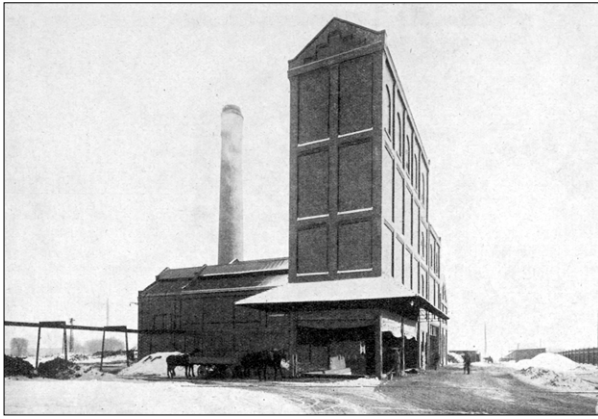


Fig. 1. Waste Incineration Plant in Poznań, view from the west; archival photo.

Ryc. 1. Spalarnia śmieci na Szeląg w Poznaniu, widok od strony zachodniej; fotografia archiwalna.

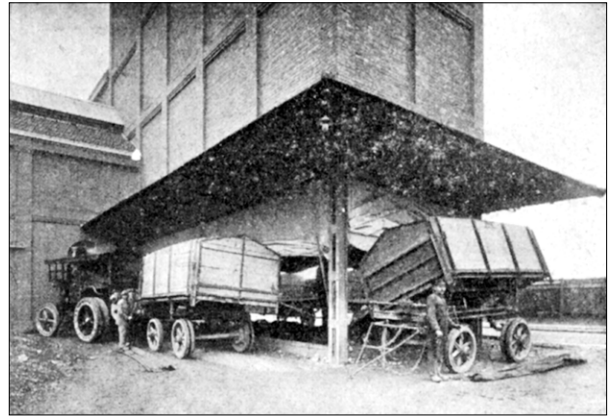


Fig. 2. Incineration Plant, waste chute; archival photo.

Ryc. 2. Spalarnia, zasyp śmieci; fotografia archiwalna.

200 m<sup>3</sup>/min. The electrical power generated by the incinerator was used to supply a prefabricate plant and the municipal grid.<sup>7</sup> Opened in December 1927, the Waste Incineration Plant at Wilczak Street was the first of its kind in Central Europe and the only one built in Poland during the Second Polish Republic.

In the 1930s, the Waste Incineration Plant operated on a commercial basis, as a separate municipal economic unit. In 1938, in order to streamline work, all the sections of the City Cleaning Department, together with the Incineration Plant, were merged into a single economic unit called Miejskie Zakłady Oczyszczania (Municipal Cleaning Works).

The incinerator ceased to operate on the outbreak of the Second World War in September 1939, and during the military operations of 1945 approximately 40% of the plant was destroyed.<sup>8</sup> After the war, plans were put in place to rebuild it, following the organization of a fleet of vehicles. Initially, this consisted of two old tractors with trailers and ten horses, which hauled away dirt from the streets and waste from municipal production plants. In practice, the incinerator restarted on 23 December 1955, the tenth anniversary of Poznań's liberation from the Nazi occupant. Only two years later, in 1957, the authorities closed it down claiming "lack of economic effectiveness" and difficulties in repairing the unusual equipment.<sup>9</sup>

In subsequent years, the incinerator and its surroundings accommodated, among other enterprises, the headquarters of a taxi company, including garages, repair workshops and a club (Klub Taxi). The actual plant was not used, except for the ground floor, where a repair garage and car wash operated. Later, the nearby halls and buildings housed Wilmarkt, Poznań's first complex of market halls for local merchants, which operated in Wilczak Street from 1993 to 2006, when the buildings were demolished. The site of the former market was acquired by Howard Holdings from Ireland, with plans to develop a luxury housing estate comprising 440 flats and seven lofts, located in the actual building of the former incinerator. Ultimate-

ly, due to the economic crisis, the investment did not come through, and in 2010 the site was acquired by the Poznań-based developer Agrobex. The new owner decided that building flats in the post-industrial building was unprofitable and planned to convert it into commercial premises. Despite these plans, the building remained unused for several more years.

From the time when the plant ceased to serve its original purpose of a waste incinerator, it was used by various tenants who were unconcerned about its technical condition and gradually stripped it of its original form and character. From then on, the structure gradually fell into disrepair. The actual incinerator building, although valuable and historic, was not listed in the National Registry of Cultural Property, but only in the local records.<sup>10</sup> However, the inclusion of the investment area in the local zoning plan made it possible to put the property under the protection of the Municipal Conservator of Cultural Property in Poznań.<sup>11</sup> Ultimately, the owner decided to rebuild it for commercial functions. From the very beginning, the project enjoyed wide public interest, and information about its progress was regularly published by the local media.<sup>12</sup> The redevelopment of the building turned out to be a feasible venture; however, a number of technical and formal problems emerged, in addition to practical (or even doctrine-related) conservation considerations.

All of the above should be put in the context of the complex demands facing the protection of post-industrial sites, albeit numerous successful examples in this field can serve as a source of creative inspiration.<sup>13</sup>

### Research and design methodology

The surviving incinerator building consisted of four fragmented blocks of varying heights, ranging from 8.5 to 20.5 m, and an adjacent over 30-m-high brick smokestack. The incinerator was built on brick and concrete foundations. It was a mixed steel and brick construction featuring columns, binding joists, a steel and wood rafter and ceramic brick walls. These con-

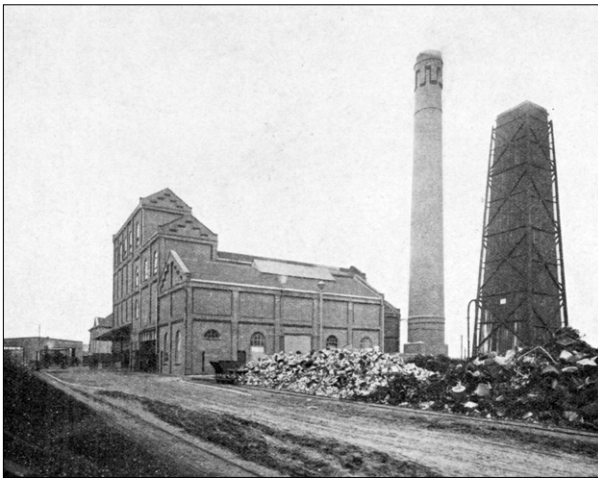


Fig. 3. Waste Incineration Plant in Poznań, view from the east; archival photo.  
Ryc. 3. Spalarnia śmieci na Szelażu w Poznaniu, widok od strony wschodniej; fotografia archiwalna.



Fig. 4. Incineration Plant, image from 2007 showing the missing smokestack top and the additions on the ground level; photo courtesy of Litoborski+Marciniak.  
Ryc. 4. Spalarnia, zdjęcie z roku 2007 ukazujące brakujący wierzchołek komina oraz dobudówki na poziomie parteru; fotografia dzięki uprzejmości Litoborski+Marciniak.

stituted a group of different blocks with pitched roofs covered with ceramic tiles. The original conversion design was commissioned to an architectural studio in Poznań by an Irish developer. The design foresaw the conversion of the incinerator building into commercial and residential premises. In the course of preparing the construction and conservation documentation, a number of technical surveys were carried out to determine the technical condition of the property.

The evaluation of the building's technical condition was crucial to determining if it could be redeveloped to serve new functions. In February 2001, the authors of the conservation "white sheet" wrote: "The general condition of the building is good. The walls are not cracked, which suggests that the downward movement of the whole building is stable."<sup>14</sup> The first technical survey of 2007 permitted the redevelopment with the reservation that the technical condition of the building was deteriorating. This suggested that the existing brick wall structure should be repaired, but because of its overloading, this required "an additional support frame," which would take over the load from the new additional inter-story ceilings, while transferring it to independent foundations.<sup>15</sup> Simultaneously, the roof structure had to be replaced because of progressing corrosion of the steel elements and its insufficient load-bearing capacity. At that time, the technical condition of the smokestack did not raise any objections. The design documentation for the adaptation of the building was developed on the basis of the aforementioned guidelines and obtained an appropriate building permit in 2008.<sup>16</sup>

The crisis in the real estate market brought the works to a halt and forced the then owner to sell the designed investment together with the incinerator building. The new investor, after several failed attempts to sell the property, decided to independently develop the building into commercial premises.<sup>17</sup> The poor techni-

cal condition of the building, which was deteriorating year by year, proved to be an immense problem. Key elements in assessing the building's condition were the passage of time, changing weather conditions, and above all, the fact that the building had been unused for over a decade.

Fourteen years after the first technical survey, a new one was conducted in March 2015. This demonstrated progressing technical deterioration and the urgent need to renovate the building. Already at that time, its technical condition was judged as bad and very bad, or "pre-failure [condition] threatening the safety of the structure," with the conclusion that its further use may pose a safety risk to the health or life of its users.<sup>18</sup> It also found numerous cracks in the walls, missing bricks, mechanical damage, overgrown vegetation and numerous damp patches.

Based on these findings, the designers foresaw the restoration of the original architectural form of the facade, while adapting the building to its new functions.<sup>19</sup> The ground level was intended for retail premises, and the first and second floor for offices. The last story of the highest, slender part of the building was to be used to house the technical infrastructure for air exchange in the building. This solution made it possible to effectively "conceal" within the massing the considerable air handling units. Moreover, several haphazard additions that had "grown" around the building on the ground level shortened the width of the front facade by approximately 2 m, whilst the roof geometry remained unchanged. Subsequently, these extensions were to be removed.

Another expert survey of 2017 confirmed the property's dramatic technical condition, including a threat to the structural stability of the high part of the incinerator building and the smokestack, which deviated from the vertical by 13 cm. Of crucial significance was the deterioration of the "existing steel structure

which [was] coupled with the column structure of the walls,<sup>20</sup> as well as numerous vertical cracks in the plasters reinforcing the external walls.

According to the authors of the study, due to the pre-failure state of the property, it was necessary to demolish the main part of the incinerator building and the adjacent smokestack.<sup>21</sup> Considering the preservation requirement stipulated in the zoning plan, based on the conclusive opinion of the Municipal Conservator of Cultural Property and the designers, the investor decided to reconstruct the incinerator section and adapt it to its new functions.

### Architectural form versus conservation guidelines

The former incinerator building with the adjacent generally accessible square is the main element of the composition and, simultaneously, the dominating feature of the neighboring housing estate. As regards the facade, the design aimed to restore it (to the highest possible extent) to its original state, reflecting the building's unique character. This included the removal of all the non-original haphazard layers that had accumulated through the post-war adaptations and alterations, such as distorted or bricked-up openings (windows and doors), garage doors, canopies, etc. Furthermore, this also included the restoration of the window joinery and ironwork, and based on this, additional doors and windows were designed, maintaining the original proportions, divisions and arched lintels. The plans foresaw the replacement of the damaged parts of the facade or individual bricks, as well as repairing those features that were to undergo conservation and renovation. The smokestack and the uppermost part of the building (of key significance to its form) were planned to be demolished due to their very poor technical condition, and then to be rebuilt in their original form. The inner structure of the ceilings, partition walls and vertical passageways, which had been repeatedly altered and were unsuitable for adaptation to their new functions (also due to their poor technical condition), were to be extensively rebuilt with a new support structure added from the inside of the brick wall cladding.

Subsequently, a likely course of construction and conservation work was determined and approved by the conservation authorities in Poznań. This was released in the following stages:

1. The best-preserved walls of the lowest part on the north and north-west side underwent conservation, including filling in the missing small ceramic features.
2. The middle part of the building situated on the south-east side was restored, preserving as much as possible of the original substance. The treatment included its conversion, as well as filling in and partially reconstructing the damaged features to restore the maximum of the original appearance, but in different shades underlining the original and rebuilt parts of the building.



*Fig. 5. The high section during the demolition of the deformed and cracked walls with visible corroded steel structure; photo by P. Paradziński.*

Ryc. 5. Część wysoka w trakcie rozbiórki oraz odkształcone i spękanne ściany z widocznie skorodowaną konstrukcją stalową; fot. P. Paradziński.

3. Due to the building's poor technical condition, the highest north-western large-volume part, the roof structure and cladding, and the smokestack were demolished. They were then reconstructed retaining the layout of the block and facade but using modern construction techniques (layered walls with ceramic cladding).

These decisions were dictated by the existing archive materials, and by a detailed architectural, constructional and photographic inventory. A diverse set of conservation methods was used for the external walls and the interior, in accordance with the evaluation of the conservation authorities.<sup>22</sup> The adaptation of the preserved part included restoration, repair and reinforcement works. The damaged parts of the facade and individual bricks were replaced, and the missing elements were filled in. These complex and diverse conservation and construction procedures were the only way to preserve the maximum of the original features and to restore the original form of the building.

The inner structure of the ceilings, partition walls and vertical passageways, which had been repeatedly altered and were unsuitable for adaptation to their new functions (also due to their poor technical condition) were extensively rebuilt with a new support structure added from the inside of the brick wall cladding. The most complicated part were the structural



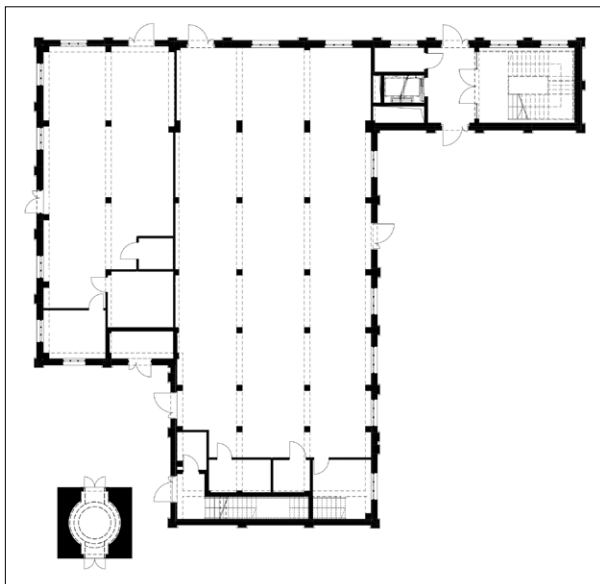


Fig. 6. Incineration Plant, ground floor plan of the building and smokestack; image courtesy of Litoborski+Marciniak.

Ryc. 6. Spalarnia, rzut parteru budynku i komina; dzięki uprzejmości Litoborski+Marciniak.

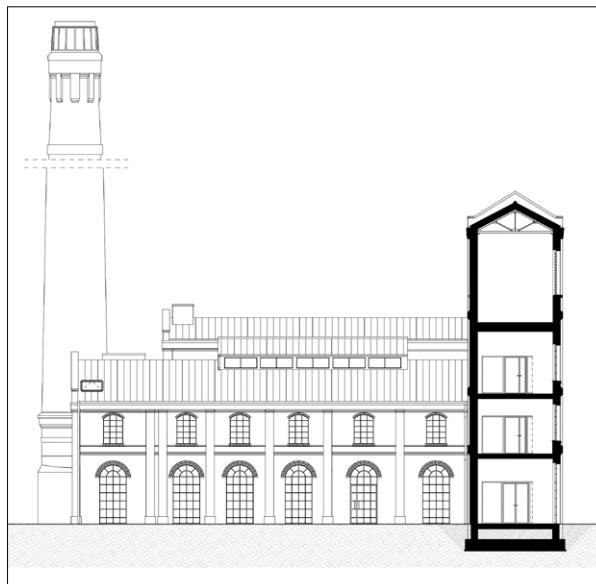


Fig. 7. Designed cross-section of the high part of the incinerator with a view of the eastern facade; image courtesy of Litoborski+Marciniak.

Ryc. 7. Projektowany przekrój wysokiej części spalarni z widokiem na elewację wschodnią; dzięki uprzejmości Litoborski+Marciniak.

solutions. The deteriorated inner steel structure was replaced by a reinforced concrete one, which met strict fire safety regulations. A few internal walls were also demolished and rebuilt. The foundation of part of the reconstructed section was made on a reinforced concrete slab. The internal foundations under the columns and under the new internal walls were made of reinforced concrete footings and benches, respectively. The building's structural system, due to fire protection requirements (for a mid-high building), was designed as a massive structure using the spatial formwork calculation model. This featured reinforced concrete columns and binders, and 18-cm-thick multi-area Filigree floor slabs. The walls of the upper stories were made of 20-cm-thick reinforced concrete. The existing outer brick walls were fixed to the new reinforced concrete structure with steel ties (anchors).

The conservation and restoration of the lower parts of the building did not go beyond standard procedures, including hydrothermal cleaning of the masonry and filling it with ceramic material similar in size to the authentic one (post-demolition and new bricks). On the other hand, the reconstructed parts were entirely made of new bricks to make them clearly stand out from the original materials.

### Construction and conservation regulations and requirements

The conversion of the Old Waste Incinerator Plant featured its redevelopment and changing its form of use, whilst preserving as much as possible of its original features. In addition to the building's technical condition and the scope of changes required for its adaptive reuse, the challenge also included the existing technical

and construction regulations.

It is worth noting that the building, although a historic one, was not listed in the National Register of Cultural Property, and the scope of protection specified in the zoning plan was limited to "the preservation of its existing shape and facade."<sup>23</sup> Nonetheless, even historic buildings are not exempt from the existing technical and construction regulations, in particular the Regulation of the Minister of Infrastructure on the technical conditions to be met by buildings and their placement.<sup>24</sup>

Paragraph 2.2 of the said Regulation permits alternative solutions in "buildings and areas that are listed in the Register of Historical Monuments or areas protected by conservation authorities based on the provisions of zoning plans." Moreover, pursuant to Article 5, Paragraph 1, Section 4 of the Construction Law,<sup>25</sup> buildings and related construction equipment should, taking into account their expected life, provide the necessary conditions for the use of public and multi-family residential buildings by disabled persons, as stipulated in Article 1 of the Convention on the Rights of Persons with Disabilities (2006), in particular persons in wheelchairs. In the case of historic buildings, this raises far-reaching implications and the need to use, for example, passenger lifts, which due to the different usable levels in the incinerator building, proved to be necessary.

Ultimately, the building was fully adapted to the needs of persons with disabilities. This involved designing the site in front of the building to ensure direct access from the pavement level to level 0 through all public entrances to the main hall and commercial premises. A passenger lift was also provided for transporting persons with disabilities and connecting all

the usable levels. Moreover, doors and corridors were made wide enough to ensure access of such persons to all the public spaces.

### Construction work and project execution

Due to the dramatically poor, or even pre-failure condition of the upper part of the building and smokestack,<sup>26</sup> the architects decided to demolish these and partly reconstruct them in shapes corresponding to their original form. Analyses of the feasibility of redeveloping the property in modern form, using modern materials (e.g., glass) highlighted the building's architectural incoherence, raising concerns about its ultimate aesthetic expression.

Following consultations with the conservation authorities, a section of the building was reconstructed in its historical shape using modern technology and a different color of ceramic material to make it stand out from the original bricks. To fulfil the requirements of efficient energy use, the reconstructed external walls were layered and thermally insulated with external brick cladding (corresponding to the other parts of the building), which was tied to the load-bearing reinforced concrete structure.

The remaining external brick walls, after appropriate treatment (replacing missing bricks and damaged sections, removing dirt and light red paint coating, etc.) were preserved to serve as wall cladding, strengthened from the inside with a new reinforced concrete support structure. The entire facade of the building, after repairing the bricks, producing new ones and restoring the old openings, was grouted to obtain a uniform, coherent architectural expression, whilst preserving and exposing the historical layers.

In light of the existing regulations, an architectural and conservation challenge was posed by the ventilation solutions, especially the mechanical ventilation system. In particular, this involved the large size of the air handling units and the considerable width of the ducts, as well as the necessity to locate the air intake and exhaust within the facade. Ultimately, the air handling units were located on the last, open level of the high section and the ducts were channeled under the ceiling structure and the roof trusses, which corresponded to the industrial character of the building. Furthermore, the air intakes and outlets were incorporated into the dimensions of the existing wall openings.

The window and door joinery were reconstructed in dimensions corresponding to the original characteristic divisions and profiles. Due to the technical parameters of the partitions, they were made using aluminum profiles, since steel profiles were not feasible.

Another difficult feature was the roof. The existing roof covering, and above all the steel structure, were corroded and did not meet modern strength standards. The existing purlin and rafter roof based on steel lattice girders was dismantled and replaced with new steel lattice trusses meeting the current, revised regulations



*Fig. 8. Second floor interior of the lower part of the plant, visible reconstructed steel structure of the roof; photo by P. Marciniak*  
Ryc. 8. Wnętrze pierwszego piętra niższej części spalarni, widoczna odtworzona konstrukcja stalowa dachu; fot. P. Marciniak.

for snow and wind loads, as well as taking into account the need for roof insulation and adequate fire protection. Roof pitches and truss heights were modelled on the original trusses, as were the purlin and rafter structures. The roofing was made of graphite-colored coated steel with a standing seam. The gutters, downpipes, roofing and other details were adapted to the color and architectural expression of the roof and its structure and were made of similar material.

A particular challenge was the brick smokestack located near the main building of the incinerator. Since the end of the Waste Incineration Plant's operation, it had not performed any specific function, other than being a distinctive high dominant feature among the surrounding buildings. Its upper part was probably destroyed during the war, lowering its height and irretrievably destroying its slender proportions. Additionally, disfiguring mobile telecommunication antennas were installed on its top in the early twenty-first century. Expert surveys carried out in 2015 and 2017 showed, beyond any doubt, the catastrophic technical condition of the smokestack, namely cracks in its upper part, as well as a significant 13-cm deviation from the vertical, which posed a destruction risk. In the expert's opinion, the smokestack required immediate demolition. Both the designers and the conservation authorities were aware that without the characteristic dominant feature of the smokestack, the incinerator complex would never regain its unique architectural expression.



Fig. 9. Thermal wall insulation installed from the inside; photo by P. Marciniak.  
Ryc. 9. Izolacja termiczna ścian mocowana od wewnątrz; fot. P. Marciniak.

Therefore, they decided to rebuild it in a shape corresponding to the original form. The structural guidelines adopted for the construction plans assumed the option of reconstructing the smokestack according to various technical and material requirements, with an emphasis on ceramic material (solid bricks). In the course of the construction work, it turned out that it was impossible to find any contractor who would undertake to build the smokestack using this technology. Moreover, none of the contacted brick manufacturers would produce ceramic fittings needed to reproduce the original shape. Ultimately, the smokestack was rebuilt to its original height (from the late 1920s), but using a mixed technology, namely a reinforced concrete structure encased in ceramic material. The only contemporary-looking feature is the glazed and internally illuminated smokestack top cap, which is a modern reinterpretation of a “shining lantern.” The final function of the smokestack remains open to discussion. Since the building is supplied by the municipal heating provider, the smokestack’s function of removing flue gas is no longer relevant.

The realization of the project (between 2018 and 2020), is a noteworthy example of redevelopment cooperation due to the commitment of the conservation authorities and the developer, as well as the competence and experience of the site manager.<sup>27</sup>

## Conclusion

The redevelopment, adaptation and modernization of the historic building of the Old Incinerator Plant brought to light a number of technical and conservation-related conclusions, as well as observations concerning the doctrine and methodology related to the protection and preservation of post-industrial architectural heritage.

In a situation where a building is not listed as historical monument but only registered in local monument records, and where the scope of its protection in the local spatial development plan is limited to the preservation of the “existing shape and facade,” there is a dangerously wide area for the interpretation and range of preservation of its authentic features. On the other hand, it is also an opportunity for a unique approach to preserving such features. In the latter case, it is key to determine the value of such property, which can be supported by assessment and valuation criteria. Fortunately, these have been established for buildings from the twentieth century in Poznań.<sup>28</sup>

Based on the individual example of the Old Incinerator Plant in Poznań, we can formulate some general conclusions regarding the practical aspects of preserving historic post-industrial sites. We can, thus, refer to the general guidelines for the methodology of treating post-industrial sites, whilst focusing on a specific project.<sup>29</sup> It seems that in the case of a building with an interesting history, a specific preservation status and a limited scope of protection, as well as the complex requirements of the target users, it is not possible to define one “correct” and compulsory method for the conservation process. To salvage such assets, it is essential to combine many approaches and, in some cases, use non-standard solutions.

In practice, due to the varying technical condition of a building, as well as a limited scope of protection (e.g., being specified only in local property records), it might not be practical to undertake an extensive (and costly) process to salvage it. The existing condition of a historic building, especially in the face of dynamic (or even aggressive) activities of investors and private developers, requires answers to questions about the priorities and forms of preservation, as well as the scope and feasibility of such interventions. Assuming that the key issue is the survival of cultural property and the preservation of as much of its authentic substance as possible, it is necessary to use an unconventional approach to the construction and conservation work. The Old Incineration Plant in Poznań is a perfect example of how an interventive adaptation is an opportunity to preserve cultural property in its entirety.

The final observation concerns the responsibility of the owners of cultural property, confirming the known fact that unused buildings are subject to much faster technical degradation. In the case of the Old Incineration Plant in Poznań, this was a period of approximately fifteen years, which was enough to cause





Fig. 10. Waste Incineration Plant in Poznań after restoration, view from the east; photo by B. Jankowski.  
Ryc. 10. Spalarnia śmieci w Poznaniu po restauracji, widok od strony wschodniej; fot. B. Jankowski.

significant changes and structural damage due to the lack of proper exploitation procedures. This shows that even a relatively short period without continuing maintenance in relation to the age of a facility can, in the case of post-industrial buildings, lead to the rapid deterioration of their technical condition. In many cases, the widely promoted idea of leaving a historic site for future generations does not stand the test of time and its passage decreases the chances of preserving it in good condition.

It would seem that the answer to the question “to demolish or to preserve?” should not raise any doubts. However, in practice it is not straightforward (although of course, every effort should be made “to preserve”).<sup>30</sup> This is particularly difficult in the context of a “free market game,” where the value of expenditure must be weighed against the benefits of the developer, who

would often prefer to get rid of the “historic” problem. Arguments for the importance of a building to national culture and heritage are not always respected, especially when the preservation options are limited by the type of heritage listing. In such a situation, providing a wide range of restoration work, or even partial and limited reconstruction, should be accepted as a feasible solution.

The restoration of the Old Incineration Plant in Poznań shows that the complex history of post-industrial buildings and their technical condition require non-standard solutions. The plant has survived, and as such, should be preserved for future generations. The preserved valuable, authentic substance requires protection and further care, which should also be based on the knowledge and awareness of all the participants of the investment process.

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<sup>8</sup> J. *Stara spalarnia śmieci w Poznaniu. Rys historyczny*, p. 9.

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<sup>10</sup> Gminna Ewidencja Zabytków m. Poznania (Municipal Records of Cultural Property of the City of Poznań, Waste Incineration Plant Complex, 1926–1927), No. 5109.

<sup>11</sup> The Local Spatial Development Plan for "Wilczak–Czapla"

in Poznań, Resolution LVIII/758/V/2009 of the Council of the City of Poznań of 7 July 2009 specified the provisions for the preservation of the incineration plant. According to par. 21 art. 2) and par. 6 and par. 6 art. 1) the former waste incineration plant complex in area 5-U was to be protected by the conservation authorities, and that it was possible to redevelop it, whilst maintaining its current shape and facade. In practice, these provisions became a strong tool for ensuring that the site was protected by the conservation authorities.

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- <sup>16</sup> All surveys and design for the incineration plant were made by Litoborski+Marciniak Biuro architektoniczne sp. z o.o. of Poznań.
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- <sup>24</sup> Rozporządzenie Ministra Infrastruktury z 12 kwietnia 2002 w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie, Dz.U. 2002, item 690, as amended.
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- <sup>26</sup> These included mainly a longitudinal fracture in a gable wall, fractured pillars, deformed gable walls, corroded steel structure, fractures in the smokestack, etc. See: expert surveys specified earlier in the article.
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## Abstract

The article presents the redevelopment process of an old waste incineration plant, one of the few examples of post-industrial architecture from the period of the Second Polish Republic which have survived to the present day in Poznań. The goal of the project was to adapt the building to a new purpose and function, and to renovate it preserving, as far as possible, its authentic structural elements. The challenge included not only the poor technical condition of the building and the scope of changes required for its adaptation to the new functions, but also its adjustment to meet the existing technical and construction regulations. The example of the redevelopment and modernization of the historic building serves as a basis for outlining and analyzing the technical, organizational and legal issues facing designers, conservation authorities and investors who undertake to redevelop locally listed cultural property that is also protected by the provisions of zoning plans. The methodology and solutions adopted at the intersection of practice and the conservation doctrine contribute to the discussion on redeveloping post-industrial sites.

## Streszczenie

W artykule przedstawiono proces przebudowy starej spalarni śmieci, jednego z niewielu obiektów architektury przemysłowej z okresu II Rzeczypospolitej zachowanych do dnia dzisiejszego w Poznaniu. Zrealizowany projekt zakładał zarówno zmianę przeznaczenia i zmianę funkcji obiektu, jak i jego przebudowę z zachowaniem w jak największym stopniu autentycznych elementów budowlanych. Wyzwaniem okazał się nie tylko istniejący stan techniczny obiektu i zakres zmian wynikających z przystosowania do nowych funkcji, lecz także dostosowanie do funkcjonujących przepisów techniczno-budowlanych. Na przykładzie przebudowy i modernizacji historycznego obiektu zarysowano i przeanalizowano wybrane problemy techniczne, organizacyjne i prawne, stające obecnie przed projektantami, służbami konserwatorskimi oraz inwestorami podejmującymi przebudowę obiektów chronionych wpisem do gminnej ewidencji zabytków i zapisami miejscowego planu zagospodarowania przestrzennego. Metodyka prac oraz przyjęte rozwiązania na styku praktyki i doktryny konserwatorskiej są głosem w dyskusji na temat prowadzenia prac przy obiektach przemysłowych.

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## Late-Medieval Manor in Nowe Miasto Nad Wartą

### Późnośredniowieczny dwór w Nowym Mieście nad Wartą

**Keywords:** fortified house, Greater Poland architecture, late medieval architecture

**Słowa kluczowe:** dwór wieżowy, architektura wielkopolska, architektura późnośredniowieczna

Nowe Miasto nad Wartą, located in southern Greater Poland, was already divided into two parts in the late Middle Ages, which resulted in the establishment of two knightly abodes in the town. The older of them, located on the so-called “Kopiec,” north of the city, was described in an extensive monograph in the 1990s.<sup>1</sup> The younger one was examined only last year, during the collection of materials for a popular study devoted to the history of the nearby parish church.<sup>2</sup> The conclusions from this study are presented in this text.

#### Sources regarding the “new manor”

The oldest source entry, confirming *expressis verbis* the existence of the “new manor,” comes from 1448.<sup>3</sup> However, more detailed information appeared in a document from 1450, which mentioned “tres domus, que iacet penes pontem transeundo de civitate ad Laskowka super sinistra parte penes curiam novam,” and a bit further described the resources “pro reformatione molendini, quo molendinum stat super Laskowka ante valvam nove curie.”<sup>4</sup> The document describes both the surroundings of the “new manor” (see below) and its location in the local topography; it stood in the western part of the city, close to the road, by the bridge, on a hill overlooking Laskówka, a former village, later absorbed by Nowe Miasto.<sup>5</sup> Today, in this place, on the bank of a dry stream, on the edge of the fluvial terrace along the Warta River, there is a building traditionally known as “Dwór Grabski” or “Pastorówka.”

#### State of the research

The exact history of the building is unknown and the literature, apart from a short subsection by T. Jurek and R. Grygel, contain brief references only.<sup>6</sup> In the 1930's, the Nowe Miasto parish priest, Fr Jan Dybizbański wrote that the last hereditary owners of the town, the Grabski family, sold their property to Lieutenant Herrmann Kennemann in 1840. A couple of years later, in 1854, an evangelical school was opened in the building of the former manor house, which also served as a place of prayer until the Protestants erected their own church in Nowe Miasto in 1871.<sup>7</sup> In 1890, a separate school building for Protestants was built;<sup>8</sup> probably at that time the former manor was reestablished as the exclusive seat of the pastor and remained in this function until the Second World War. Describing the issue of the existence of the “new manor,” Tomasz Jurek and Ryszard Grygiel stated, basing on the results of *in situ* inspection, that the entire building “seems to be an unquestionable relic of the former Grzymułtowski and Grabski manor from the second half of the seventeenth century.”<sup>9</sup> All the information, both from sources and from the literature, required, as noted by the above-mentioned authors, verification based primarily on thorough architectural research.<sup>10</sup>

#### Architectural and archaeological research<sup>11</sup>

The former manor house is now a one-story building laid out on a plan in the shape of an elongated rectangle

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Fig. 1. The kindergarten building, containing the remains of the so-called "new manor," view from the southeast; photo by the author.  
Ryc. 1. Budynek przedszkola zawierający relikty tzw. nowego dworu, widok od południowego wschodu; fot. autor.

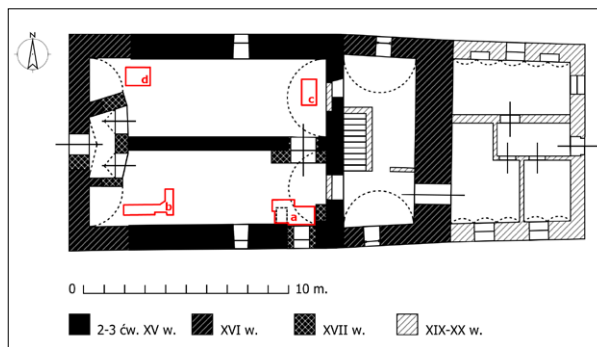


Fig. 2. Manor house in the Nowe Miasto nad Wartą, basement plan with marked probe excavations; comp. by author.  
Ryc. 2. Dwór w Nowym Mieście nad Wartą, rzut piwnicy z oznaczonymi miejscami odkrywek; oprac. autor.

with a usable attic, illuminated by a series of rectangular windows, covered with a gable roof (Fig. 1).<sup>12</sup> Architectural studies of the building allowed to describe its several basic construction phases (Fig. 2). As for the lowest story, the basements, they consist of two, clearly separate, parts. The older one is made up of three chambers covered with semicircular barrels (Fig. 4; Fig. 8): two parallel to each other, located to the west (both lengths approx. 11–11.5 m and a width of approx. 3.6 m) and one transverse to them, located under the central part of the manor (approx. 7.8 m, width approx. 3.6 m; Fig. 9, 10). The younger part of the cellars, located under the eastern part of the building, consists of several chambers covered with the so-called Prussian cap ceiling, divided by thin partition walls.

Due to the use of the Flemish bond, it should be assumed that the two western chambers and the "transverse" central chamber were created, at the latest, by the turn of the sixteenth and seventeenth centuries.<sup>13</sup> In turn, the eastern part of the cellars can be hypothetically connected with the nineteenth-century extension of the manor. As for the above-ground part, the photographs from the time of the renovation of the facade allow the conclusion that it is undoubtedly younger than the oldest part of the cellars. It was built entirely in a English cross bond, with a clear trace of the addi-

tions in the eastern part of the present building, traces of window transformations and the old entrance to the basement, located on the western side of the current porch.

Regarding the oldest part of the manor, it is worth noting that the preserved parts of the cellars differ from each other: the thickness of the northern and southern lateral walls of the two western chambers is approx. 1.25 m, while the outer walls of the central chamber are approx. 0.25 m. thinner (Fig. 2). Therefore, it can be assumed that they were not created in the same construction phase, which would also be supported by the derivative nature of the connecting passages (Fig. 3, 8). In the two-chamber part of the western cellars, several transformations appeared over time: the chambers were slightly extended to the west (probably still in the sixteenth century),<sup>14</sup> creating a new entrance in the gable wall, with a later vestibule covered with a barrel vault with lunettes (Fig. 4, 5). There was also a new passage created between the rooms in the eastern part and a new descent, possibly for loading commodities, in the southern wall (Fig. 3).

Archaeological research of the cellars allowed to extrapolate the original height of the room (apex height of the vault, approx. 2.5 m), as well as its paved pavement, composed of well-fitted fieldstones with a diameter of



Fig. 3. The cellars of so-called "new manor," south chamber, eastward view; photo by the author.  
Ryc. 3. Piwnice tzw. nowego dworu, komora południowa, widok w kierunku wschodnim; fot. autor.



Fig. 4. The cellars of so-called "new manor," south chamber, westward view; photo by the author.  
Ryc. 4. Piwnice tzw. nowego dworu, komora południowa, widok w kierunku zachodnim; fot. autor.



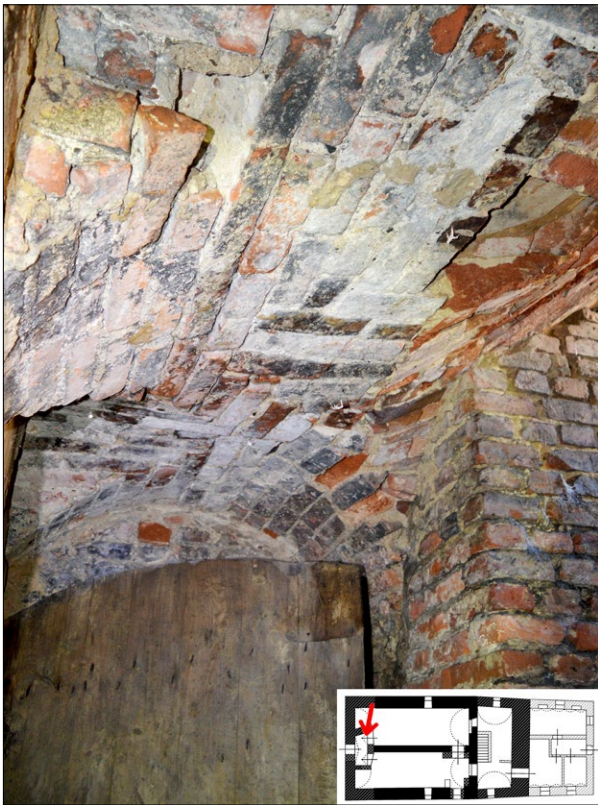


Fig. 5. The cellars of so-called “new manor,” vestibule, southward view; photo by the author.  
Ryc. 5. Piwnice tzw. nowego dworu, przedsionek, widok w kierunku południowym; fot. autor.



Fig. 6. The cellars of so-called “new manor,” southern chamber, excavation b; photo by the author.  
Ryc. 6. Piwnice tzw. nowego dworu, południowa komora, odkrywka b; fot. autor.

approx. 20 cm (Fig. 6). In addition, the study revealed the existence of a type of stone bench that stretched along the southern wall. The later raising of the level of the pavement could be associated with infiltration of groundwater (these infiltrations were found especially in the excavations in the northern chamber). These works were conducted, at the earliest, in the sixteenth century and probably in the seventeenth century, as evidenced by the discovered shards of ceramic vessels and glass. It is difficult, however, to explain the fragments of burnt wood lying on the pavement; perhaps they are evidence of a fire, resulting in the manor collapsing into its interior, although it is more likely that they were brought in due to the raising of the level of the pavement and were not associated with any disaster, at least not one that would interfere with the basement. In the sixteenth or seventeenth century, when the usable level of the rooms was changed, the paving of the northern room was probably also remade (Fig. 7); its derivativeness is evidenced by a worse level of workmanship, location at the level of the current usable level and covering the added western walled section of the chamber with it (Fig. 2).

### Comparative analysis

In the attempt to find architectural analogies for the layout of the preserved part of the cellars of the manor house “in Laskówka,” two possibilities of reconstruct-

ing the construction phases should be taken into account. The first one, based on the observation of the difference in wall thickness, would assume a secondary walling of the room, transverse to the pair of western longitudinal chambers (Fig. 2). In the second variant, all three of the above-mentioned rooms would be a homogeneous structure, and the irregularities mentioned would only be an evidence of negligent masonry.

When accepting the latter proposal, it would also have to be assumed that the “new manor,” appearing in documents from around the middle of the fifteenth century, is probably not corresponding to the oldest parts of the present building. The formal analogies for such a three-chamber basement layout appear rather late. The examples of early implementations of such a layout are the mansions in Wrząca Wielka (dated generally in the fifteenth century<sup>15</sup>) and the manor house in Drzewica (the second half of the fifteenth to early sixteenth century).<sup>16</sup> The one-and-a-half-bay division of the interior in the Nowe Miasto was undoubtedly the most popular (apart from the cross layout), way of organizing the utility levels of sixteenth-century manors.<sup>17</sup> The further examples could be the manor house (so-called “kamienica” type) in Kamionka, erected approx. 1555–1559,<sup>18</sup> or the fortified house in Nowy Jasieniec, built on the foundations of the former Teutonic castle, probably in the first half of the sixteenth century.<sup>19</sup> There were also instances of a similar interior arrangement used in strictly square plan tower build-





Fig. 7. The cellars of so-called “new manor,” northern chamber, fragment of exposed cobblestones; photo by the author.  
Ryc. 7. Piwnice tzw. nowego dworu, północna komora, fragment odkrytych kamieni brukarskich; fot. autor.

ings (Rzemień, a tower from the turn of the fifteenth and sixteenth centuries).<sup>20</sup>

Considering the possibility of the, described here, manor, being erected in two separate phases, it is possible to make a reference to both similarly arranged buildings that function invariably with a pair of parallel basement rooms and to those that were extended with a transverse chamber over time. The first group includes the oldest, tower part of the castle in Żywiec (before 1462), as well as the tower layout in Hawłowice Górne (dating uncertain).<sup>21</sup> As for the extension of two-chamber cellars with a transverse part, the examples could be: the so-called reeve’s tower in Krosno,<sup>22</sup> the reeve’s tower in Warsaw<sup>23</sup> (both in the oldest part of the fourteenth century), as well as the defensive tower in Wojciechów near Lublin (late fifteenth century to the 1520s, probably extended in the second quarter of the sixteenth century).<sup>24</sup>

This brief overview of formal analogies leads to two potential dating possibilities for the “new manor.” According to the first, a single-phase building with a three-chamber basement was erected, at the earliest, at the end of the fifteenth century, or rather in the sixteenth century. The second, which assumes a two-phase structure, would require the western part of the two-chamber part (dimensions approximately 11 x 12.5 m) to be considered<sup>25</sup> as identical to the manor house from before the mid-fifteenth century, and the eastern part of the chamber to be an addition built, at the earliest,



Fig. 8. The cellars of so-called “new manor,” northern chamber, eastward view; photo by the author.

Ryc. 8. Piwnice tzw. nowego dworu, północna komora, widok w kierunku wschodnim; fot. autor.

in the second half of the same century. The author believes that a conclusion may come from an overview of the ownership situation of Nowe Miasto in the fifteenth and sixteenth centuries.<sup>26</sup>

### Document analysis

When analyzing the ownership situation of the part of Nowe Miasto with the “new manor” in the fifteenth and sixteenth centuries, one can come to the conclusion that there are only three periods in which it would be possible to construct a brick manor. These are the years approx. 1420–1444, approx. 1475–1500 and 1541–1551. In the period of approx. 1420–1444, after the death of Jan Doliwa Nowomiejski, the city was divided into two parts; one, with the former fortress, went to Maciej Borek from Osieczna. The second was taken over by Dobrogost from Ostroróg, who, probably having no other seat, could have built a residence in Nowe Miasto, mentioned in sources from before the mid-fifteenth century.<sup>27</sup> In 1444, a period of multiple ownership changes began in Nowe Miasto, after which, in the third quarter of the fifteenth century, the indebted and divided property was given to indigent żupca (judicial low-level clerk) from Pyzdry—Jan Brudzewski. In the years approx. 1475–1497 the legal situation of the part with the “new manor” stabilized under his son, Mikołaj Brudzewski. After that time, however, there was another, constantly progressing fragmentation of property, connected with a conflict with the Rozdrażewski family, which owned the other part of the Nowe Miasto estates. This conflict, fraught with deaths, lasted almost three decades, but ended in 1529 with Hieronim Rozdrażewski taking over the entire property.<sup>28</sup> After his death, the town was once again divided between two heirs: Stanisław, who received half of the estate from the *fortalicium*,<sup>29</sup> and Jan, who inherited the part with the “new manor.” Jan, who is not known to have had his manor elsewhere than in the Nowe Miasto, died before 1551<sup>30</sup> and after his death the property was inherited by three sons.<sup>31</sup> Afterwards, both parts of the property were gradually fragmented further.<sup>32</sup>



Fig. 9. The cellars of so-called “new manor,” eastern chamber, northward view; photo by the author.  
Ryc. 9. Piwnice tzw. nowego dworu, wschodnia komora, widok w kierunku północnym; fot. autor.

Considering the wealth and social position of the aforementioned owners, the author thinks that the burden of constructing a brick manor house would be borne by Dobrogost from Ostroróg, heir to a great fortune and son of the general starost of Greater Poland and the voivode of Poznań, and Jan Rozdrażewski, belonging to the family which built a large brick parish temple in the city and a brick manor on the “Kopiec.” As for Mikołaj Brudzewski, it seems that he was not particularly wealthy since he married his daughters to “average middle-class nobles,” with one of them perhaps married to a burgher from Poznań.<sup>33</sup>

Assuming that the irregularities in the structure of the basement of the “new manor” do not result from the negligence of masons, but from its two-phase nature, the first phase of construction, involving the construction of a pair of western rooms, would therefore initially take place approx. 1430–1447, and the second phase, including the expansion of the whole construction by the eastern chamber, for the years 1541–1551 (Fig. 2). As for the above-ground part of the building (perimeter walls), it was probably built in the second half of the seventeenth century, during the reconstruction carried out by Krzysztof Grzymułtowski, the Marshal of the Sejms and the Voivode of Poznań, the



Fig. 10. The cellars of so-called “new manor,” entrance to the eastern chamber; photo by the author.  
Ryc. 10. Piwnice tzw. nowego dworu, wejście do wschodniej komory; fot. autor.

author of the Laskówka.<sup>34</sup> It is difficult to determine the time of the nineteenth-century expansion—it can be assumed that this event is documented by the date “1890” preserved to this day on the eastern gable.

#### The issue of defensive character of the “new manor” and an attempt to reconstruct the complex

Ryszard Grygiel, writing about the manor of interest, stated that the original description of the former residence as “antiqua curia cum fortalicio” and the simultaneous description of the new one as “curia nova” characterizes the latter as a place “to live in, but devoid of any defensive features.”<sup>35</sup> The author of this article believes this conclusion is premature. The information contained in the documents never directly related to the manor house itself; it appeared incidentally in the context of general location. There is no doubt that the manor was situated on an elevated ground, as stated in a document from 1450, so it could be described as “curia in monte.”<sup>36</sup> The author believes that similar terms were not used here, because in the context of the older manor, this would create confusion regarding which manor is actually being discussed.

The very ambiguous expression “curia” does not exclude the defensive capabilities, even though defensive manors were usually referred to as “fortalicium.”<sup>37</sup> There were instances, however, when both of these terms were used interchangeably. For example, the same knightly abode in Staw was called successively “castrum” (1422), “fortalitium,” “curia... in monte” (1468) and again “fortalitium” (1488),<sup>38</sup> while the building in Brzeźnica was called, almost simultaneously, “castrum,” “fortalicium” (1535) and “curia” (1534)<sup>39</sup> Moreover, the fourteenth-century residential tower of Casimir the Great in Łobzów was called in 1420 “Curia regalis Lobzow,” in 1443 “castellum Lobzow,” and in 1517 again “curia regalis.”<sup>40</sup> The use of interchangeable names shows, first and foremost, the lack of appropriate linguistic tools to distinguish between defensive



and residential buildings.<sup>41</sup> Their various uses could also depend on the lexical resources of the author of the documents and the content he wanted to convey.<sup>42</sup> Therefore, speaking of the character of the “new manor,” we must bear in mind the above reservations, especially considering its elevated location, being surrounded by a fence with a gate, as well as brick walls, which enabled passive resistance.<sup>43</sup>

The question of the defense of the “new manor” in Nowe Miasto is directly related to the question of the reconstruction of its aboveground part. Based on the wall thickness (1.25 m), it can be concluded that the lateral walls of the cellars were designed to carry a considerable weight. Similar, even thinner walls can be found in the cases of multi-story, brick residential towers (Hawłowice Górne: 1.2 m; Kwaśniowo Dolne: 0.8 m),<sup>44</sup> as well as in fortified houses (Drzewica, ap-

prox. 1.3 m,<sup>45</sup> Łopatki approx. 0.9 m).<sup>46</sup> It can therefore be assumed that the building of interest was built as a fortified house or a, popular later, so-called “kamienica” type (tenement house). It was, without a doubt, not a tower (as would be noted by sources), but it was also probably not a one-story seat, devoid of fortified features. With time, already in the sixteenth century, these features became less relevant, as evidenced by, e.g., the added entrance to the eastern part of the cellars accessible from the ground level (Fig. 10).

In one of his texts, Leszek Kajzer postulated paying more attention to eighteenth and nineteenth-century buildings, which often hid in their walls relics of older, sometimes even sixteenth-century, architectural designs.<sup>47</sup> The example of the “new manor” in Nowe Miasto nad Wartą shows clearly that this remark, written nearly half a century ago, is still valid.

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<sup>25</sup> Here, the author assumes that the thickness of the original western gable wall would be analogous to that of the opposite eastern wall.

<sup>26</sup> Jacek Chachaj has recently pointed out the usefulness of this method of dating architectural phases; cf. J. Chachaj, *Pałac czy dwór? Na Czechowie czy na Czechówce? Glossa do rozważań o krajobrazie kulturowym północno-zachodniej części historycznego Lublina*, “Roczniki Humanistyczne” 2019, vol. 67, No. 4, p. 186.

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- <sup>43</sup> Leszek Kajzer paid particular attention to the double meaning of the then defense, which did not have to mean the fortified features of the residence itself, but could refer to the field context, supported by a defensive circuit; see: L. Kajzer, *Dwory w Polsce*, p. 53.
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## Abstract

The goal of this article is to present an unknown, late-medieval fortified house in Nowe Miasto nad Wartą, preserved in the cellar section of the building, which was previously connected with the seventeenth-century seat of the city's owners. The presented analysis, based on the results of architectural and archaeological research, serves to approximate the date of construction of the object, describe the construction phases and subsequent transformations, as well as the initial reconstruction of the site. The results of the research were supplemented with conclusions from the comparative analysis, and the proposal for the dating of the oldest part of the manor to the first half of the fifteenth century was based on the analysis of preserved sources directly related to the object, as well as documents concerning the ownership status of Nowe Miasto properties. The study also allowed for the identification of potential investors of the construction (Sędziwój from Ostroróg) and the extension (Jan Rozdrażewski) of the residence.

## Streszczenie

Celem artykułu jest wprowadzenie do naukowego obiegu nieznanego dotąd, późnośredniowiecznego dworu wieżowego w Nowym Mieście nad Wartą, zachowanego w partii piwnic budowli łączonej dotąd z XVII-wieczną siedzibą właścicieli miasta. Analiza, oparta na badaniach architektonicznych oraz archeologicznych, służy przybliżeniu datacji obiektu, uchwyceniu faz jego budowy i rozbudowy oraz przekształceń w czasie, kiedy przestała pełnić pierwotną funkcję. Autor rozważa też kwestię obronnego charakteru dworu, a także proponuje jego wstępną rekonstrukcję. Wyniki badań uzupełniono wnioskami z analizy porównawczej, uwzględniającej analogiczne założenia na terenie Polski, natomiast propozycję datacji najstarszej części dworu na pierwszą połowę XV wieku oparto na źródłach, odnoszących się zarówno bezpośrednio do obiektu, jak i do dokumentów dotyczących sytuacji własnościowej dóbr nowomiejskich. Pozwoliło to wskazać potencjalnych inwestorów budowy rezydencji (Sędziwój z Ostroroga) oraz jej rozbudowy (Jan Rozdrażewski).

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## Architectural Creation in the Archaeological Reserve on the Example of the New Acropolis Museum

### Kreacja architektoniczna w rezerwacie archeologicznym na przykładzie Nowego Muzeum Akropolu

**Keywords:** archaeological heritage, protection, preservation, conservation design, Acropolis, Athens

**Słowa kluczowe:** dziedzictwo archeologiczne, ochrona, projektowanie konserwatorskie, Akropol, Ateny

#### Introduction

In the modern world and in times of economic crisis, archaeological heritage has become a factor in the broadly understood contemporary policy of sustainable development.<sup>1</sup> Not only are the academic and educational, emotional, symbolic and aesthetic values of archaeological heritage recognized, but also its economic potential, which becomes an important, if not equivalent, component of a synergistic approach to the protection of its resources. And for this reason, the protection of archaeological heritage reveals a noticeable tendency to combine preservation and protection activities with the ability of sound management thereof. As written by M. Pawleta, quoting the opinion of J. Purchla<sup>2</sup> and K. Broński:<sup>3</sup> “heritage is an object of protection, on the other hand, it’s a potential that should be adapted to new conditions and used for cultural and economic advance. The above statement, consisting in the search—under market economy conditions and progressing globalization—for a compromise between the protection of heritage and development, is forcing us to change the passive philosophy of heritage protection and the need to reevaluate our attitude towards it.”<sup>4</sup>

By protecting archaeological heritage, we preserve it for society and the generations to come.<sup>5</sup> By popularizing knowledge about it, we enhance awareness

of the past and the identity of the place, as well as the cultural identity of recipients, thus teaching future generations to respect and care for common heritage. In this sense, the development of tourism and education about the past can bring tangible benefits to the protection process itself, including in the context of future policy related to cultural heritage, and also archaeological heritage.

“The utilitarian nature of archaeological heritage manifests itself in manifold functions that it can currently play in the lives of any particular group of people. Moreover, heritage constitutes a shared ownership of society, which has the right to use it, but in such a way that it does not deplete its resources nor pose a threat to its integrity.”<sup>6</sup> Excavation works, and in particular their outturns, should be open since the cultural and archaeological heritage—being public property—is maintained, among others, from public funds. Since access to archaeological heritage is legally guaranteed and its educational value through visits to museums and sites in situ affects the development of regional economies and increases the prosperity of citizens as well as social awareness, then due to the promotion of archaeological tourism, it is important to have an attractive and clear arrangement.

Arranging an archaeological site is no easy undertaking, let alone designing architecture directly on

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Fig. 1. New Acropolis Museum in the Plaka District in Athens, architect Bernard Tschumi, view from the Acropolis; source: [https://pl.wikipedia.org/wiki/Muzeum\\_Akropolu\\_w\\_Atenach](https://pl.wikipedia.org/wiki/Muzeum_Akropolu_w_Atenach) (accessed: 6 VIII 2021).

Ryc. 1. Nowe Muzeum Akropolu w dzielnicy Plaka w Atenach, architekt Bernard Tschumi, widok z Akropolu; źródło: [https://pl.wikipedia.org/wiki/Muzeum\\_Akropolu\\_w\\_Atenach](https://pl.wikipedia.org/wiki/Muzeum_Akropolu_w_Atenach) (dostęp: 6 VIII 2021).

such territory. According to the Act on the Protection and Preservation of Historical Monuments of 2003, recognized archaeological sites are supervised by a conservator and placed under statutory conservation. By archaeological site we are simply referring to a spatially compact area within which there are archaeological sources, by which we mean immovable and movable monuments and other traces of past human use of a given area, together with the surrounding cultural (stratigraphy) and landscape context. An archaeological site may be classified for access in a either a full or narrow scope, which is always determined by the preservation and protection of archaeological heritage resources. In the Polish environment, when an archaeological site is made available to the public, in line with common understanding it becomes an archaeological reserve. The definition of an archaeological reserve, long solved in Europe which treats it as an area of archaeological heritage protection, has a clearly narrowed nature in Poland.<sup>7</sup> Most often it is described as an area of excavations and archaeological sites managed by a local museum, and simply put it is a “museum at an excavation site.”<sup>8</sup> Most researchers recognize the importance of making archaeological heritage public, which fundamentally determines the concept of an archaeological reserve.<sup>9</sup> Nevertheless, this concept is much broader and must be differentiated from the definition of an architectural or natural reserve, for example similarly to archaeological heritage itself, which in matters of preservation and protection has for years been considered collectively with issues related to the protection of architectural monuments.<sup>10</sup>

In such a historic space, where protection is provided to both immovable relics preserved on the surface, as well as the system of cultural layers and the surrounding landscape, architectural creation is a challenge, not only in terms of creativity, but also academic research and preservation. Cooperation of the architect with archaeologists and conservators, who will develop preservation guidelines for the design of a specific archaeological site, is therefore indispensable. Such design is never easy, because interference with the ground should also be minimized, and in the case of a large-cubature project, the issues of building settlement in such a protected zone require non-standard solutions. It is likewise essential to integrate the newly created figure with the surroundings and refer to the historical character of the place, which should not be treated marginally, as design in context, but broadly—as preservation design. Project implementation often involves random archaeological discoveries, which may result in the necessity of multiple changes to the project and adapting it to the newly established preservation conditions. The designer must be aware of such difficulties and be prepared for certain conceptual flexibility in advance.

### The New Acropolis Museum as a case study

An example of an exceptionally difficult project is the implementation of the New Acropolis Museum. Analysis of this instance as a so-called case study perfectly illustrates the problems that may be encountered by the designer and the investor when undertaking activities within an archaeological site located in a strictly protected zone of the cultural landscape and being part





*Fig. 2. New Acropolis Museum, a new idea of suspending the building above the archaeological site at the foot of the Acropolis; photo by K. Stala.*

Ryc. 2. Nowe Muzeum Akropolu, nowa idea nadwieszenia obiektu nad stanowiskiem archeologicznym u stóp Akropolu; fot. K. Stala.

of a historic area. The concept of the New Acropolis Museum<sup>11</sup> has a lengthy and complicated history. It is as much a creation established on architectural slabs as it is the result of a long-term and fierce debate among the Greek intellectual elite, people of science, art and culture, as well as politics.<sup>12</sup> A special role in this debate was played by archaeologists, who on the one hand blocked a number of projects important for Athens, also key for the city's communication system, and on the other hand guarded the protection of cultural heritage, which resulted from their awareness of the dangers that could threaten the priceless relics of architectural monuments preserved in the historic center above and below ground. For thirty-five years, disputes were held over the shape of the metro network, which was to solve issues resulting from excessive air pollution, damaging not only human health, but also ancient stone monuments.<sup>13</sup> It was not until 1992 when approval for this important municipal project was granted, but it was conditioned by restrictive procedures and close monitoring of construction works by numerous archeological teams. This resulted in a two-year delay and a major increase in costs, but also in the protection of the underground heritage hidden from destruction.

When the first metro sections were finally put into operation in 2000, not only the expected reduction in car traffic and a considerable reduction in pollution were achieved, but also the work of archaeologists produced more than 10,000 unique historical buildings that significantly enriched knowledge about the ancient city.

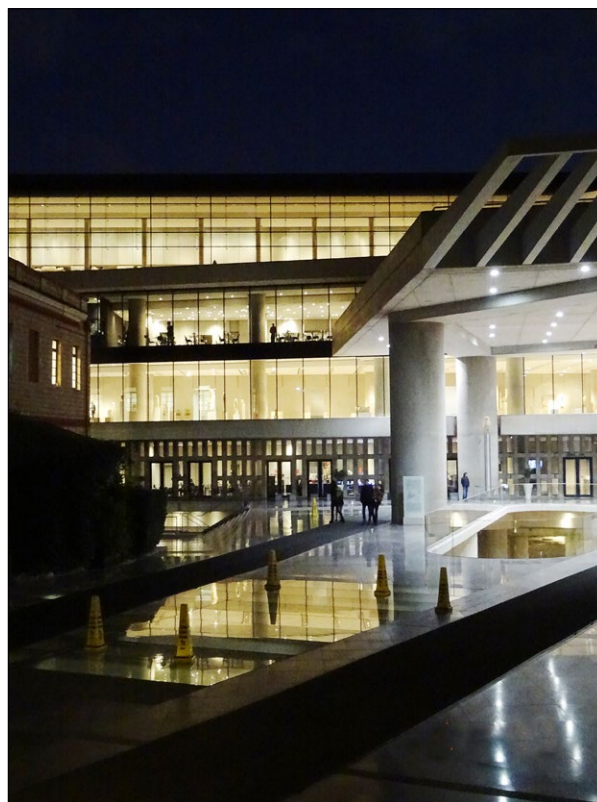
In 1981, Melina Mercouri, a famous Greek singer, actress and politician, took office as the minister of culture in the socialist government of Andreas Papandreu. Thanks to her efforts, the scheduled agenda was enriched with returning the collection of stone details from the Parthenon Frieze,<sup>14</sup> which the British ambassador to the Ottoman Empire, Count Thomas Bruce Elgin, had disassembled in the years 1801–1812 and transported to England in a predatory and damaging manner. Today, the stone details adorn the Greek collection at the British Museum. The Greeks made a number of diplomatic contributions to this matter in 1833, 1924, 1941–1944, and in 1983. It is well known that the case remains the subject of a legal and diplomatic dispute to this day and, at the same time, of firm resistance from the British authorities, who for many years continued to inform the public about the lack of adequate space in Athens for the safe storage and display of the collection.<sup>15</sup> Obviously, this reasoning had a demagogic nature, considering the fact that the only suitable place to display the stone details is the facade of the temple of Athena Parthenos, i.e., the site of their original destination. However, seeking to neutralize these pseudo-arguments, still in 1976, the then Greek prime minister Konstandinos Karamanlis decided to build a new museum and place in the immediate vicinity of the Acropolis, but it was only Melina Mercouri who in 1989 announced an international architectural competition, which received the submission of 483 projects. The jury chose a design developed by the well-known Roman architectural studio, i.e., Studio Passarelli by Manfredi Nicoletti and Lucio Passarelli. Under the project, the museum building was “blended” into the gentle slope of the Makrygianni District, located at the foot of the Acropolis, in the vicinity of the house of Ioannis Makrygiannis, a hero of the struggle for independence and the adjacent military hospital and nineteenth-century buildings, which were to be included in the new development of this area. The Italian architects' concept assumed the creation of a “non-architectural” structure, as if nonexistent within the district of Makrygianni, penetrating into the geology of the area, permanently rooted in it and accentuated only by the roof plane slightly tilted towards the Acropolis, in which a symbolic “eye” directed at the “sacred rock” was cut, preserving the memory of the past and conducting a dialogue with it.<sup>16</sup>

Unfortunately, working under time pressure and political conditions, the Greek Ministry of Culture did not recognize the selected location as sufficient in terms of its archaeological “activity,” and in emphasizing the symbolic content, the architects who were experienced in dialogue with cultural heritage disre-

garded historical information about the area's potential complex settlement stratigraphy. Construction work commenced almost immediately when it turned out that heavy equipment had breached major parts of the ancient city discovered here. The late Roman and early Christian baths, private houses, as well as sculpture and ceramics from the Classical to the Byzantine period, which were preserved in this very place, made it impossible to complete the chosen project. However, the archeologists recognized new unique opportunities for wide-ranging field research on buildings in the former surroundings of the Acropolis.

The unsuccessful start of this cultural project, so prestigious for Greece, and supported financially by the EU, also carried serious legal consequences. The government was sued by the International Council on Monuments and Sites and the District residents over the destruction of monuments, and Studio Passarelli sought substantial damages for the canceled contract. In this situation, 1994 saw the establishment of a new Committee for the Construction of the New Acropolis Museum, composed of archaeologists, architects, historians, constructors, and authorities of international renown.<sup>17</sup> The chairman of the Committee and the jury of the new competition is Dimitrios Pandermalis, professor of archeology at the University of Thessaloniki. The Committee developed new competition assumptions and conservation guidelines, assuming the inviolability of the Makrygianni archaeological site, but maintaining the selected location of the museum, thus allowing its shape to be significantly elevated beyond the dimensions of the existing development. The priority was to minimize the structure's interference with the terrain, and to exhibit archaeological discoveries: excavated architectural objects, foundations of ancient houses, sewer pipes, and other remains mainly from the sixth and seventh centuries AD. It can thus be concluded that the New Acropolis Museum, suspended over the archaeological site of Makrygianni, was also intended to serve as protection against rainfall and sunlight, but without interfering with the natural climate of atmospheric air.

The competition announced in 2000 was won by Swiss architect Bernard Tschumi, who runs an architectural studio in New York. The Acropolis Museum project was based upon three ideological pillars: the natural lighting of artifacts, the dynamics of the exhibitions' spatiotemporal sequences, and integrity of the external and internal space with the functional-utility program. Following the competition guidelines, Tschumi designed a structure suspended over the archaeological site on columns, treating it as an integral part of the museum. It was deemed that the final solutions could only be accepted after the archaeological work should be fully completed in 2002, but the research work was extended and continued, intermittently, until 2012, hence the construction work began while it was being carried out.<sup>18</sup> Since 1997, the research has been led by the Greek archaeologist S. Eleftheratou.<sup>19</sup>



*Fig. 3. New Acropolis Museum, fragment of the main entrance in the evening illumination with a ramp with a glass floor leading over the archaeological site; photo by A. Kadłuczka.*

Ryc. 3. Nowe Muzeum Akropolu, fragment głównego wejścia w wieczornej iluminacji z rampą ze szklaną podłogą prowadzącą nad stanowiskiem archeologicznym; fot. A. Kadłuczka.

Architectural critics reacted favorably to Bernard Tschumi's design, paying attention to the sparing and highly transparent form of the building or the bold, even provocative use of modern materials: glass, steel, aluminum, and concrete without formal references to traditional construction. That said, the architect himself explained his concept as referring to the art of ancient Greece not with a traditional form, but rather a more meaningful message for Greek culture—offering a simple and precise architecture based on mathematical logic and the conceptual clarity of the ancient world.<sup>20</sup> More broadly, the consensus of thinking about the new Acropolis Museum is presented by the project co-author Michael Photiadis, a prominent Greek architect with a rich and diverse career, who wrote: “This was from the beginning the thinking underpinning the new Museum, something we discussed and analyzed in depth during my collaboration with the project's designers. The transparency of the Parthenon Gallery eradicates the distance from the rock of the Acropolis and links the sculptures directly with the monument. The other, no less important, collections of exhibits that relate the history of the Acropolis and its slopes, from pre-historic Times to late Antiquity, are displayed on the other levels of the Museum and invite visitors to take a fascinating stroll amongst the greatest artefacts of ancient Attican art. Finally, the preservation and in-





Fig. 4. New Acropolis Museum, view of the building from the side of the Acropolis from which the main entrance was designed; photo by A. Kadłuczka 2018.

Ryc. 4. Nowe Muzeum Akropolu, widok budynku od strony Akropolu, z której zaprojektowano główne wejście; fot. A. Kadłuczka 2018.

tegration of an ancient Athenian neighborhood under the Museum's building brings visitors closer to the ancient city's daily life at the foot of the Acropolis. At the same time, the coexistence of the modern architectural shell together with the antiquities it houses creates an unexpected but fascinating contrast, something which, although perhaps perplexing at first, soon appeals to spectators.<sup>21</sup>

In the building's spatial composition, the most important, symbolic significance can be observed in the last, highest floor, reserved for the gallery dedicated to Athena, the city guardian, but also her sanctuary—the Parthenon on the Acropolis, whose spatial dimensions and relations it repeats. The original carved panels of the famous frieze from the temple, which are displayed here in a safe manner, can be admired from extraordinary closeness and in all the richness of its vividness, in a way never before available. That said, the frieze is not complete. The place of the missing 88 panels currently stored in the British Museum is taken by their ad hoc plaster replicas with an information about anticipation of the originals, as is the case with the missing Caryatid of Erechtheion. The gallery has one more extraordinary value; it is something much more than just the "eye" proposed by Studio Passarelli, it is a monumental viewing terrace with a 360-degree *circarama* allowing for enthrallment with the Acropolis and the Athenian metropolis.

Lastly, attention must be drawn to Tschumi's idea to create a new museum formula integrating the internal exhibition space of original artifacts with the external space, in which the visual effect of the building is enhanced by the effects of sunlight during the day and a sophisticated illumination system in the evening and night hours. It is complemented by a modern multimedia thematic projection using the elevation of the building. The new Acropolis Museum is also revelatory in a technical sense. The enormous columns, placed carefully between the relics of the historic Makrygianni



Fig. 5. New Acropolis Museum, view of the archaeological reserve, 2020; source: <https://www.podrozepoeuropie.pl/muzeum-akropolu-ateny> (accessed: 16 XII 2021).

Ryc. 5. Nowe Muzeum Akropolu, widok rezerwatu archeologicznego, 2020; źródło: <https://www.podrozepoeuropie.pl/muzeum-akropolu-ateny> (dostęp: 16 XII 2021).

development, carrying a multi-story building, were set on feet embedded on the parent rock and equipped with sliding bearings ensuring resistance of the entire structure to an earthquake in the range of up to 10 points on the Richter scale.<sup>22</sup>

## Conclusion

When analyzing the issues of protection, both the numerous artifacts discovered during the research, as well as the cultural layers, it should be stated that the structural concept of the building seeks to respond to the preservation guidelines. The structure's powerful mass is set in the ground in a way that minimizes construction intervention over a large area. The manner in which the building is suspended above the uncovered relics and rested on pillars rather than on a continuous footing is a very correct solution. Construction materials such as glass, steel, concrete, and aluminum are good-quality, robust materials. The roof in the form of a ceiling over the relics left in situ is made from concrete and also represents the first utility level of the museum exhibition. It is a structure which resembles an archaeological shield, protecting the remaining architecture exposed during the research from rain, wind and, above all, fiery sun. The natural climate is not disturbed here because the ruins have remained in the air, but temperature and sunlight are reduced thanks to the solid, thick ceiling. After the archaeological research had been completed, the uncovered relics were subjected to conservation and protection. Steel bridges for visitors were suspended over the relics.

Another aspect is respect of the cultural landscape and the fact that the body of the building fits into the existing development and the historical panorama of the city. Both the structure and the dialogue with the existing urban space have contributed to a powerful polemic and although,<sup>23</sup> as mentioned above, the project was approved for implementation, the dispute among

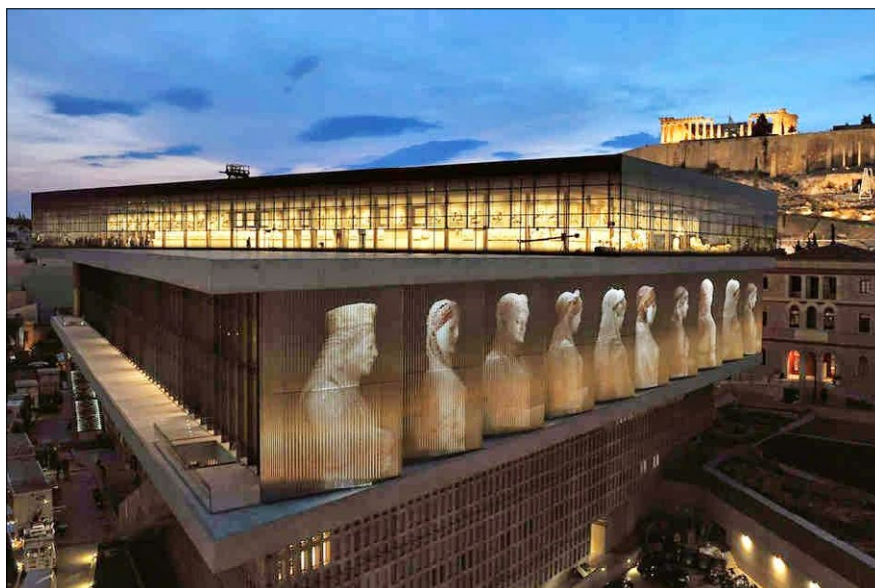


Fig. 6. New Acropolis Museum, view of the building with elevation panels used for multimedia presentation and the glazed Parthenon Gallery in the background of the Acropolis; source: <https://wydarzenia.interia.pl/swiat/news-otwarto-nowe-muzeum-akropolu,nld,862187> (accessed: 16 XII 2021).

Ryc. 6. Nowe Muzeum Akropolu, widok budynku z panelami elewacyjnymi użytymi do prezentacji multimedialnych i przeszklonej Galerii Partenonu w tle Akropolu; źródło: <https://wydarzenia.interia.pl/swiat/news-otwarto-nowe-muzeum-akropolu,nld,862187> (dostęp: 16 XII 2021).

architecture critics, architects, and conservators concerning the assessment of these two elements does not subside. It can be certainly stated that the professional community divided into supporters of traditional solutions and modernists, open to bold contemporary design ideas found an excellent subject of discussion in this project. The archaeological community was also clearly divided. The basic allegations concerned the alleged destruction of the Makrygianni site, which was reported by some researchers, misinforming the public opinion. In fact, the research was professionally conducted using the wide-field method, monitored by scientific and government institutions, and lasted for many years (from 1997–2012). The research team was interdisciplinary, with over 100 people working at its peak. The official opening of the reserve took place after careful preparation of the exhibition in 2019, ten years after the inauguration of the Museum. You can read about the course of archaeological research and its results in the book written by the archaeologist who conducted the research, S. Eleftheratou.<sup>24</sup>

This is an illustrative example of the long and complicated path that the idea of creating a museum in a place exceptionally rich in remnants of the bright past of ancient Athens has covered. Mistakes and omissions resulted in legal and financial implications, halting construction works and causing embarrassment both in the academic community and among the public opinion. The constructive conclusions drawn from the initially unsuccessful actions resulted in high-level implementation, both in terms of art and aesthetics, as well as preservation. All the substantially complex guidelines of the archaeological and preservation community were met. This was possible thanks to the

cooperation of various environments and the conceptual flexibility of the design office, mainly thanks to the experience of Bernard Tschumi, his thorough architectural education, and work at leading European and American universities. Not without significance is the fact that the author of the New Acropolis Museum project was the dean of the School of Architecture, Planning and Preservation at Columbia University in New York, who combined the design skills of an architect, an urban architect, and drew from his experience in preservation design. This implementation testifies to the importance of the architect's cooperation with the archaeological and preservation community, also the architect's education and professional experience in preservation design, when undertaking design works in an area as sensitive as an archaeological site.

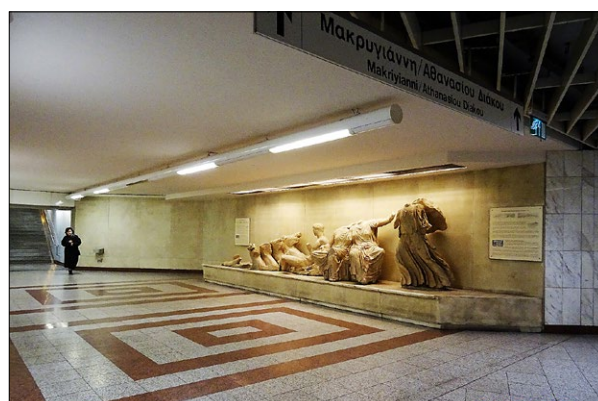


Fig. 7. The new metro station of the Athenian Acropolis Museum with exhibited replicas of Parthenon sculptures, as a contemporary example of "musealization" of public space; photo by K. Stala.

Ryc. 7. Nowa stacja metra ateńskiego Muzeum Akropolu z wystawionymi replikami rzeźb z Partenonu, jako współczesny przykład „muzealizacji” przestrzeni publicznej; fot. K. Stala.



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<sup>1</sup> A. Kozień, *Sprawne zarządzanie dziedzictwem kulturowym przez organy samorządu terytorialnego*, "Wiadomości Konserwatorskie – Journal of Heritage Conservation" (hereinafter: "WK") 2020, No. 64, p. 7–16.

<sup>2</sup> A. Böhm et al., *Raport na temat funkcjonowania systemu ochrony dziedzictwa kulturowego w Polsce po roku 1989*, ed. J. Purchla, [http://www.kongreskultury.pl/library/File/RaportDziedzictwo/dziedzictwo\\_raport\\_w.pelna\(1\).pdf](http://www.kongreskultury.pl/library/File/RaportDziedzictwo/dziedzictwo_raport_w.pelna(1).pdf), p. 56. (accessed: 25 X 2016).

<sup>3</sup> K. Broński, *Rola dziedzictwa kulturowego w rozwoju lokalnym. Doświadczenie polskie doby transformacji (po 1989)*. *Zeszyty Naukowe Akademii Ekonomicznej w Krakowie* 706, 2006, p. 7–26, 12–14.

<sup>4</sup> M. Pawleta, *Upowszechnianie dziedzictwa Archeologicznego regionu Bobolic: Realizacje i propozycje*, "Folia Praehistorica Posnaniensia" 2016, vol. 21, p. 389–413.

<sup>5</sup> Ibidem; J. Sroczyńska, *Wartość społeczna zabytków architektury w świetle wybranych dokumentów UNESCO, ICOMOS, Rady Europy, kształtujących teorię ochrony dziedzictwa kulturowego*, "WK" 2021, No. 65, p. 7–19.

<sup>6</sup> J. Sroczyńska, op. cit.; J. Jaskanis, *Ochrona zabytków archeologicznych w Polsce w latach 1964–1990. Uwagi uczestnika Zdarzeń*, [in:]: *Tadeusz Roman Żurowski i konserwatorstwo archeologiczne w Polsce XX wieku*, ed. Z. Kobyliński, J. Wysocki, Warszawa 1999, p. 173–188.

<sup>7</sup> The term archaeological reserve is defined by the Euro-

- pean Convention on the Protection of the Archaeological Heritage, Art. 4, item 1, ratified in Poland in 1992 (Dz.U. 1996, No. 120, item 564), yet the aforementioned Act on the Protection and Guardianship of Monuments does not unequivocally define the term archaeological reserve (Dz.U. 2018, item 2067).
- <sup>8</sup> W. Hensel, *Archeologia żywa*, Warszawa 1973, p. 286.
- <sup>9</sup> Z. Rajewski, *O rezerwatach archeologicznych w Polsce*, “Wiadomości Archeologiczne” 1959, vol. 25, No. 8, p. 240–247; idem, *Pokaz zabytków w terenie*, “WK” 1966, No. 30, p. 102–116; idem, *Rezerwaty archeologiczne i muzea na wolnym powietrzu*, “Archeologia Polski” 1968, No. 13, p. 429–442.
- <sup>10</sup> K. Stala, *Współczesne aspekty projektowania osłon w rezerwatach archeologiczno-architektonicznych. Z zagadnień ochrony i ekspozycji dziedzictwa archeologicznego*, “WK” 2019, No. 60, p. 105–105.
- <sup>11</sup> The Old Acropolis Museum was built in the interwar period as a small building embedded in the rock of the Acropolis.
- <sup>12</sup> About strong critique opinion among architects can be read in: N.A. Salinger, *Anti-architecture and Deconstruction*, Solingen 2004, p. 170–171; A. Stara, *The New Acropolis Museum: banal sloppy, badly detailed sophistry*, “The Architectural Review” 2009, No. 1348, p. 24–26; some critique opinions among archaeologists can be found in: D. Plantzos, *Acropolismus, Behold the raking geison: The new Acropolis Museum and its context-free Archaeologies*, “Antiquity” 2011, vol. 85, No. 2011, more about polemics and defense the concept of the museum is written in: C. Ntaflou *The New Acropolis Museum and the Dynamics of National Museum Development in Greece*, <https://cp.liu.se/cep/078/009/cep12078009.pdf> (accessed: 6 VIII 2021)
- <sup>13</sup> As a result of stone corrosion caused by air pollution in Athens, the original statues of the Caryatids of Erechtheion were dismantled and placed in special hermetic display cases in the old Acropolis Museum; replicas were introduced in their place.
- <sup>14</sup> Fifty-six slabs of the 111-slab frieze covered with a relief, 15 (of the 92) metopes and 17 figures of tympanums of the Parthenon, as well as 1 caryatid and 1 column from the Erechtheion.
- <sup>15</sup> M. Horaček, *Museum of art. versus the city as a work of art. A case of the New Acropolis Museum in the Athens*, “International Journal of Architectural Research” 2014, vol. 8, No. 2, p. 47–61.
- <sup>16</sup> Excerpt from the text on the website of Studio Passarelli, [www.studiopassarelli.it](http://www.studiopassarelli.it) (accessed: 6 VIII 2021): “The Acropolis Museum was conceived as an eye on the Acropolis, “sank” into the ground in which it is deeply rooted. The aura of the place inhibits a loud voice and the roof, which the only element of emerge, consists of nothing more than a rectangular slab of stone which splits the low-lying base of a rather organic distribution of volumes. The goal was to create a non-architecture, a sort of artificial geology untouched by the ephemerality of time. [...] Open on the smooth sloped roofing of the museum in front of the sacred rock is the eye: a semicircular orbit protected from the sun, with a view of the Parthenon, which is projected into the interior space.”
- <sup>17</sup> Inter alia: Santiago Calatrava, Nikolaos Fintikakis, Wolf-Dieter Heilmeyer, Professor of Archaeology, University of Berlin, Director of Antiquities, Museum of Berlin, Paolo Marconi, Professor of Architecture, University of Rome, Professor Georgios Penelis, Professor of Civil Engineering, University of Thessaloniki, Professor Dennis Sharp, Professor of Architecture, London
- <sup>18</sup> The study of the archaeological site during the construction of a building aimed at its exhibition is a procedure that has been successfully used in the past. Such examples can be cited from Arkrotiri in Greece (Santorini), where research in the reserve continues to this day, as well as in Çatalhöyük in Turkey. In Cartagena in Spain, Lepenski Vir in Serbia and at many other archaeological sites, construction work began before the completion of the research, when the site’s extent and character has been already recognized. Polish experiences include archaeological works under the Main Square in Krakow, when the construction of the reserve began, and excavations in another part of the underground, not yet covered by the project, were completed at the same time.
- <sup>19</sup> S. Eleftheratou, *Acropolis Museum the excavation*, Athens 2020.
- <sup>20</sup> E. Stathaki, *Bernard Tschumi Q&A exclusive*, [www.parthenoninternational.org/node/102](http://www.parthenoninternational.org/node/102) (accessed: 6 VIII 2021).
- <sup>21</sup> “This was from the beginning the thinking underpinning the new Museum, something we discussed and analyzed in depth during my collaboration with the project’s designers. The transparency of the Parthenon Gallery eradicates the distance from the rock of the Acropolis and links the sculptures directly with the monument. The other, no less important, collections of exhibits that relate the history of the Acropolis and its slopes, from pre-historic Times to late Antiquity, are displayed on the other levels of the Museum and invite visitors to take a fascinating stroll amongst the greatest artefacts of ancient Attican art. Finally, the preservation and integration of an ancient Athenian neighborhood under the Museum’s building brings visitors closer to the ancient city’s daily life at the foot of the Acropolis. At the same time, the coexistence of the modern architectural shell together with the antiquities it houses creates an unexpected but fascinating contrast, something which, although perhaps perplexing at first, soon appeals to spectators.”
- <sup>22</sup> *Tschumi talks about the New Acropolis Museum*, [elginism.com/new-acropolis-museum/tschumi-talks-about-the-new-acropolis-museum/20080811/1216/](http://elginism.com/new-acropolis-museum/tschumi-talks-about-the-new-acropolis-museum/20080811/1216/) (accessed: 6 VIII 2021): “This museum is done with the latest earthquake protection technology, developed in the last 20 years from our experience in Japan and California, called Base Insulation System. The lower part of the building is anchored into the ground, but the upper part is actually separated from it by a sort of cushion, like ball bearings, so that the upper part can move separately from the lower part.”
- <sup>23</sup> The mentioned polemic continues in the scientific community to this day. Criticism of the architectural and archaeological community is widely described in: M. Horaček, op. cit., p. 51–53. Unfortunately, in addition to the substantive aspects, non-substantive factors, including political ones, played an important role in the criticism of the project; In A. Snodgrass, *Soft targets and no-win dilemmas: respond to Dimitris Plantzos*, *Soft targets and no-win dilemmas: respond to Dimitris Plantzos*, [https://www.researchgate.net/publication/286067084\\_Behold\\_the\\_raking\\_geison\\_The\\_new\\_Acropolis\\_Museum\\_and\\_its\\_context-free\\_Archaeologies](https://www.researchgate.net/publication/286067084_Behold_the_raking_geison_The_new_Acropolis_Museum_and_its_context-free_Archaeologies), p. 629–630 (accessed on: 6 VIII 2021), the author accused Plantzos, one of the main opponents of the project, of intentionally ignoring the facts when putting forward critical arguments and selectively cited examples:

D. Plantzos, op. cit., he also attributes the issue of the lack of reliable criticism to Y. Hamilakis, who published information about the relics allegedly destroyed by researchers in the Makrygianni site: Y. Haamilakis, *The nation and its*

*ruins: Antiquity archaeology and national imagination in Greece*, Oxford 2007. These doubts were disassembled in 2020 in: S. Eleftheratou, op. cit.

<sup>24</sup> A. Snodgrass, op. cit.; M. Horáček, op. cit., p. 47–61.

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## Abstract

This article addresses the issue of design in archaeological heritage, which it discusses on the example of the world-famous design, i.e., the New Acropolis Museum by Bernard Tschumi Design Studio. The design touches upon all major topics related to an investment of this type, such as the protection of architectural and archaeological relics, protection and preservation of the cultural landscape or embedding a massing in the existing historical urban tissue. Special emphasis was placed on the problem of designing within the archaeological heritage and at the archaeological site, which was under excavation during the construction of the museum building. This fact generated very serious concerns in the conservation community and among the public about the safety of discovered relics of ancient buildings. Aware of the problems related to the facility's design and construction and analyzing the solutions used here, the author approaches the discussed example as a case study, drawing conclusions far beyond the history of the building's construction.

## Streszczenie

Artykuł porusza temat projektowania w obszarze dziedzictwa archeologicznego, omawiając go na przykładzie światowej sławy dzieła – Nowego Muzeum Akropolu autorstwa Studia Projektowego Bernarda Tschumi. Realizacja ta dotyczy wszystkich istotnych zagadnień związanych z inwestycją tego typu, jak ochrona reliktów architektonicznych i archeologicznych, ochrona i zachowanie krajobrazu kulturowego czy osadzenie bryły w istniejącej historycznej tkance miejskiej. Szczególny nacisk położono na problem związany z projektowaniem w obrębie dziedzictwa archeologicznego oraz na stanowisko archeologiczne, które podczas realizacji budynku znajdowało się w trakcie badań terenowych. Fakt ten wzbudził w środowisku konserwatorskim i wśród opinii publicznej obawy o bezpieczeństwo odkrywanych reliktów antycznej zabudowy. Śledząc problemy związane z projektem, a następnie wznoszeniem obiektu oraz analizując zastosowane tu rozwiązania, autorka traktuje omawiany przykład jako tzw. *case study*, wyciągając wnioski o charakterze znacznie szerszym niż historia powstawania budowli.

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## Cultural Park: Between the Pressure of Globalism and the Protection of Local Values, a Case Study

### Park kulturowy – między presją globalizmu a ochroną wartości lokalnych. Studium przypadku

**Keywords:** landscape, monument protection, cultural park, globalism,

**Słowa kluczowe:** krajobraz, ochrona zabytków, park kulturowy, globalizm

#### Introduction – Landscape as a record of historical and contemporary processes

Environmental conditions determine the natural landscape. The cultural landscape is shaped by human interaction with the environment. As a result of the interaction caused by humanity's desire to achieve its culturally determined goals, the landscape is undergoing constant metamorphosis. Hence, the cultural landscape contains in its physiognomy a record of historical and contemporary processes that constantly shape the area of perception. Depending on the nature of the processes, their intensity and orientation, a given landscape may retain and accumulate historical values or undergo gradual or rapid transformations in line with contemporary trends.<sup>1</sup> In cases where we deal with a landscape with a predominance of defined historical values, we perceive such a landscape as historic. Due to the values attributed to the testimonies of history and the understanding of the social interest in their behavior in such cases, we should initiate protection mechanisms. We should consciously control the processes taking place in our environment, in the landscape, to preserve, exhibit and use the perceived values socially.<sup>2</sup> The conflict of values, the predominance of conservative tendencies or negative transformations is

also reflected in the landscape record, in the current physiognomy of a given area. Hence, in the areas of historical landscapes, it is easy to see threats and trends of globalization, as they result in changes leading to significant modifications of a given landscape. The landscape once again turns out to be a sensitive indicator of changes taking place on a local and global scale.

#### Subject, purpose and methodology of research

The starting assumption was that historical landscapes that qualify for protection as historic landscapes are a particular form of the cultural landscape. These landscapes are of research interest to the authors. In such landscapes, we can see both the evidence of old forms of land use and development and features that co-create regional differences and determine the cultural identity of a given area. Changes in such landscapes pose a threat to the value of the testimony of history.<sup>3</sup> Counteracting negative changes is based, among other things, on the system of monument protection. In Poland, the evolution of the system of monument protection in the field of cultural landscape protection has progressed from the perception of viewing issues (view from and of the monument) to a comprehensive approach to landscape issues in the formula of a

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cultural park defined as a statutory form of monument protection. The evolution of the system resulted in the regulatory provisions of the Act on the protection and care of monuments of 2003, defining the goals, forms and procedures of establishing a cultural park and its place in the monument protection system. The system is complemented by the “Principles of creating and managing the Cultural Park and drawing up a plan for its protection”—that is, a formalized executive instruction, constituting official substantive help in the case of establishing a cultural park.<sup>4</sup> The document’s formal status results from the recommendation for application expressed by the Monuments Protection Council operating at the Ministry of Culture and National Heritage. The analysis of the functioning of cultural parks on a state-wide scale and noting their susceptibility to globalist transformations is the basis for formulating conclusions both in the sphere of the effectiveness of forms of monument protection and the dynamics of changes in native cultural landscapes. This analysis is possible thanks to a good definition of the initial state—the delimitation of the area, and the definition of the values and characteristics of landscapes that are protected in the form of cultural parks. Against this background, it is easy to distinguish the features and processes that result from the pressure of globalist tendencies, which, as a rule, differ from the properties of local processes and are rooted in place-based tradition. Protected historic landscapes are treated as a reference area for the dynamics of globalization processes in the cultural landscape of particular value. The overriding aim of this research is to capture the scale and dynamics of globalization processes in the landscape perceived as a threat to the values of the cultural landscape. The

complementary goal is to formulate conclusions for the improvement of monument protection tools in protecting historical (monumental) landscapes.

### Historical conditions – the value of heritage

According to the classic definition of J. Bogdanowski, cultural landscapes in which one of the historical figures of the natural environment has survived in a compact area, complemented by buildings, engineering works or other elements appropriate for a given type of economy and period, are historical landscapes to which we add historical value. It is a particular case of a cultural landscape of exceptional value as a holistic document of bygone eras.<sup>5</sup> Among the multitude of types of such landscapes, urban landscapes constitute a particular category. They can be landscapes that have grown organically over the centuries (e.g., the Old Town in Cracow with a thousand-year history of evolution), they can document the coexistence of various cultural patterns (e.g., Cracow’s Kazimierz, the neighboring historical quarters of a Jewish and a Christian city), or they can be urban landscapes resulting from homogeneous urbanization action (e.g., Nowa Huta—an ideal city-turned-district in the era of Socialist Realism and Socialist Modernism). They are usually landscapes with a distinct range of forms that build the specificity and identity of the place. Cracow’s historic districts, such as the Old Town, Kazimierz with Stradom, Nowa Huta, or Krupówki Street in Zakopane, are examples of such landscapes. For each of the areas mentioned above, a cultural park was established with an dedicated subject and protection purpose via municipal government decisions. For each of these areas, extensive analytical

Table 1. Stages in the preparation of a protection plan for a cultural park. “Plan for the protection of the Cultural Park area of Krupówki Street in Zakopane,” according to terms of the Agreement concluded by the authors’ team with the Zakopane City Hall.

| No. / Stage of development | Task  |
|----------------------------|---|
| 1.                         | Historical analysis of the area of Krupówki Street  |
| 2.                         | Division of the Krupówki landscape into essential elements with justification for the selection of the division method  |
| 3.                         | Identification of architectural and landscape interiors (WAK) and their complexes (ZWAK)  |
| 4.                         | Analysis of the landscape of the Krupówki Street area using the identified WAK and ZWAK   |
| 5.                         | Analysis of active and passive exposure of the street area within the boundaries of the cultural park   |
| 6.                         | Valorization of the area of the cultural park in terms of historical and contemporary   |
| 7.                         | Information and consultation meeting with stakeholders-residents of the city of Zakopane.   |
| 8.                         | Analysis of past and current processes in the landscape of the Krupówki Street area and determination of the directions of changes  |
| 9.                         | SWOT analysis for establishing a cultural park  |
| 10.                        | Guidelines for the protection and shaping of the landscape, resulting from the value assessment   |
| 11.                        | A list of actions in individual ZWAKs, in the form of strategic material, containing guidelines for the resolution of the Zakopane City Council of September 3, 2015 No. XII/183/2015 on the establishment of a Cultural Park for the area of Krupówki Street, in the scope applicable to the City of Zakopane Spatial Development Conditions and Directions Study, and to local spatial development plans in the area covered by the cultural park |
| 12.                        | Second information and consultation meeting with stakeholders-residents of the city of Zakopane   |

and management documentation was developed, contained in the cultural park protection plan formula, implemented in a standard methodological convention.<sup>6</sup> The attached table illustrates the method through the content and stages of developing a plan to protect the Krupówki Street cultural park in Zakopane.<sup>7</sup>

On the one hand, the formula of the study presented above serves to precisely define the conditions and historical and compositional values of landscapes. On the other hand, the cultural landscape, analyzed in terms of critical points, lines, axes and viewing surfaces as well as elements of passive exposure in the form of dominants, subdominants, accents and viewing areas, and synthesized in the scale of interiors and architectural and landscape interior complexes, reveals its specificity and is subject to detailed document. This formula shows the specificity of a given area's landscape and culture, identity, and historical values. Individual cultural parks take on an individual dimension and gain specific protection goals. Thus, the Old Town Cultural Park in Cracow serves to protect the landscape of the medieval city, filled with architecture of valuable architecture, which has accumulated over the centuries. The Kazimierz Cultural Park with Stradom in Cracow covers a vast area of the city, where there are legible elements of the medieval charter-period urban system, the historic Oppidum Judeorum (Jewish Town), island-like religious complexes with the highest architectural value and quarters of buildings from the nineteenth and twentieth centuries illustrating cultural evolution and a functional district dominated by tenement houses and complexes of historic industrial and technological monuments. Nowa Huta Cultural Park includes a homogeneous urban composition of a socialist realist, satellite for the contemporary city of Cracow, which was to be a base for the strategic metallurgical plant, according to political and economic assumptions of the V.I. Lenin Steelworks. The Cultural Park of Krupówki Street in Zakopane stretches along the street that is the central axis of urbanization of the Podtatrze summer resort, which turned from a highland village at the turn of the nineteenth and twentieth centuries into a city, the most famous center of tourism, entertainment and mountain sports in the Polish Carpathians. Each of the areas mentioned above is characterized by a cultural landscape with individual characteristics and a historically conditioned character. In each of them, the values resulting from the historic character have been recognized, and thus each has become the subject of formal legal protection.

### **The pressure of globalism – transformation**

Globalization refers to at least three dimensions of life: economic, socio-cultural and political.<sup>8</sup> Although one of the classics of analyses of globalism, the Nobel laureate J.E. Stiglitz, avoids qualifying globalization as a good or bad process, there are many voices about the threats and adverse effects of globalization.<sup>9</sup> Uniformi-

zation, homogenization, and standardization are indicated as the effects of globalization. Cultural and economic processes of westernization, coca-colonization, McDonaldization, ikeicization, and the like are identified.<sup>10</sup> From the Polish perspective, it can be indicated that the negative impact of globalization in the landscape dimension was recorded in the statutory form. The regulation of the Council of Ministers of January 11, 2019, on the preparation of landscape audits (Dz.U. 2019, item 394) states that “for identified threats to the possibility of preserving the value of the landscape, the source of the threat, the scale of the threat and the degree of threat are determined.” At the same time, “mixing local patterns and global processes in a given area” is seen as one of the categories of threats. In fact, in historical complexes, in historic cultural landscapes, the pressure of globalism is evident and destructive. It is expressed in a different scale and form—from unified retail chains, their product offerings, signs and visual communication, preferring invasive ornamental greenery alien to local habitats, forms of management and scaling, and cosmopolitan architecture that ignores the genius loci and landscape identity. This catalogue of threats can be expanded with the functional and formal transformation of landscape components generated by international investor factors. Interference with the substance of objects, including monuments that make up components of local landscapes (e.g., tiles or plasters from global producer networks, and profoundly changing the perception of colors and textures of buildings). The sum of these interventions and the accompanying changes in expectations, fashions, and consumer preferences translate into the destruction or profound transformation of a given landscape's landscape identity and cultural identification.

The unification of the architectural substance, the facade of monuments, the globalization of the formal and functional substandard, the advantage of a mobile community over one rooted in a given area affects both traditionally understood monuments, holistically perceived cultural landscapes, as well as the sphere of intangible heritage of a given community. In the examples of valuable landscape areas of Cracow or Zakopane mentioned above, such phenomena occur incidentally, but they can be perceived as a harbinger of a more general tendency and increasing threats.

### **Cultural park – the intention behind and the potential for shaping processes**

As a legal form of monument protection specified in the Act of July 23, 2003, on the Protection and Preservation of Historical Monuments, a cultural park is a tool dedicated to the protection of historic landscapes. It is a form of monument protection entrusted to the competence of the local government. It is a process control tool for protective purposes. Processes that are often opposed to runaway processes of exploitation, commercialization, and finally, the globalization of the

landscape. In areas with high cultural and historical values, it is often the last line of defense initiated by the local government, rightly sensing the threat, not to the historical substance but the character and the spirit of the place. The essence of protective measures in identifying and defining the values to which this protection is to apply. Value identification enables them to be prioritized, valorized, and allows for identifying threats and processes to which they are subjected. These findings, in turn, become the basis for the diagnosis of the condition of cultural heritage, and in particular of the cultural landscape, which reflects the synthesis of the processes taking place. Thanks to these arrangements, it is possible to formulate recommendations in the protection plan of a given cultural park.

The cultural park protection plan is a document of the local government that defines the management method: managing and arranging the area to protect, partially renovate and “successfully continue” the form of a given cultural landscape. The plan is an attempt to diagnose, forecast and immediate changes in the landscape. It is not a static evaluation of values and the determination of an equally static, ideal target state but an attempt to define ongoing processes and consequences. Thus, the cultural park is the highest expression of the self-government’s responsibility for the area entrusted to it.<sup>11</sup> The experience of the Municipality of Cracow in establishing and managing cultural parks is pioneering in Poland. The case of Krupówki in Zakopane shows the transfer of methods of protecting and extracting the value of the cultural landscape in a highly commercialized area.

Let us take a closer look at the guidelines for Krupówki in Zakopane. The division of the Cultural Park area for the Protection Plan was based on morphological criteria, treated as a record of past and ongoing processes here. Such a division allowed for the definition of areas with internally coherent features, which combine different components of the urban landscape. Instead of a mechanical division into streets, building blocks and green areas, the resulting areas were consistent in terms of origin, use, form and size of objects, and thus: with similar conditions and problems, not only conservation and protection or viewing but also, for example, social or related to the intensity of tourist traffic.

Areas with similar features were defined as ZWAKs: architectural and landscape interior complexes, as they consist of visually different but mutually complementary interiors—streets, squares, intersections, gardens in the middle of blocks, courtyards, etc.

Sets of interiors with similar features were combined into larger areas, called landscape models of Krupówki Street. Their identity and distinctiveness are determined both by the differences in the structure of buildings and the differences in terms of scale and meaning, scenic aspects. The exhibition, i.e., the detailed definition of the essential openings and viewpoint connections, is another specific feature of the Cultural Park Protection Plan, which distinguishes it

from other documents, e.g., the local spatial development plan. The individual fragments of the city resulting from such adopted methods of division were assessed in terms of historical and contemporary values, taking into account the directions and pace of changes shaping them.

The division of the landscape of the area of Krupówki Street into essential elements and the justification of the division criterion in the adopted working method corresponds to the object of protection of the Cultural Park, which is the historic landscape. The landscape, being a physiognomy, the face of the environment, is the most visible, the most general, and at the same time the most literal—a record of the processes taking place in the past and currently taking place.

The analyses of the directions of changes, prepared based on previous experiences (Cracow’s cultural parks), show the tendencies and threats of recent changes currently underway, among which the following models have been identified:

1. Continuative Model—denotes all phenomena indicating the creative continuation of historical functions, attention to the form and structure of all the components of the interior (buildings, roads, greenery, etc.).
2. Preservative Model—denotes the phenomena that shape the general behavior of form and substance, but in a non-interfering or opportunistic way; it is usually associated with deviation from historical functions and limited care of the condition of the landscape.
3. Metamorphic Model—denotes phenomena that shape the landscape quickly and violently, often related to the implemented adaptations and transformations. Today it is impossible to assess these changes unequivocally; the model determines the facts of their occurrence and pace.
4. Degradation Model—denotes phenomena that negatively shape the landscape.

At the same time, guidelines for protection and conservation activities were defined, namely:

- conservation—all procedures aimed at maintaining the current state of the interior, with additions and legibility;
- integration—combining old and new substances, merging broken and obliterated systems;
- reconstruction—recreating non-existent elements and assemblies according to historical data;
- recomposition—creating new values with the use or marking of relics of old systems;
- creation—creating new values with the use of inspiration from old forms and systems.

Use process models:

- contemplation—fulfilment of the conditions that allow for complete use of place-based identity (*genius loci*); predominance of service functions (primacy of the existing value);
- extensive contemplation—use with the utmost care

for existing place-based value, conditioned, for example, by religious and commemorative functions; often with limited accessibility;

- intense contemplation—the whole use of the value of a place as a catalyst for activity based on its phenomenon, but not requiring permanent and irreversible changes in its substance;
- penetration—meeting the conditions for introducing commercial functions while maintaining the possibility of referring to a place's traditions (balance of the existing and added value);
- participation—the primacy of new, commercial functions of considerable intensity.

Models of the process of shaping landscape identity are:

- Sublimative—emphasizing, extracting, improving, raising existing values.
- Additive—perfecting the form, function, and hence: the identity of the place by introducing small contemporary additions.
- Integrative—combining the old and new forms,

functions, and thus: the identity of the place, on the principles of balance.

- Applicative—searching for a new identity by introducing new functions, forms, and meanings—concerning the historical background.

Below we present an example card containing a synthesis of analyses and guidelines for a selected landscape area (WAK) taken from the protection plan of the cultural park of Krupówki Street in Zakopane.<sup>12</sup>

### Views and greenery

- the observation axis to the tower of the Holy Family Church is kept
- tidying up greenery (removing root suckers created by trees, caring for lawns, adding grass in well-trodden areas, designing low greenery)
- arrangement and modernization of small architecture (benches, litter bins, surface).



Fig. 1. Elimination of the tacky image of a historic building dominated by commercialism, a—current state, b—state according to the guidelines of the cultural park protection plan, 2015; photos by Z. Myczkowski.

Ryc. 1. Eliminacja niekorzystnego wizerunku zespołu historycznego zdominowanego przez komercję, a – stan istniejący, b – stan według wytycznych planu ochrony parku kulturowego, 2015; fot. Z. Myczkowski.


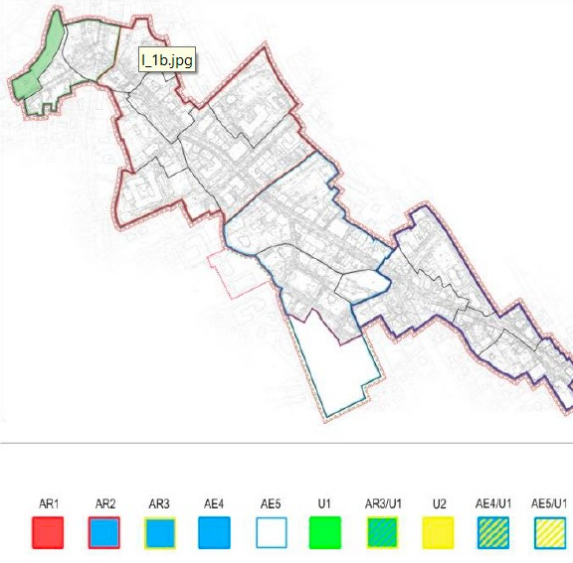


Fig. 2. Visual reduction of the global style of architecture dominated by commercialism in the context of the regional cultural landscape of Krupówki Street in Zakopane, a—the current state, b—the state framed by greenery according to the guidelines of the cultural park protection plan, 2015; photos by Z. Myczkowski.

Ryc. 2. Redukcja wizualna globalnego stylu architektonicznego zdominowanego przez nadmierną komercję w kontekście regionalnego krajobrazu kulturowego ul. Krupówki w Zakopanem, a – stan istniejący, b – stan obramowany zielenią według wytycznych planu ochrony parku kulturowego, 2015; fot. Z. Myczkowski.



Table 2. Synthesis of analyses and guidelines for ZWAK I.1, Pęksowy Brzyzek; source: *Plan ochrony Parku Kulturowego obszaru ulicy Krupówki w Zakopanym*, authors: J. Wowczak, A. Siwek, U. Forczek-Brataniec, P. Nosalska, R. Marcinek, Z. Moździerz, A. Rykaczewska, Z. Myczkowski, Kraków 2016–2017.

| ZWAK I. 1  | Pęksowy Brzyzek  |
|--|--|
| No plan in force   | Characteristics: Areas of religious cemeteries ZC / Public spaces / Sequences and viewpoints |
|  |           |
| Landscape type: with a predominance of archetypal features: CONS                   | Protection process model: AO   |
| Identity shaping process model: Sublimative  | Use process model: Extensive contemplation   |
| Optimal model view shaping process: Preserve                                       | Model/typology of the processes: CONT  |

| DISTANT VIEWS |               |                   | URBAN INTERIORS  |  |                                   | INTERIORS WITH WATER |                            |                   |
|---------------|---------------|-------------------|------------------|--|-----------------------------------|----------------------|----------------------------|-------------------|
| Unveiling     | Preserve view | Forefield cleanup | Greenery cleanup | Street furniture restructuring and modernization | Removal of disharmonious elements | Visibility           | Ensuring functional access | Spatial framework |
|               | x             | x                 | x                | x  |                                   |                      |                            |                   |

### Conservation recommendations for street and park furniture

The cemetery area:

It is forbidden to install advertising boards and devices, except for signs related to tourist routes, information boards related to the service and function of the area, boards related to devices and objects of technical infrastructure.

It is permitted to install street and park furniture related to the service and function of land use.

Fences (height, type).


Area for the development of religious services:

It is forbidden to locate advertising boards and devices, except for signs related to the course of tourist routes, information boards related to the service and function of the area, boards related to devices and objects of technical infrastructure.

It is permitted to install street and park furniture related to the service and function of land use.

Fences (height, type).

Table 3. Conservation recommendations in the field of street and park furniture.

| Address; name in circulation, an entry in the register, entry in the municipal records; dating |                |  |           | Conservator's recommendations<br>Systemic // Detailed  | Actual function      | Technical condition | Current view  |
|--|----------------|--|-----------|--|----------------------|---------------------|---|
| Kościeliska  | Pęksów Brzyzek | A.K./349/31 z 5.11.1931 and L.A.K.31 z 5.11.1931 | From 1850 | The historical complex of the highest value, STRICT CONSERVATION PROTECTION, all activities require the permission of the competent Provincial Conservator of Monuments and the preparation of conservation programs in advance. SPECIAL PROTECTION SHOULD BE SUBJECT TO THE ORIGINAL MONUMENT SUBSTANCE and THE VIEW AND SPATIAL RELATIONS OF THE COMPONENTS OF THE TEAM. | Religious-sepulchral | Good                |  |

### Conclusion – globalism versus identity of place – defense of values

It is believed that the economic and cultural pressure of globalization is an inevitable phenomenon. Z. Bauman stated: “Globalization cannot be stopped in any way, much less reversed. You can be ‘for’ or ‘against’ the net of interdependence that entwines the entire planet, but the effect of this attitude will be the same as applauding or protesting against successive solar or lunar eclipses.”<sup>13</sup> However, due to respect for the past and the need to protect the principles of place-based identity, it is possible to indicate areas where changes should be slower or not at all. Establishing a cultural park with a statutory protection plan, as an element combining state legislation with protection provided by local law, appears to be a powerful tool for inhibiting globalist

processes in areas of exceptional landscape value. Establishing a cultural park may result in the fact that the development is not inhibited within its boundaries but directs it to be a continuation and complement to the tradition of the place and exclude globalist cultural degradation. The experiences cited and examples show this mechanism in practice. A cultural park in its genesis was not constructed as a conscious counterbalance to globalism, but in practice, the protection of the identity of a readable place in the landscape becomes a natural barrier to globalist pressure. The experience resulting from the establishment of cultural parks and the preparation of conservation plans for them may be a significant inspiration for shaping new tools of landscape policy aimed at preserving local values. After all, as J. Purchla said, locality becomes a value in itself in the face of globalization.<sup>14</sup>

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## Abstract

The presented discussion concerns the cultural park as an autonomous form of monument protection. It is necessary to define the dependencies and differences between other forms of monument protection in Polish legislation in the context of opposing globalism, which forced appropriate comparisons. The evolution of the monument protection system in the sphere of cultural landscape protection has gone from the problem of views (view from and to the monument), to a comprehensive approach to landscape issues in the formula of a cultural park. Individual stages of the evolution of a cultural park as a form of protection are the result of experience and individual attempts to create and run these parks. Nevertheless, first, to present a complete picture of the phenomenon, it is necessary to present the doctrinal and legal conditions that work complementary or parallel to the monument protection system. A cultural park, in its genesis, was not constructed as a conscious counterbalance to globalism, but in practice, the protection of the identity of a clear place in the landscape becomes a natural obstacle to the pressure of globalization.

## Streszczenie

Przedstawiona w artykule dyskusja dotyczy parku kulturowego jako autonomicznej formy ochrony zabytków. Konieczne jest zdefiniowanie zależności i różnic pomiędzy innymi formami ochrony zabytków w polskim prawodawstwie w kontekście przeciwstawienia się globalizmowi, co wymusiło odpowiednie porównania. Ewolucja systemu ochrony zabytku w sferze ochrony krajobrazu kulturowego przeszła od problemu widoków (widok z zabytku i na zabytek) do wszechstronnego podejścia do kwestii krajobrazowych w formule parku kulturowego. Poszczególne etapy ewolucji parku kulturowego jako formy ochrony są wynikiem doświadczenia oraz prób utworzenia i prowadzenia tych parków. Niemniej najpierw, aby przedstawić kompletny obraz zjawiska, konieczna jest prezentacja doktrynalnych i prawnych warunków, które działają komplementarnie lub równolegle względem systemu ochrony zabytków. W swojej genezie park kulturowy nie został skonstruowany jako świadoma przeciwwaga dla globalizmu, lecz w praktyce ochrona tożsamości czytelnego miejsca w krajobrazie staje się naturalną przeszkodą dla presji globalizacyjnej.

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## Structure of Areas of Greenery within Cracow's City Blocks: Historical Transitions and Contemporary Development in the Context of Adaptation to Climate Change

### Struktura terenów zieleni w obrębie kwartałów zabudowy śródmiejskiej Krakowa – historyczne przemiany i współczesne zagospodarowanie w kontekście dostosowania do zmian klimatu

**Keywords:** historical urban layout, greenery in block development, types of greenery and accessibility, block gardens, climate change

**Słowa kluczowe:** historyczny układ urbanistyczny, zieleni w zabudowie kwartałowej, rodzaje zieleni i dostępność, ogrody śródblokowe, zmiany klimatyczne

#### Introduction

The city, as a living organism, constantly transforms due to socio-economic change. The transformation of heritage areas is not as sudden as that of other urban areas. However, the outcomes of these changes are also visible there and typically apply to the so-called soft landscape, of which greenery is an integral part. Megatrends that include globalization and metropolization<sup>1</sup> affect the space of historical city centers due to, among others, growing tourist pressure. Touristification is closely tied with downtown depopulation, commercialization of space and its adaptive reuse (e.g., as tourist infrastructure, parking spaces), which often takes place at the cost of greenery.<sup>2</sup> The presence of green areas in compact city structures, together with singular trees that provide shade, is increasingly appreciated. The reason for this is not only development density

and aesthetic considerations, but also climate change, which result in a perceptible heat island effect in urban areas. The need to protect greenery is discussed increasingly often, not only in the context of preserving historical layouts, but also that of improving resident access to green areas, improving a city's microclimate and stormwater retention.<sup>3</sup>

This paper discusses the green areas of the Old Town of Cracow, a city with a compact urban form and of medieval origin. Despite numerous restrictions on development, this area does change. New museums, hotels and other service buildings are being built and new public spaces are being designed.

This study covers the green areas of Cracow within Planty Park and Wawel Hill, independently of the size of their areas. This area includes city blocks with varied development, including townhouses, monasteries, churches, palaces, a university, a theater, and a royal

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castle. The boundary for the area under study was dictated by its historical layout, clearly identifiable within the city's spatial structure and further highlighted by the boundaries of the Old Town Cultural Park (2010).<sup>4</sup> The point of reference for the comparative analysis of greenery assets was provided by a garden catalog prepared for the area under study<sup>5</sup> (hereinafter referred to as the Catalog), which also defined the timeframe of the study: 1994–2021.<sup>6</sup>

The objective of the study was to assess the transitions in the accessibility structure of the Old Town's green areas. The paper also presents the structure of city blocks in the context of the presence of greenery, typically with housing development and atypical blocks, associated with other uses, such as religious or service use. Detailed research goals were focused on determining biologically active area assets and comparing them with the state from 1994, presenting the varieties and types of greenery present in the area under study, based on use and accessibility, and an analysis of historical development morphology in the context of greenery. Another research aim was to assess greenery assets and the potential to increase greenery parameters within the Old Town's urban layout in reference to planning provisions.

### Research methods

Research work was conducted along multiple trajectories and was divided into three stages. The first stage included a review of the literature<sup>7</sup> and archival materials. Data included in the Catalog, prepared in the years 1991–1994, was used. Starting information sources also included: garden registers,<sup>8</sup> monuments register entries, dendrological surveys, historical and landscape studies concerning individual gardens from the archives of the Cracow University of Technology Chair of Landscape Architecture, the Lesser Poland Voivodeship Monuments Conservator (MWKZ) and the National Archives in Cracow.

The second stage covered research on the existing state of greenery and changes in land use within the Old Town. It was conducted using the Geographic Information System (GIS). Data aggregation was based on vector graphics and raster data analysis. BDOT 500 databases and satellite images were sourced from the surveying and cartographic resources of the Office of the City of Cracow and the Office of the Marshall of the Lesser Poland Voivodeship. In addition, the data was updated during surveying and on-site analyses. Conclusions were formulated in the third stage.

Methodological problems occurred during comparative analyses due to differences in source data. In 2021, the analysis was based on digital data, while in 1991–1994, on data collected in the field. The field observation method was employed in both cases, yet the Catalog focused on the history of each site, plant types and forms, and not on land use and detailed area analysis, it featured no listings and statistics for garden areas.

### Urban structure and greenery

Cracow is a city whose origins date back to the sixth century. During the High Middle Ages, from the ninth to the thirteenth century, organic forms predominated in its urban layout. The year 1257 was crucial to the city's urban layout, when it was issued a charter based on the Magdeburg law (June 5, 1257). The charter determined the reach of a planned settlement network, and a medieval town with a regular layout was established. This initiated the development of an urban form that became the basis for placing the medieval center of Cracow, together with Wawel Hill, Kazimierz and Stradom, on the UNESCO World Heritage Sites List (149.65 ha) in September of 1978, as one of the first twelve such sites around the world. Here, the basis for inclusion was criterion four, according to which a site should be an exceptional case of a type of structure or an architectural complex that illustrates a significant stage in human history. The reasoning stressed the value of the historical and architectural center of Cracow, which, shaped over almost a millennium, is one of Europe's most notable artistic and cultural complexes.

Cracow's town charter made no references to its urban layout, with customary law coming into play instead. A regular, orthogonal layout was introduced, based on modular dimensions, adapted to existing pre-charter elements such as churches, monasteries, main transport routes and streets. The layout's delineation was based on a system of units of measure and area. The main housing blocks were demarcated. A grid-based layout of blocks was created, of which close to 25 blocks were intended for housing and service buildings. The base module that formed the urban structure was a full settlement plot that was 21x42 m. A town block, resembling a square with an 84 m long side in shape, consisted of eight full-sized plots, and after secondary divisions, of sixteen half-sized plots.<sup>9</sup> Scholars distinguish five types of parcellation of a regular old-town block into settlement plots.<sup>10</sup>

The placement of the plot front relative to the block's outline was key. For instance, in blocks abutting the market square, the fronts of four houses faced the square, while the remaining four, in pairs, faced the streets extending from the square.<sup>11</sup> Plots with development had an elongated shape (half-sized, with 1:4 front-to-side ratio). The primary layout that emerged in the development of housing plots was based on the townhouse from the front and an outbuilding that terminated the plot, and which also sometimes framed its side.<sup>12</sup> Between them there was a space was planned differently across history, either as a yard, courtyard, garden or orchard. Over time, formal greenery was introduced, although it was small in terms of area, as revealed by Janusz Bogdanowski.

The layout of the city, linked with the market square, was connected with Okół—a suburbium adjacent to the castle, with an axis in the form of Grodzka

Street, with Kanonicza Street running parallel. Plots were oriented with their fronts facing the street, and their structure was essentially similar to the section tied with the market square. From the south, the layout is terminated by Wawel Hill and the castle, situated near the Vistula River. The city was surrounded by a fortified line with a moat (built between the end of the thirteenth and the first quarter of the fourteenth century). After its demolition in the 1820s, the site was used to create Planty Park, a linear ring park. Monasteries were placed in the urban layout's blocks, especially along the outline of the walled city. At present, these include seven buildings out of the ten operating monasteries. Those abutting the walls had mostly been of pre-charter origin.

### Study of the Old Town's green areas

The form and function of city greenery stems from morphological transformations of settlement units that gave rise to the development of the city. In the case of historical development layouts, both large complexes of monastic buildings and various types of townhouses were of essential significance, as did other forms of development like palaces or public buildings which, within their own plots produced forms of greenery of varying scale. The base element of the city's morphology that is the town block (urban block) was used by Bogdanowski as a basis for introducing the term "block garden" into the literature. With this, Bogdanowski clearly showed the value of not only obvious sites like gardens accompanying monasteries, palaces, or public buildings, but also the compositional, aesthetic, and environmental value of townhouse gardens. At the time, this opposed the stereotypical perception of smaller greenery layouts that were seen as random plantings or unspecified greenery, whose value stemmed solely from forming a part of green substance assets. Bogdanowski's findings clearly demonstrated that the block garden, understood as a structured layout, irrespective of size, is an important element of urban greenery.<sup>13</sup>

In Cracow, only larger garden complexes, e.g., monastic ones, were initially covered by registers.<sup>14</sup> Studies of gardens in townhouse courtyards were initiated in the 1970s by Bogdanowski.<sup>15</sup> They focused on the buildings of the city center within the borders of Planty Park and buildings situated within the so-called second ring road (between Planty Park and Trzech Wieszczów Avenues) in the former districts of Nowy Świat, Piasek, Wesoła. The work, conducted from 1974 to 1991 in various teams supervised by J. Bogdanowski and W. Genga, was performed by: Z. Myczkowski, M. Swaryczewska, D. Uruska-Suszek, J. Więckowska, K. Fabijanowska and A. Zachariasz. Data concerning the gardens of the city center as surrounded by Planty Park was verified during the preparation of the Catalog. No comprehensive measures were taken afterwards.

### Typology of the green areas under study

In the Catalog,<sup>16</sup> gardens belonging to each property were marked on a plan of the city. The following regularities were observed. The greatest number of gardens survived in layouts with half-sized plots. They predominate along Sławkowska and Św. Jana streets and along Szewska and Floriańska streets, in the block near Planty Park. There was much less of them in blocks adjacent to the market square (six full blocks and two elongated blocks that encroached on Grodzka Street with their pre-charter layout). Only four gardens with addresses at the market square survived and all are contemporary and small. This stemmed partially from their renovations.

Greenery also accompanies palaces. According to the monuments register, there are fourteen palaces in the area under study, of which nine have gardens. These include: the courtyard garden in the Wielopolski Family palace (Cracow's city hall—3/4 Wszystkich Świętych Square) and the garden in the courtyard of the Bishops' Palace (3 Franciszkańska Street).

One exception is 15 Kanonicza Street with its gardens, many of which have valuable compositions. Some plots abut Planty Park. They are larger than half-sized plots, both in width and length, e.g., Kanonicza Street numbers 3, 5 and 7.

Since the Middle Ages, religious buildings like churches and monasteries have played a crucial role in the city's landscape. Monastic complexes were built on plots of varying size and were often redeveloped and remodeled. They are accompanied by gardens, often large ones, which stems from their peripheral location, near the walls (currently Planty Park).<sup>17</sup> Monasteries situated deeper inside the city have smaller gardens, of the courtyard type, e.g., a Jesuit garden at 8 Mały Rynek.

At present, every church in the Old Town has its own, usually very small, patch of greenery, such as the one near the St. Mary's Basilica. There are also those whose nearby trees were removed, e.g., the Church of the Holy Cross (they obscured the facade from the side of Planty Park). There are also other religious buildings, such as the calvary at 5 Reformacka Street, an extensive garden at the Church of the Holy Cross parish (23 Św. Krzyża Street) or the garden accompanying the Seminary (8 Podzamcze Street).

Another group is formed by gardens that accompany public buildings and that extend their function, such as: the Wawel Castle, the Jagiellonian University, a range of schools, banks, a theater, and museums. Typically, at least a part of such a garden was formal. This can be seen in many nineteenth-century sites designed in the styles of Historicism, Eclecticism or early Modernism, where architecture was supplemented by regular garden forms (e.g., the bank at 15 Szpitalna Street, the J. Słowacki Theater). They continue to be an inseparable part of urban space and stand out in the landscape, signify a place, and define the quality of public space.

|  |  |
|--|--|
| Types of green areas identified in the Cracow's Old Town                           | small public gardens with landscaped greenery in the form of a parterre, an intermediate and a high level, often accompanying public buildings, co-forming formal spaces and setting the stage for architecture e.g. (Wszystkich Świętych Square in front of the Cracow City Hall, the J. Słowacki Theater, the Palace of Art) |
|  | public parks—Planty Park and the areas around Wawel Hill   |
|  | greenery that accompanies squares and streets in the form of small beds or singular trees  |
|  | block gardens, divided into three types: courtyard gardens on plots with mixed-use housing and service townhouses, lawns in the courtyards of urban palaces, gardens constituting large areas of landscaped greenery accompanying religious buildings, institutions of culture, science and public buildings                   |
|  | royal gardens at Wawel Hill, both historical and contemporary, within the defensive walls  |
| Green areas identified by function stemming from the use of accompanying buildings | accompanying mixed-use residential and service townhouses (townhouses, urban palaces);   |
|  | accompanying science and education facilities (e.g. universities, scientific institutes, high schools)   |
|  | accompanying cultural facilities (e.g., theaters, museums, including Wawel Castle, the archaeological Museum);   |
|  | accompanying public and commercial buildings such as banks, hotels, stores, etc.   |
|  | accompanying religious buildings (churches, monasteries, a calvary, and their accompanying seminaries and parish buildings);   |
|  | squares and streets  |

Source: by authors, based on on-site analyses.

Fig. 1. Types of green areas in terms of its form and function stemming from the use of accompanying buildings in the Old Town area; by the authors.

Ryc. 1. Rodzaje terenów zieleni pod względem ich formy i funkcji wynikających z użytkowania otaczających budynków na obszarze Starego Miasta; oprac. autorki.

Spectacular discoveries have also been made since the Catalog's completion, such as the discovery of fragments of a sixteenth-century garden at Wawel Castle, at a terrace adjoining the eastern facade, in 2000. The garden was later recreated.<sup>18</sup>

This study focuses on green areas, understood as assets that supplement urban tissue. In line with this assumption, the types of green areas in terms of its form

and function stemming from the use of accompanying buildings were identified in the Old Town area (Fig. 1).

Six of the identified functional categories were deemed the most representative and that, due to the specificity of forms of development, form cohesive morphological groups. The service function category was found to be the most diverse, as it was formed by both townhouses and former urban palaces. To better present the specificity of

| AREA BALANCE                         |                |                                   |                                 |                                    |                               |  |                                       |                                      |
|--------------------------------------|----------------|-----------------------------------|---------------------------------|------------------------------------|-------------------------------|--|---------------------------------------|--------------------------------------|
| Primary use                          |                | Total site area [m <sup>2</sup> ] | Built-up area [m <sup>2</sup> ] | Undeveloped area [m <sup>2</sup> ] | Share of undeveloped area [%] | Biologically active area [m <sup>2</sup> ] | Share of biologically active area [%] | Non-permeable area [m <sup>2</sup> ] |
| Services (U)                         | banks          | 5359                              | 3694                            | 1665                               | 31%                           | 741  | 13.83%                                | 924                                  |
|                                      | healthcare     | 1499                              | 469                             | 1030                               | 69%                           | 796  | 53.10%                                | 234                                  |
|                                      | administration | 11591                             | 7211                            | 4380                               | 38%                           | 1025                                       | 8.84%                                 | 3355                                 |
|                                      | hotels         | 42899                             | 36598                           | 6301                               | 15%                           | 883  | 2.06%                                 | 5418                                 |
|                                      | other services | 13738                             | 12255                           | 1483                               | 11%                           | 30   | 0.22%                                 | 1453                                 |
| Religious services (Uks)             |                | 98329                             | 48887                           | 49442                              | 50%                           | 19442                                      | 19.77%                                | 29968                                |
| Science and education services (Ukn) |                | 45321                             | 30430                           | 14891                              | 33%                           | 5123                                       | 11.30%                                | 9768                                 |
| Cultural services (Uk)               |                | 42848                             | 23022                           | 19826                              | 46%                           | 6483                                       | 15.13%                                | 13343                                |
| Mixed-use housing and services (MWU) |                | 161051                            | 121481                          | 39570                              | 25%                           | 9680                                       | 6.01%                                 | 29890                                |
| Streets and squares                  |                | 239583                            | n/a                             | n/a                                | n/a                           | 5126                                       | 2.14%                                 | 234457                               |
| Total                                |                | 955936                            | 284047                          | 138588                             | n/a                           | 49329                                      | n/a                                   | 328810                               |

Source: by authors, based on on-site analyses and data from the Municipal Spatial Information System (MSIP).

Fig. 2. State of greenery in the Old Town of Cracow in 2021, divided by building functions; by the authors.

Ryc. 2. Stan zieleni na Starym Mieście w Krakowie w roku 2021, z podziałem na funkcje budynków; oprac. autorzy.

| Greenery accessibility | Green area in the Old Town, excluding Planty Park and Wawel Hill | Total green area in the Old Town | Primary components  |
|------------------------|--|----------------------------------|---|
| Unrestricted access    | 25%  | 80%                              | Greenery of squares, streets, Planty Park, frontal gardens, beds and parterres and the greenery of Wawel Hill |
| Restricted access      | 25%  | 10%                              | Block gardens, gardens near service buildings, Wawel within the defensive walls                               |
| Inaccessible           | 49%  | 7%                               | Monastic gardens, private gardens   |

Source: by authors, based on on-site analyses and data from the Municipal Spatial Information System (MSIP).

Fig. 3. Old-Town greenery accessibility analysis; by the authors.  
Ryc. 3. Analiza zieleni Starego Miasta; oprac. autorki.

this category, four subcategories were isolated within it. They include buildings that offer accommodations (hotels, hostels), banks, public administration, and health-care.<sup>19</sup> Religious functions were analyzed in two subcategories: monastic complexes and churches. Cultural services such as museums and cultural institutions were another category, while functions of science and education encompassed academic institutions and various types of schools. The final category, that of residential functions, is difficult to define due to the high number of apartments for short-term lease, which are not recorded (Fig. 2). The successive decrease in the population of the Old Town, which has been observed for many years, is also a signal that many former residential spaces are now used as commercial premises.<sup>20</sup>

Another aspect investigated in this study is accessibility, which was explored in three categories, depending on the degree of accessibility to users. The accessibility analysis showed that generally accessible green areas include the greenery of squares, streets, frontal gardens, and parterres located in front of public, commercial or religious buildings. This group is characterized by its small areas. This is formal greenery that enriches the composition and aesthetics of urban interiors while having little utility. The size of green areas with various degrees of accessibility have been presented in figure 3. The analysis showed that the greenery of Planty Park, apart from its compositional value, clearly improves accessibility to greenery in the area under study. Furthermore, it should be added that inaccessible greenery consisted mostly of monastic gardens. This prompted an initiative by a group of urban activists that began in February 2021, and which culminated in a request sent to Pope Francis to allow Cracow's citizens even partial access to monastic gardens in the city center.<sup>21</sup>

Independently of the previously mentioned types, functions or accessibility, green areas are linked with the notion of biologically active areas. This is crucial in the context of improving a space's environmental quality. Biologically active areas are defined by the Ordinance of the Minister of Infrastructure of April 12, 2002, and their minimum percentages of site area are defined in planning documents to maintain a proper (depending on development density) balance between paved and permeable surfaces.

As shown by the analysis, a great variety of biologically active area to site area ratios was observed in the area under study. Seven ranges of its value were identified (Fig. 4). The variety stems from the morphology of each block and its function. As a result, the lowest ratio was found in blocks directly abutting the Main Market Square or those in its vicinity. Three blocks with no greenery were found. It should be noted that only one of these, located along the northern frontage of the Main Market Square, was full. The others had an irregular form and size, which contributed to the biologically active area to site area ratio being zero.

### Comparison of greenery presence in the Old Town area

Transformations in the development structure were found to be insignificant, although some courtyards were adapted for commercial uses.<sup>22</sup> Due to applicable heritage conservation forms, construction efforts were conservative and applied mostly to block interiors—the courtyards. Land use changes in the years 1992–2011 were found to be minimal, which stems from the urban form of this part of Cracow.<sup>23</sup>

The reasons behind the decrease in the ratio include outbuilding development growth, an increase in circulatory spaces (car parks) and the growth of outdoor gastronomic establishments. The increase in built-up area in the period between 1997 and 2021 was 11,045 m<sup>2</sup>. The scope of various works is illustrated by the number of construction permits issued (Fig. 5).

The most important changes focused on the blocks of Jana, and Pijarska streets, Floriańska Street—the Czartoryski Museum and hotels, 16 Św. Jana Street—gastronomic establishment, Św. Marka Street, Tomasz Street and Planty Park—service building and hotel, Grodzka Street—Wszystkich Świętych Square—Wyspiański Pavilion, buildings on the corner of Floriańska Street and the Main Market Square (2 Floriańska Street, 45 Main Market Square)—gastronomic establishment and bank. In terms of greenery type changes, the former municipal garden (Catalog item 119) near the Higher Seminary (once part of the Discalced Carmelites' monastic gardens) abutting Planty Park, which was divided and developed into a grassy sports pitch and the playground.



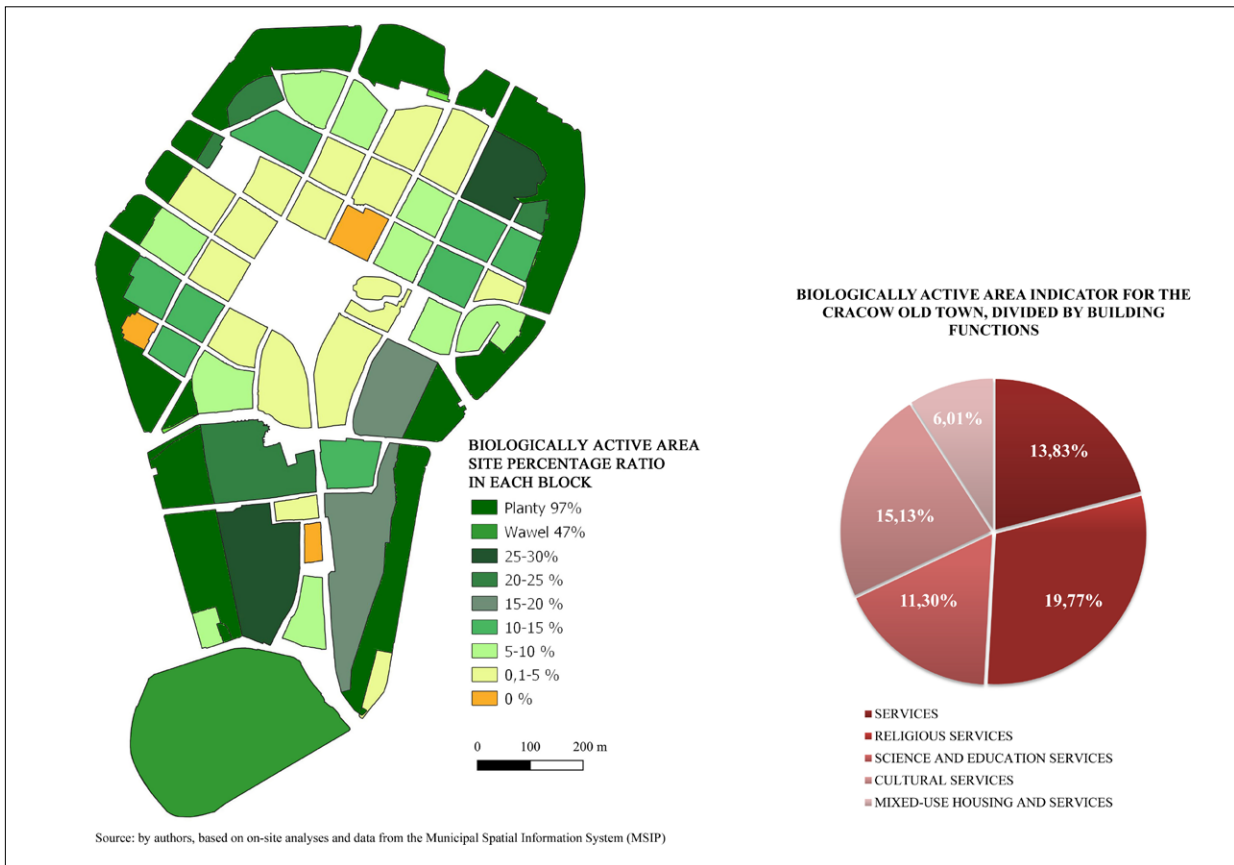


Fig. 4. Biologically active area site percentage ratio in each block and in relation to building function; by the authors.  
Ryc. 4. Współczynnik powierzchni biologicznie czynnej w każdym kwartale oraz z podziałem na funkcje budynku; oprac. autorki.

| Construction permit issue date | Number of construction permits issued | Number of plots covered by permits |
|--------------------------------|---------------------------------------|------------------------------------|
| 2014                           | 114                                   | 100                                |
| 2015                           | 96                                    | 109                                |
| 2016                           | 63                                    | 64                                 |
| 2017                           | 89                                    | 159                                |
| 2018                           | 13                                    | 14                                 |
| 2019                           | 19                                    | 27                                 |
| 2020                           | 93                                    | 112                                |
| 2021                           | 40                                    | 55                                 |
| Total                          | 527                                   | 640                                |

Most common construction projects:

- Interior remodeling,
- Facade renovation,
- Replacement of windows/doors/restoration of walled-up apertures/walling in existing apertures/replacement of fire barrier doors
- Form of use change
- Construction/extension of electrical, plumbing, heating, gas utilities, ventilation, fire hydrant
- Remodeling and vertical extension of an outbuilding,
- Attic remodeling/roof truss renovation,
- Roofing replacement.

Source: by the authors, based on data from the Municipal Spatial Information System (MSIP).

Fig. 5. Construction traffic in the Cracow Old Town in the years 2014–2021; by the authors.  
Ryc. 5. Ruch budowlany na Starym Mieście w Krakowie w latach 2014–2021; oprac. autorki.

Paving was prevalent wherever the courtyards were in private hands and in complexes with religious buildings: the Church of St. Mark, monastic complexes of the Reformed Congregation of the Order of Friars Minor, the Presentation Sisters, the Orders of St. Francis, and St. Dominic. The changes mostly entailed providing parking spaces, which in certain cases heavily interfered with the structured greenery of gardens. Positive changes took place in the spaces of public squares: Św. Ducha, Szczepański, the Little Market Square, which had their parking spaces removed, and the first two saw the appearance of greenery. In addition, the Professor's Garden of the Jagiellonian University at Jagiellońska Street saw an increase in green area.

### Forms of green area conservation in the Old Town

The Monument Protection and Preservation Act (2003) defines the legal conservation of heritage sites and objects. The scope of a site's entry in the monuments register is crucial, as it should encompass the entire composed layout, i.e., in the case of historical townhouses it should also cover their gardens. The decision to enter a site in the register should include a precise list of all parts and elements of the historical complex (e.g., forms of greenery) as only then can there be a legal basis to protect the entire layout. Historical reconnaissance is important, as

| Old Town green areas [m <sup>2</sup> ] |  |  |  |
|--|--|--|--|
|  | green area for each unit from the Catalog (1997) | green area for each unit from the Catalog (2021) | green area for the zone under study (2021) |
| blocks                                 | 66016  | 47060  | 49329                                      |
| Wawel Hill                             | 45561  | 45561  | 45561                                      |
| Planty Park                            | 190880   | 190880   | 190880                                     |
| <b>Total</b>                           | <b>302457</b>                                    | <b>283501</b>                                    | <b>285770</b>                              |

Source: by authors, based on *Parki i ogrody Krakowa w obrębie Plant z Plantami i Wawelem. Katalog parków i ogrodów w Polsce, vol. 1*, ed. J. Bogdanowski, Warszawa 1997, on-site analyses and data from the Municipal Spatial Information System (MSIP).

Fig. 6. Comparison of greenery in 1997 and in 2021; by the authors.  
Ryc. 6. Porównanie zieleni z lat 1997 i 2021; oprac. autorki.



Fig. 7. State of greenery of the Old Town in 2021 with changes in the urban structure and development; by the authors.  
Ryc. 7. Stan zieleni na Starym Mieście w roku 2021 ze zmianami w strukturze miasta i zabudowie; oprac. autorki.

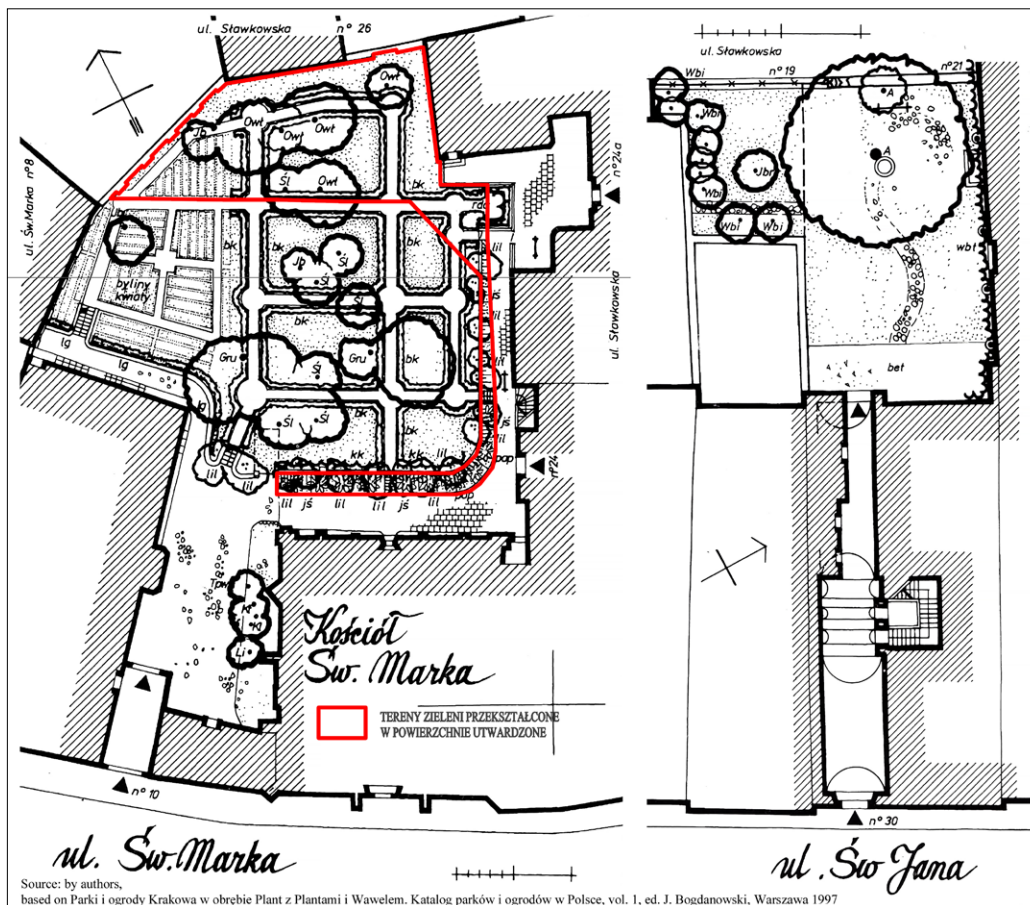


Fig. 8. Two exemplary gardens with a distinctive green composition – on the left a quarters layout, on the right a tree organizes the space. Visible transformation (decrease in green area amount noted within this analysis – as of 2021) in the garden at 10 Św. Marka Street (Catalog chart 9), marked in red; preserved garden layout at 30 Św. Jana Street (chart no. 67); by the authors.

Ryc. 8. Dwa przykładowe ogrody z charakterystycznymi kompozycjami zieleni: po lewej układ kwartałowy, po prawej przestrzeń organizowana przez drzewo; widoczne przekształcenia (obniżenie powierzchni zielonych odnotowane w analizie – stan na rok 2021) w ogrodzie przy ul. Świętego Marka 10 (Katalog, karta 9) zaznaczone na czerwono; zachowany układ ogrodu przy ul. Świętego Jana 30 (karta nr 67); oprac. autorki.

is assessing a site's value, its borders and area. The surroundings, i.e., the area around and near the monument, as specified in the decision to inscribe the monument in the register, is also crucial, e.g. to conserve visual assets and protect against adverse external factors. Some of these elements can be placed under conservation via local spatial development plan provisions, which are also a form of heritage conservation.<sup>24</sup>

The area under study is covered by a local spatial development plan that has been in effect since 2011.<sup>25</sup> In terms of greenery, the plan stipulates the duty to conserve existing greenery of the most valuable compositional layouts, e.g., of Planty Park, Wawel Hill, historical gardens and public gardens, and allows for the recomposition of certain green areas and the possibility of introducing new landscaped greenery composition in undeveloped areas.<sup>26</sup> The provisions of the local spatial development plan define full and partial conservation of development, with the former preventing any new development in courtyards or other alterations to their space. As stipulated in the plan (par. 8, section 8, point 3), built-up-to-site-area ratios and biologically active area ratios were not defined for properties under

full conservation. Another document that is in force in the area under study is the Old Town Cultural Park Protection Plan,<sup>27</sup> which elaborates on the local spatial development plan's provisions. The plan mandates the maintenance of historical greenery complexes, stresses the need for biodiversity and environmental assets, the improvement of the natural environment and preventing its decay.<sup>28</sup> These values are verified in the design documentation agreed by the restorer.

### Cultural heritage zone and climate change adaptation

The municipal policy of numerous cities, both around the world and in Poland, acknowledges improving the quality and attractiveness of urban space to residents and tourists and the associated adaptation to climate change as a major priority. One of the first efforts in this field is to increase the amount of green areas to provide greater stormwater absorptivity. Enhancing absorptivity parameters can be achieved by greenery and certain types of paved surfaces that, depending on the materials used, can be permeable to varying degrees. Green areas in-

| Item no. | Type of surface  | Overview of surface type – ecological value  |
|----------|--|--|
| 1        | Paved surface  | Land cover that is impermeable to stormwater and air, without plant growth; using construction materials (concrete, asphalt, tiles or slabs with base courses with impermeable gaps)   |
| 2        | Partially paved surface  | Water- and air-permeable land cover, allows for plant growth and infiltration (clinker, gravel, tiles or slabs with a base course from sand and aggregate)   |
| 3        | Half-open (permeable) surface  | Fully water- and air-permeable surface, allows for plant growth and infiltration (grass, wood mosaic, mixed surface out of grass and stone)  |
| 4        | Soil surface that allows for plant growth, no contact with ground              | Surfaces without access to the ground, soil on the roofs of basements, garages, with a layer of soil no greater than 80 cm   |
| 5        | Soil surface that allows for plant growth, no contact with ground              | Surfaces without access to the ground, soil on the roofs of basements, garages, with a layer of soil greater than 80 cm  |
| 6        | Soil surface that allows for plant growth, with contact with ground            | Surfaces with access to the ground   |
| 7        | Stormwater drainage into the soil, calculated per m <sup>2</sup> of the ground | Stormwater drainage into the vegetative layer that allows for absorption   |
| 8        | Vertical gardens with a height of up to 10 m                                   | Green walls on external building walls without windows and on freestanding walls, maximum height of 10 m   |
| 9        | Green roofs  | Extensive green roofs with a thin vegetative layer, intended for the planning of stonecrops, bryophytes and grasses. Such roofs do not require elaborate maintenance. Intensive green roofs, with a thicker vegetative layer that provide significant potential for garden arrangement: e.g. perennials, grasses, shrubs and small trees. Intensive green roofs require significant maintenance. |

Source: by authors.

Fig. 9. Types of surfaces accounted for in Biotopflächenfaktor BFF calculations used in Berlin's landscape plans; by the authors.

Ryc. 9. Rodzaje powierzchni uwzględnionych w obliczeniach Biotopflächenfaktor BFF użyte w planach krajobrazowych Berlina; oprac. autorki.

clude not only classical parks or public gardens, but also green roofs, walls and any patch of greenery, and their design in a compact urban structure under conservation is a serious challenge. However, despite strict greenery preservation guidelines, legal regulations permit alterations that increase the amount of greenery and permeable surfaces. Despite these favorable provisions, this study proves that the Old Town's amount of green areas is being reduced (Fig. 6). This means that alterations in blocks should be monitored and inspired by good examples of increasing the amount of greenery and permeable surfaces (Fig. 7, 8).

Berlin is one such example. Its urban structure is different than Cracow's, but effective planning efforts to increase the amount of greenery in a densely developed city are a positive indication. Berlin has landscape plans in force, and some of them feature biologically active area ratios (Biotopflächenfaktor – BFF). This indicator is a numerical parameter that describes the share of an area that ensures natural vegetation in various types of development (Fig. 9). It defines the size of land covered by foliage that serve as a place of cultivating plants and fulfil environmental functions such as evaporation, absorption, filtering, rainwater drainage. Landscape plan guidelines with BFF indicators concern the replacement of paved surfaces with permeable ones, including greenery. However, alterations include site-dependent measures. Alterations include: introducing greenery (tall, low, vertical) into

courtyards, frontal gardens, roofs, facades, firewalls and fences. Changes in land surface area also applied when siting car parks and paved surfaces in parks, yards, and courtyards.<sup>29</sup>

### Summary and conclusions

Climate change affects every city, including heritage sites and zones where potential for action is limited, but the authors believe that they do not endanger their historical value. The City of Cracow 2030 Climate Change Adaptation Plan<sup>30</sup> points to climate threats in the Old Town areas as being: heat waves, torrential rains, floods, and air pollution concentrations. Remedial actions listed include increasing the amount of green areas and increasing paved surface permeability.

The objective outlined in the introduction, namely identifying the greenery asset pool in the Old Town, the degree of its transformation and the potential of its increase, was achieved. The Catalog was used as a reference point for illustrating changes in the area's structure. Data on the contemporaneous state of greenery (area and type) acted as comparative material. The Catalog lists 187 various types of green areas and Planty Park and Wawel Hill, which results in 189 items in total. Our analysis covered 39 additional gardens, which brought this number up to 228. Despite the increase in the number of units, a decrease in green area to 18 thousand m<sup>2</sup>/1.8 ha was observed (Fig. 5). It should be



noted that this value can have a margin of error due to the precision of numerical data used in both analyses.<sup>31</sup>

The findings of the analyses presented led to the following conclusions:

1. A significant loss of greenery was observed in the area under study, especially in yards and courtyards, with a visible tendency to increase the share of greenery in public spaces (e.g., Św. Ducha Square, Szczepański Square).
2. Local spatial development plan provisions were found to be insufficient to protect block gardens against alterations based on a reduction in biologically active surface amount.
3. There is a need for a greater and more comprehensive monitoring of alterations in terms of plot development within the jurisdiction of the voivodeship conservation officer.
4. Every block of the Old Town requires dedicated analysis to determine the potential to increase the amount of green and permeable areas with indications of specific solutions and their technical specifications.
5. There is a need to develop solutions to increase the amount of green areas and surfaces with varying degrees of permeability.
6. It is necessary to compile a design solutions catalog in the field of greenery: ground floors, surfaces, greenery on fire walls, walls, fences, roofs, facades, as well as changes that could be used in specific cases (e.g. climbers on racks, trellises, rain gardens).
7. Adapting cities to climate change should also cover listed heritage areas with adaptations of proposed action to their specificity and cultural values.

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- <sup>1</sup> B. Luchter tied functional change with metropolization processes, such as: an increase in areas for the highest-order service development and a decline in areas for basic uses; B. Luchter, *Przemiany użytkowania ziemi w centralnej części Krakowa – byłej dzielnicy katastralnej Śródmieście w latach 1992–2012*, “Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie” 2014, 6 nr (930), p. 146.
- <sup>2</sup> Uchwała Rady Naukowej Instytutu Ochrony Przyrody PAN na temat zieleni miejskiej Krakowa, <https://naukadlaprzyrody.pl/2020/12/12/uchwala-rady-naukowej-iop-pan-na-temat-zieleni-miejskiej-krakowa/> (accessed: 9 VI 2021).
- <sup>3</sup> *Nature-Based Solutions to Climate Change Adaptation in Urban Areas. Theory and Practice of Urban Sustainability Transitions*, ed. N. Kabisch et al., Cham 2017.
- <sup>4</sup> Uchwała Nr CXV/1547/10 Rady Miasta Krakowa z 3 XI 2010 w sprawie utworzenia parku kulturowego pod nazwą Park Kulturowy Stare Miasto.
- <sup>5</sup> *Parki i ogrody Krakowa w obrębie Plant z Plantami i Wawelem. Katalog parków i ogrodów w Polsce*, vol. 1, ed. J. Bogdanowski, Warszawa 1997.
- <sup>6</sup> The survey for the Catalog was ended in 1994.
- <sup>7</sup> Examples include *Kraków. Studia nad rozwojem miasta*, ed. J. Dąbrowski, Kraków 1957; M. Borowiejska-Birkenmajerowa, *Kształt średniowiecznego Krakowa*, Kraków 1975; B. Krasnowolski, *Lokacyjne układy urbanistyczne na obszarze ziemi krakowskiej w XIII i XIV wieku*, cz. 1, cz. 2, Kraków 2004, the state of the art was comprehensively discussed here; idem, *Lokacje i rozwój Krakowa, Kazimierza i Okołu. Problematyka rozwiązań urbanistycznych*, [in:] *Kraków. Nowe studia nad rozwojem miasta*, ed. J. Wyrozumski, Kraków 2007, p. 357–426.
- <sup>8</sup> A record is a simplified historical and compositional study of a historical garden with conclusions and conservation guidelines.
- <sup>9</sup> M. Borowiejska-Birkenmajerowa, op. cit.; B. Krasnowolski, op. cit.; M. Motak, *Historia rozwoju urbanistycznego Krakowa w zarysie: podręcznik dla studentów szkół wyższych*, Kraków 2019.
- <sup>10</sup> M. Łukacz, *Średniowieczne domy lokacyjnego Krakowa*, “Czasopismo Techniczne” 2011, No. 7–A, p. 67–98.
- <sup>11</sup> Ibidem; M. Motak, op. cit.
- <sup>12</sup> M. Łukacz, op. cit.; *Parki i ogrody*, op. cit.
- <sup>13</sup> Bogdanowski wrote of “single-tree gardens” acknowledged as having a thoughtful composition; cf. J. Bogdanowski, “Karty katalogowe ogrodów”, Kraków 1975–1978, Archives of the WMKZ; *Parki i ogrody*, 1997, op. cit.
- <sup>14</sup> *Parki i ogrody*, op. cit., p. 25–26.
- <sup>15</sup> J. Bogdanowski, “Ogrody śródblokowe Krakowa. Klasyfikacja i optymalizacja użytkowania”, Biuro Rozbudowy Krakowa 1979, Archives of the WMKZ; idem, *Problemy urbanistycznej rewaloryzacji zabudowy mieszkaniowej z przełomu XIX i XX w. na przykładzie Krakowa*, “Ochrona Zabytków” 1980, vol. 33, No. 2, p. 104–115; idem, *Przedmowa redakcyjna*, [w:] *Parki i ogrody*, op. cit., p. 25–34.
- <sup>16</sup> *Parki i ogrody*, op. cit.
- <sup>17</sup> These include monastic complexes of: the Order of St. Dominic, the Order of St. Francis, the Poor Clares, the Bernardine Sisters, the Presentation Sisters, the Canonesses of the Holy Spirit.
- <sup>18</sup> A. Zachariasz, *Zielony Kraków: dla przyjemności i pożytku Szanownej Publiczności*, Kraków 2019, p. 172–197.
- <sup>19</sup> Sites that represented a given function either entirely or in 75% were included. Those associated with accommodations and banks were acknowledged as an essential and formal element of the area’s landscape. Administrative and healthcare buildings are essential urban functions, hence the decision to list them.
- <sup>20</sup> Old Town district population: 2005 – 47319, 2010 – 44060, 2015 – 40622, 2019 – 30609; see: *Kraków w liczbach*, <https://www.bip.krakow.pl/?m-mi=6353> (accessed: 20 VI 2021).
- <sup>21</sup> M. Kursa, *Czy papież Franciszek pomoże w otwarciu klasztornych ogrodów w centrum Krakowa?*, “Gazeta Wyborcza”, 11 III 2021.
- <sup>22</sup> Since the Catalog’s publication in 1997.
- <sup>23</sup> “For almost thirty years (1983–2012) the share of major use categories has been similar (e.g. in 1983 the share of technical uses was 71.85%, in 1992 – 72.7%, in 2012 – 72.6%, and green uses amounted to 28.15%, 27.2% and 27.3%”; B. Luchter, op. cit., p. 139.
- <sup>24</sup> A. Zachariasz, op. cit., p. 28.
- <sup>25</sup> Uchwała Nr XII/131/11 Rady Miasta Krakowa 13 IV 2011 w sprawie uchwalenia miejscowego planu zagospodarowania przestrzennego obszaru “Stare Miasto”.
- <sup>26</sup> Ibidem.
- <sup>27</sup> Uchwała Nr CXV/1547/10 Rady Miasta Krakowa z 3 XI 2010 w sprawie utworzenia parku kulturowego pod nazwą “Park Kulturowy Stare Miasto”.
- <sup>28</sup> Uchwała Nr XLII/544/12 Rady Miasta Krakowa z 4 IV 2012 w sprawie zatwierdzenia “Planu ochrony Parku Kulturowego Stare Miasto w Krakowie”.
- <sup>29</sup> *Der Biotopflächenfaktor als ökologischer Kennwert Grundlagen zur Ermittlung und Zielgrößenbestimmung Auszug, Landschaft Planen §Bauen*, Berlin 1990; L. Kochel, *Kształtowanie krajobrazu w opracowaniach planistycznych na przykładzie Berlina*, doctoral dissertation prepared at the Cracow University of Technology, 2019.
- <sup>30</sup> Plan adaptacji miasta Krakowa do zmian klimatu do roku 2030 (MPA), [https://www.bip.krakow.pl/?dok\\_id=114317](https://www.bip.krakow.pl/?dok_id=114317) (accessed: 9 VI 2021).
- <sup>31</sup> One case for doubt is the amount of greenery at the Main Market Square, listed as 20 a, which disagrees with the sizes shown on the plan of this space.

## Abstract

Urban greenery is not limited to parks and public gardens, but also singular trees, green roofs, walls that beneficially affect the city's natural environment and minimize climate change consequences. This paper discusses the green areas of Cracow's Old Town, an area of medieval origin, compact urban form, surrounded by a park (Planty) established at the site of demolished fortifications. It depicts the structure of the development of its town blocks while accounting for the presence of greenery. Comparative studies were performed based on data included in a catalog of gardens from central Cracow from 1997, developed by a team led by Janusz Bogdanowski, compared with the present-day state. The study assessed changes in the structure, use and accessibility of greenery, while accounting for applicable planning provisions and potential for alterations. The asset pool of biologically active areas was identified and the varieties and types of greenery present in the area were presented, which enabled the demonstration of the extent of its transformation and the potential for its expansion.

## Streszczenie

Zieleń miejska to obecnie nie tylko parki i skwery, lecz także pojedyncze drzewa, zielone dachy, ściany, które korzystnie wpływają na środowisko przyrodnicze miasta i minimalizują skutki zmian klimatycznych. W artykule rozważano tereny zieleni Starego Miasta w Krakowie, obszaru o średniowiecznym rodowodzie, zwartej formie urbanistycznej, okolone parkiem (Planty) założonym w miejscu wyburzonych fortyfikacji. Pokazano strukturę kształtowania bloków urbanistycznych z uwzględnieniem obecności zieleni. Studia porównawcze przeprowadzono na podstawie danych zawartych w katalogu ogrodów centrum Krakowa z roku 1997, opracowanym przez zespół pod kierunkiem Janusza Bogdanowskiego, zestawionych ze stanem współczesnym. Oceniono zmiany zachodzące w strukturze i użytkowaniu zieleni oraz dostępności do niej, uwzględniono aktualne zapisy planistyczne oraz możliwość potencjalnych przekształceń. Określono zasób terenów biologicznie czynnych, ukazano rodzaje i typy zieleni występującej na badanym obszarze, co pozwoliło zobrazować stopień jego przekształceń i możliwości jego powiększenia.

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## Visual Analysis as an Element of the Cultural Park Protection Plan: Evolution and Development of the Method on the Example of Several Districts in Cracow

### Analiza widokowa jako element planu ochrony parku kulturowego. Ewolucja i rozwój metody na przykładzie dzielnic Krakowa

**Keywords:** city landscape, visual values, protection of the urban layout

**Słowa kluczowe:** krajobraz miasta, walory widokowe, ochrona układu urbanistycznego

#### Introduction

The Cracow School of Landscape Architecture (KSAK) has developed its original methods for studying the landscape of urban layouts. They are based on the foundations of the analysis of architectural form and its exposition. They are developed and improved both by scientists of the Cracow University of Technology and representatives of other centers.<sup>1</sup> They stem from a comprehensive method by Professor Bogdanowski which is formed on a holistic approach to landscape issues. This approach has become a starting point for works related to protection of cultural city landscape and open landscape. One of the effects of actions in this respect is a form of protection of cultural landscape in the form of a cultural park.<sup>2</sup> It presents an integrated approach to the protection of urban space. The cultural park has become the basis for planning in the spirit of sustainable development while taking into account cultural, natural, and visual resources.<sup>3</sup>

The source of this approach can be found in the European Landscape Convention. In its definition, the perceptive aspect is emphasized because it has become

equivalent to natural and cultural resources. In this way the issue of perception has been confirmed and gained its rightful place in the process of landscape resource management. The vista as a common good requires adequate methods of studying, identification, characterization, assessment and, as a result, creating guidelines for preservation, protection and creation without any losses.<sup>4</sup> The issues of studying city views and vistas have a very rich history.<sup>5</sup> Their specific development can be observed in the post-war years when new methods in planning developed and were implemented in cities in the rebuilding process.<sup>6</sup> This trend continued in planning over the subsequent decades.<sup>7</sup>

It was at that time that Professor Bogdanowski worked on the concept entitled JARK-WAK that emphasized the landscape values of the city. The concept is still being developed and continued. Moreover, it is applied in planning and expert analyses regarding landscapes undergoing transformation. Studies and projects concerning fortress landscapes, calvary landscapes, complex engineering projects,<sup>8</sup> or historic city centers are also worth mentioning. Another important trend comprises the methods developed within the

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framework of visual analyses prepared for the evaluation of visual and landscape impact. They stem from studies of impact of new projects on existing landscape conditions. This method finds confirmation in numerous visual studies of landscape.<sup>9</sup>

J. Palmer presented an extensive overview of implemented methods while stressing versatility and a wide range of applications. At the same time, the authors of the GLVIA (Guidelines for Landscape and Visual Impact Assessment) guidelines for defining the visual impact on landscape stress its valuable contribution to the study of urban space while articulating the need for developing its application and new studies to integrate existing achievements in this field.<sup>10</sup> The presented method used in the analysis of visual values of cultural parks integrates both trends. It combines the issues related to assessment of cultural landscape specific to the Cracow School of Landscape Architecture and the studies of spatial dependencies conducted with the use of contemporary methods in the field of visual impact assessment. Integrating methods is especially valuable in historic urban spaces where the issue of protection and development constitutes a major problem in planning central spaces. This paper presents the process of the evolution of the research method which took place while studying three urban structures. The analysis of these three different city districts led to an adjustment of the methods' tools and structures to the properties of the analyzed areas. Additionally, over the decade that passed between the first and last protection plan, additional scientific tools have been developed. This was also reflected in the method's evolution. This presents its versatility and flexibility. On the one hand, it is qualified as a proper scientific tool for diversified urban spaces, while on the other, it allows for making use of emerging scientific techniques and applying them already at the analysis stage. This leads to a situation in which the presented method demonstrates the possibility of wide application in the study of historic urban structures which remains particularly important when faced with urban densification and increasing threats to visual integrity of historic urban structures.<sup>11</sup>

### Materials and method

In Cracow, there are three areas with the status of a Cultural Park. These include the Old Town, Nowa Huta as well as Kazimierz with Stradom. Two of them encompass spatial arrangements dating back to medieval times with a differently preserved urban layout. The third plan concerned a city built from scratch on farm land in the mid-twentieth century. The areas in question are urban structures of recognized value placed under forms of statutory conservation, such as: an entry on the UNESCO list (the Old Town), strict conservation zone (the Old Town, Nowa Huta, Stradom and Kazimierz), historical monument status (the Old Town, Kazimierz and Stradom) (Fig. 1). All the analyzed areas are mostly located on almost flat ter-

rain with insignificant differences in landform. Wawel Hill with the Wawel Castle showed distinctive features within the Old Town, while in Nowa Huta it was the Vistula River embankment with a number of buildings on its side. As a result, the city blocks constituting a homogeneous structure in height formed a compact system with tight walls limiting any external access. Objects distinguished by height proved a decisive factor for the visible shape of these structures, which created independent visual connections and determined the appearance of the composition features in the form of depth, borrowed or multi-plane views. Thus, they would determine the picturesque and attractive landscape of the city.<sup>12</sup>

For the purposes of the Cultural Park Protection Plan for all three areas, an analysis of the visual values was made as an element of the Cultural Park Protection Plan. It was one of the components of the protection plan developed in a multidisciplinary team. Work on the area of the Old Town was the first visual analysis during which frameworks of the method were formed.<sup>13</sup> The structure of the protection plan was based on a division into architectural and landscape interiors in accordance with the JARK-WAK method. The visual analysis was based on the division into interiors done on the basis of historical and contemporary determinants. Historical studies of landscape transformations conducted on the basis of historical iconography were an important element of the analysis. Then, in accordance with the method of architecture and landscape interiors, an analysis of resources was conducted together with interior characteristics in terms of active and passive exposition. The key issue here is both that of views within the studied area and the outside views of the Old Town panorama with identification of major points of outside views of Cracow panorama. Afterwards, a valorization of active and passive exposition was performed, which led to formulating guidelines referring to particular interior groups.

The area of Nowa Huta presented a different challenge. This space was built in the mid-twentieth century based on the idea of a "neighborhood unit." It was deprived of planned landmarks and formal buildings and demonstrated completely different compositional features. Because of neglect and a lack of care in the last quarter-century, it required the method to be expanded to account for analyzing view clutter, and the limitation and deformation resulting from uncontrolled development of greenery and accumulation of elements that degrade space. The area of Kazimierz and Stradom, as a layered and extremely varied form, has somehow combined the characteristic features of the Old Town and Nowa Huta. In this case, the method evolved in terms of the analysis of visual impact of the landmarks as well as temporary form layers and structures that influence the visual shape of the area. In the case of Stradom and Kazimierz, the latest tools in the form of the method of a multipoint analysis included in the method of analyzing the visibility degree were applied.

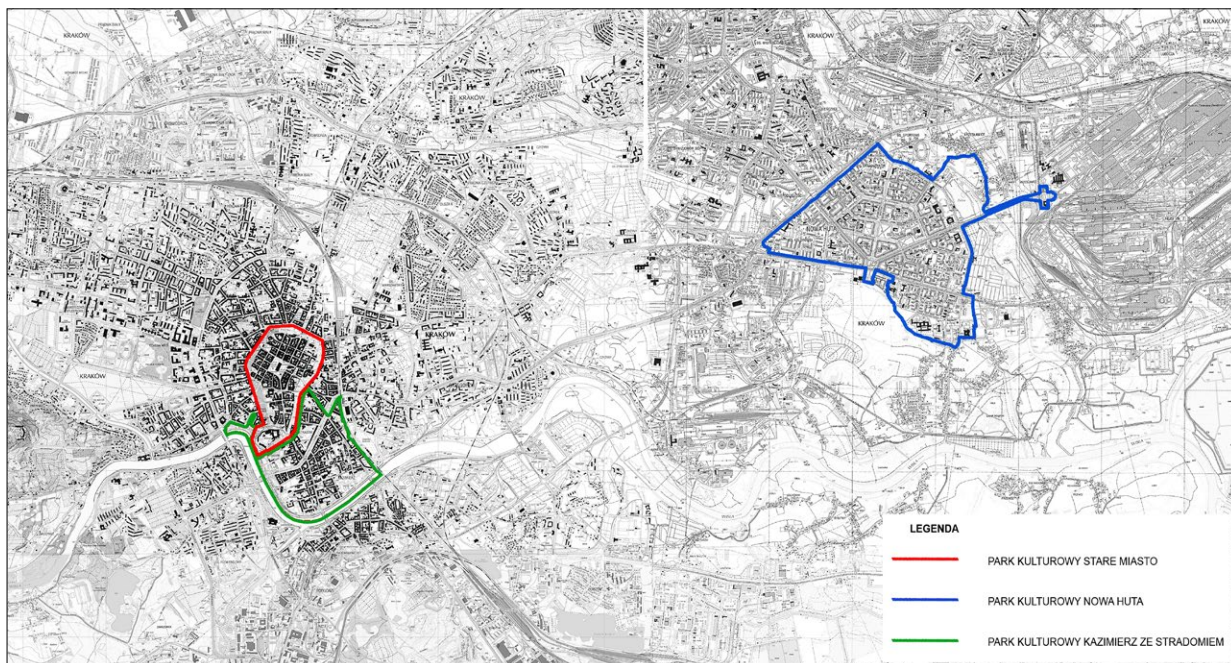


Fig. 1. Location of three cultural park areas in Cracow: the Old Town cultural park, Nowa Huta cultural park, Kazimierz and Stradom cultural park; by P. Koppel.

Ryc. 1. Lokalizacja trzech obszarów parków kulturowych w Krakowie: Park Kulturowy Stare Miasto, Park Kulturowy Nowa Huta, Park Kulturowy Kazimierz ze Stradomiem; oprac. P. Koppel.

## Results

Work on visual analyses of three selected examples was stretched in time and concerned different spatial structures. This led to the development of the analysis method and constituted its validation. The results of the method's development were presented for two fundamental parts of the analysis, i.e., studying visual resources as well as the stage of landscape characteristics in the form of active and passive exposition.

Preparatory work involved desk and field research in accordance with the adopted method. The desk research included an analysis of historical materials, a preliminary division into architectural and landscape interiors as well as digital analyses of spatial models (Fig. 2).

Because of the development of digital research tools, the visibility analysis underwent significant evolution. In each case, both digital terrain model (DTM) as well as digital terrain surface model (DTSM) were used. In the case of the Old Town, digital data in the form of a spatial model was used to obtain elevation and surface data and to prepare comparative visualizations. In case of Nowa Huta, both DTM and DTSM were prepared on the basis of laser scanning. For the purpose of detailed analyses selected sections of areas were refined and detailed. On the basis of the model a simulation was made of spatial impact of non-existent yet planned Nowa Huta landmarks in the form of a visual range of a planned town hall and an obelisk at Centralny Square in various height variants (Fig. 3). The detailed model



Fig. 2. Division into architecture and landscape interiors of three cultural parks; by P. Koppel.

Ryc. 2. Podział na wnętrza architektoniczne i krajobrazowe w trzech parkach kulturowych; oprac. P. Koppel.



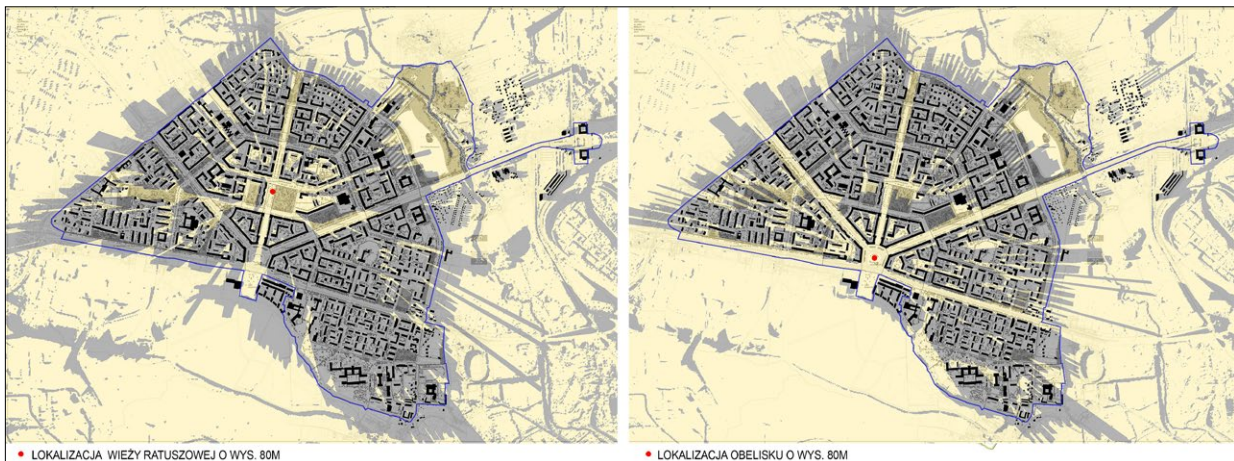


Fig. 3. Visibility ranges of the planned town hall tower and the obelisk in Nowa Huta, visual analyses conducted on the basis of digital terrain model; by the authors.

Ryc. 3. Zakresy widoczności projektowanej wieży ratuszowej i obelisku w Nowej Hucie, analizy widokowe przeprowadzone na podstawie cyfrowego modelu terenu; oprac. autorki.

proved to be extremely useful for defining the range of deformed interiors of developed quarters. On the basis of the model, a potential for correcting tree density was presented. It was aimed at preserving the character of the place while making the urban structure more legible. Furthermore, the model was also used for demonstrating the scope of visibility corrections in order to display crucial compositional elements as it was in case of the only visually closed axis of Solidarności Avenue. What is more, the model was used to simulate future preservation activity with regards to Centralny Square.

In the case of Stradom and Kazimierz, terrain models have additionally become the basis for the analysis of active exposition. As a result of the development of the method's visibility analysis capabilities, it was equipped with a crucial tool for the precise examination of visibility degrees based on multipoint analysis. At the desk research stage, the method of analyzing visibility degree from 2018 was used.<sup>14</sup> On its basis the manner of evaluating the elements of active exposition was improved. It allowed, among others, to precisely identify the areas with the highest number of visible landmarks, which, in turn, became an important and measurable indication for locating key points of active exposition. Moreover, the landmark visibility degree map constituted the basis of numerous decisions at the stage of valuating active and passive exposition.

In each analyzed case, field work included data verification and landscape survey. Identification of historical photography took place and contemporary documentation to compare then with the current state. The development of the methods at the analytical stage proved to be extremely useful for field work. On the basis of a digital analysis of visibility ranges, a photographic survey of views was performed in areas where visibility ranges overlapped. This allowed for documenting and verifying the results. It also facilitated the hierarchization of the views in the field. In all of these cases this stage of research represented a similar

approach yet a slightly different scope. The method's evolution in initial data preparation made it possible to better predict which areas would require a deeper analysis. It constituted the answer to the different spatial character of particular structures. Their preliminary characterization in virtual space and preparing auxiliary materials facilitated and made work in the field more effective. Therefore, in case of the Old Town visual relationships between Planty Park and the buildings were enhanced while in case of Nowa Huta it was necessary to analyze visual relations for potential landmarks and detailed greenery analyses in developed quarters. At the same time, in the case of Stradom, they were studies of visual ranges of landmarks within the studied area as well as in the neighboring areas.

### Active exposition

Based on the division into interiors as well as desk and field research, a characteristic of visual resources of individual interiors was prepared. It was based on a division into active and passive exposition as applied by the KSAK.<sup>15</sup> Active exposition is defined by the act of landscape observation while passive exposition is defined by landscape views in the form of views and panoramas. This distinction allows for separating functional dependencies of exposition from seen landscapes. Elements of active exposition consist of points, series, visual surfaces and visual axes (Fig. 4). Elements of passive exposition consist view components, such as: dominant elements (landmarks), subdominant elements, accents, the foreground and the background. The specifics of active exposition stemmed from the location of the point, series and visual surface. It was connected to the way of its management. Passive exposition is a view, a panorama is in image whose disclosure depends on spatial structure and the substance it is built from. Both exposition categories were closely interrelated and interdependent; yet, their specifics de-

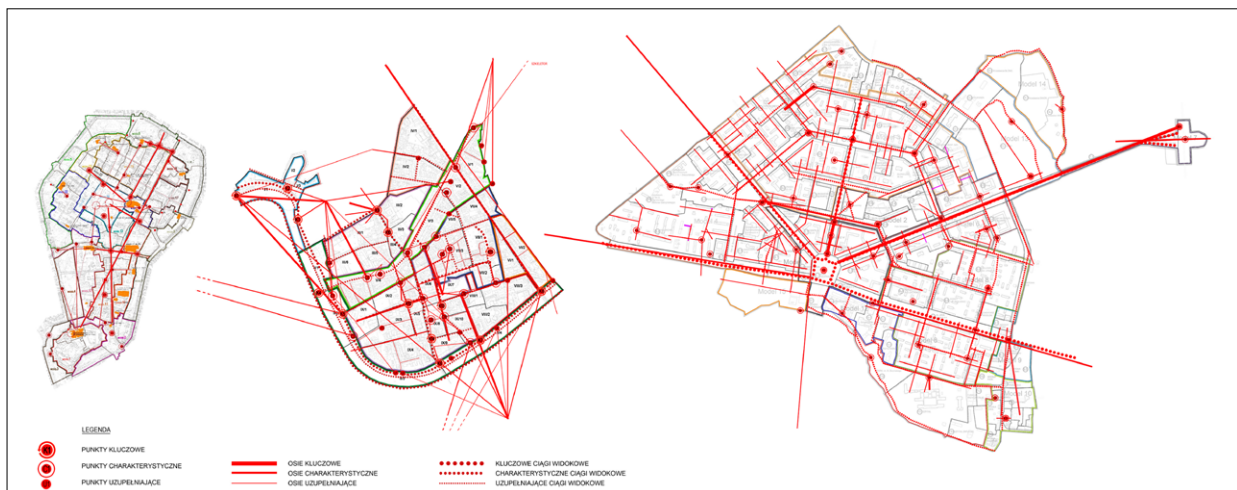


Fig. 4. Comparison of the map of active exposition of the analyzed cultural parks; by the authors.  
Ryc. 4. Porównanie map ekspozycji aktywnej analizowanych parków kulturowych; oprac. autorki.

terminated a different approach and a different impact on design decisions.

In case of the Old Town cultural park identification of elements of active exposition was conducted on the basis of studies on historical iconography and work in the field supported by a digital model. Distinctness of the structure and its visual isolation from the surroundings allowed for locating and characterizing elements of active exposition. The Old Town protection plan by CUT includes a matrix for categorizing elements of active exposition. It distinguishes key, characteristic and supplementary elements. The selection of key points in urban space identifies the main critical points to become the basis for monitoring at a later stage.

In case of Nowa Huta there are no dominants but a clear predominance of views on a micro-landscape scale. The above created the character of particular visibility studies in individual quarters as well as a detailed analysis of Solidarności Avenue. In this case an analysis of visibility degree was used. It is conducted on the basis of the digital terrain surface model (DTSM). These analyses helped to define current visual relations on a micro and macro landscape scale. Moreover, possible visual ranges were studied and they concerned potential yet never realized spatial forms which then were compared to the existing situation. Digital analyses were also used for developing conduct models for correcting excessive greenery in order to uncover elements of the urban layout. Those were conducted for selected quarters as well as Centralny Square.

In case of the diversified structure of Stradom and Kazimierz the studies of active exposition were supported with detailed visibility analyses of numerous dominants. In order to indicate their actual role in the district space we applied the exposition degree index which has become an important element supporting the location of viewpoints. A view analysis from the highest and most attractive objects of the urban layout

helped to locate the sites from which they were viewed either individually or collectively. This constituted auxiliary material verified in the field, to define elements of active exposition. The original method to determine visibility degree from 2018 was applied in this case.<sup>16</sup> It supports the location of key points by indicating places of concentration of exposition of dominants and sub-dominants.

The case studies have led to substantive and methodological conclusions. In terms of substance, the comparison of spaces of different nature and origin indicated that it is vertical differentiation of elements as well as presence of surfaces as visual foregrounds that create distinctiveness and a range of active exposition. Both in the Old Town and Kazimierz and Stradom the main elements that enriched the space and determined its multi-planned nature and wealth in borrowed views were landmarks and subdominant elements. Nowa Huta, while deprived of planned yet unbuilt landmarks, has become a labyrinth of corridors with almost no multi-planning, borrowed views or vertical views. The dominant expositions in the micro and meso scales are narrowed down to single-plane views limited by developed quarters. The main visual axes indicated street frontages and avenue canyons. Solidarności Avenue has taken on a special significance against this background. It was terminated by the Administrative Centre and the issue of greenery maintenance in order to recreate visual connections in the interior scale. Due to the vicinity of an extensive viewing area in Nowa Huta in the form of the Nowa Huta Meadows, and in the case of Stradom and Kazimierz, the vicinity of the Vistula riverbed, the border areas adjacent to these areas gained scenic views of high compositional value.

The presented features of comparative areas clearly demonstrated graphical combinations in the form of maps, in particular diagrams of visual axes. In this respect, the applied method of hierarchization of ele-





Fig. 5. Comparison of the exposition evaluation maps of the analyzed cultural parks; by the authors.  
Ryc. 5. Porównanie map oceny ekspozycji analizowanych parków kulturowych; oprac. autorki.

ments of active exposition while expanded with additional analyses resulting from the place specifics, has become an appropriate tool for studying the spatial character of this urban structure.

### Passive exposition

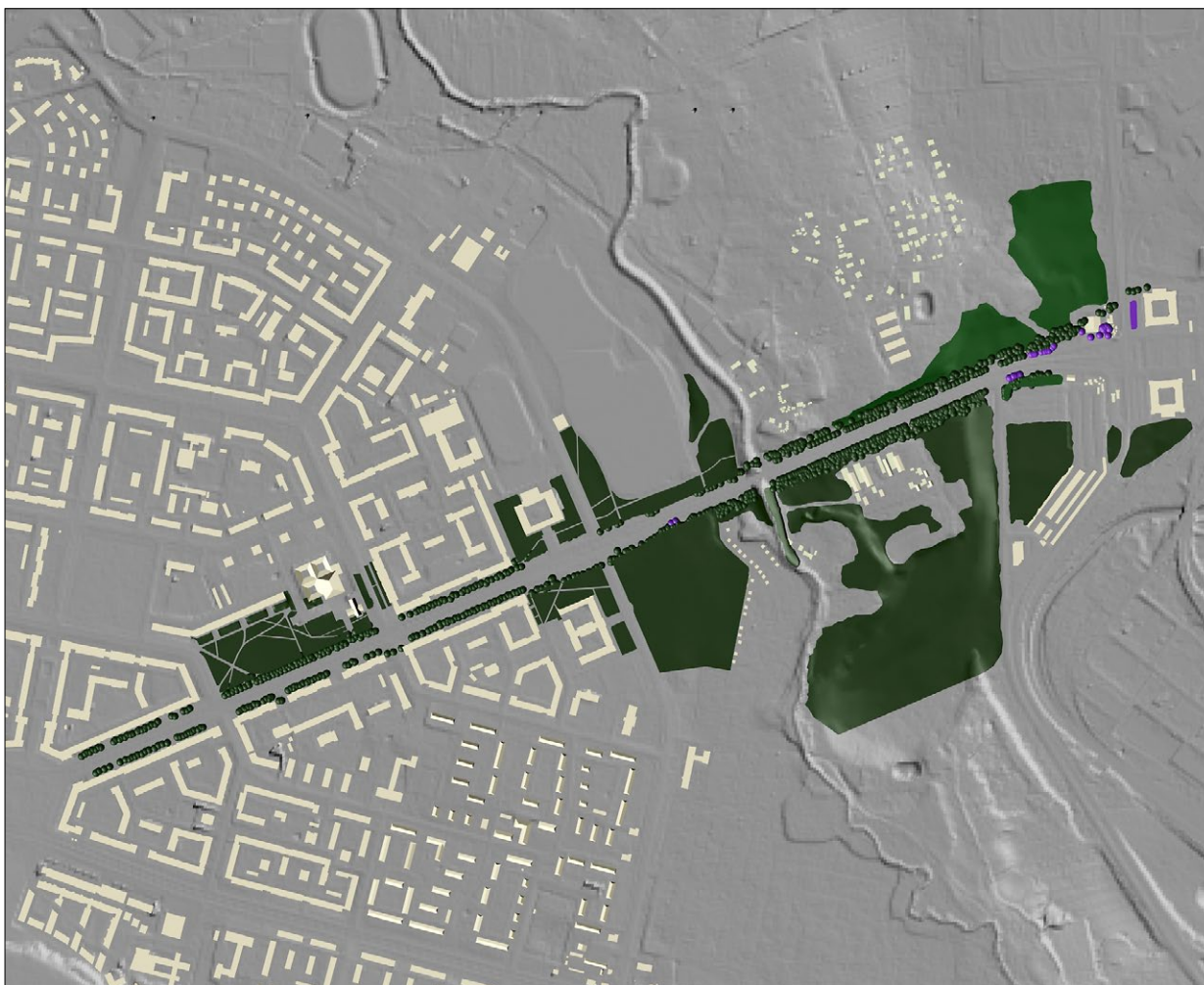
The character of passive exposition was shaped by two factors, namely: the quality of substance that created the space as well as the composition created by the mutual arrangement of individual elements. The quality of substance was defined on the basis of work conducted by a team of historians. Each interior gained historical value. Historical substance evaluation was based on the following criteria: conservation status, layout clarity and system homogeneity. The second factor that determined the perception of spatial structure are its compositional features. This issue was most clearly visible in case of the Kazimierz and Stradom Cultural Park. The compositional features of the view were characterized and their occurrence was determined. The following features were distinguished: depth of view, distance, width, multi-layeredness, borrowed views. It took the form of an expressive formula with specific criteria for assessing the compositional structure of the system.<sup>17</sup> In this particular case, the evolution of the method here has led to defining the main criteria and their clear separation.

Supplementary materials took on the form of panoramas where the presence of characteristic features for the composition was demonstrated. The issue of view clutter evolved in the analyzed cases. Comparing the cases showed a different approach resulting from differences in maintenance and care for each space. In the case of a space that is neat and regularly cleaned, as in that of the Old Town, this criterion was included in the general analysis of passive exposition. In the case of Nowa Huta, this phenomenon was given a different form: that of the degree of visual clutter, assessed in

accordance with two criteria: clutter caused by natural, and cultural elements. In the case of Stradom and Kazimierz, the space that included areas of considerable neglect and showed an accumulation of intense use this issue developed even further. The degree of visual clutter was singled out from the issues of passive exposition. It took the form of the degree of visual clutter.

Project overlay, a lack of renovation and ongoing cleanup activity in relation to transport, advertising and the information space introduced a superficial disorder into the urban space, separate from the quality of the urban substance. Determining the degree of clutter and its identification constituted a source of significant data for defining further action aimed at improving the visual values of the analyzed area. Among the elements that determine visual clutter degree, the following were distinguished: chaotic street furniture, neglected greenery, the presence of advertisements, an excess of road signs and the haphazard siting of parking places. The degree of clutter was divided into three values: high, medium and low.

The analysis of the criteria adopted for active and passive exposition formed the basis for formulating assessments for the studied areas. In case of the Old Town and Nowa Huta, they took a tabular and graphic form (Fig. 5). Maps of valorization of active and passive exposition and maps of collective assessment were prepared. On their basis, exposition protection zones have been distinguished. In case of Stradom and Kazimierz, these maps were additionally overlaid with data related to the visual clutter. This summary allowed for zoning of the analyzed area. The areas with the highest visual values were indicated, as well as areas requiring intervention due to the degree of visual clutter, which has a degrading effect on the valuable historical substance. The combination of the zone of special exposition value and the zone of particular visual clutter made it possible, in turn, to identify areas for immediate cleaning interventions.



*Fig. 6. Visual analysis application allows to distinguish individual features of the views of individual spaces. Solidarności Avenue, the trees indicated by color have been selected for correction in order to restore the axial view of the Administrative Centre; by P. Koppel.*

Ryc. 6. Zastosowanie analizy widokowej pozwala zidentyfikować indywidualne cechy widoków poszczególnych przestrzeni: al. Solidarności – oznaczone kolorem drzewa zostały wybrane do korekty, aby przywrócić osiowy widok Centrum Administracyjnego; oprac. P. Koppel.

## Conclusions

The examples of the visual analysis presented above were prepared for the purposes of drafting the cultural park protection plan. They indicate the evolution of the method of analysis stemming from the features of the analyzed areas as well as the development of scientific tools. The developed method takes into account the essential elements of the procedure and makes it possible to adapt detailed studies to the specificity of the analyzed area. Its application allows to distinguish individual features of the views of individual spaces: features that are essential to its further shaping and management in the spirit of sustainable development aimed at preserving the most valuable visual resources for protection of the diversity of cultural heritage and landscape (Fig. 6). The visual analysis in this approach, based on the achievements of the Cracow School of Landscape Architecture and contemporary methods developed

as a part of visual impact assessment, allowed for the gradual adaptation of tools to the needs of the analysis. Basing it on a common methodological core allowed for some flexibility necessary to study spaces with differing specificities in order to emphasize their distinctive features which constitute the formal identity of the urban landscape and its originality. The cases mentioned above confirmed the effectiveness of the application of the study sequence according to the adopted order: resource identification and characterization, and assessment, which made it possible to formulate local guidelines. At the same time, they indicated the significance and merit of conducting visual analyses as a tool supporting design decisions in protection plans (Fig. 7). The evolution of the method indicates its universality and usefulness in the field of analyzing various urban spaces. The adopted formula allows for further verification and development of the method as a result of using spaces with distinctive features for research.



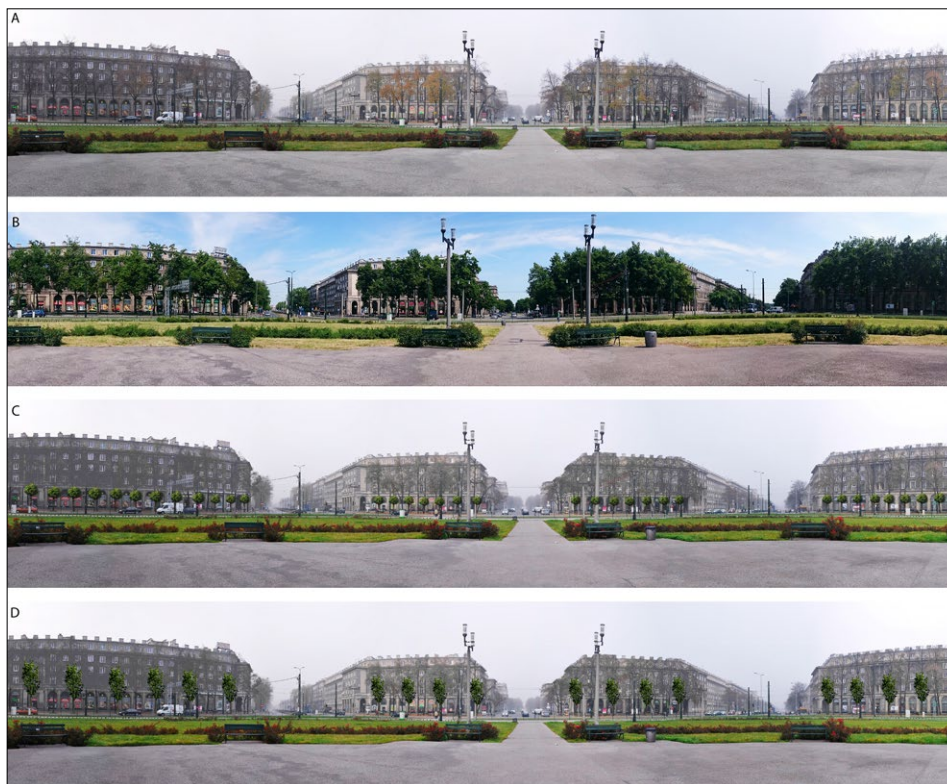


Fig. 7. Visual analyses as a tool supporting design decisions, four views of Centralny Square; in descending order: a—leafless state, b—full foliage state, c—introducing small spherical trees – visualization, d—introducing smaller oval trees – visualization; by the authors.  
Ryc. 7. Analizy widokowe jako narzędzie wspomagające decyzje projektowe: cztery widoki Placu Centralnego, od góry do dołu: a – stan bez liści, b – stan z pełną roślinnością, c – wprowadzenie małych drzew sferycznych – wizualizacja, d – wprowadzenie mniejszych drzew owalnych – wizualizacja; oprac. autorki.

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## Abstract

This article presents the evolution of the visual analysis method used in the design of cultural park protection plans. Using three cases as examples, the specifics of visual studies of urban layouts, which is one of the elements of a multidisciplinary protection plan, were presented. This method is based on the experience of the Cracow School of Landscape Architecture and on global advancements in the field of landscape analysis. While it was developed during research and verified on the basis of implementation works, it was used in an integrated approach to assist in the conservation of valuable urban layouts. On the basis of studies prepared for three cultural parks, selected elements of the analysis and their usefulness for further stages in the form of valorization and guidelines prepared for the protection plan were analyzed. The method of visual analysis developed as a result of the evolution presented can be used in planning works concerning valuable spatial systems.

## Streszczenie

Artykuł przedstawia ewolucję metody analizy widokowej stosowanej w projektach planów ochrony parków kulturowych. Na podstawie trzech przykładów zaprezentowano specyfikę badań widokowych układów urbanistycznych, stanowiącą jeden z elementów multidyscyplinarnego planu ochrony. Metoda ta opiera się na doświadczeniach Krakowskiej Szkoły Architektury Krajobrazu oraz na światowych dokonaniach w zakresie analiz widokowych. Wypracowana i rozwijana w trakcie badań oraz weryfikowana na podstawie prac wdrożeniowych znalazła zastosowanie w zintegrowanym podejściu do ochrony cennych układów urbanistycznych. Opierając się na opracowaniach wykonanych dla trzech parków kulturowych, przeanalizowano wybrane elementy analizy i ich przydatność dla dalszych etapów w postaci waloryzacji i wytycznych sporządzonych do planu ochrony. Wypracowana metoda analizy może znaleźć zastosowanie w pracach planistycznych dotyczących cennych układów przestrzennych.



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## Impact of Legal Protection on the Preservation of a Historical Rural Structure on the Example of Frydman

### Wpływ prawnej ochrony na zachowanie historycznej struktury wsi na przykładzie Frydmana

**Keywords:** heritage conservation, rural development, historical structure

**Słowa kluczowe:** ochrona dziedzictwa, rozwój wsi, historyczna struktura

#### Introduction

The objective of this paper is to demonstrate the impact of conservation regulations on the preservation of the historical structure of rural areas. The case analyzed was Frydman, located in Zamagurie, Poland,<sup>1</sup> and was selected due to its tourist-related development and significant degree of preservation of its settlement system, which includes numerous heritage sites.

The analyses conducted as a part of this study mostly covered reports and documents that govern heritage conservation and management, and stem primarily from heritage conservation and spatial planning law. They are preceded by studies of the transformation of Frydman's structure, based on analyses of the literature, including works by Marian Kornecki<sup>2</sup> and Tadeusz Trajdos,<sup>3</sup> current and historical cartographic materials and surveys of the village's current state.<sup>4</sup> The analyses end with an indication of preserved elements of the structure and the conditions that determine them, including legal regulations. Conclusions, set against studies by Andrzej Tomaszewski,<sup>5</sup> Alexandra Bitušikova,<sup>6</sup> Jolanta Sroczyńska,<sup>7</sup> Żaneta Gwardzińska,<sup>8</sup> and Adam Kozień,<sup>9</sup> point to a range of topical heritage conservation problems in development policy, defining optimal measures that combine active conservation with sustainable rural development.

The history of Zamagurie was investigated in Polish studies after the end of the Second World War, when this region once again became a permanent part of Poland. It then entered the Polish–Slovakian touring zone, which had concentrated in nearby Podhale since the nineteenth century. Research development intensified due to plans to build the Czorsztyn Reservoir in the 1960s. Studies and planning documentation produced since that time, which included those by Witold Cęckiewicz<sup>10</sup> and the teams of Bogusław Krasnowolski<sup>11</sup> and Tadeusz Rutkowski,<sup>12</sup> documented the history of the origins and transformations of rural areas and the region in general, providing conservation guidelines for their development, which were legally supported in terms of heritage site and landscape preservation. The first post-war regulations on cultural heritage conservation of 1928<sup>13</sup> were amended in 1962<sup>14</sup> by introducing conservation records for singular sites and a register for urban complexes. Post-1989 amendments were to restructure the country after its political transformation and to prepare it for accession into European Union structures. The decision-making powers of local governments were increased in the new administrative division into voivodeships, powiats and municipalities.<sup>15</sup> The year 2003 saw the introduction of the currently applicable novelizations of the Spatial Planning and Development Act,<sup>16</sup> the Historical Mon-

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Fig. 1. Development of Frydman in 1846 and 2020, based on a cadastral map from 1846 and a field survey from 2020; by A. Korzeniowska. Ryc. 1. Zabudowa Frydmana w latach 1846 i 2020; opracowanie autorki na podstawie mapy katastralnej z 1846 oraz inwentaryzacji terenowej z 2020.

uments Protection and Preservation Act,<sup>17</sup> and the Act on the Precepts of Conducting Development Policy.<sup>18</sup>

### History of the transformation of Frydman's rural structure

Frydman is located in the eastern part of the Łapsze Niżne municipality, in the Nowy Targ powiat. The local economy's primary branch is tourism, which is based on attractive landscape and cultural conditions, and which has replaced historically predominant agriculture and cattle breeding.

The village, believed to be the oldest in the Polish territory of Zamagurie, was issued a charter based on the Magdeburg laws in 1308. Located in a multi-cultural borderland area, it often found itself in different states. Initially Polish, it became a part of Hungary towards the end of the fourteenth century, and later, in the eighteenth and nineteenth centuries, it became a part of Austria and Austria-Hungary. After the end of the Second World War, it was permanently given back to Poland by Czechoslovakia.

One of the first watershed moments in the village's history was the construction of a grange in the sixteenth century. The grange included a residential castle and outbuildings. Its extension was curtailed by a socio-economic crisis that ended along with the abolishment of serfdom in the second half of the nineteenth century. The castle and its nearby buildings were purchased by Józef Nowobilski, while the remaining post-manorial areas and hamlets became

sites of intensive construction. In 1967, a decision was made to build the Czorsztyń Reservoir. The result of work carried out in the years 1969–1995, apart from the reservoir itself, included the erection of a tall levee and a new road, which replaced the historical link with Dębno Podhalańskie. The regional project strengthened the local tourist infrastructure, which had successively been replacing agriculture since the 1960s. After 1989, the capitalist turn towards private property and a free-market economy, combined with accession into the European Union, resulted in a neoliberal management policy.

The charter-period layout of Frydman was based on niwa-type planning principles, with the niwas aligned with the Dunajec River Valley and the course of a trade route to Hungary. This route served as a basis for an elongated, central square, the so-called *nawsie*, confined by a domestic niwa divided into regular plots and surrounded by field niwas, cultivated using collective crop rotation. The development of farmstead plots consisted of functional strip zones. Behind the houses that formed the *nawsie*'s frontage, there was an outbuilding zone and orchards, meadows and barns. The form of the farmstead, similarly to the entire layout, was based on German models. The buildings, initially having only a single space, were placed with their gables facing the road and were adapted to local climate conditions. Over time, they evolved in the direction of elaborate complexes, adapting to needs and means. The compact wooden development was consumed by fires numerous times, forcing the locals to rebuild fol-

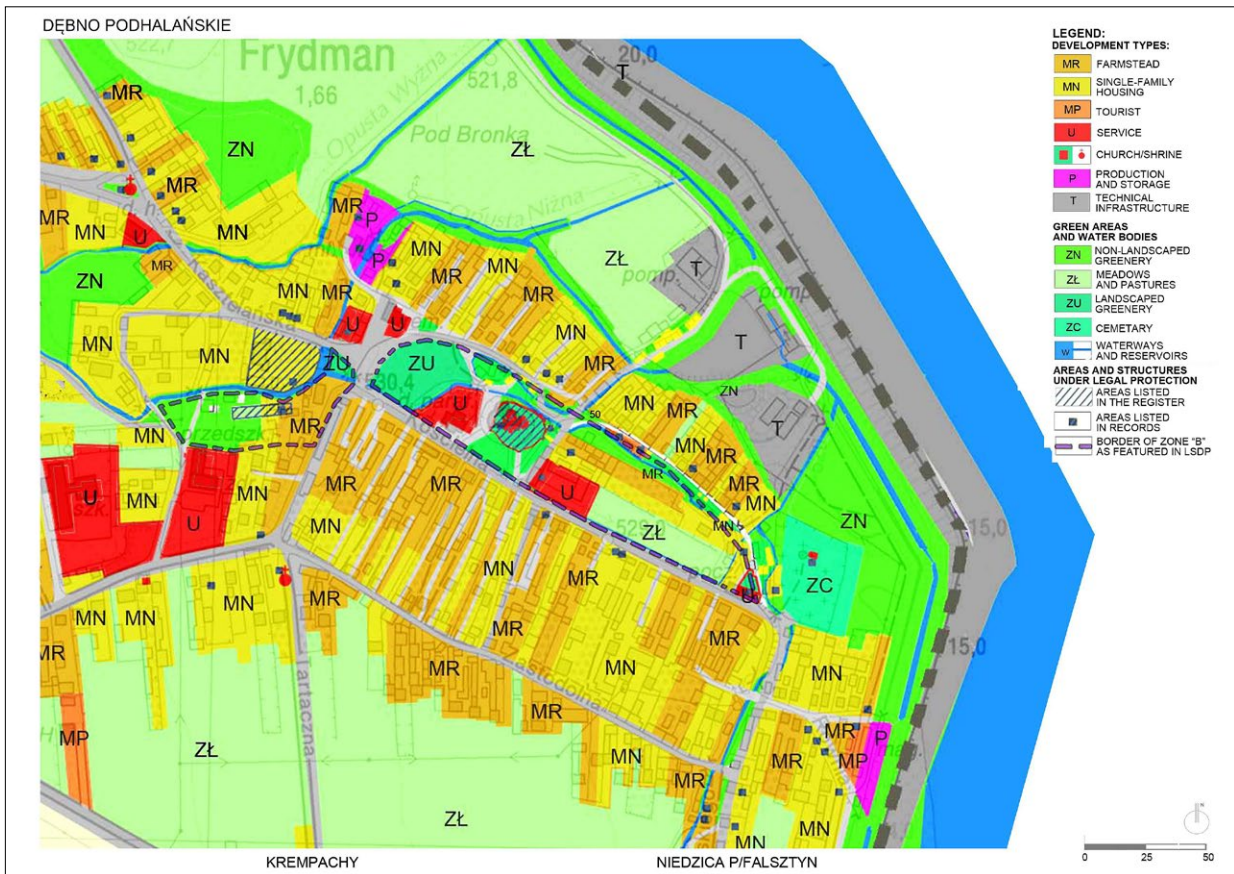


Fig. 2. Scheme of the present-day development of Frydman, based on sources listed in the text; by A. Korzeniowska.  
 Ryc. 2. Schemat współczesnej zabudowy Frydmana; opracowanie autorki na podstawie źródła wymienionego w tekście.

lowing contemporaneous regulations, which mandated the use of more durable and safer masonry structures. These mandates, unsupported by material availability, were not universally respected. Significant changes in form began in the 1960s. A departure from agriculture towards non-agricultural economic ventures resulted in the densification of farmstead plots, the development of fields and the remodeling of existing buildings based on modern materials and designs supplied by the authorities, which resulted in unified forms that were alien to local tradition.<sup>19</sup>

The parish church was one of the most significant buildings in the village. Along with the cemetery, it occupied a central place near the nawsie. Its greatest extension in the mid-eighteenth century covered a new set of chapels and a bell tower. Initially, the church was accompanied only by a wooden parish house and out-buildings, to which a school and a hospital for the destitute were added. A tavern also operated near the nawsie. The tavern building later acted as a school and a local government building. Based on the charter, a grain mill and a sawmill also operated near the course of the Białka millrace and Przykopa Creek within the borders of the hamlet (the so-called “upper mill”) and in the meadows near the Dunajec River (the so-called “lower mill”). Economic and technological transformation that negatively affected the feasibility of their operation resulted in their closure near the end of the twentieth century.

The scheme of the village’s historical layout from the mid-nineteenth century, documented based on a cadastral map from 1846, continued its charter-period layout. Its comparison with the current state (Fig. 1) demonstrates the retention of the original mode in which the structure functioned. The plan of settlement plots remained legible, as did the course of main public and service roads, with local changes induced by Austrian and Austro-Hungarian reforms. The greatest changes in the hamlet’s development occurred in farmstead development, wherein houses retained historical frontages but were modernized in terms of form and accompanying site development.

A continuation of these processes was observed. They are oriented towards the redevelopment of each property following individual needs and means, and highly varied stylistic preferences. The invariably centrally placed massing of the church, surrounded by greenery, acts as the layout’s height-based landmark. The historical field layout is still legible, albeit made smaller by areas transformed by housing development and the Czorsztyn Reservoir and cut off by the road to Nowy Targ (Fig. 2).

The group of factors that affect the retention of original layout elements includes a visible and direct link of initial planning precepts with surviving natural determinants. The role of top-bottom legal regulations that are not backed by local resident needs is significant smaller.





Fig. 3. Parish Church of St. Stanisław in Frydman, located in the historical center of the village (the *nawsie*), set out by compact frontages, it is surrounded by the square's tall greenery; by A. Korzeniowska.

Ryc. 3. Kościół parafialny św. Stanisława we Frydmanie, zlokalizowany w historycznym centrum wsi (*nawsie*), wyznaczony przez zwarte pierzeje i otoczony zielenią wysoką placu; oprac. A. Korzeniowska.

### Conservation of Frydman's cultural heritage

The heritage conservation policy at the village level includes administrative decisions and strategic documents stemming from relevant legal acts and ordinances concerning, among others, monument conservation and spatial planning.

Activities that target monuments are directly governed by the Act of 2003, which regulates: acknowledgement as a monument to history, cultural park establishment, conservation provisions in local spatial development plans and entries in the historical monuments register and records. The register is a form of conservation intended to provide legal, organizational and financial conditions for a monument's preservation by the conservation service. Entering a site in a monument record is a form of preservation to be provided by said monument's owner and is based on: maintaining the site in the best possible condition, ensuring conditions for its study and documentation, and the popularization of its values for history and culture. The essential difference between conservation and care results in different scopes of necessary and possible action.

Frydman features structures and sites included in the Lesser Poland Voivodeship Immovable Monuments Register<sup>20</sup> and the municipal monument records.<sup>21</sup> The Register includes: the Parish Church of St. Stanisław and its surroundings (Fig. 3), the castle, and manorial wine cellars.<sup>22</sup> The church is the most well-preserved of these structures. It is in active use and is regularly renovated by conservation services. Both the inhabited castle and the cellars, which are partially made available to visitors on a private plot, require urgent renovation.

The municipal monument records for Frydman, as a part of the Łąpsze Niżne municipality, was approved in 2007 and has not been amended since that time.<sup>23</sup> It includes 70 buildings, mostly consisting of houses from the beginning of the twentieth century, 25 of which stand within the charter-period layout. The religious building group, which includes six chapels and shrines, of which the oldest is dated to 1706, is numerous in proportion to the total number of monuments. In the non-residential building group, there are structures that offered services, such as masonry taverns, the inactive wooden grain mill and the sawmill of the "upper complex." The technical condition of the monuments is varied, especially in the residential buildings group. Some of them are abandoned are falling into ruin (Fig. 4). Apart from those that have retained their shape and continuity of use, the group of buildings in which historical form, legible in the outline of the floor plan and the frontage line have been significantly remodeled, is the most numerous. They are mostly accompanied by outbuildings that were adapted into garages and storage buildings after agricultural activity had ceased. A number of well-preserved detached wooden houses was adapted into "summer" homes (Fig. 5). Examples of wooden farmsteads from the interwar period have survived in a looser structure near the main entry roads into the village, namely Kamienne Pole Street and Kasztelańska Street.

The Łąpsze Niżne municipality has had a Municipal Monument Conservation Program since 2014.<sup>24</sup> The SWOT analysis included in the Program indicated, among others: the surviving elements of the cultural landscape, a rich folklore, the existence of municipal monument records and the good state of





*Fig. 4. Abandoned masonry house from 1900, located Jana III Sobieskiego Street, entered into the monuments records, record No. 237/1179; photo by A. Korzeniowska.*

Ryc. 4. Opuszczony budynek murowany z roku 1900, zlokalizowany przy ul. Jana III Sobieskiego, wprowadzony do ewidencji zabytków (nr 237/1179); fot. A. Korzeniowska.



*Fig. 5. Diverse housing development along Kościelna Street, to the right is a house adapted to a guesthouse, originally from 1925, entered into monument records, record No. 220/1179; photo by A. Korzeniowska.*

Ryc. 5. Różnicowana zabudowa mieszkaniowa wzdłuż ul. Kościelnej, na prawo widoczny obiekt zaadaptowany na pensjonat, pierwotnie z roku 1925, wpisany do ewidencji zabytków (wpis nr 220/1179); fot. A. Korzeniowska.

preservation of religious buildings. Numerous cultural trails and local government organization activity were also mentioned. The weaknesses listed included the poor technical condition of buildings from the municipal records, associated with a lack of public understanding of conservation, illegal construction and poorly conducted renovation and a lack of knowledge about the values of the structures under conservation. Opportunities, understood as external development determinants, were listed as potential for financial support, including that from the European Union, for conservation and promotion, and an increase in the number of tourists and including conservation in the municipality's pro-development programs. Threats included the decay of the cultural landscape via the introduction of disharmonious development, ineffective law enforcement, and a promotion policy focused on commercialization. Based on analyses, goals for reparatory efforts were set. The first goal, concerning the prioritization of culturally valuable areas in municipal spatial policy, should be achieved by introducing unified conservation policy and spatial order retention in strategic documents and local spatial development plans.

The second objective was the use of tourism development resources by, among others, visual information systems and participation in supraregional programs. The third strategic goal was heritage conservation and the increase of its assets by, among others, updating the municipal records, ongoing monitoring and reparatory programs, as well as increased accessibility. The fourth goal included direct action for conservation and threat elimination by legal and promotional support offered to building owners and interventions whenever threats are identified. The final goal, in support of the previous ones, was public education to popularize the idea of a public monument caretaker and to propagate knowledge about local assets.<sup>25</sup> The tasks listed in the Program are concord-

ant with agreements made at the Nowy Targ powiat<sup>26</sup> and voivodeship levels,<sup>27</sup> in which the purposefulness of conservation measures was confirmed via joint action by local government and conservation authorities, building owners and managers, and by existing and planned legal, financial, social and control instruments.

The Spatial Planning and Development Act stipulates the necessity that precepts governing measures concerning monuments and contemporary cultural treasures in local spatial development plans are consulted with conservation services.<sup>28</sup> Frydman's administrative limits have been fully covered by plan provisions since 2006.<sup>29</sup> The plan assumes the functioning of farmstead development and services in the historical center of the village, as based on the current road system. Further development was supplemented by single-family residential development to the southeast from the Nowy Targ road, beyond which a protected zone of the historical field system was established. Apart from listing buildings featured in monument records, the document introduced conservation zone "A," for buildings listed in the monuments register, and conservation zone "B" (buffer zone) for the historical nawsie area as confined to its charter-period scope. All activities concerning the buildings and areas in question must be approved by the Voivodeship Monuments Conservator and must comply with applicable construction and fire safety codes. In adherence to the provisions of the ordinance on the required scope of local spatial development plans,<sup>30</sup> the precepts of erecting new development were codified in terms of its location and form, height, roof pitch and materials allowed, assumed to reference regional traditions. The plan's text also included a provision that mentioned the establishment of the Spisz Landscape Park, to be established in the future.

In accordance with the Act's provisions, the local spatial development plan implemented the Lesser Poland Voivodeship Plan, which was approved in 2018.<sup>31</sup> This

plan had Zamagurie featured as a part of the “Mountain Park”—a wildlife and landscape complex of nationally recognized value. Its primary development goal is to maintain tourism attractiveness in a balance with economic transformation and landscape conservation via, among others, a transition from passive conservation to effective and rational heritage asset management by simultaneously exposing authenticity and adaptive reuse that would combine conservation with accessibility. Due to the necessity to protect historical complexes against ongoing deterioration, it was proposed to establish a cultural park in Frydman<sup>32</sup> so as to limit negative phenomena and “spontaneous construction.”<sup>33</sup>

Strategic documents drafted by an interdisciplinary panel that also included local residents express a view on the local development policy. At the municipal level, there is no duty to possess a development strategy, yet the provisions of such a strategy form a basis for executive documents and the funding of the tasks that such a strategy could specify, in the social, economic and spatial dimensions.<sup>34</sup> The strategy of the Łąpsze Nizne municipality, in alignment with the guidelines of the Lesser Poland Voivodeship, points to tourism-oriented development. In the document, approved in 2014,<sup>35</sup> the municipality’s mission statement lists the development of the cultural and sports infrastructure and the conservation of cultural heritage with the intent to improve local living standards and increase tourist traffic.

Cultural heritage, tradition and monuments were mentioned as the municipality’s strengths. They also included, among others, wildlife and landscape attractiveness and the possession of a sports, leisure and road infrastructure, as well as well-developed accommodations and gastronomic infrastructure.<sup>36</sup> Local and regional place-based traditions were not acknowledged as development opportunities. Such opportunities included the municipality’s placement within the landscape, which enables a joint tourism offer with Slovakia and surrounding municipalities. Cultural heritage conservation was listed seventh on a list of major strategic goals. Measures specifically planned for Frydman included the renovation of wine cellars, whilst general provisions for the municipality featured the establishment of a Spisz Rural Open-Air Museum, the promotion of the municipality, the activation of folk bands, the reconstruction of places of worship, and the renovation of historical buildings. All tasks financed from aid funds and the municipality’s budget were to be completed by 2020. Officially, none of these tasks were concluded as of the writing of this paper.

At the Lesser Poland Voivodeship level, there is the “Małopolska 2030” Voivodeship Development Strategy adopted in December 2020,<sup>37</sup> whose culture and heritage section features tradition and heritage which require conservation and preservation via dialog with residents, recognizing their needs and support for joint action with residents aware of said heritage’s value.

## Conclusions

This study demonstrated that the fourteenth-century structure of the village of Frydman is a preserved case of a regular layout typical of Spisz, located in a region that focuses on tourism development. The continuity of the historical layout is visible in the planned road network, plots, essential services and farmstead development. At the same time, significant transformation of the form of houses lead to the erasure of historical value, depreciating the value of the cultural landscape. Findings indicate that the continued existence of the layout’s form was supported by the universality of naturally continued planning precepts that were aligned with the terrain. Rigid administrative regulations played a much lesser role.

Architectural mandates introduced in the 1960s were commonly adopted as, contrary to previous ones, they were supported by an extensive funding policy that was aligned with a desired vision of prosperity. Unconstrained individual opportunity was facilitated by a liberal capitalist economy that came afterwards, bringing with it attractive forms and technologies that compounded unavoidable architectural chaos. The idea of conservation, which primarily assumed following praiseworthy values, was thus misunderstood from the very beginning. The Act of 1962 that stipulated keeping records of valuable structures in municipalities could not stop the transformation, supported by state guidelines. The Act of 2003 that came afterwards increased the responsibility of property owners, placing a restrictive emphasis on preserving buildings in their original forms and materials. The guidelines, unsupported by a wider policy of action, often led to the decay of monuments instead of preserving a living tradition. Studies of Frydman’s heritage that began in the second half of the twentieth century, which affected conservation postulates, were an essential documentation of the pre-existing state and a voice in the academic discussion yet did not influence real action. Research on the contemporary transformation in the light of continued landscape and social determinants and applicable law, unfortunately indicate that previous, unfavorable tendencies, are continuing.

Historically, changes in the cultural landscape were greatly affected by natural determinants, including fires that periodically destroyed entire villages and forced reconstruction efforts following contemporaneous precepts and tendencies, filling the compact structure in places with residential masonry buildings. Due to the plot widths, they invariable remained under threat. The effect of this situation was a fire in the Zamagurie village of Nowa Biała, similar in layout to Frydman, that took place on June 19, 2021, and consumed around fifty buildings of the compact northern frontage of Św. Katarzyny Street. It is difficult to enforce protective inter-building distances in the historical structure of narrow plots. It appears necessary to locally re-evaluate fire safety regulations in terms of fire-resistant con-

struction materials, constant building monitoring and resident training to ensure both human safety and heritage preservation.

The applicable Monument Protection and Preservation Act fails to provide an environment for the suitable protection of monuments, especially those featured in monument records. The scope of optimal action largely depends on their owners' needs and financial capabilities, as the owners are burdened with performing complicated and costly development. The end result is often the illegal remodeling or abandonment of a building, which is not constricted by conservation services, which operate following flawed legislation. As demonstrated in studies by Żaneta Gwardzińska,<sup>38</sup> in many instances the lack of the legal execution of conservatorial supervision over decaying monuments stems from financial and staff shortages that plague conservation services which do not have the knowledge and funds to conduct legal administrative proceedings.

Gwardzińska also noted the problem of inconsistencies in legal regulations, including between conservation, real estate management, bankruptcy and construction regulations. The complicatedness of administrative procedures means that they are often foregone in favor of simpler penal proceedings, which typically end in an unpaid fine instead of the active renovation of a monument. A comprehensive amendment of the law should thus cover changes in funding at the level of the National Monument Preservation Fund, supported by exemptions for owners, to be included in, among others, the national tax or real estate management policies.

The legal problems diagnosed also concern the function of local spatial development plans as acts of local law that regulate the spatial development of rural areas. Authors of such plans, despite possessing knowledge and experience in heritage conservation and management, have limited room to enact them, as they operate in a system that ties mutually exclusive interests of spatial development, monument conservation, and construction and property law. The provisions of the plan for Frydman, by continuing historical solutions that are aligned with the terrain, provide conditions to retain the layout, yet their vagueness does not sufficiently protect the tradition of architecture in the local landscape.

The provisions of strategic documents such as the Monument Protection Plan or the Strategy point to the functioning of heritage in the development of a tourist-friendly rural area that faces spatial problems and a lack of cultural awareness among residents.

The problem of the active conservation of cultural heritage was identified by Andrzej Tomaszewski as a postulate of the proposed campaign entitled "Europe – a common heritage."<sup>39</sup> In his opinion, the cultural identity of an area is defined by the cultural landscape as a whole that is universal to a community, a whole whose active conservation should lead to harmonious development. Tomaszewski highlighted the necessity to engage joint political and social forces aware of

cultural values, protecting against a path towards cosmopolitanism and "contemporary" architecture. Studies by Alexandra Bitušíkova are aligned with this strategy. Based on the Slovakia region of Banská Bystrica, Bitušíkova identified an optimal heritage development strategy based on people as carriers of tradition, combined with people-focused economic action to be taken by the regional government as a condition for the continued existence and resilience of heritage as cultural, economic, social and political assets.<sup>40</sup>

Strategic guidelines, correct at a statement level, do not define priorities in a cohesive and active policy and serve primarily implementing current development needs. There is a lack of visions with financial and substantive support, and a lack of action targeting historical tissue that would result in benefits to owners that would materialize in time and space. Document provisions are drafted by groups of authors that include both academics and representatives of local governments and residents. The missions and strategic goals included in those documents thus display an erroneous image of the functioning of heritage in the sustainable development of rural areas. Adam Kozień's study on Polish legal acts, from the level of the Constitution of the Republic of Poland downwards, clearly point to the management of local heritage as an equally important resource in shaping the sustainable development of areas in an economic, social and ecological sense, confirming the role of local government bodies in the popularization of cultural treasures with state-level support. The main problem with realizing these goals was identified by Kozień as a lack of heritage management regulations in Polish law, which covers, among others, monument conservation, local government and administrative law, and spatial planning. The limiting of conservatorial structures to the voivode level was also identified as a major problem, as it is the voivode who makes decisions concerning the staffing of necessary institutions at the municipal level.<sup>41</sup>

Changes in legal determinants should provide conditions for bottom-up social initiatives. Demonstrating the primarily financial benefits derived from held values to residents and space users will facilitate their use in development, supported legally and substantively by heritage management specialists. Research of functioning social initiatives by Jolanta Sroczyńska confirmed the existence of the problem of the lack of social involvement in heritage conservation. Sroczyńska argued that accessible places tied with contemporaneity and current needs of people, as well as those that have features that a local community finds distinctive.<sup>42</sup> Sroczyńska's study described cases of initiatives by the Polish national Civic Education Center, which, by activating the younger generation, involves the local government and communities in action in historical sites such as a granary or palace. In the case of Frydman, such an idea could be implemented in targeting service and manufacturing buildings.

## Summary

Frydman is a regionally unique image of local history, culture and economy, as recorded in a living structure, and whose case can be used as a basis for guidelines applicable to a greater group of tourism-oriented villages. An analysis of the conditions of its existence demonstrates the advantage of historical precepts which were sufficiently tied to the site to be naturally continued by residents. The simultaneous transformation of development following present-day legal regulations in heritage conservation and man-

agement points to threats to the existence of the local cultural landscape.

Striving to improve the current state of the village's valuable rural fabric, one solution would be to use its surviving elements as a basis while limiting further architectural transformation. In the light of an obvious lack of reversal action, one should pursue an improvement of the quality of common spaces in by using local culture in an attractive manner. Protective measures would thus become a natural and desired path to improving place-based quality, appreciated as residents as a heritage with actual value.

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## Abstract

This paper discusses the functioning of the heritage of the village of Frydman, which is one of the most well-preserved cases of Spisz layouts and features numerous architectural monuments. The layout, which persists in local natural conditions, appears unthreatened despite the occurrence of significant change in the cultural landscape in historical architecture. The discussion begins with an identification of surviving elements of Frydman's structure and an investigation of the determinants of its origins, which were sequentially referenced to contemporary times and possible development trajectories. The research objective of the study was to answer the problem of the functioning of heritage in present-day legal conditions, specifically in terms of heritage conservation and spatial planning. This study clearly indicates the complexity of the problem, in which the synergy of legal provisions and the local community is a crucial area. To ensure it, both a systemic improvement of the regulation and the raising of public awareness on heritage conservation and management would be necessary.

## Streszczenie

Artykuł dotyczy funkcjonowania dziedzictwa wsi Frydman, będącej jednym z najlepiej zachowanych przykładów układów spiskich, reprezentowanych przez liczne zabytki architektury. Trwające w uwarunkowaniach naturalnych, dziedzictwo to wydaje się niezagrażone podczas zmian krajobrazu kulturowego zachodzących w zabytkowej architekturze. Rozważania rozpoczyna zdefiniowanie zachowanych elementów struktury oraz uwarunkowań ich powstania, które kolejno zostają odniesione do czasów współczesnych i możliwych dróg rozwoju. Celem badawczym było znalezienie formy funkcjonowania dziedzictwa w ramach prawnych, m.in. z zakresu ochrony dziedzictwa oraz planowania przestrzennego. Badania jednoznacznie dowodzą złożoności problemu, w którym kluczowy jest wpływ realizacji zapisów prawa na życie lokalnej społeczności. W celu poprawy sytuacji konieczne są zarówno systemowa poprawa regulacji, jak i podniesienie świadomości społecznej na temat ochrony i zarządzania dziedzictwem.

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## Protection of the Architectural and Urban Layout as a Basis for the Design of the Underground Extension of the Historic Building of the Pomeranian Philharmonic in Bydgoszcz

### Ochrona układu architektonicznego i urbanistycznego jako podstawa projektu podziemnej rozbudowy zabytkowego budynku Filharmonii Pomorskiej w Bydgoszczy

**Keywords:** urban and architectural heritage, extension of historical building, Pomeranian Philharmonic

**Słowa kluczowe:** dziedzictwo architektury i urbanistyki, rozbudowa budynków zabytkowych, Filharmonia Pomorska

#### Introduction

The necessary conditions and needs for the proper functioning of cultural facilities change constantly. The level of working conditions of artists and the comfort of spectators and participants of cultural life is increasing. The tasks and objectives of cultural institutions today include not only the preparation and presentation of artistic works, but a range of integrative and recreational activities. The public wants to perceive a cultural facility not only as an area for acquiring knowledge or aesthetic pleasure, but also as a meeting place. In this way, institutions subscribe to Ray Oldenburg's idea of the "third place." These necessary changes form the basis for decisions to renovate, remodel or extend existing cultural buildings, which are often subject to conservation protection. These interventions, due to their wide scope, fundamentally affect the functional relationships of the spaces within the facility, as well as the relationships between the facility itself and its surroundings. Determining the value of an existing building that needs to be protected or restored is a key element of pre-design analysis. Design itself, on the other hand, is a search for balance between meet-

ing the new program conditions and the protection of historical, aesthetic, socio-cultural or functio-spatial values of a monument. The architectural and urban design competition for the extension and rebuilding of the Pomeranian Philharmonic in Bydgoszcz serves an example of this. Kozięń Architekci, the authors of the winning entry, decided on an underground extension in order to protect the existing special architectural and urban layout. The work clearly preserves and emphasizes the position of the existing building of the Pomeranian Philharmonic. It exposes it as a dominant feature in the structure of the surrounding space. Despite the extensive expansion, the project does not introduce any other entrance for music lovers than the existing main entrance to the historic building, maintaining the significance of the front elevation. At the same time, the building will acquire new functional and spatial values that will support its active functioning.

#### From the history of the Music Quarter and the construction of Pomeranian Philharmonic

A new district was planned on the basis of urban plans from 1898 and 1903 in the area of the present-day Music

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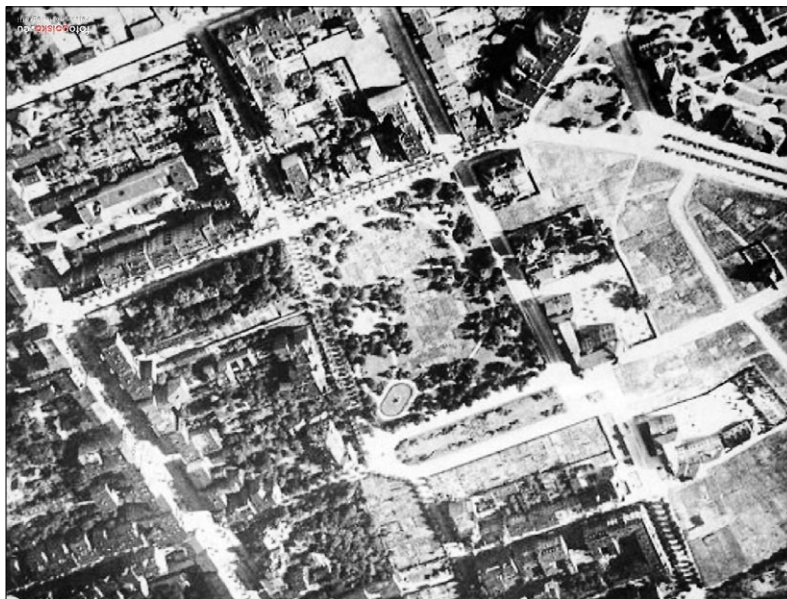


Fig. 1. Aerial photograph of the surroundings of Kochanowski Park in Bydgoszcz, 1911, author unknown, source: <http://fotopolska.eu> (accessed on: 18 IX 2021).

Ryc. 1. Zdjęcie lotnicze otoczenia parku Kochanowskiego w Bydgoszczy, 1911, autor nieznan, źródło: <http://fotopolska.eu> (dostęp: 18 IX 2021).

Quarter. The squares and compositional axes gained public buildings as well as a significant amount of greenery, referring to the concept of a garden city. A large landscape park called Bismarck-Garten, now Jana Kochanowskiego Park, was created in the central part. The Baroque Revival building of the present Academy of Music by E. von Saltzwedel (1904–1906), an asylum for the blind built in the early Renaissance style at the junction of today's Kołłątaja and Staszica Streets (1902), villas in Gdańska Street, and the building of the municipal school (now the building of the University of Life Sciences) (1905–1906) were constructed at that time. Two large cultural buildings were built later, after the Second World War: the Polish Theater (1947–1949) and the Pomeranian Philharmonic (1954–1958). They and the building of the Music School Complex completed the layout.<sup>1</sup>

From the very beginning, the building of the philharmonic was intended by Andrzej Szwalbe, the director of the Pomeranian Symphony Orchestra, to be the center of the musical complex in Bydgoszcz.<sup>2</sup> In February 1953, the director asked the city authorities to construct a building with appropriate parameters, good acoustics and proper facilities for the orchestra. None of the halls in the city, where the fifty-person orchestra had performed as guests so far, guaranteed appropriate conditions for artistic activity. Three locations were considered as possible sites for the building:

- the site of the former Evangelical cemetery in Jagiellońska Street (present-day Witosa Park),
- the square at the junction of Markwarta Street and Staszica Street (present-day Leszka Białego Square),
- the area in the vicinity of Jana Kochanowskiego Park.<sup>3</sup>

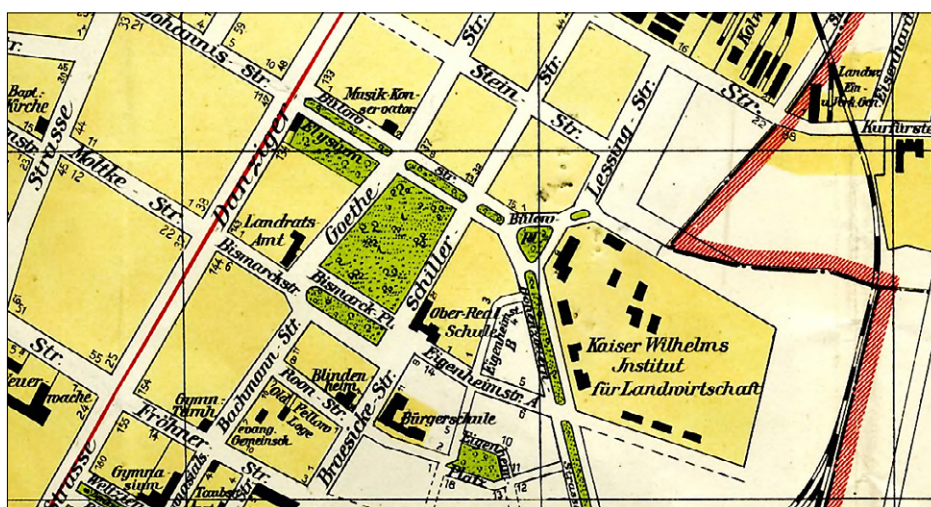


Fig. 2. Town Plan of Bromberg, 1914, A. Dittman, excerpt, source: <https://kpbk.umk.pl/> (accessed on: 18 IX 2021).

Ryc. 2. Plan miasta Bromberg, 1914, A. Dittman, wycinek, źródło: <https://kpbk.umk.pl/> (dostęp: 18 IX 2021).



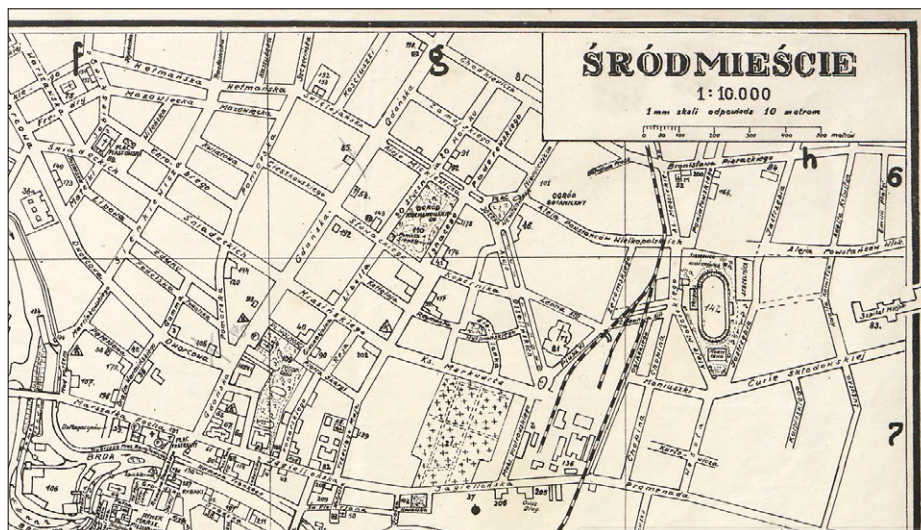


Fig. 3. Town Plan of Bydgoszcz, 1939, A. Sułkowski, excerpt, source: <https://kpbc.umk.pl/> (accessed on: 18 IX 2021).  
Ryc. 3. Plan miasta Bydgoszcz, 1939, A. Sułkowski, wycinek, źródło: <https://kpbc.umk.pl/> (dostęp: 18 IX 2021).

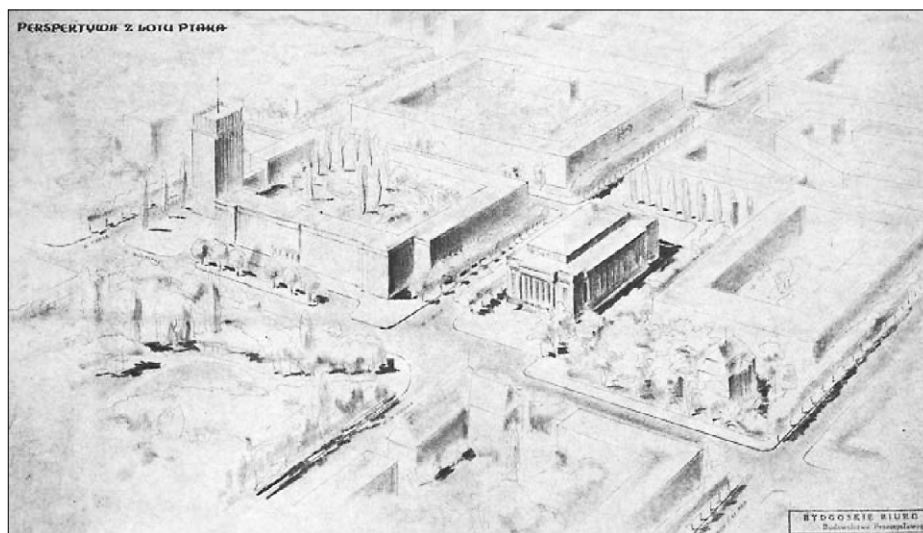


Fig. 4. Pomeranian Philharmonic and its surroundings according to the unrealized proposal by architect Jan Kossowski, 1953; source: *Naród sobie. 60 lat gmachu Filharmonii Pomorskiej w Bydgoszczy*, ed. M. Grochowina et al., Bydgoszcz 2018.  
Ryc. 4. Filharmonia Pomorska i jej otoczenie według niezrealizowanej koncepcji architekta Jana Kossowskiego, 1953; źródło: *Naród sobie. 60 lat gmachu Filharmonii Pomorskiej w Bydgoszczy*, ed. M. Grochowina et al., Bydgoszcz 2018.

Finally, the philharmonic was to be built on the site of allotments and former tennis courts, in the vicinity of the park, at the junction of Libelta (present-day Szwalbeo) and Staszica Streets. The 1953 development plan by Jan Kossowski assumed a free-standing building in a green area. The maintenance and supplementation of the existing greenery was one of the basic elements. The architect proposed office buildings in the park adjacent to the building, which was not followed.

The management of the Philharmonic launched a closed competition for the design and the surroundings of the building, with requirements concerning its dimensions - 35 m x 45 m and a height of 18 m. Five teams took part in the competition. The jury, chaired by Professor Piotr Biegański (co-author of the reconstruction of the Old and New Towns in Warsaw), selected the project prepared by Miastoprojekt Północ-Wschód from

Bydgoszcz, whose director at that time was Mieczysław Windorowski, and the chief engineer was Edward Baniulewicz. The team was headed by Stefan Klajbor, a graduate of the Gdańsk University of Technology, who was responsible for correcting the plans during construction. Bogdan Piestrzyński, engineer, became the building's designer. Construction was completed in 1958. The exterior of the building refers to the architecture of simplified classicism in its pure form, and in the details of the interior design to the modernist style and art deco accents that continued in the first post-war years. Thanks to the efforts of the authorities of the Pomeranian Philharmonic, on December 18, 1981 the Philharmonic building was entered in the register of historic monuments as an example of "simplified Classicism."

The concept of Bydgoszcz's Music Quarter was revived in the 1970s. In Tadeusz Czerniawski's design

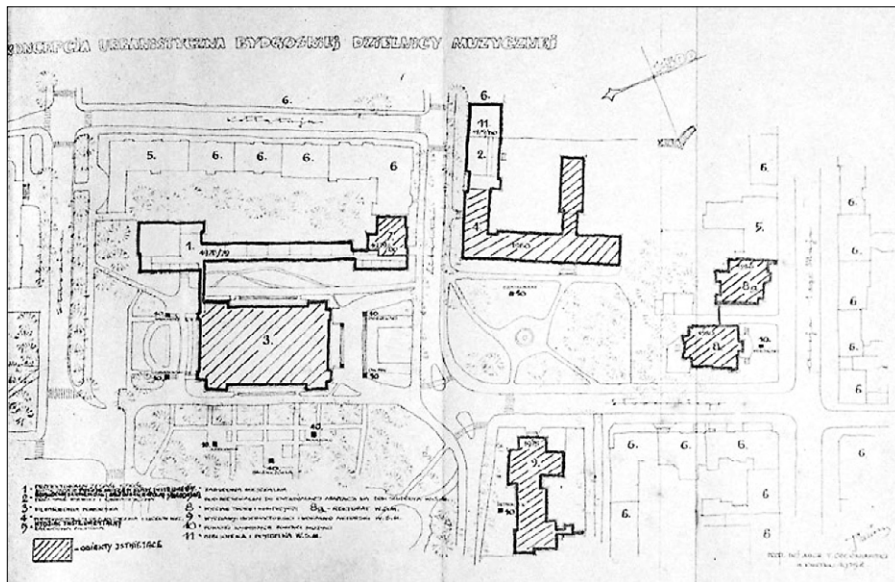


Fig. 5. Conceptual proposal of the Music District by architect T. Czerniawski, 1975.  
Ryc. 5. Koncepcja Dzielnicy Muzyki opracowana przez architekta T. Czerniawskiego, 1975.

from 1975, the philharmonic was the central element of a complex of buildings connected to green areas. The “entrance gate” to the complex was to be constituted by two existing buildings in Gdańska Street, planned as the Rector’s Office of the Academy of Music and the Department of Theory and Composition (currently buildings of the Polish Radio). The existing buildings located by the green square would constitute the Primary and Secondary Music School, and on the opposite side the Faculty of Instrumental and Vocal Performance of the Academy of Music (now the Academy of Music). The philharmonic offices were to be located in the existing building at the corner of Kofłataja and Staszica Streets. The design also provided new buildings. It proposed a long pavilion located along the southern elevation of the philharmonic building, connected to it by a narrow corridor. The pavilion was to house the practice rooms of the music school and to be an extension of the philharmonic with a choir room and a dining room. Behind the music school, on today’s Szwalbego Street, a gym and a library of the music school were to be built. The new facilities were not constructed. The concept also provided the placement of monuments of prominent figures of music in the green areas around the building. The greenery was an important compositional element of the layout, and it was intended to dampen noise. The park became a music hall, where live piano recitals were held in the 1970s. In order to create an atmosphere of silence and concentration, in the 1980s the traffic around the buildings was restricted. In this way, in the park surroundings, the so-called Bydgoszcz Music District was created, where schools, cultural institutions and street furniture elements were concentrated. As historian Agnieszka Wysocka wrote: “The well-thought-out concept of the Bydgoszcz Music District is worth preserving [...] successive generations add their own

fragments, but they should always remember to respect history and the collective memory.”<sup>74</sup>

#### Guidelines and conditions for extension and remodeling

The building of the Pomeranian Philharmonic is used for musical events of both local and international range. It serves as the musical center of Bydgoszcz, as well as an art gallery and a center of scientific inspiration. Over time, however, the historic edifice has ceased to meet the requirements of a musical institution. Director Maciej Puto wrote: “In the late autumn 2015 the idea, firstly perhaps a vague one, was born that the Philharmonic Hall needs to be extended.”<sup>75</sup>

In 2018, the City Council adopted a new local spatial development plan for the area “Śródmieście – Filharmonia Pomorska,” taking into account the needs of the Institution. According to the provisions of the plan, with regard to the area marked with the symbol 1.UP:<sup>6</sup>

- it is permitted to build a new development that would act as an extension of the Pomeranian Philharmonic building from the eastern side (i.e., from Staszica Street), with the possibility of connecting the new volume with the existing building at the level of the underground or/and the overground stories, on condition that the full exposition of the remaining facades of the building is preserved;
- it is permitted to locate the extended part of the Pomeranian Philharmonic’s building completely below the ground level, on the condition that the necessary technical devices and installations are located in the aboveground parts of the building and/or are integrated with the development elements of the formal surroundings of the Philharmonic’s building, taking into account a high aesthetic and composition standard of the place arrangement;



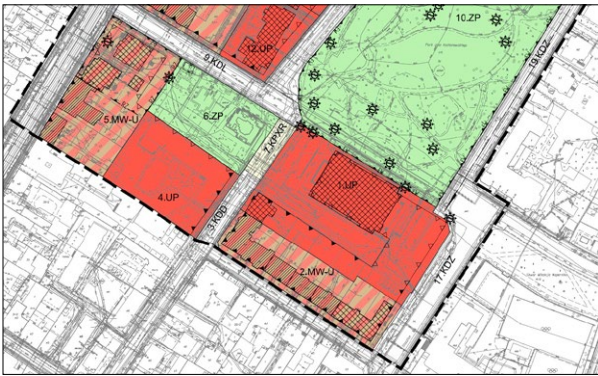


Fig. 6. Local Spatial Development Plan “Śródmieście – Filharmonia Pomorska,” 2018.

Ryc. 6. Lokalny Plan Zagospodarowania Przestrzennego „Śródmieście – Filharmonia Pomorska”, 2018.

- in the development of new buildings and land development, the closure of the viewing axis of Paderewskiego Street, marked on the drawing of the plan, should be taken into consideration;
- in the development and arrangement of the space of the square in front of the main entrance to the historic building of the Pomeranian Philharmonic, the possibility of organizing open-air cultural events should be ensured.

The Pomeranian Philharmonic prepared a Functional and Utility Program for the project “Extension and rebuilding of the Ignacy Jan Paderewski Pomeranian Philharmonic in Bydgoszcz.” Within the framework of the project, it was assumed that the existing building will be renovated, remodeled and extended, and the whole building post-extension would have the target volume of approx. 86,000 m<sup>3</sup> (currently 51,054 m<sup>3</sup>) and the net area of approx. 16,600 m<sup>2</sup> (currently 6,787 m<sup>2</sup>). The facility was to be divided into distinct functional zones:

- Meloman Zone—generally accessible to guests of the complex, without the need to register entry. Including: foyers, concert halls, café, restaurant, banquet halls, shops, media room, cloakroom and restrooms (for listeners).
- Musicians’ Area—accessible after registering the entrance of employees and visitors. It includes: rehearsal rooms, concert halls with facilities (dressing rooms, instrument storerooms), canteen, sheet music library.
- Administration Zone—accessible after registering the entrance of employees and users. Including: offices with administrative functions, separate passageways, social, sanitary, technical and storage facilities.
- Parking Zone—underground parking spaces for 150–200 cars (entrance with toll).
- Supply Area—accessible after registration of the entry of employees and users—enclosed lock for small and medium delivery trucks (transport of instruments, equipment, possibly food products).

The architectural competition was announced in

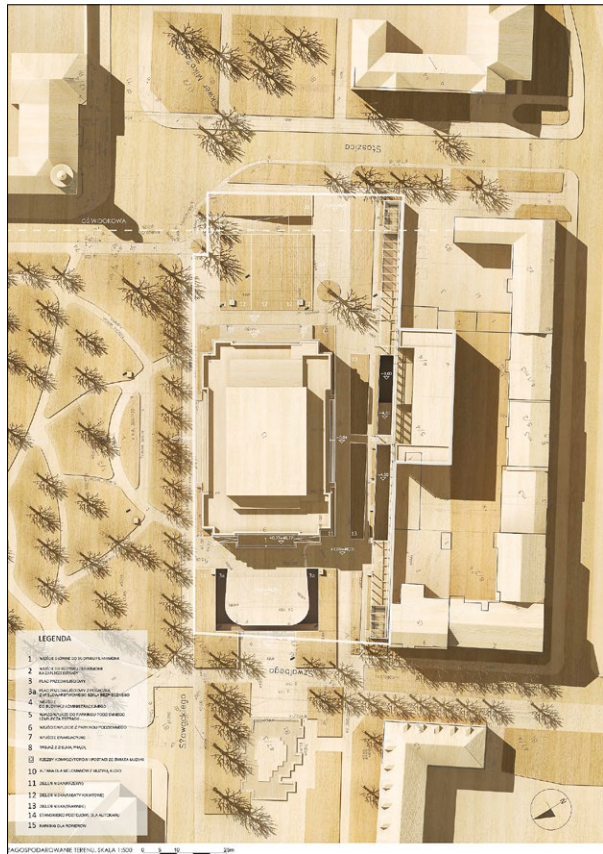


Fig. 7. Conceptual design of extension and remodeling of Pomeranian Philharmonic by Kozień Architekci, siteplan; 2020.

Ryc. 7. Projekt koncepcyjny rozbudowy i przebudowy Filharmonii Pomorskiej opracowany przez Kozień Architekci, plan sytuacyjny; 2020.

2019 and the results in May 2020. The Jury, chaired by the well-known and respected architect Romuald Loegler, selected the project of the Kozień Architekci studio from Cracow.<sup>7</sup> The Jury awarded the project for “the indisputably most accurate solution of the design task. The solution proposes an architectural creation that achieves a balance between a highly satisfactory fulfilment of programmatic requirements and its spatial compliance with the requirements of the applicable local spatial development plan. The design unambiguously preserves and emphasizes the position of the extant edifice of the Pomeranian Philharmonic Hall, exposing it as a dominant element in the structure of the surrounding space. Such is an obvious expectation of the local community of dedicated music lovers. [...] the main, historic entrance to the Philharmonic Hall will be retained, serving the entire functional program—both the extant symphonic hall and the new chamber hall which is situated underground, on the main axis of the existing building. Such a disposition of functions is a very successful solution ended. In a building of that type it has a foremost meaning from the spectator’s point of view. [...] the excellence of this work is proved by the shaping of such a great construction project with the sensitivity towards relations with its surroundings and towards understanding human needs.”<sup>8</sup>

## Urban assumptions and architectural solutions of the competition project

There were three basic assumptions adopted in the design:

- the creation of an urban space that would be friendly, open, flexible and integrate the functions of the edifice with the surrounding structure of the city space;
- the subordination of the spatial composition to the existing elements of the city's composition—in particular, maintaining the free-standing, compact volume of the building as a sign in the city space;
- the underscoring of the entrance to the building.

Maintaining the principle of the free-standing dominant feature of the main building of the philharmonic surrounded by green areas was considered a basic goal. This assumption was realized by introducing a considerable part of the extension under the surface of the area surrounding the building. The administrative zone was located in the new building along the frontage which, in accordance with the provisions of the LSDP, is to constitute the closure of the city block adjacent to the project site. The termination of the visual axis of Paderewskiego Street with the gable wall of the existing building at Staszica Street was maintained.

In order to strengthen the meshing of the building in the green areas, a pedestrian passage (in place of an existing car park) was introduced along the southwest facade—an avenue of composer's monuments. Along the entire length of the pedestrian route, along the border of the neighboring development quarter, a spatial support structure for plants is designed, constituting a sequence of elements: a "music lovers' haven," footbridges, glass canopies, green patios of underground floors, staircases, bicycle parking, technical infrastructure. The transport zones with an unloading bay are located under a green roof, making the entire surroundings of the main building accessible to the city's inhabitants and music lovers. The entrance to the underground car park and unloading zone is located on the southern side, from Ignacego Paderewskiego Street. The second entrance, from Stanisława Staszica Street, is used for the above-ground parking zone for coaches and vehicles.

The main entrance to the historic building retained its role, while also providing an entrance for music lovers and visitors to the extended part. Under the formal square in front of the main entrance to the Philharmonic building, a new Chamber Hall was sited, visible from the outside through the glass floor—lit up during concerts. The entrance for artists, administration, technical and service staff is located in the new administration building. This building also houses the entrance to the restaurant (also accessible from the main building) and the audience service department. The respective areas—for music lovers and employees—are accessible from the levels of the underground car park.



Fig. 8. Conceptual design of extension and remodeling of Pomeranian Philharmonic by Kozień Architekci, aerial view; 2020.

Ryc. 8. Projekt koncepcyjny rozbudowy i przebudowy Filharmonii Pomorskiej opracowany przez Kozień Architekci, widok z lotu ptaka; 2020.

One of the important assets of the place is the green surroundings of the Pomeranian Philharmonic and the Music District in which it is located. The representative form of the building is emphasized both by the layout of the green park and the composition of the multimedia fountain. A specific musical *genius loci* is also created by such elements as monuments to composers. The solution adopted in the competition assumed maintaining this state with the maximum introduction of attractive green forms shaping the structure and blending with the park. The proposed green areas on the plot are mainly roof gardens and vertical gardens. In front of the eastern facade, a carpet of perennials and grasses was introduced in an arrangement of colorful strips. In front of the administration building, a sunken garden, a vertical garden of climbing plants on a pergola frame and a belt of raised beds planted with warm-colored plants were used. The strong form of the building is complemented by ground-cover plants and evergreen hedges, so that it can also act as decoration in winter. The flowerbeds leading up to the multimedia fountain



Fig. 9. Conceptual design of extension and remodeling of Pomeranian Philharmonic by Kozień Architekci, plan of underground level -1; 2020.

Ryc. 9. Projekt koncepcyjny rozbudowy i przebudowy Filharmonii Pomorskiej opracowany przez Kozień Architekci, rzut poziomy -1; 2020.





Fig. 10. Conceptual design of extension and remodeling of Pomeranian Philharmonic by Kozień Architekci, cross-section A–A; 2020.  
Ryc. 10. Projekt koncepcyjny rozbudowy i przebudowy Filharmonii Pomorskiej opracowany przez Kozień Architekci, przekrój A–A; 2020.

were planted with hedges and roses. The plants were deliberately chosen to be attractive year-round, flowering times, color and texture, and seasonal coloring.

The main building, remaining a free-standing landmark in the city, is also becoming an open object, vibrant with life not only at concert times. In this way, it subscribes to Ray Oldenburg’s idea of the “third place.” The main entrance and hall no longer serve only the Large Hall and the Small Hall, but also lead to the new Chamber Hall and a number of public spaces: a restaurant, media room, gallery or banquet halls located on the first underground level. It is to be a cultural facility serving not only as an area for acquiring knowledge or aesthetic pleasure, but also as a meeting place.

The second underground level provides space for the musicians’ artistic work and relaxation. The rehearsal rooms, waiting rooms and canteen for the employees are located on the green patios or under the glass roofs, so as to provide the musicians with an intimate and friendly atmosphere for creative work. Office spaces were placed in the administration building, and a music library as well as rest and guest rooms on the top floor.

The principle of the renovation of the existing building was based on the conservative character of the works, the preservation of the facade and the functional and spatial arrangement of the formal, generally accessible rooms, and in particular the Large Concert Hall, cloakroom lobbies, ground floor and first floor foyers, western staircases. It was assumed that the original coloring of the facade and walls in the representative and public areas would be restored. The basic interference changing the character and spatial arrangement concerns the Small Hall and the basements of the building.

## Conclusions

Cities are constantly changing and buildings are an important part of this transformation. The needs to provide adequate working conditions for artists and comfort for audiences and participants in cultural life are increasing. The new objectives of cultural institutions today include not only the preparation and presentation of artistic works, but a range of integrative and recreational activities. On the other hand, an important aspect of the redevelopment or extension of existing cultural buildings, which are often subject to conservation, is the protection of existing values. The competition design by Kozień Architekci can serve as an example of this, where the basic assumption of the conceptual proposal was to protect the existing urban and architectural layout. The provisions of the binding plan allowed for the extension of the historic building from the eastern side. However, an attempt was made to carry out a completely underground extension, also permitted by the plan. The strong formation of the free-standing edifice in the green areas, being a continuation of the assumptions of the plan from the beginning of the twentieth century and the idea of a garden-city, and at the same time the beginning and the central element of the Music Quarter, were maintained. The underground extension made it possible not only to maintain the free-standing character of the building, but also to retain one main formal entrance to the entire concert hall complex. In this way, the authors have proven that the need for extension can be successfully satisfied without having to change the spatial layout that has been established over the years.

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<sup>4</sup> Eadem, *Koncepcja dzielnicy muzycznej – przykład przestrzeni tematycznej, element tożsamości miasta* [in:] *Naród sobie*, op. cit., p. 112.

<sup>5</sup> M. Puto, *Filharmonia Pomorska – nowe pokolenia*, [in:] *Tożsamość zapisana architekturą i muzyką – Filharmonia Pomorska*, ed. M. Urbańska, M. Grochowina, Bydgoszcz 2020, p. 11.

<sup>6</sup> Uchwała nr LXVI/1386/18 Rady Miasta Bydgoszczy z 26 września 2018 w sprawie miejscowego planu zagospodarowania przestrzennego “Śródmieście – Filharmonia Pomorska” w Bydgoszczy, Dz.Urz. Województwa Pomorskiego 2018, item 4998.

<sup>7</sup> Design team of the first-prize-winning entry in the competition: architecture: Marek Kozień, Magdalena Kozień-Woźniak, Katarzyna Kozień-Kornecka, collaboration: Joanna Filipek, Jakub Dziewoński, Jitendra Buragohain, landscape architecture: Agata Zachariasz, Krystyna Szar, acoustics: Tadeusz Kamisiński, Visualisations: Rafał Barnaś.

<sup>8</sup> *Tożsamość zapisana architekturą i muzyką – Filharmonia Pomorska*, ed. M. Urbańska, M. Grochowina, Bydgoszcz, p. 83.

## Abstract

The necessary conditions and needs for the adequate functioning of cultural facilities are constantly changing. These necessary transformations form the basis for decisions to rebuild and extend existing cultural buildings, often subject to conservation protection. To design means seeking a balance between new program conditions and protection of the historical, aesthetic, socio-cultural, or functio-spatial values of a monument. The competition design by Kozień Architekci serves as an example of this. The architects demonstrated that the need for extension can be successfully satisfied without having to change the spatial layout of the city established over the years. This article presents the history of the site and construction of the historic building that was the focus of the design by Kozień Architekci, the competition guidelines for the building's extension and renovation, and the competition work that is to be the basis for project execution.

## Streszczenie

Niezbędne warunki i potrzeby odpowiedniego funkcjonowania obiektów kultury ulegają ciągłym zmianom. Te konieczne przekształcenia stanowią podstawę decyzji o modernizacji, przebudowie czy rozbudowie istniejących budynków kultury, często podlegających ochronie konserwatorskiej. Projektowanie to poszukiwanie równowagi pomiędzy spełnieniem nowych warunków programowych a ochroną wartości historycznych, estetycznych, społeczno-kulturowych czy funkcjonalno-przestrzennych zabytku. Przykładem jest projekt konkursowy opracowany przez zespół Kozień Architekci, który udowodnił, że potrzeba rozbudowy może zostać pomyślnie zrealizowana bez konieczności zmiany utrwalonego przez lata układu przestrzennego. W artykule przedstawiona została historia miejsca i budowy zabytkowego gmachu będącego przedmiotem projektu pracowni, wytyczne konkursowe dla rozbudowy i remontu oraz praca konkursowa, która ma być podstawą realizacji przedsięwzięcia.

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## Shaping the World Picture: Notes on Andrzej Piotrowski's *Architecture of Thought*: Part II

### Kształtowanie „światoobrazu”. Wypisy z książki *Architecture of thought* Andrzeja Piotrowskiego. Część II

**Słowa kluczowe:** Dziedzictwo architektury, odbiór fenomenologiczny, analizy niewerbalne, technologia myślenia, aksjologia przestrzeni, ontologia, prezentyzm

**Keywords:** architectural heritage, phenomenological reception, non-verbal analyses, technology of thought, axiology of space, ontology, presentism

The first part of this paper, entitled *On the Need for Ontology: Notes on Andrzej Piotrowski's Architecture of Thought*, was published in “Wiadomości Konserwatorskie – Journal of Heritage Conservation” 2021, No. 66.

#### Introduction

Architecture scholars and theorists rarely reach for the non-verbal areas of its design and study. Just as they rarely draw on the sphere of the non-visual perception of transforming space. The confinement to visual perception of transforming space was inherited from the Greeks. It entered our culture through, among other means, Plato's work, as Plato “[...] had the visual eye of a Hellene, an eye equal in terms of nature to the one with which Polykleitos recognized the canon and the same nature that the Greek mathematician who directed towards pure geometric forms.”<sup>1</sup> This was possible because of *λόγος* (*logos*)—Greek wisdom (and word) took on the form of a canon. Greek art excellently confirms this. Architecture and sculpture in Greece was based on a “canon” (which corresponded to *nomos*, the law that governed music). Canon (differently than rules applicable in other cultural communities)

expresses an essential “rule of perfection,” which the Hellenes recognized in perfect proportion that could be expressed in numbers.<sup>2</sup> In this context, we should remember the deepest meaning of the word “to look” in ancient Greece. “In various forms of cultural activities, one thing was common: looking, gazing.” To the Greeks, as K. Kerényi noted, “looking and festivity were linked with each other by their very nature.”<sup>3</sup> And: “the correct fulfilment of Greek religiosity can be characterized—from the side of a subjective experience—as a special type of seeing: as the visual knowledge of people in a festive mood.” This is why the religious experiences of the Greeks are, according to Kerényi “primarily a visual experience [...] if we want to characterize the style of Greek religion in terms of its predominant experience, we are in the right to call it a religion of vision.”<sup>4</sup>

As our entire Latin cultural circle was shaped by this viewing and thinking of classical Greeks, it is difficult to find the matter of transforming space in non-verbal analyses or ones that are detached from “retinal” (Pallasmaa) perception. Especially as all philosophies after Plato developed in his shadow. His rules that governed existence: one that births ideas that give birth to objects

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and phenomena, will come to be found in varying degrees and configurations, yet unchanging.

One exceptional scholar who analyzes and problematizes space in a phenomenological view, which is verbal, is Andrzej Piotrowski of the University of Minnesota. To highlight the transformation of space as the work of a thought process (an architecture of thought) even more, Piotrowski reached to experiencing space by cultures as different as those of Mesoamerica, Byzantium or of the Victorian period.<sup>5</sup> We have already discussed his greatly interesting analyses of the architecture of the Lublin Renaissance and Byzantine and Gothic architecture in the context of religious and political doctrine on the pages of the “Journal of Heritage Conservation,”<sup>6</sup> as an important contribution to viewing cultural heritage.

He stressed, as did Guardini, that it is responsible for the complete domination of human thought by “rationalism.” Present since the Renaissance, towards the nineteenth century, a world shaped by machines gained supremacy.

However, it is difficult to agree with Piotrowski’s presentism, which presents the history of the Pan-American conquest from a present-day perspective. Of course, axiologically, the age of slavery in North America, the conquests of the Spaniards and the Portuguese in South America, or the European wars of religion are shameful, but they are so by contemporary standards; this does not contribute any new impulses to the image of today. Nietzsche warned against retrospection, which is the domain of the conscience, and against projection, which is the imposing of Platonic ideals that we have not risen up to in the past, into the future. “My conclusion is—Nietzsche writes—that the actual man presents a much greater value than a ‘coveted’ man from any of previous ideals.”<sup>7</sup> Nietzsche pointed to the tragedy of being that obscures existence ahead of Heidegger—he separated the ontological from the ontic.

This paper is the second critical text on Andrzej Piotrowski’s book *Architecture of Thought*. The first, which was published in “Wiadomości Konserwatorskie – Journal of Heritage Conservation,” concerned Piotrowski’s non-verbal analyses of Byzantine, pre-Columbian architecture and—which is especially significant to us—that of the eastern lands of Poland of the seventeenth and eighteenth centuries.<sup>8</sup>

### Shaping the world picture

We easily agree with Piotrowski that the verbal perspective of presenting the process of a work’s creation and experience “usually eliminate what makes architecture unique—the inherent ambiguity of its meanings. [...] Buildings and urban spaces have an inexhaustible capacity to reveal the traces of previously overlooked cultural and political phenomena. It is as if material constructs that surround people and frame their interactions record life in its fullest complexity.”<sup>9</sup>

It appears that we must also discuss other exceedingly important thoughts by Piotrowski, which refer to the world picture, as Martin Heidegger described contemporary existence.<sup>10</sup> The essence of today’s architecture as a part of popular culture appears to be completely obscured by the “shroud of being.” It appears exceedingly important to scholars of monuments or contemporary cultural treasures<sup>11</sup> in the light of the humanist thought proposed by Piotrowski. In his studies, Andrzej Piotrowski presented how, over the span of a century, space became taken over, as a commodity; how consistently it shaped not only objects of perception, but also, and more importantly—imposed a manner of designing and creating this perception. Categories of perceiving space were imposed, a specific “technology of thought,” as the author wanted it, was imposed. “Architects compete because the market constantly monitors their performance and rewards those who produce better, or rather more spectacular, responses to comparable programs, sites, and budgets. This approach would not be possible, however, without a less obvious assumption: an uncritical trust that people are actually aware of what they need and can articulate what they desire. This trust produces an impression that, for example, architectural fashion is benign, a mere expression of the freedom of choice and somehow capricious attitude that clients have toward aesthetic preferences. Complex issues of contemporary buildings—ways in which they are infused with meanings and partake in shaping people’s identities and aspirations.”<sup>12</sup>

Our contemporary form of shaping the space of the world picture emerged slowly over the course of evolution, which has rapidly picked up the pace during the reign of industrial capitalism. This civilizational formation, via science, philosophy and art, learned to control thought, the technology of thought, as presented by Piotrowski.

“[...] technology of thought emerged the way architectural ideas evolve. Architects became only a fraction of those who started to design lived reality. Buildings and cities were included in the category of mutable constructs that could explore the same issues probed by viewing devices and mass media. In this way, architecture was aligned with forces that succeeded in developing permanently ductile modes of symbolic thought—the foundation of the market economy and the culture of consumerism.”<sup>13</sup> The material symbols of change in the manner of perception were mass-produced “instruments for looking.” Inventions of optical devices, which were the practical consequence of Isaac Newton’s (1643–1727) discoveries and those of his successors, contributed to a complete change in modes of seeing and in the viewer. Piotrowski, citing Jonathan Crary, indicated that along with the industrial production and sale of optical inventions, a fundamental change took place. The previous model, shaped by direct experience, or camera obscura, was replaced by devices whose goal was to compete with traditional vision, “a surface of inscription on which a promiscu-



ous range of effects could be produced.”<sup>14</sup> However, in contrast to Crary, Piotrowski noted that one of the “scientific toys” with the most profound significance was the kaleidoscope. Today we can find it at any flea market stall. However, at the time, it attracted interest among the elite and has forever (at least until today) changed the form of perception and its shaping. The novelty it introduced was change for change’s sake, successive alterations without a hierarchy of mutual links or purpose. It is a play with variable (kaleidoscopic, as we now say) forms, purely for enjoyment. Differently than in nature, where changes in form are a strategy of genes that dictates the behavior of a species, the changing view in a kaleidoscope only serves entertainment. Scholars like Crary, cited by Piotrowski, highlighted the greater significance of inventions like photography, the stereoscope or the kaiserpanorama. However, it appears essential that increasing techniques of photorealism replaced drawings in popular pictorial messaging. “The emerging market of mass-produced commodities was the most discernable force behind the industrial revolution. It needed fresh ways of representing, interpreting, and evaluating reality.”<sup>15</sup>

“[...] mechanically replicated images hold the key to the process of creating interest and assigning meanings to things [...] In a repetitive manner, magazines and posters could repeat and refine successful practices, as well as disseminate their messages to masses of people. Commercial advertising closed the financial feedback loop.”<sup>16</sup> Illustrated magazines appeared—a new tool of influencing opinion and advertisement. [...] The improvement of accuracy in image reproduction was crucial in shaping this function of newspapers. When illustrated, they gained a kaleidoscopic quality. Images functioned like pieces of tinsel in the kaleidoscope.<sup>17</sup> Photorealism became a tool that allowed freedom in piecing the perceivable world and to manipulate its image as in a kaleidoscope on the pages of the magazines.

One excellent case of such activity was the “Illustrated London News” (“ILN”) that Andrzej Piotrowski analyzed. The editors of the magazine, during the Great Exposition in London (May–October 1851) decided that their goal was to “speak to the eye.” “Pictures... have the great advantage over words, that they convey immediately much new knowledge to the mind they are equivalent, in proportion as they approach perfection, to seeing the objects themselves; and they are universally comprehended.”<sup>18</sup>

Piotrowski noted that steadily improving methods of presenting reality are accompanied by a development of subtle methods of manipulating these presentations. He pointed to the growing divide from perfect photoreal images from the content of symbolic shapes produced and affirmed by cultural patterns as myths, and historical, philosophical or religious narratives. Thus, on the one hand, newspapers verify “objective truth” by using scientific instruments that merely reproduce reality, while on the other they deliberately and subtly alter this “objective” image to obtain the correct reac-

tion. Using convincing cases, the author demonstrates that images “create an impression that they disseminate truthful information about empirical reality, while at the same time they operate in the unverifiable realm of perceptions, emotions, or desires. By shaping reasons for observing, implying a correct way of viewing and interpreting, and legally affirming the truthfulness of the mechanical reproduction of appearances, they identify and target essential aspects of meaning production.”<sup>19</sup> We can also observe how such activities affected the shaping of the enthusiastic reception of a scientific perception of the world, including the so-called taxonomy and autonomy of academic disciplines. “Emblematic of the nineteenth century, totalizing orders or evolutionary sequences would not have been so widely and uncritically accepted if not for the representational training—symbolic practices that created interest and presumed trust in things invented or scientifically justified. Images, those printed in magazines as well as the holistic visions painted in one’s mind, were instrumental in these process.”<sup>20</sup> Using the case of the “ILN,” Piotrowski demonstrated an evolution in the application of the “technology of thought” to manipulate the reception of information and thus shaping opinion.

In successive examples, he shows how successive experiments with composition, information, a mosaic of truth and falsehood, important and trivial things (such as technical drawings of major inventions mixed with technically identical drawings of evidently ignorant inventions) test and train public reception. “These were all experiments with blurring the distinction between commercial promotion and representations of lived reality—a fascinating spectrum of which were published in the ‘ILN.’”<sup>21</sup> One key method was maintaining an apparently fundamental division into commercial and non-commercial messaging, with the latter suitably modified so that its presentation “seemingly protected purity, truth, honesty, or at least elegance, in things worthy of knowing and discussing.”<sup>22</sup> These were trainings mainly at the subliminal level, whose desired perception was obtained by a “kaleidoscope effect” and the proper composition of images. “These were all experiments with blurring the distinction between commercial promotion and representations of lived reality.”<sup>23</sup>

A separate issue, yet closely linked with the above-presented causes of the author, is the evolution of advertising in this context. Piotrowski, tracing advertisements of the Pears Soap Company over the decades, showed the techniques the company had been using, such as subconscious associations with the might of the British Empire, “aging” the product’s origins, and referencing to classical sources of Anglo-American culture or overtly sexual subtexts and voyeurism. Another form was to add the advertised product or its name to an image from high culture, for instance by a recognized artist. The discrete addition of the soap’s name to the content of an academic painting shows this mixing of symbolic meanings; or religious, political, or

academic contexts (independent science experts). In more general terms, advertisers sought “symbolic vulnerabilities in lived reality,” wrote Piotrowski.<sup>24</sup> One method that was devised at the time was contrast and shock induced in the reader. As a part of using such measures, one advertiser placed—and depicted in an advertisement—a gigantic advert on the Cliffs of Dover. As the Cliffs of Dover are “a traditional symbol of defiant British sovereignty,” defacing it with “slogans touting soap” induced a commercially profitable shock. Although it did lead to the passing of one of the strictest anti-advertisement acts of Victorian England—the Dover Corporation Act.<sup>25</sup> All these practices led to the development and widespread use of sophisticated techniques of presenting and thought, as manipulating the symbolic thinking of viewers (technology of thought) in the first decades of the twentieth century. During the industrialization period, it was acknowledged that it is advertisement makes an ordinary object something desirable (Marx). “Capitalism created people who operated like viewing devices, who could see any physical or cultural reality as open to commodification. They no longer needed physical manipulation of fragmented images to transform the world. They could, for example, employ a photographic camera, an apparatus guaranteeing the scientific accuracy of a recorded view, to photorealistically represent such worlds as the repository of means necessary to generate profit”—Piotrowski concluded.<sup>26</sup> It was at this time that a typically Victorian product was created and “objectivized” as an obvious concept of “good taste.” Even today, it allows one to impose a measurable, irrefutable opinion while also co-creating and pursuing constantly changing fashion. It is essential that these actions dominated these kaleidoscopic change for change’s sake. They have the desirable limitless flexibility of relations between symbolic and material structures. The world changed into a financial-political system of rewards—when one was an obedient consumer, or punishment—when one could not afford to make their dreams come true.

To us, from a perspective of architecture as a discipline, including heritage conservation doctrine, as a part of national cultural treasures, the reflections on contemporaneous understanding of architectural styles are of particular interest. As seen in the text under discussion, most theorists abided by their academically correct interpretations. Gottfried Semper presented a different approach, as he had seen, as Piotrowski quoted, industrial buildings without ornamentation as unconditional progress: “the free will of the creative human spirit is the first and most important factor in the question of the origin of architectural styles,” and their changes drive “powerful individuals or corporate bodies.”<sup>27</sup> He saw progress in the collapse of traditional forms of production and spatial forms. However, his arguments on clothing and decoration, in which he encapsulated the quintessence of contemporaneous “technology of thought,” as Piotrowski presents it, were extraordinary. Semper associated ornamentation

and attire with theatrical practices, claiming that “the denial of reality, of the material, is necessary if form is to emerge as a meaningful symbol,” and an artist or architect can be said to have achieved the greatest success when they have “masked the material of the mask.”<sup>28</sup> According to Piotrowski, this summarized an already well-grounded belief that polarization and free operation with material and symbolic aspects were necessary to apply the latter to mask the former. “Only when the material structure was presumed meaningless could a building [...] carry various masks of meaning. Arbitrarily selected and arranged, pieces of meaningful appearances could then be glued together by themed narratives to create an impression of symbolic integrity. In this way, buildings could indiscriminately admit symbolic references, historical styles, or commercial messages.”<sup>29</sup>

The peak achievement of advertising in this context was the Pears building that had been built in London at the time, and which the “ILN” described as follows: “a palatial edifice in New Oxford Street, London. The ILN heralded it as ‘one of the grandest architectural works’ constructed during the Jubilee Year of Queen Victoria and reaching ‘the highest grade of artistic advertising.’”<sup>30</sup> The eclectic architecture built in the late 1980s and 90s was erected not only as a loose mixture of styles freed from the rigors of canon. “it celebrates the total control of meanings and the disappearance of any need for architecture-specific qualities, those visual and material phenomena that could clutter literal symbolism. It equates architecture with referencing a well-formed system of signs and constructing a narrative that holds a collage of signs together. This businessman’s vision represents the complete dismantling of the old ways of thinking about buildings, and the new modality of perception and sense-making mirrors the capitalist techniques of meaning production.”<sup>31</sup> This is how Piotrowski summarized the sequence of his study of eclectic architecture, of developing Victorian capitalism.

Another area of discussion of the “technology of thought” in architecture that Andrzej Piotrowski investigated in his book *Architecture of Thought*, was Le Corbusier’s High Modernism. It is to Le Corbusier’s genius that we owe the radical change in the shaping of space in the twentieth century. The works of his acolytes in 1960s and 70s Poland are a meaningful contribution to the heritage of Polish culture, and as such should be placed under statutory conservation.<sup>32</sup> Contrary to architects of the Victorian era, Le Corbusier saw no conflict between the mission of an architect—a classically educated artist—and that of a pragmatic engineer—a personification of modernity. His departure from the legacy of the nineteenth century was to create a new audience, a new man, who would live in “machines for living in” and “ideal cities.” A symbolic proof of this was the replacement of the classical canon of proportions—the figure of a man inscribed into a circle and square, with the “modulor”—a new grid of proportions based on the “golden ratio.”<sup>33</sup> The aporias of

the harmonic courses of a distance of 173 cm (Le Corbusier's height), when measured against 189 cm (the height of Jerzy Sołtan)<sup>34</sup> are a good illustration of the dogmatism of the rational hypotheses from "Corbu's" teachings.

In his book, Andrzej Piotrowski studied one of the less known, or rather less documented aspects of the image of the great architect, one which he himself wanted to preserve for us. He argued that Le Corbusier excellently combined the tradition of nineteenth-century capitalism, not only in his house designs, but in creating the manner of perceiving his message and his figure. For instance, Piotrowski presented how he had manipulated a photo of grain elevators from the famous article by Walter Gropius in 1913.<sup>35</sup> These forms, now canonical for Modernism, which were to testify about the "pure, geometric, cubist forms" were used by Le Corbusier to illustrate his artistic arguments after precise interpretation. Clear retouches of the original, borrowed photograph, clearly show his overt intentions. Although honesty was a prime tenet of Modernism, the architect retouched reality, bending it to his assumptions; "Such modifications were often more competently executed, but these types of pictures illustrate many of his books and a variety of subjects. He even altered depictions of famous historical monuments"—noted Piotrowski.<sup>36</sup>

Citing research by Beatriz Colomina, it can be stated that conceptual work never ended: even the photographs of completed houses had been manipulated. "Photography and layout construct another architecture in the space of the page."<sup>37</sup> Le Corbusier's all-encompassing "technology of thought" began to emerge already during formative tours, noted down on the pages of early photographs and sketches. Firth photographs, and then—better—sketches presented an evolution of informed reception and the transformation of conscious perception. Photographs and drawings, initially narrative, utilizing established symbolic messaging, became denotative, they pursued a new means of communication. These later drawings experimented with the perception of reception, focusing his attention on a created image.

Among examples of this directing of the draftsman's attention, and thus creating perception, are three sketches made by Le Corbusier on the same day, from the same place, the pretext for which supposedly came from the view of Michelangelo's dome from the Vatican gardens. It is visible how greatly the imposed theses of perception affect the end result, without any practical relation to the matter that provided the impulse to create. "Designers should actively participate in that ordering; they should not only compose the material world but, first of all, they should constantly organize perception and thinking itself"<sup>38</sup>—stated Piotrowski. Le Corbusier was able to put his talent as a creator of perception to use as the publisher (financial head) of "L'Esprit Nouveau," which was published thanks to advertisements, and later of his own books. The afore-

mentioned correction of images to steer perception is a matter of course here: when he discussed the strength of spiritual impact/perception of a "pure" interior, he simply "purified" it by retouching the photo. He administered this procedure as if "right before the eyes" of the reader. As claimed by Andrzej Piotrowski, Le Corbusier had made use of the fact that after over a century of training, readers had come to accept that images are intended to actively shape specific forms of seeing and interpretation, as if they were sketches. "When he graphically alters old monuments of architecture or keeps redrawing his own projects long after they have been physically constructed, Le Corbusier does nothing more than act as a modern designer of symbolic thought."<sup>39</sup> He quoted Le Corbusier himself: "the true purist work should conquer chance and channel emotion; it should be the

rigorous image of a rigorous conception' which offers 'facts to the imagination.'<sup>40</sup> Nineteenth-century colonialism and well-established capitalism initiated the manufacture and use of total scientific knowledge covering history and nature. Scientists and inventors offered humanity new ideas that holistically organized the lives of societies and individuals. Capitalism, as a consequence, abolished pre-existing, traditional hierarchies of values and axioms encoded in symbolic structures.

The twentieth century and its most significant thought current—Modernism—normalized the use of science, knowledge and rational solutions, whose apparent goal was progress. The architect "disciplines" of CIAM held a firm belief in the role of modern architecture in the progressive shaping of a progressive society and a progressive man. In Andrzej Piotrowski's book we can find a well-known photo from the "L'Esprit Nouveau" from 1925 Paris, in which Le Corbusier gives the French minister of public education and the arts a tour of a pavilion that he had designed. The architect and the lawmaker are seen hunched over the Plan Voisin—a design that featured the demolition of half of Paris and the relocation of hundreds of thousands of residents to gigantic skyscrapers, which were intended to replace the traditional city. How close are we in symbolism to a photo of Albert Speer and Adolf Hitler going over a model of a gigantic Berlin—the capital of the Reich of a Thousand Years. Such totalitarian powers as those known from the twentieth century, which brought totalitarian visions of societies and transforming space, would not be possible without the silent approval of the majority, which places its faith in such visions. As argued by Piotrowski, this approval was programmed, tested and trained for over a century of experiments with the technology of thought, the potential to steer the reception of communication. The method of Andrzej Piotrowski's view of the transformation of space—of architecture—undoubtedly meaningfully enriches the critical body of analyzing the ways in which its design emerges and how it affects its audience.

Romano Guardini observed that contemporary people, that is “Modernist and Postmodernist,” use borrowed terms in their reception of space. Its perception is completely secondary.<sup>41</sup> The moment of the “rupture” of humanist design and perception, as understood by the Greeks and the “inhuman” (or modern and timeless) took place around 1830–1870 according to Guardini. Around this time, as demonstrated by Andrzej Piotrowski, there appeared a completely new view of the shaping of the perception of the transformation of space and the criteria of assessing its transformation.

However, these are not purely epistemological studies, as Piotrowski would have it. These analyses are backed by partially axiological arguments. Which in itself is not incorrect, when one is aware of it. The greatest limitation any investigation faces is the investigator. Here we enter a dispute on worldview, or even personality—about the definition of progress. It is clearly evident in the putting forth of axiological arguments by

Piotrowski. All we can do is quote the words of Rainer Maria Rilke from *Requiem*: “Who is speaking of victory? To survive is everything.”<sup>42</sup>

We must become used to the contemporary formula of axiological correctness—the rewriting of history from the position of the descendants of slaves and the oppressed, and those of sexual and religious minorities. Nowadays this is morally well-received, yet it is epistemologically fruitless.

It also appears that such presentism distances us from insight into architecture as a discipline of art, as defined by Rainer Maria Rilke: to him, art appeared an individual’s pursuit to, above discomfort and darkness, communicate with all things, both the smallest and the greatest, and through such ceaseless dialogues come closer to the quiet sources of all life. In his view, the mysteries of things meld inside the individual with their own deepest feelings and manifest as if in its own yearning. Beauty is the rich language of these intimate confessions.<sup>43</sup>

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<sup>5</sup> Andrzej Piotrowski, *Associate Professor at the University of Minnesota*, <https://design.umn.edu/directory/andrzej-piotrowski> (accessed: 7 IX 2021).

<sup>6</sup> Cf. O. Salata, B. Stelmach, *O potrzebie ontologii. Wypisy z lektury Architecture of thought Andrzeja Piotrowskiego*, “Wiadomości

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- <sup>20</sup> Ibidem, p. 166.
- <sup>21</sup> Ibidem, p. 171.
- <sup>22</sup> Ibidem, p. 172.
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- <sup>32</sup> Cf. A. Białkiewicz et al., op. cit., p. 152–162.
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## Abstract

Phenomenological studies are of fundamental significance to the discipline of architecture and urban design. Gaining insight not the transformation of space by coming into contact with space "in and of itself" has an essential weight in a period of Heidegger's world picture. Such rarely encountered non-verbal analyses are presented by Andrzej Piotrowski in his book *Architecture of Thought*. The authors, in recognition of the weight and originality of Piotrowski's studies, point to the "axiological trap" that is based on a partial formulation of evaluative hypotheses instead of epistemological analyses. We can therefore accuse them of presentism—an ahistorical perception of phenomena and mechanisms. In this context, it is necessary to bring up the thought of Friedrich Nietzsche, that only the present exist. The past and future are illusions. His concept of time forces a phenomenological perception of reality, here and now, as well as an ontic reflection via an existential, individual experience of each and every one of us.

## Streszczenie

Dla dziedziny architektura i urbanistyka zasadnicze znaczenie mają badania fenomenologiczne. Poznanie przekształcania przestrzeni poprzez obcowanie z przestrzenią „samą w sobie” ma w dobie heideggerowskiego „światoobrazu” zasadniczą wagę. Takie rzadko spotykane niewerbalne analizy prezentuje Andrzej Piotrowski w swojej książce *Architektura myśli (Architecture of Thought)*. Autorzy artykułu doceniając wagę i oryginalność badań Piotrowskiego, wskazują na „pułapkę aksjologiczną”, która polega na częściowym stawianiu tez wartościujących zamiast epistemologicznych analiz. Można tym samym zarzucić im presentyzm – ahisteryczne postrzeganie zjawisk i mechanizmów. Trzeba w tym kontekście przypomnieć myśl Fryderyka Nietzsche, że naprawdę istnieje tylko czas teraźniejszy, przeszłość i przyszłość to iluzje. Jego koncepcja czasu zmusza do fenomenologicznego odbioru rzeczywistości, tu i teraz, do refleksji ontycznej poprzez egzystencjonalne indywidualne doświadczenie każdego z nas.

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## Methods for Protecting, Conserving, Repairing and Reinforcing Highly Vulnerable World Heritage Sites: Guidelines for the Sector BI of the Former KI Auschwitz II-Birkenau Master Plan for Preservation

### Metody ochrony, konserwacji, zabezpieczania i wzmacniania szczególnie wrażliwych obiektów światowego dziedzictwa – wytyczne do Globalnego Planu Konserwacji sektora BI dawnego KL Auschwitz II-Birkenau

**Keywords:** Auschwitz-Birkenau State Museum, Master Plan for Preservation, vulnerable heritage, masonry structures, wooden roof framings

**Słowa kluczowe:** Państwowe Muzeum Auschwitz-Birkenau, Globalny Plan Konserwacji, wrażliwe dziedzictwo, konstrukcje murowane, więzby drewniane

#### Introduction

As early as in the beginning of the 1990s, questions about the future of the Auschwitz-Birkenau Concentration Camp began to be asked with growing concern.<sup>1</sup> The international debate preceding the development of the Master Plan for Preservation (MPP), launched in 2009 in cooperation between the Auschwitz-Birkenau State Museum and the Auschwitz-Birkenau Foundation, stressed the need to provide effective protection for the remains of the last surviving major extermina-

tion center and the largest German Nazi concentration camp—the only place of its kind on the UNESCO World Heritage List—in the name of the victims and as a responsibility for future generations.

The obligation incumbent upon Polish society and the state administration to protect the remains of the former Auschwitz I and Auschwitz II-Birkenau Concentration Camps stems not only directly from the provisions of the law, including the 1972 UNESCO Convention to which Poland acceded in 1976, first by depositing its instrument of ratification and then by

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Fig. 1. Aerial photograph showing the former Auschwitz II – Birkenau camp, BI sector seen in the lower section; source: earth.google.com (accessed: 10 II 2021).

Ryc. 1. Zdjęcie lotnicze ukazujące dawny obóz Auschwitz II – Birkenau, sektor BI widoczny części dolnej; źródło: earth.google.com (dostęp: 10 II 2021).

publishing the Polish text of the Convention in the Official Journal of Laws (Dz.U. No. 32 of September 30, 1976, item 190), but also from the significance that this site has for the Polish nation and the nations of the world. As Piotr M.A. Cywiński, director of the Auschwitz-Birkenau State Museum, stated: “Auschwitz lies at the very center of contemporary experience. There is no way to avoid it in the most important questions about mankind, culture, and civilization today. [...] Caring for what remains of Auschwitz thus serves not only the preservation of the historical Place, but also permits us better to understand the events, challenges, and dangers of the contemporary world.”<sup>22</sup> The preservation of these objects is particularly important now when the last witnesses of the crimes committed here are passing away, because “there is only one thing worse than Auschwitz itself... and that is if the world forgets there was such place.”<sup>23</sup>

The first activities within the framework of the MPP included, among other things, the improvement of the condition of the two historical blocks of the former Auschwitz I Concentration Camp by the principle of minimum intervention<sup>4</sup> as well as the conservation of five wooden barracks, including those used as washrooms and latrines, at the former Auschwitz II-Birkenau site.<sup>5</sup> The greatest challenge of the MPP turned out to be the complex of brick barracks in the oldest part of the former camp in Brzezinka.<sup>6</sup> This sector critically required urgent intervention.<sup>7</sup> This project was a pilot for all brick buildings in sector BI. The aim was

to show whether and to what extent it was possible to fulfil the conservation objectives adopted in the MPP: minimum interference in the preserved substance, preserving it the most intact form possible for decades to come, and at the same time making these buildings available to the millions of annual visitors, something their technical condition previously prevented.

### Auschwitz II-Birkenau, sector BI

Sector BI is the oldest part of the Auschwitz II-Birkenau camp. Work in this sector began in October 1941, using Soviet prisoners of war and prisoners brought in from Auschwitz I as the labor force, and as building materials—everything that could be salvaged from the houses left after the eviction of the inhabitants of the village of Brzezinka. At the turn of 1941 and 1942, in the autumn and winter months, the first six residential barracks were completed, eight were finished and covered with a roof, and in seven others the walls and roof construction were completed. In time, the threshing floors were finished with flat bricks or thin concrete screed.

The interior of each barracks was divided into several dozen of semi-open sections with additional two levels of berths (*buksa* in the prisoners’ slang) intended for four people each. According to SS plans, each barrack was thus designed to hold more than 700 prisoners, and, in some cases, the number was even higher. The brick outer walls were only 12 cm thick

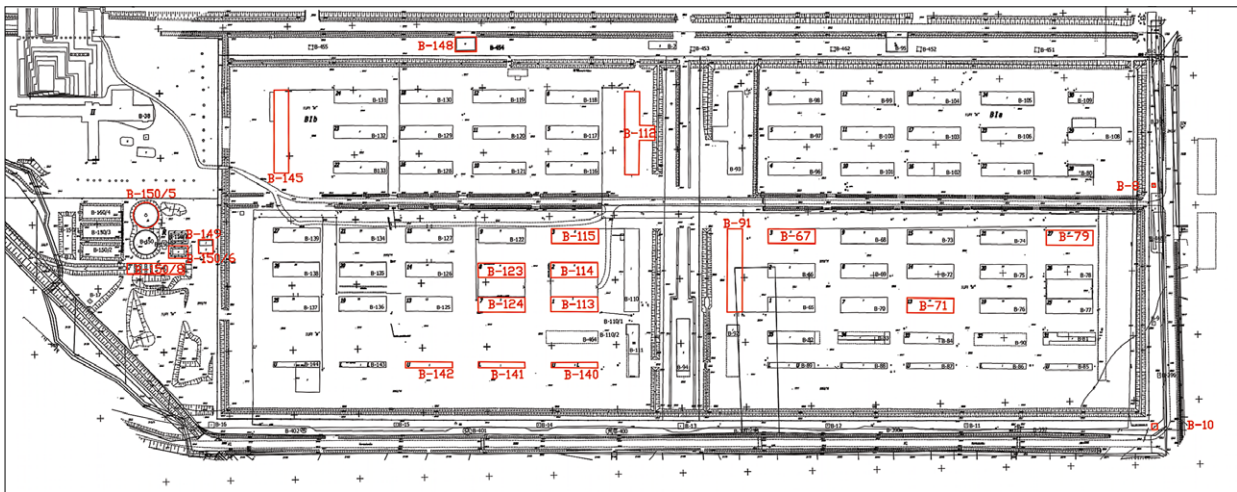


Fig. 2. Map of the buildings of the BI sector subjected to the research project: prisoner barracks (B-67, B-71, B-79, B-113, B-114, B-115, B-123, B-124) and prisoner barrack rellicts (B-146), kitchen (B-91), bath and disinfection barrack (B-112), latrines and washrooms (B-140, B-141, B-142), depository warehouse (B-145), sewage treatment plant (B-150/8), Imhoff tank (B-150/6), sprinkler system (B-150/5), fire tank (B-148), air raid shelter (B-398), sewage pumping station (B-149), guard towers (B-8 and B-10), cesspit (B-467); source: S. Karczmarczyk et al., op. cit., by R. Paruch.

Ryc. 2. Mapa budynków z sektora BI objętych projektem badawczym: baraki dla więźniów (B-67, B-71, B-79, B-113, B-114, B-115, B-123, B-124) i relikty baraków dla więźniów (B-146), kuchnia (B-91), łaźnia i barak dezynfekcyjny (B-112), latryny i umywalnie (B-140, B-141, B-142), magazyn depozytów (B-145), oczyszczalnia ścieków (B-150/8), zbiornik Imhoffa (B-150/6), system zraszaczy (B-150/5), zbiornik pożarowy (B-148), schron lotniczy (B-398), pompownia ścieków (B-149), wieże strażnicze (B-8 i B-10), dół kloaczny (B-467); źródło: S. Karczmarczyk et al., op. cit., oprac. R. Paruch.

and had no ceiling partition, so even with so many people inside, the two iron cookers could not heat such a large space. There were no sanitary facilities of any kind in the barracks. It was only at the turn of 1943 and 1944 that a small part of each barrack was allocated to serve those purposes. When construction work resumed in mid-1942, the subsequently built barracks, most of which had not survived, were made of wood. The windowless barracks of the stable type, designed for 52 horses, were supposed to hold about 400 prisoners.

In total, about 300 barracks as well as other facilities, including administrative buildings, 13 km of drainage ditches, 16 km of barbed wire fences, and several dozen kilometers of roads were constructed on the 170-ha site of Auschwitz II-Birkenau. Most of the buildings, especially the wooden barracks, were demolished by the end of 1944 or destroyed during the evacuation of the camp prior to the entry of the Red Army on January 27, 1945.

The first work by the newly restored Polish government to secure the site of the camp with a view to preserving evidence of the crimes committed there by the Nazis began in April 1946. It was decided to reconstruct some of the buildings, including Crematorium I and the so-called Death Wall at the side of block 11 in Auschwitz I, where the condemned were led for execution. The most solid buildings, the Auschwitz I brick barracks, were used as exhibition areas, while the Birkenau camp was left as testimony not only to the crime but also to attempts to erase evidence of it.

These buildings were not erected with a view to a long-term existence, they had never been intended

to last. And yet, they document the inhuman conditions of life in the camp but also bear the traces left by otherwise anonymous prisoners, such as inscriptions and drawings. Exposed for decades not only to the atmospheric effects but also to other negative factors at the site of the camp (such as high groundwater levels) or resulting from the very circumstances of their erection, they required protective measures that went beyond the state of art as well as any known case study in the field of conservation and cultural heritage.

## Research project

The challenge in the conservation of the brick barracks in the oldest part of the former Auschwitz II-Birkenau concentration camp was not only the very poor technical condition of the buildings, often tantamount to a building disaster but also the lack of a catalogue of good practices and examples to follow. As A. Łopuska emphasized, there are no similar objects in the world in a similar state of preservation, covered by such strict protection at the same time.<sup>8</sup> The pilot project for renovation required, first and foremost, extensive and interdisciplinary research and the development of new conservation methods which could be used in such a sensitive context and at the same time eliminate the replacement of the structure and fabric of the structures with a new or partially contemporary one or the introduction of visible support systems.

The project, carried out in close cooperation with the Conservation Team at the Auschwitz-Birkenau State Museum, involved eight research institutions:





Fig. 3. Barrack B-123, photographic documentation from field research: a—general view, gable wall supported by scaffolding and anti-collapse corset; b—view of the interior, so-called bucks; c—view of the interior, excavation in the floor; d—view of the interior, deformation of the roof truss; photos by B. Krcha 2015.

Ryc. 3. Barak B-123, dokumentacji fotograficznej z badań terenowych: a – widok ogólny, ściana szczytowa podtrzymywana przez rusztowanie i gorset przeciwważeniowy; b – widok wnętrza, tzw. kozły; c – widok wnętrza, odkrywka w posadzce; d – widok wnętrza, odkształcenia więźby dachowej; fot. B. Krcha 2015.

the Cracow University of Technology, the Jan Matejko Academy of Fine Arts in Cracow, the AGH University of Science and Technology in Cracow, the University of Agriculture in Cracow, the Gdańsk University of Technology, the Łódź University of Technology (TUL), the Adam Mickiewicz University in Poznań, and the Research and Education Center for Historic Preservation in Nysa. The project carried out between 2013 and 2016, covered the following issues: research into biological corrosion, research into paint layers, physicochemical and strength tests of materials, research into methods of conserving, protecting and reinforcing mineral, reinforced concrete, metal and wooden elements, and key research into developing methods of conserving, securing and reinforcing the structure of buildings, finishing elements and their subsoil, taking into account the statics and physics of buildings. The latter research scope was carried out by a team of employees of the Faculty of Architecture of the Cracow University of Technology headed by Doctor Stanisław Karczmarczyk in cooperation with Laboratory L-1 of the Faculty of Civil Engineering of the Cracow University of Technology. The Institute of Building Design of the Faculty of Architecture headed by Professor Waław Celadyn acted as a leading entity with the broadest scope of activities.

The scope of the research project carried out by the team of the Cracow University of Technology included, inter alia, description and assessment of the state of preservation of the existing buildings along with systematics of their damage and assessment of the reasons for its occurrence. The analysis of the research results is presented separately in partial reports for each of the studied objects; the technical inspections carried out as well as static-strength calculations of the majority of the structural elements of the structures included in the study were used to develop a global program of structural and constructional safety works in relation to conservation assumptions. The final report summarized the architectural and conservation aspects of the research project and presented guidelines and recommendations for the execution of the works, both descriptively and in the form of drawing documentation. The study also identifies the probable threats to the structural and construction substance of the buildings that may occur during the preliminary and conservation work.

### Defects and risks in the BI sector

The numerous technical defects revealed during the investigation, the effects of which grew over the seventy years of the buildings' existence, and the structural

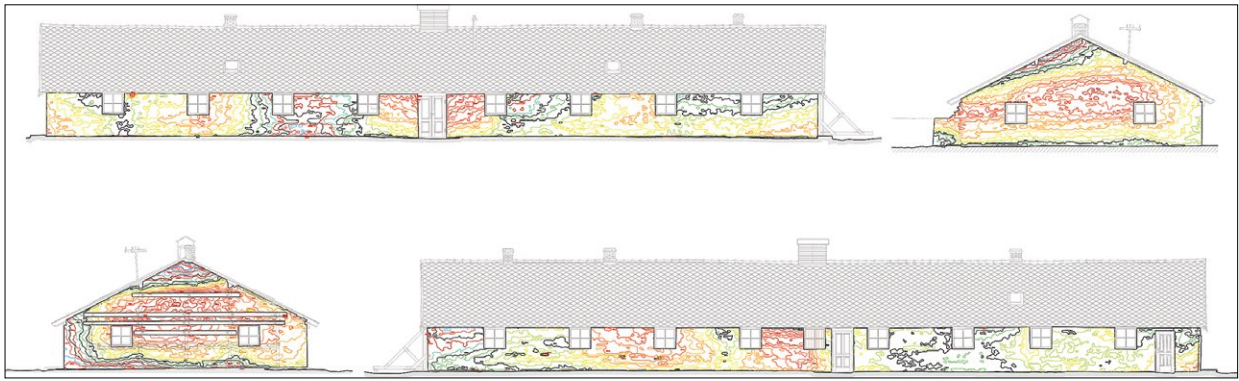


Fig. 4. Image of scanning the longitudinal wall of barrack B-123 based on scans provided by Geotronics Poland; source: S. Karczmarczyk et al., op. cit., by R. Paruch.

Ryc. 4. Obraz ze skanowania podłużnej ściany baraku B-123 na podstawie skanów dostarczonych przez Geotronics Poland; źródło: S. Karczmarczyk et al., op. cit., oprac. R. Paruch.



Fig. 5. Scan image of the gable wall of barrack B-123 based on scans provided by Geotronics Poland; source: S. Karczmarczyk et al., op. cit., by R. Paruch.

Ryc. 5. Obraz ze skanowania ściany szczytowej baraku B-123 na podstawie skanów dostarczonych przez Geotronics Poland; źródło: S. Karczmarczyk et al., op. cit., oprac. R. Paruch.

and constructional conditions required the preparation of individual methods of reinforcement, conservation, and protection. The most difficult tasks in the case of prisoner barracks B-123 and B-124 included restoring the original geometry and original features of deformed and cracked external walls while preserving the original structure of the buildings, ensuring the required level of safety and functional features of the roof load-bearing structure, and stabilizing the foundations of the residential barracks, In particular, protecting the foundations and floors from blow-out phenomena, ensuring the protection of masonry structures and furnishings, including partition walls from capillary rising damp and moisture generated by plant growth and microorganisms.

The high complexity of the research and the tested repair and reinforcement methods resulted from the huge amount of damage found. The most important types of damage occurring in the cubature objects in the BI sector include cracking, spalling and deflection of load-bearing elements related to incorrect statics of the buildings; moisture (the dominant factor for the strength of bricks is the porosity structure, and permanent saturation with ground or precipitation water, frequent in the studied objects, may cause reduction of

strength by 10%, the so-called strength in the state of softening) and salinisation (due to damage or lack of damp proofing, the objects in the BI sector are subject to cyclic dampening several times a year; even at low salt content this causes a systematic process of their accumulation in the near-surface layers and deeper mortars); loss of material properties as a result of biological and microbiological corrosion; extreme strain indexes of wooden elements and lack of global load-bearing capacity of roof structures; and extreme deflections of external walls.

The primary causes of the progressive degradation of BI sector facilities include construction of buildings from demolition materials by unqualified persons; uneven operation of the load-bearing system (wall–foundation) and the roofing (roof trusses defectively supported by insufficiently strong brick walls); lack of sufficient rigidity of curtain walls; uneven settlement of foundations resulting from low bearing capacity indices and a rather high average groundwater table; blowing action of the soil on shallow foundations and floor layers; biological and microbiological corrosion; lack of coordinated work after 1959, especially with regard to vertical and horizontal waterproofing; and acts of vandalism.



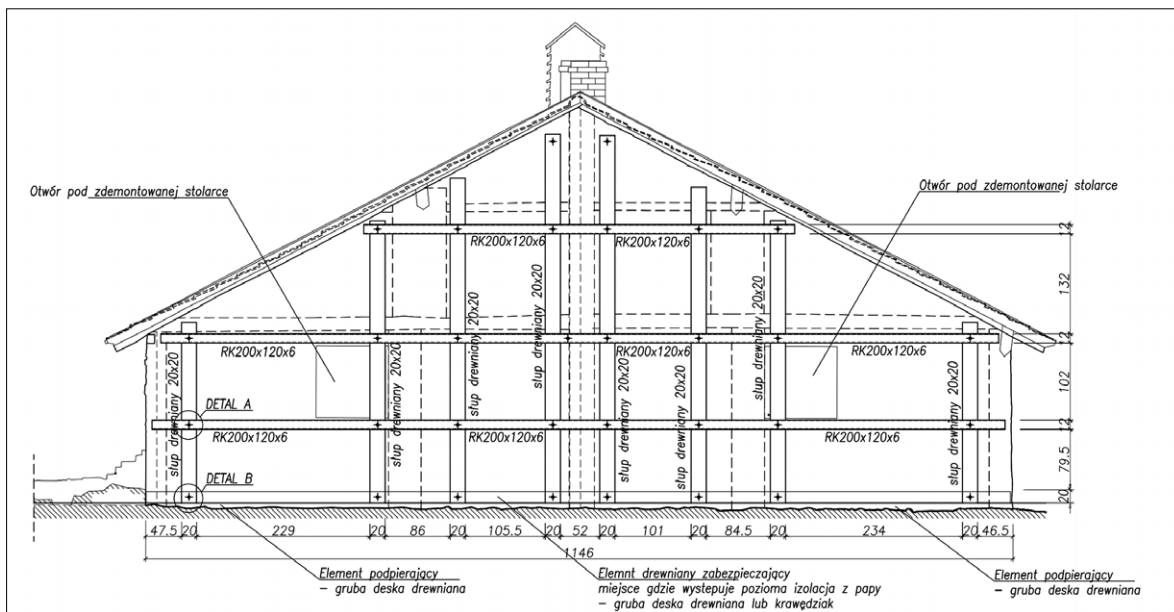


Fig. 6. Western gable wall of the B-124 barrack and the scheme of the strengthening apparatus used in the pilot project; source: S. Karczmarczyk et al., op. cit., by R. Paruch.  
 Ryc. 6. Zachodnia ściana szczytowa baraku B-124 oraz schemat aparatu wzmacniającego użytego w projekcie pilotażowym; źródło: S. Karczmarczyk et al., op. cit., oprac. R. Paruch.

### Innovative methods to secure and reinforce highly vulnerable buildings: Materials and methods

The individually defined scope of work carried out by the Cracow University of Technology team included: investigation of the subsoil, examination of concrete samples taken from the foundations, examination of brick masonry walls together with mortars, examination of moisture and salinity of brick mason-

ry and concrete foundations, examination of wooden elements taking into account verification with resistograph (RESI)—a minimally invasive resistance measurement device, geodetic surveying of geometric deformations of load-bearing elements, analysis of laser scanning of buildings made available by the Museum, review of the technical condition of all load-bearing elements, preparation of 3D calculation models with static-strength analysis, and performance of all other laboratory tests at the Institute of Materials and Struc-

| building | north wall | south wall | east wall | west wall | chimney |
|----------|------------|------------|-----------|-----------|---------|
| B-123    | 60         | 80         | 50        | 70        | 90      |
| B-124    | 40         | 60         | 20        | 60        | 215     |
| B-91     | 30         | 50         | 100       | 70        | 43      |
| B-8      | 40         | 40         | 60        | 40        | none    |
| B-10     | 40         | 40         | 40        | 40        | none    |
| B-113    | 100        | 20         | 20        | 100       | 48      |
| B-114    | 80         | 60         | 20        | 80        | 69      |
| B-115    | 50         | 60         | 30        | 80        | 36      |
| B-67     | 20         | 20         | 100       | 60        | 36      |
| B-71     | 40         | 60         | 20        | 40        | 49      |
| B-79     | 20         | 60         | 50        | 80        | 30      |
| B-112    | 20         | 20         | 40        | 40        | 373     |
| B-140    | 40         | 20         | 20        | 40        | 50      |
| B-141    | 60         | 90         | 50        | 40        | 31      |
| B-142    | 50         | 20         | 60        | 50        | 19      |
| B-145    | 20         | 40         | 20        | 60        | -       |

Table 1. Extreme values of deformation of walls and brick chimneys in objects of sector B1 in millimeters [mm]; by the authors.

tures L-1 Lab. The laboratory work included tests on the minimal number of core samples and other samples taken under the control of the Conservation Team at the Auschwitz-Birkenau State Museum as well as reference samples.

As far as core samples of the foundations are concerned, they were taken from previously prepared open pits in the form of boreholes using a wet diamond drill (75 mm in diameter), and in the external walls—using a dry diamond drill (100 and 50 mm in diameter). Due to the nature of the objects under investigation, samples were taken in extremely limited numbers, in the least visually exposed locations possible, without damaging the drawings or inscriptions. It was also decided to take smaller samples than indicated by the standard method, which recommends samples of 150 mm diameter. The samples identified as necessary for at least this limited range of strength tests to complete destruction were then prepared accordingly and used for other laboratory tests, including moisture and salinity tests.<sup>9</sup>

### Foundations

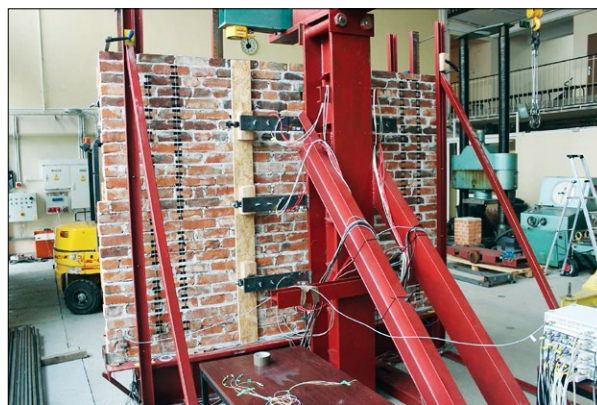
Based on previous research experience and building on the results provided by other parties involved in the project (field, laboratory and computational analysis), the team recommended the reinforced soil injection method as a form of foundation protection.<sup>10</sup> The application of this method makes it possible to increase the mechanical parameters of the soil lying directly under the building and to stabilize the significantly weakened structure of buildings as well as to improve their general stability. This solution also provides protection against the effects of deterioration of ground conditions associated with changes in suspended water levels, which may occur as a result of other works carried out at the site of the former camp or climate change.

In the final report, this method, tested by the team in other projects, including historic buildings, was presented in four variants adapted to the technical condition of the buildings along with a list of preparatory activities, risk assessment and criteria for selection of the variant.

### Brick walls

A considerable number of wall deformations in various directions combined with equally numerous cracks, scratches and spalling of brick walls were found in the studied objects. In order to optimize repair methods, a classification of cracks according to dilation was created and appropriate measures were selected for each class.

The study found a high homogeneity of historic mortars and a large variance in the compressive strength of historic bricks, and consequently a large variance in the compressive strength of masonry cores. The challenges of sampling itself described above were not without impact here. The strength of the masonry



*Fig. 7. Test of a wall straightening treatment using a test wall carried out in Laboratory L-1 of the Faculty of Civil Engineering of the Cracow University of Technology, 2015; photo by S. Kańka.*

*Ryc. 7. Test zabiegu prostowania ściany z wykorzystaniem ściany testowej wykonany w Laboratorium L-1 Wydziału Inżynierii Łądowej Politechniki Krakowskiej, 2015; fot. S. Kańka.*

was lower than the standard, but this was consistent with the initial assessment of the effects of exposure to external factors.

According to the standard, straightening of the walls should be applied in all cases where the vertical deviation exceeds 20 mm. A summary of the extreme values of deformation in the studied objects is presented in Table 1. In the barracks, it reached a value of 100 mm, and in the case of brick chimneys, it even reached a value of 373 mm. The state of preservation of many objects included in the research project was assessed on this basis as a state of the high probability of loss of stability.

In order to eliminate the need for a system of supports or the use of the only proven method of straightening historical walls involving their detailed inventory, at least partial demolition and reconstruction, which contradicted the assumptions of the MPP, a method for straightening and stabilizing walls was developed.<sup>11</sup> The method was tested using specially prepared replicas of the barracks and tested first under laboratory conditions (Fig. 6, 7) and then under field.<sup>12</sup> Although the procedure of straightening the wall caused small cracks, these, along with other defects, were filled with appropriately selected mortars and micro-cements and carbon fiber bands stabilizing the extremely flimsy (only 12 cm thick) masonry walls erected in autumn and winter in inhuman conditions by the camp prisoners and exposed to the effects of atmospheric agents, capillary rise and microbiological corrosion for nearly eighty years.

### Wooden roof trusses

In the case of the roof trusses in the buildings under investigation, it was also not possible to take normative samples for destructive laboratory tests. In order to determine the technical condition of the wooden



elements, a pioneering study was carried out using a resistograph (RESI).<sup>13</sup> In combination with the assessment of biological surface corrosion, this allowed us to collect the data necessary to estimate the wood classes for static-strength analysis. The requirements of PN-EN-1995-1-1: 2010 Eurocode 5, PN-EN 338 and PN-EN 1912 could not be unambiguously assigned to the timber elements in the investigated objects. A significant part of the wooden elements located in the buildings studied did not meet the basic requirements of the standard. The only solution was to carry out a correlation of many characteristics obtained from different tests.<sup>14</sup>

The results presented in the final report indicated a very large scatter of material properties of the cross-section of wooden elements within one object and a very low level of bearing capacity. It was therefore necessary to carry out complementary tests on rafter reinforcement using carbon fiber strips and composite material elements.<sup>15</sup> Laboratory tests carried out on rafters removed from the rafters of barracks B-123 and B-124 after their experimental reinforcement with carbon strips showed an increase in flexural strength by 5%. While on a global scale this is not a significant increase, in the case of a single element with a large cross-section it may be more than indicated by laboratory tests. It is noteworthy that the proposed innovative method used composite materials when they were still in the phase of certification.

### Conclusion

The development of appropriate methods for the conservation, protection, and reinforcement of the cubature objects in the BI sector of the former Auschwitz II-Birkenau Concentration Camp was only possible by taking into account both tangible and intangible factors and a wide, not necessarily technical, research perspective. All proposed solutions took into account the necessity of assessing the individual condition of individual elements allowing for the evaluation of the minimum effective scope of interference, as well as its role in a complex, sensitive entity that goes beyond its physical manifestation.

The above-described unprecedented and performed for the first time on the site of the former Death Camp inscribed on the UNESCO World Heritage List, made it possible, as evidenced by the success of the pilot implementation, to effectively solve the key problems of wall deformation and eliminate the threats resulting from defects of foundation elements and unfavorable water and ground conditions.<sup>16</sup> Non-destructive, innovative testing of the truss elements and digital static-strength models have made it possible to select the solutions necessary to preserve the integrity and authenticity of the building. Dismantling of individual elements of the roof truss, their conservation and re-assembly would have altered the original historical layout of the layers. Moreover, it was not possible

to replace the structural elements with new ones, due to the accepted conservation assumptions of preserving all the original elements if they lose their structural and load-bearing properties.

The methods developed by the team from the Faculty of Architecture of the Cracow University of Technology within the framework of the above-described research project for securing, reinforcing and conserving buildings and their elements, although complete and adapted to the individual conditions and specificity of each object, may require updating in the future as new construction materials appear. However, the revision of the guidelines should only take place based on the results of an equally interdisciplinary research work. Significant support in the implementation of the next stages of the Master Plan for Preservation may be provided by new technologies allowing for, among others, a quick and accurate survey of the sites, including the constantly improved BIM spatial modelling, also used in another section of the work carried out at the site,<sup>17</sup> or 3D static models (both methods were used in this research, too). The completed 3D computational models of each building included in the partial reports, due to their material assumptions and static systems, can form the basis for further computational analyses of the building structure related to the recorded damage or deformation at the stage of execution projects.

Undertaking design and execution activities for historic buildings must be preceded by a reliable and substantive analysis of many components. Historic buildings and structures cannot be evaluated or verified following but the provisions of the applicable design standards or separate technical guidelines applicable to contemporary construction projects. Each element constituting a part of a historic building in such a case requires from the designer particular sensitivity, and in particular wide interdisciplinary knowledge in making decisions that are often important for the sustainability of the historic substance to be preserved for future generations.

In the case of the majority of historic buildings, the elements forming the examined object cannot be classified solely according to the guidelines and assumptions of PN-EN standard. Buildings located in the former camps of Auschwitz I and Auschwitz II-Birkenau constitute, in this respect, unprecedented research and implementation challenges. The Evaluation of the correctness and effectiveness of the method of action based on an analysis of just one issue is practically impossible in their case. On the other hand, even a holistic strategy based on multi-criteria analyses cannot be limited solely to ensuring the permanence and accessibility of these sites, just as the intangible heritage of Auschwitz-Birkenau cannot be separated from the material traces of martyrdom of many nations of the world. This is all the more reason why the successful pilot work carried out in barracks B-123 and B-124, which set a precedent on a global scale, should be regarded as a groundbreaking, globally significant achievement.

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## Abstract

The conservation of brick barracks with historical numbers 7 and 8 (B-124 and B-123) was one of the key tasks carried out as part of the Master Plan for Preservation for the former Auschwitz-Birkenau Concentration Camp. The aim of the preliminary project completed in 2019 was to show whether and to what extent it was possible to fulfil the conservation objectives adopted in the MPP: minimum interference in the preserved substance, preserving it in a possibly intact form for decades to come, and at the same time making the buildings accessible to visitors, which had not been possible before due to their technical condition. All works in the BI sector, both completed and planned, are based on research results and methods developed over the course of a long-term, interdisciplinary research project. This article presents the most important results of research carried out at the Faculty of Architecture of the Cracow University of Technology and selected methods of protection and strengthening developed by the team for this vulnerable heritage.

## Streszczenie

Konserwacja baraków murowanych o historycznych numerach 7 i 8 (B-124 i B-123) była jednym z kluczowych zadań realizowanych w ramach Globalnego Planu Konserwacji byłego obozu Birkenau. Celem zakończonego w roku 2019 projektu pilotażowego było sprawdzenie, czy i w jakim stopniu możliwe jest spełnienie przyjętych w GPK założeń konserwatorskich: minimalnej ingerencji w zachowaną substancję, jej zachowanie w możliwie nietkniętej formie na kolejne dziesięciolecia i równocześnie udostępnienie tych obiektów zwiedzającym, co wcześniej, ze względu na ich stan techniczny, nie było możliwe. Wszystkie działania w sektorze BI – zakończone, trwające i planowane – oparte są na wynikach badań i metodach opracowanych w ramach wieloletniego, interdyscyplinarnego projektu badawczego. Artykuł przedstawia najważniejsze wyniki badań realizowanych na Wydziale Architektury Politechniki Krakowskiej oraz wybrane metody zabezpieczenia i wzmocnienia opracowane przez zespół na potrzeby tego wrażliwego dziedzictwa.



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Uczelnia współpracuje ze szkołami wyższymi oraz instytucjami naukowymi i badawczymi na całym świecie. Niektóre kierunki, np. *architektura* i *budownictwo*, posiadają akredytacje zagranicznych instytucji, a część z nich – dzięki umowom o podwójnym dyplomowaniu – gwarantuje dyplomy uznawane w całym świecie. Pracownicy, studenci i wychowankowie Politechniki Krakowskiej swoją wiedzę i doświadczenie przekuwają na konkretne rozwiązania, mające zastosowanie w codziennym życiu i wspierające różne branże, a ich projekty oraz realizacje wzbudzają podziw i są doceniane przez liczne, także międzynarodowe gremia.





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