### Valuation of historical buildings

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Abstract – The present work brings together various intervention solutions on similar buildings in the city of Oradea, dating from the same period: around the 1900s. The buildings of the study are not historical monument buildings, but in the General Urban Plan of the city of Oradea, they are symbolized as buildings of historical value. The structural system of the buildings is similar, as well as their shape. The constructions had various initial functions and the interventions on them are carried out in order to change the use, also in order to bring them to the current exploitation and performance norms. Consequently, the work presents various ways of approaching these constructions from an architectural and structural point of view, giving solutions for their value recovery. Depending on the proposed function, the interventions are carried out respecting the architecture of the buildings as well as their valuable elements, which demonstrates a correct attitude of the actors involved for the transmission of valuable architectural and structural qualities to future generations. At the same time, the work proves that there are solutions in this sense, putting the creativity of architects to the test. Through this type of intervention, the development of the city is supported in a balanced way by valuing and respecting the valuable elements of historical buildings.

Keywords - architectural value, conservation, recovery, rehabilitation, restoration.

#### **1. INTRODUCTION**

The city of Oradea has the privilege of having inherited architectural and historical values; the present work refers to real estate. The historical center of the City of Oradea is called "Urban Ensemble – The Historic Center of Oradea" and is included in the List of Historical Monuments in Romania and Bihor County with the code BH=II-a-A-01037. Of course, these buildings have a special treatment, governed by the relevant legislation specifically dedicated to historical monuments. Apart from these buildings, in the City of Oradea, we have valuable buildings, but which are not included in the list mentioned above, neither within the Historical Monument Ensemble, nor individually as a historical monument building. These buildings are symbolized and treated separately in the General

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Urban Plan of the City of Oradea, as well as in the Local Urban Planning Regulation, being considered buildings with heritage value: buildings proposed for classification, representative buildings, with special heritage value, proposed for local protection, buildings with architectural or environmental value. The present paper analyzes the intervention solutions on such buildings, which have similar architecture and structure, dating from the same period (being built around 1900) and which were intervened in a different way.



Fig. 1 Positioning in the city – red dot symbolization [1] Graphic representation of the protection of urban forms and architectural heritage in the General Urban Plan [1]

The three buildings (A, B, C) highlighted both in figure no. 1 (in its upper part), as well as in Fig. 2 and 3: they are representative buildings, with special heritage values, proposed for local protection, grouped in the same area. For this type of buildings, the General Urban Plan of Oradea imposes the following restrictions [1]:

• "for this category, total or partial demolition, modification of the architectural expression, alteration of the characteristic architectural elements is prohibited, the interventions will be of the rehabilitation type" [1];

• "the interventions on these buildings will be to rehabilitate and restore the appearance/ historical elements (decorations, shape, voids, finishes, etc.) based on documentation studies (photos, postcards, historical, archival views); the return to the original appearance of the building is mandatory in the case of large-scale, general rehabilitation interventions" [1];

• "functional conversions and partial repartitions of these buildings are allowed, provided those valuable historical elements (carpentry, finishes, etc.) are not affected" [1];

• "horizontal expansion of these buildings is allowed, provided that valuable historical elements are not affected/covered (attices, balconies, openings with borders, carpentry, wall decorations, tectonic elements, etc.) and only if the image and character of the historical volumetric configuration it allows this, without the uniqueness and particularity of the character of the building being destroyed" [1];

• "the volume of the extension bodies will relate in a harmonious, non-aggressive way to the volume of the existing building, without competing with it in terms of dimensions; pastiches and repetitions/multiplications of the decorations of the extended building are not allowed, the interventions will clearly express the character of adjoined, distinct element" [1]. These buildings are located close to the central area of the city, outside the "Urban Ensemble - The Historic Center of Oradea", area of the buildings and military complexes of the Ministry of National Defense, the Ministry of Internal Affairs.



Fig. 2 Buildings A, B, C - positioning in the General Urban Plan [1]



Fig. 3 Buildings A, B, C – Salelitary view [2]

The present work brings to attention the way of intervention on the building on the far left (Building A) and on the far right of Fig. 2 and 3 (Building C).

The three buildings grouped in the lower part of Fig. 1 (buildings D, E and F) and highlighted in Fig. 4, are not marked in the General Urban Plan as valuable buildings, a fact that emerges from the Historical Study elaborated on the occasion of the intervention on them. These buildings are located in the southern part of the city, on the former site of the military garrison, today in close proximity to the Central Campus of the University of Oradea. Two of these (building D and E) are part of the recently built Dual Campus.

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Fig. 4 Clădirile D, E, F - positioning in the PUG [1] - Vedere salelitară [3]

Description of the situation before the intervention on the buildings:

Buildings subject to the study belong to the public domain or institutions / local authorities - more precisely to the Bihor County Council.

Building use: Building A - gym, Building B - warehouse, Building C - decommissioned, Buildings B, C, D were unused for over 20 years, they were used as temporary warehouses.

The period of design and execution of the buildings is later than 1881, it is appreciated, the 1890s by historians and experts as other years of construction are mentioned in various specialized works (technical expertises).

The structure of the buildings is the same: two sections of buildings joined together with a different structure: the main body - the large hall (with the initial function of a stable for the training of horses and riders, with the presence of a small tribune maintained in the case of Building A) with ground floor height regime. The main body is a single hall-type volume. The resistance structure consists of load-bearing walls made of old brickwork, unreinforced, with lime-cement mortar, unloaded on continuous brick foundations, with the width of the footings equal to that of the walls. The built-up area of the buildings varies Building A: 1911 sq m, Building C: 2548 sq m (having the largest opening of the metal truss), Building D: 1873 sq m, Building E: 2031 sq m, and Building F: 2023 sqm.

The masonry is made of old, unreinforced brick; the thickness of the walls at the main body is 60 cm. They are reinforced with masonry pilasters / buttresses. The opening of the main body is large, varying from one building to another between 23 and 30 m, being covered with a metal truss / beams with triangular lattices, placed at interaxial distances of approx. 5.00 m. Their particularity is that the nodes of the trusses are riveted through gussets and platbands, joints that are no longer practiced today (Fig. 8).

The state of decay of these buildings is advanced due to their lack of exploitation, except for Building A (Fig. 5-12).

Attached to the main body, in each of the buildings A, B, C, D, E and F, is the building body with Ground Floor  $+ 1^{st}$  Floor system, with smaller plan dimensions: - see



the figures below. Their structure is also made of old, simple, unconfined load-bearing masonry, with reinforced concrete floors over the ground floor (Fig. 5-12).



Fig. 5 Building F – North facade 07.2024 [4]



Fig. 6 Building F – Sud-West facade [4]



**Fig. 7.** Building F – West facade [4]



Fig. 8 Building F - roof structure - metal truss [4]

#### 2. INTERVENTIONS AND SOLUTIONS

Building A (Fig. 9-11) – due to some extreme phenomena, the sports hall was uncovered, thus, in the studied phase, the interventions are minor; only to replace the covering with sheet metal of the same weight / sqm:



Fig. 9 Building A – East facade 10.07.2022 [5]



**Fig. 10** Building A – East facade [4]



Fig. 11 Building A – roof structure - metal truss [4]

Building B (Fig. 9-11) - it has not been recently modified. It is in good condition. It is not the subject of the study.

Building C (Fig. 12-13 - it is necessary to demolish it, to serve the public interest, for the construction of the new hospital for infectious diseases in Oradea. Considering that this body is a representative building, with special patrimonial values, proposed for local protection, the justification for the need to demolish this building was imposed. One of the arguments was that in Oradea there are buildings with a similar structure, of the same value as this one, which become witness buildings (buildings A and B):



Fig. 12 Building C – North-East facade 10.07.2022 [5]



Fig. 13 Building C – metal trusses 05.2021 [6]

Considering the public interest of the proposed investment on this site, the Zonal Commission of Historical Monuments gave its approval for the demolition with conditions: 2 beams of this hall will be transferred to the Campus of the University of Oradea, so that this transfer will provide solutions for rehabilitation and conservation of three metal trusses with riveted nodes: these will become testimonies of the demolished building and at the

same time educational material for the students architects and builders of the University of Oradea respectively of the Faculty of Construction, Cadastre and Architecture in Oradea. This condition was imposed due to the existing metal trusses, having a very large span or a span of 30 m and having riveted nodes. The solution validated by the authorities, which meets this condition, is highlighted in figure no. 14:



Fig. 14 Testimony of building C – metal truss [7] Project in progress

For Buildings D, E and F, the proposed interventions are for reconversion or reintroduction into the circuit of used and exploited buildings (figure no. 14. [5]).



**Fig. 15** Buildings D, E F 07.2024 [5] Buildings D and E after the intervention of rehabilitation, consolidation, arrangement

Buildings D and E had the same interventions, within the same project: Consortium for Dual Education Campus Oradea. As part of this project, Building D was consolidated, rehabilitated for energy efficiency, respectively it was designed to correspond to the function of a Workshop. Building E has been rehabilitated and energy efficient, respectively it has been fitted out to correspond to the function of a gym. A consolidation, rehabilitation and energy efficiency project are being developed for building F to have the function of a warehouse.

The interventions on them are consolidation, casing, interior equipment with energyefficient installations, provision of electrical energy production equipment on envelopes (photovoltaic panels) and arrangement of interior spaces to correspond to the proposed functions.

We highlight in the present study the interventions proposed / carried out for the consolidation of the structures, with the interest of maintaining the historical metal trusses, as well as the masonry with old brick pilasters (Fig. 16, 17, 18):



Fig. 16 Proposed intervention to strengthen the pilasters Confinement solution with metal profiles [9]



Fig. 17 Proposed intervention to strengthen the pilasters Outside View and Inside View [9]



Fig. 18 Buildings D, E. Lattice farm. Axial stress diagram - consolidated situation [9]

The reinforcement of the metal truss was made by doubling the upper sole with a rectangular profile, attached only to the truss nodes. The metal panels (Z profiles) and the bracing system were attached to it.

With the implementation of the project, the solution for strengthening the pilasters was changed, so that they were lined/plastered with reinforced concrete, according to Fig. 19.



Fig. 19 Section through the pilaster – reinforcement solution by lining [4]

These consolidation and rehabilitation solutions: lining the pilasters and thermal wrapping of the building, changed the proportions of the original building, the result of these interventions being highlighted in Fig. 14. The interventions on the volumetry of buildings D and E can be considered slightly aggressive.

Good understanding by the authorities of the value of historical buildings leads to their valuation. Thus, from the package of the three similar buildings D, E, F, located on the same site, it was decided to treat building F as a historical monument building, at the same time assigning it the function of a warehouse, thus renouncing its envelope and opting for the consolidation solution highlighted in Fig. 16. In this way, the original volume of the building is maintained.

#### **3. CONCLUSION**

In the case of historic buildings, it is desirable that intervention solutions on them reiterate the original architectural and structural integrity. The approach must be flexible, starting from the knowledge and understanding of the historical and architectural values of the building. The study demonstrated that the intervention strategy can be distinguished for each individual case, depending on the context and the pragmatism of the present.

The present work, having under study six buildings with similar architectural and structural conception, dating from the end of the 20th century and the beginning of the 21st century, demonstrates that this can be achieved through various solutions that relate to both the creativity of the architect and that of the structuralist. Even if the public interest was for the demolition of a building, respectively for the release of the site to build a hospital, a part of this building was relocated. This fragment was transformed into a testimony of what it was, moreover, it was placed right in a university campus, this relocation also having a didactic purpose.

The study brings to attention that all the factors involved in such works must be aware and recognize the historical and architectural values of the buildings, even if they are not declared historical monuments, to be treated appropriately. Thus, in a favorable environment, in an administrative-territorial unit where the authorities respect and treat buildings of historical value accordingly, saving, preserving and maintaining buildings in order to pass them on to future generations are prioritized over financial implications [10].

#### 4. REFERENCES

[1] Eugen Pănescu and all (2016), *General Urban Plan of the Municipality of Oradea Local Urban Planning Regulation*, General Designer: S.C. Planwerk S.R.L., Cluj-Napoca, S.C. Vitamin Architects S.R.L., TimişoarA, S.C. IHS Romania S.R.L., Bucharest, beneficiary: Oradea Municipality Hall

[2] https://www.google.com/maps/@47.0515523,21.9136986,698m/data=!3m1!1e3?authuser=2&entry=ttu (accessed on 07.2024)

[3] https://www.google.com/maps/@47.0430866,21.924009,698m/data=!3m1!1e3?authuser=2&entry=ttu (accessed on 07.2024)

[4] https://www.google.com/maps/@47.0430866,21.924009,698m/data=!3m1!1e3?authuser=2&entry=ttu (accessed on 07.2024)

[5] Prada M. F. (2024) – Technical expertise within the project: Capital repairs Corp C2, Oradea Municipality, Ceyrat street no. 4, beneficiary: Bihor County Council, phase D.A.L.I.– Oradea

[6] https://earth.google.com/web/@47.05165263,21.91267363,135.4135934a,120.0505777-6d,35y,-130.13964006h,66.79572158t,0r/data=OgMKATA (accessed on 07.2024)

[7] Ioan Haiduc (2022), The technical expertise developed for "Historical-architectural study, technical expertise in order to prepare the location of the new hospital for infectious diseases in Oradea" - location: Oradea, Vlădeasa street, Bihor county, Oradea

[8] Tivadar D. (2022), Valorization project through the partial relocation of the roof structure of the stable building on Vladeasa street no. 1, location: Universitatii street no. 4, Oradea Municipality, Bihor County, beneficiary Oradea Municipality, project no. 2125 / 2022, Oradea

[9] Prada M. F. (2023), *The technical expertise developed for major repairs to the frame and cladding without structural or shape changes at the sports hall - Pavilion K - location: Oradea, str.: Traian Blajovici, no. 2*, Oradea 2023

[10] Păcurar V., Moga C. (2020) The technical expertise developed for the School Campus for special education in the Municipality of Oradea - objectives C7 and C8 - location: Oradea, str.: Ceyrat, no. 4, Chuj 2020

[11] Prada-Hanga I. F., Bungau C. C., Scurt A. A., Durgheu A., Pescaru A. H., Prada M. F. (2023), *Oradea's 1900s Industrial Structures Behaviour*. Journal of Applied Engineering Sciences, ISSN: 2247-3769 / e-ISSN: 2284-7197, 113-122, DOI: https://doi.org/10.2478/jaes-2023-0015