The Link Between Historical Research and Structural Rehabilitation in the Case of Palace Building from Craiova

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Abstract. The structural rehabilitation of buildings with cultural value represents a complex field for practice. We had the opportunity to participate in the project of rehabilitation of Palace Hotel, one of Craiova's most iconic buildings. The Palace Hotel is a historical monument and it was built with the original function of hotel, bank and commercial spaces.

In the article we intend to present particularities of the structural configurations and the main directions of intervention. The experience have a high degree of relevance for the field of restorations of buildings in Romania, being characteristic for our cultural history. It also represents a statement for the historical period in which was conceived. We based all the architectural and structural interventions on research and tests. Therefore, we present the unique process of interconnection between historical value, originality of the built elements and the project decisions. In this process the permanent balance between awareness and intervention is the most important.

Keywords: Structural rehabilitation · historical monuments · spatial composition

1 Introduction

The Palace Hotel from Craiova was built, most likely, after the First World War by the architect Otto Hesselman - Carada [1]. The building was commissioned by the owners of the Oltenia Bank, one of the most important local financial institutions, the main function being that of representative headquarters.

The Oltenia Bank started its activity at the beginning of the 19th century, the initial headquarters being on Unirii Street at number 128 [2]. The exact date of the establishment of the institution is not known. According to an old photograph it can be said that the year in which the company was founded is the year 1904. On the other hand, within the bank project made by the architect Petre Antonescu, one can observe the dating of the establishment of the bank in 1893.

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Fig. 1. Palace building (Oltenia Bank) urban context

The Oltenia Bank was an important credit institution of Craiova. From a statement published in 1912 in the newspaper Patria we find out that, at that time, the bank had a capital of 3,000,000 lei and performed complex banking operations. From the report made in 1937, after the economic crisis of the '30s, it can be found that, in terms of capital, locally, the bank was on the second place after the Trade Bank. Thus, after the national banks whose capital varied between 582,280,000 and 60,000,000,000, the Trade Bank follows with a capital of 25,000,000 and the Bank of Oltenia with a capital of 23,000,000 [3].

In an article from the Patria review, from 1911 the position of the institution's progress is attributed to the skills of the bank director Ștefan M. Constantinescu "*The second credit institution in the capital of Oltenia, as much as necessary and useful as the Bank of Commerce, is the one that bears the name of this beautiful region, the Oltenia Bank. Its existence, as well as the splendid state in which it is found, the unlimited credit it has, is due to the appreciated and sufficient connoisseur in this branch Mr. Ștefan M. Constantinescu"* [4].

The project of the building on A.I. Cuza Street was conceived with a multi-functional destination, namely the representative headquarters of the bank and the hotel. This association of functions is not surprising and it aimed at increasing the bank's capital. At the end of the nineteenth century and the beginning of the twentieth century, many hotels were built in the city. In 1897, the Geblescu Hotel was inaugurated, located at the intersection of St. Demetrius and Unirii streets; in 1898 the construction of the famous Minerva Hotel was inaugurated. On Justiției Street there were the Victoria Hotel located across the street from the Palace of Justice, the current building of the University of Craiova, the Stăncescu Hotel and the Europa or Frăsinenu Hotel. These are just a few of the city's hotels, all of which are located near the Palace building. This abundance demonstrates the central character of the area as well as the potential of a significant economic gain. One of the advertisements of the time published in the newspaper Patria, which presented the Victoria Hotel mentions as the main advantage that it was "*installed* in *the street of a developed shopping center, which will bring great advantages to the commerce from the provinces being surrounded by The New Square and by the Palace of Justice* [5] (Fig. 1).

At the time *of* the installation of the communist regime, the bank is affected, its actions being blocked by the state. From a report made in 1947 we find out that the property is sold: "*we decided this sale having n view of the need for pressing money that*

the *Institution has today for the payment of the Commercial Tax for the year 1947/48 and* the *rent in relation to B.N.R., not having in the present present sources of income sufficient to cover the taxes and overheads because our Bank from August 15, 1947 only makes any kind of work and the operation of the hotel is deficient and therefore for these reasons we can no longer have funds for current operations*" [6].

2 Framing the Construction in Class, Group and Category

According to the Norm P100–1/2013, the building is framed in:

- Importance class II a = 1,2;
- Seismic zone with corner period Tc = 1.0 s and acceleration of the land
- a_g = 0,20g;
- According to CR1–1-4/2012, the winds are given by gv = 0.5 KN/sqm;
- According to cr – 1 -1–3/2012 bccue dates of zăpadă gz = 2,0 KN/sqm.

3 Spatial Configuration of the Building

The imposing volume of the Palace building is conceived in the specific manner for the hotels of the time. From a typological point of view, most of the hotels built at the beginning of the 19th century in Bucharest, were located on corner plots, with two main facades aligned at the limits of the public domain, with entrances on the corner axe of the building treated particularly from a esthetic point of view.

The first premise of interpretation focuses on historical functions. According to the historical data mentioned above, the project was conceived with the double destination as bank and as hotel. Yet, it can be acknowledged that these programs must be operated independently, having separate traffic flows, even a hundred years ago. Therefore, the project was a challenge for the architects that imagined it.

The analysis of the entrance flows of the building shows that the access to the bank was made on the corner axe and the access to the hotel was made through the last segment of the façade from A.I.Cuza Street. Besides these accesses, the building had three other public entrances from A.I.Cuza Street and two from Unirii Street. Of these, an access communicates with the gangs that perimeter the building on the east and north sides. The others led to restaurants and commercial spaces.

The configuration of the building is dominated by the existence of the central hallway and the above skylight. The access of the bank communicates directly with the hallway of the counters, developed on the height of two levels. The decoration and communication of the spaces, the open and deep perspectives indicate that this area of the building functioned as a whole and in here the bank was located. The central hall has two skylights, one at the second floor and the other at the fourth. At the upper levels, the perimeter circulation visually communicates with both skylights and functions as a courtyard of light. More clearly, from the level of the second floor, the separation of the skylight from the central hall is achieved through vertical walls broken by the windows. This particular conception that can be synthesized as "*a building in building*" supports the theory of

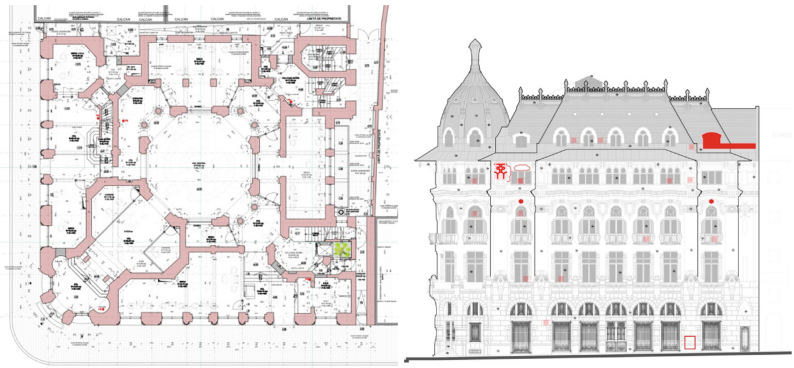

Fig. 2. Palace building, ground floor plan and southern façade, project by GETRIX S.A.

distribution of functions as follows: on the ground floor and on the first floor it was the bank and at levels two, three and the mansard was the hotel (Fig. 2).

The basement of the building is at the elevation – 4.78 and is fragmented into several independent areas. Thus, the central area is allocated to the former safe-box that had a single access, closed with grids and metal door, located under the access area of the bank. The wing from the north is completely separated from the rest of the building, the access to this area being made only through the staircase in the northeastern corner. Very likely, in these spaces was the technical equipment of the hotel. The rest of the spaces in the basement communicate, but there is a hypothesis that they could have been initially separated.

The existing vertical circulations represent another source of clues regarding the original functions. Thus, in the building a single vertical circulation connects the basement to the attic. It is located on the northeastern corner and can be accessed from the outside through the perimeter gang. The very narrow width of the ramps – 1.00 m – indicates that this staircase had a secondary, service character. Besides this staircase, another vertical circulation connects the basement and the first floor. This staircase with ramps wider than 1.20 m was probably the staircase for the bank's functionaries. According to the building regulation published in 1910, the ramps for public access could not have dimensions of less than 1.10 m.

Particularly interesting is the arrangement of the public spaces of the ground floor. As we observed, all the high arcades on the ground floor could have had doors. Historical images capture the existence at the beginning of the twentieth century of three active accesses on the façade from A.I. Cuza Street and a fourth access from Unirii Street.

The configuration of the floors intended for the hotel fits into the typology specific to this program at the beginning of the twentieth century. Thus, all the accommodation rooms were accessible from the circular corridor surrounding the central light courtyard. However, the way of solving the plan of the hotel area with direct light for all the rooms, with the service spaces distribution proves that the conception of the building met the highest standards of the time. An additional argument for the initial performance of the building is that of the presence of public spaces with destinations complementary to accommodation: confectioneries, salons, shops (Fig. 3).

Fig. 3. Palace building, central skylight

The dome of the corner dominates the general volume of the building. The main facades are designed in harmony with it. The horizontal rhythm is imposed by the presence of three layers, namely the ground floor layer dominated by high arcades, the layer comprising the first and second floors and the layer of the third floor. The separation between the layers is was composed from decorative horizontal elements. Thus, over the ground floor there is the line of balconies with massive parapets on the first floor. They sustain on extensive consoles placed in rhythm related to that of the windows. The separation of the layers between the second floor and the third floor is made of a belt with a very interesting configuration due to its shape that undulates on the entire length of the main faces.

The vertical structural system of the building is a load-bearing masonry with spreaders arranged in a cellular system or room type. The correlation between structure and function was made with great attention. The entire building is structured around a high central hall, covered with an impressive illuminator. This composition offered the spectacle of interior balconies that provided accesses to the hotel rooms. In addition, this is how the architect and the engineers emerged from the limited discourse of the cell trams of the load-bearing masonry in the brickworks. The thickness of the walls of the cell trams differs depending on the position in the floor plans, from 50 cm to 120 cm in the basement and ground floor, at 35 cm - 80 cm on the I-IV floors. At the upper levels there are concrete belts on the walls.

The covering is mounted on a roof of wood framing type, of inappropriate quality.

The floors over the first basement, intermediate basement, ground floor, and mezzanine and floors I-III are of reinforced concrete, and over the fourth floor, made of wood (Fig. 4).

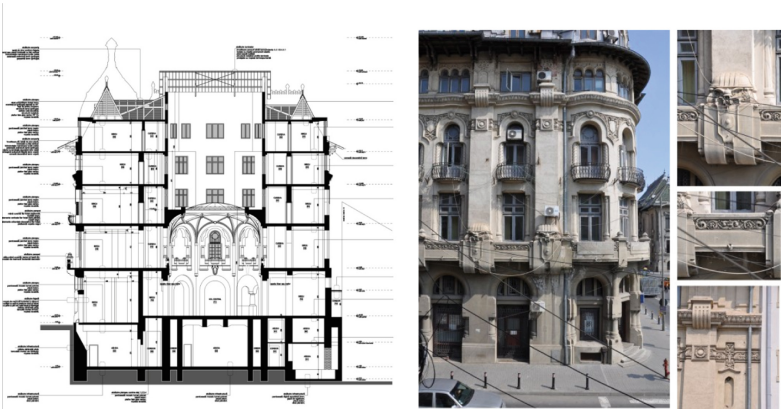

Fig. 4. Palace building, section and facades details, project by GETRIX S.A.

4 Proposed Interventions

In the restoration projects of historical monuments, all intervention decisions dedicated to structural consolidation must be filtered by the principles of preservation of valuable elements and by the just measure of necessity. Thus, in the case of the Palace building restoration project the process respected the principle of multi-layered analysis, and the decisions were taken in agreement with all the involved specialists.

At the basement level, the main problem and threat was the one brought by water infiltrations and mold deposits. Thus, the dedicated interventions involved removing the plasters from the surfaces affected by dampness and humidity, drying and treating the elements with dehumidification and desalination solutions. In order to carry out the works for the evacuation of the meteoric waters from the site, it was proposed to increase the section of gutters and downpipes, to connect the downpipes that allow this intervention, to the rainwater sewerage, our goal being to treat the source of the problems, not only the symptoms [7]. Also, it was important to replace all types of interior installations (water-channel, thermal, electrical). A key decision to ensure that the water infiltrations were resolved the pears were treated with special mortars based on hydraulic lime and we proposed new proper closures.

At the ground floor and upper levels, the consolidation interventions focused on treating the cracks that endangered the stability. The wall clutters, pilasters and cracked brick bolts, will be strengthened by injection using mortars based on hydraulic lime according to EN 459–1 norms, suitable for structural consolidation, resistant to water and to salts. For this purpose, the cracks will be thoroughly cleaned of dust with a jet of compressed air, they will be washed with water, after which the grooves through which the injection is to be made are placed on the depths of 5 cm. This method is minimally invasive, ensuring maximum stability without affecting the original substance (Fig. 5).

In accordance with the norms and design requirements, the injection routes are mounted at distances of 1 to 1.5 m along the crack and are fixed with mortar. The injection pressure should not exceed three atmospheres. The injection is done initially through the pipe located at the base of the fissure. After the mortar has begun to drain

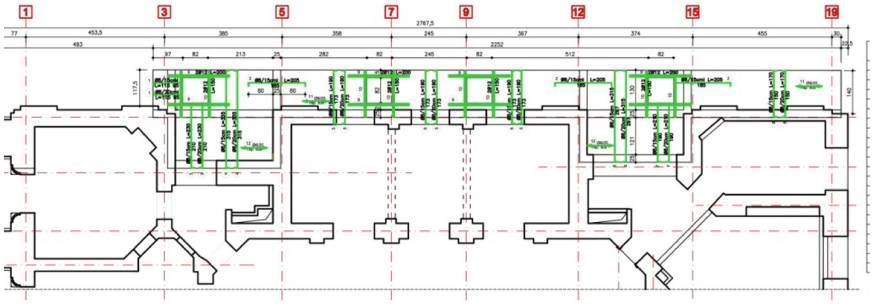

Fig. 5. Palace building wall consolidations, project by Arhing for GETRIX S.A.

out through the following pipe, the first shot is stopped with a special device and the injection is continued through the next shaft.

Analyses and resistance calculations, as well as samples of materials taken from the field and tested in the laboratory, revealed areas with load-bearing problems. In order to increase the capacity of the structural elements of cracked masonry, with reduced sections and with flat retractions, but with requests to large horizontal loads including the areas of access to the first floor, our team proposed to strengthen them with composite carbon fibers. The advantages of this consolidation process are: low own weight, does not require joints due to different delivery lengths, it is not necessary to treat the carbon slats in advance, for mounting the slats there is no need for lifting machines. In addition, they have a very good resistance and high elasticity, special behavior to fatigue and are not sensitive to alkaline solutions.

Obtaining the optimal resistance of the load-bearing capacity at the upper levels the structural elements with fissured sections, requires additional consolidation by the introduction of metal gutters Φ25 mm and Φ 35 mm. The metallic gutters of the PC 52 brand will be positioned in the upper elevation of the lintels and the intrados of the upper level floor, centered in the transverse section of the load-bearing wall, in a system of drilled galleries.

In order to increase the load-bearing capacity of the structure on the 4th floor and to improve the effect of horizontal washer, it is proposed to strengthen the wooden floor by installing and fixing a complementary upper layer of wooden cabinets, position twigs at an angle of 45º to the existing one. In order to ensure the degree of resistance to fire, the intrados of the wooden floor over the fourth floor will be covered with special plasterboard.

In addition, all the wooden elements will be treated antiseptic, water-repellent, anti-fungal and fireproof. Unfortunately, the existing framing had major degradations, with rotting components, affected by cavities, fungi and infiltrations of meteoric waters. Thus, not being an element of high value, many original elements being replaced by previous repair works, we imposed its total replacement with a new structure. Also, the metal structure of the two skylights requires local consolidation, at the level of the perimeter leaning, by introducing complementary elements, as well as by consolidating the existing ones. The proposed consolidation solution does not affect the initial structural concept and the way of cooperation of the skylights with the main structure. The entire

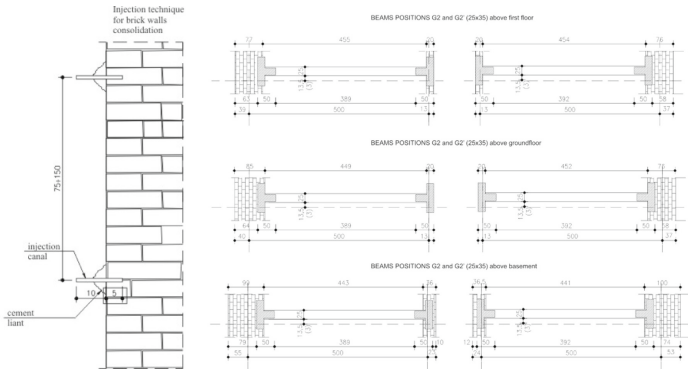

Fig. 6. Palace building wall consolidations, project by Arhing for GETRIX S.A.

metal structure, compulsorily rehabilitated, will be cleaned and anticorrosive treatment, fireproof and painted (Fig. 6).

The restoration process also involves adapting to a good functioning of the objectives, in relation to the current exigencies and activities. Adaptation supposed the closing and filling of some doors. The new bricks will be held in assize for the cooperation of the old wall with the new one.

5 Conclusions

The character of a historical monument of great value requires special attention during the execution of the consolidation and restoration works at the level of the entire objective. In order to intervene properly it was important to understand the history of the building, the spatial configuration and the laboratory conclusions regarding the resistance of elements.

The history research taught us about the urban context of the building and about its place among similar constructions. Therefore, discovering the multi-use system, the junction between bank services, hotel rooms and public commercial features we could appreciate that the building was representative for the city. As it was, the building testify about a performing business model, a very well conceived structure.

Impressive for us was to understand the level of connection between form and function, in an era that this concept was still far away from becoming common sense. All the functions work very well together, without disturbances. More so, the building adapted through time to numerous functional changes, even the restoration project being adapted without many interventions.

Finally, all the tests and laboratory analysis proved that it was possible to preserve many of the original elements without damaging the original elements. This was possible only because we could identify the real causes of problems and treat them punctually.

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