Aspects Concerning Rehabilitation of Old Masonries

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Abstrait : *La réadaptation des gares principales en Roumanie est une condition de l'intégration d'EU. Par différents projets sera remis en état le bâtiment de toute la station sur les couloirs européens. Ces bâtiments faisant faire des structures par la maçonnerie, étaient nécessaires pour améliorer leur résistance, intérieur - des fonctions extérieures et esthétique. Cet article montre quelques technologies employées afin de moderniser les gares des bâtiments en Roumanie à Iasi, à Suceava Burdujeni, à Arad et à Alba-Iulia.*

1. Methods to Rehabilitate Masonry Structures

Specialty literature and technical regulations had mentioned methods in order to improve the main qualities of old masonry structures: introducing new structural elements in order to reduce the distance between axes of structural walls, introducing new structural elements as: RC frames and plan elements as floors, steel supplementary frames, repairing roofs structure made generally by wood elements, repairing and repainting elements.

Must have in view that, a lot of buildings, are historical monuments; in these must be kept all architectural details and paintings.

At this moment in Romania are rehabilitated 105 constructions included in mentioned category before. By example, as historical monuments can be mentioned the railway stations: Alba-Iulia, Arad, Cluj, Buzau, Iaşi, Oradea, Sibiu and Suceava.

Each rehabilitation project had in view particularities of structures, location (geotechnical and earthquake aspects), and existing damages mentioned in expert's report and technical measures to rehabilitate structure, shown in technical projects as Romanian low recommend.

In the same time with constructional works were and are developed activities on all installations: electrical, heating and ventilations, air conditioning and water – sewage.

Functionality and equipments at all stations were designed in order to ensure a European Quality.

2. Rehabilitation Works in Locations without Earthquake Activity

In this category are included all railway's stations in North Romania and Transilvania territory.

2.1 Suceava - Burdujeni Railway Station

Situated in North of Moldova, station's building was realized at the end of XIX century. Its structure was realized by masonry (ceramic blocks).

As history could be mentioned the following:

- Building station is a historical monument from C category, being as architectural idea a copy at reduced scale of Freiburg (Germany) railway station;
- Contractor Austrian Company Strusberg;
- Main building (central body) begun in 1869 and between 1895-1903 was realized the superior floor and lateral pavilions;
- Burdujeni railway station was opened for the first time in 1869 when was celebrated the railway Roman – Suceava (binding at frontier The Kingdom and Bucovina being in Austrian – Hungarian administration);
- Till 1960 the main waiting room was used even for high life events of Romanian Railways

and City Hall of Suceava;

- In 2000 year begun the rehabilitation works.

Rehabilitation works had in view:

- Ensuring the water drainage with a new pipes' system;
- Masonry repair works;
- Painting rehabilitation in main waiting room (Photo 1, 2, 3);
- Changing all works made by wood with new ones, including the roof's structure;
- Modernizing all installation by changing them, with new modern ones at interior and exterior, being attentive to keep the aspect as historic monument.

Photo1

Photo 2

Photo 3 Rehabilitation of Paintings in Main Waiting Room

2.2 Alba-Iulia Railway Station

Alba-Iulia Railway Station is well known from the arrival of people and personalities in town in the moment of Great Union at 1st December of 1918.

This station was built on the IV th Corridor, inaugurated in 1871 (Braşov Railway Administration).

As rehabilitation works can be mentioned:

- Consolidation of infrastructure realized by masonry blocks, using supplementary Steel frames (Photo 1); and shirting structural walls with OB 37 network and concrete (Photo 2), repairing and changing installations – electrical, water- ditches (Photo 3); realizing new powerful

waterproofing system;

- Replacement of wood floors in superstructure using RC plan elements leaned against new RC restraints (Photo 4);

Photo 1 Alba Iulia Railway Station – Infrastructure's Rehabilitation

Photo 2 Alba Iulia Railway Station - Infrastructure's Rehabilitation

Photo 3 Alba Iulia Railway Station- Infrastructure's Rehabilitation of Installations

Photo 4 Replacement of wood floors in superstructure

- Replacement of old wooden joinery with a new one made by Aluminum and heat protective glass.

Rehabilitation works was organized to be ready at 15 November 2005 when are celebrated 85 years from Great Union.

2.3 Arad Railway Station

The railway station, opened in 1858, set the northern point to the central axis of the town Arad. With its 96 km of railway, Arad reached the second place in the country, after Bucharest. The location of railway station is shown in Photo 5.

Nowadays the railway station is rehabilitated, the problem being limited at: adjusting

functionality, realizing new RC floors, new finishing and changing all installations systems (Photo 6, 7).

Photo 5 Arad Railway Station

Photo 6 New Compartment and Installations

Photo 7 Arad Railway Station - Realizing new installations. Repairing an RC floor

3. Rehabilitation Works in Locations with Earthquake Activity

3.1 General Issues at Iaşi Railway Stations

At this point will be presented the rehabilitations works at **Iaşi** Railway City. Iaşi railway station was included in a national program with EBRD finance. The rehabilitation's works of station consist in masonry structure's reinforcement, modernization of functions at the first ground and new installations according with new requirements specific for the euro stations. In the same program were included the railway stations: Timişoara, Cluj, Craiova and Constanța.

The entire works have as finalizing term January 2007 when Romania will be completely member of European Union.

Iaşi station contain specific constructional works on structure, having in view the particularities of terrain and the importance of building

Railway Station has three buildings: the first, named the *main building* was built in 1868-

1970, A building finalized in 1928 and B building finalized in 1948.

The main (central) building signifies the first great railway station built in Romanian Counties being situated at the extremity of railway Lemberg – Cernăuți – Iaşi.

The main building was realized according the favor for building and exploitation of railway Suceava- Roman, being under the management of Victor Ofenheim (photo 8). It is declared historical monument.

The architecture was similarly of "Ducal Palace" from Venice, Italy. The total length or central building is of 133.8 m; height of ground floor and two levels; were included 113 rooms.

The embankments and the platform for the direct lines (1000 m length) had consumed a volume of 130,000 mc clay filling on 2 m depth because the superior terrace of Bahlui River contains silt clay with high sensibility on water's action.

Photo 8 Iaşi Railway Station. Main Building

The Austrian architectural style gave to Iaşi railway station between the two world wars the name "German Palace".

From a hand the earthquake's activity and from the other hand the water's raising level, were the main reasons of damages on structure and furnishings. Was decided after 1977 the rehabilitation of station's buildings.

3.2 Rehabilitations Project

The expert's report used the simplified method in order to evaluate the resistance capacity. Because the existent structure had a reduced degree of seismic protection was necessary to draw up an intervention project. In this purpose were solved by rehabilitation: infrastructure (enlarging foundations section using natural stone and steel bares – Photo 9); shirting structural walls using RC protections; introducing new structural walls in order to reduce the distance between walls axes (Photo 10); introducing RC pillar at walls intersections (Photo 11) , RC binding over windows and doors; replacing the floors executed in wood with RC plan systems; introducing RC restraints; changing damaged structural elements of roof; introducing new installations (heat, air conditioning, water – ditches, gas, electricity).

Unfortunately the issues of water's infiltration in walls' structure weren't solved, and, walls situate at ground floor are wet.

Water's infiltration in foundation layer generated a various ram around main building (3…4 mm along transverse direction and 4…6 mm along perpendicular direction).

Photo 9
Foundations' System

Photo 10
Supplementary structural wall

Photo 11
RC Pillars at Walls' Intersections

4. Conclusions

Constructional works executed nowadays at railway's stations try to increase functionality, resistance capacity and security in exploitation, and to guarantee a European quality. All rehabilitation's projects had in view: location, importance, type of structure, utilities and aesthetical issues.

5. References

[1] *** Normativ P100/1992;

[2] *** Normativ P2/85;

[3] *** Legea 10/1995.