HISTORICAL STRUCTURES IN THE ROMANIAN BANAT AREA

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ABSTRACT

Having a remarkable architecture, and also a rich history built on a fascinating style melange and techniques of construction with influences reaching all corners of Europe, the Banat region naturally becomes one of the main historical areas of Romania. From the vienese to the hungarian architecture school, from neoromanian to neobyzantine construction style, from 16th century wooden churches to the central european art-nouveu and from the sinagogue monumentalism to the 19th century industrial architecture, this is what Banat means. The present paper aims to analyse the historical structures being built throughout two centuries, starting with the Austro-Hungarian occupation in 1716 until the end of the First World War in 1918, the year when Banat region was brought back to Romania, with a heritage of several thousand buildings of great value. We will study the types of degradation and its nature, how they behaved in time and the vulnerable situation they currently face due to lack of concern for preserving the built heritage.

The swampy nature of the land in the Banat area required different interventions in order to stabilize the soil, using ceramic blocks as material for building foundations and basements. Thus, for two centuries, brick was the main construction material of the building infrastructure. While the ground floor of the building follows basement structure on brick masonry arches and vaults, indicating a well defined step of an architecture that only built one storey structures, upper floors would have a wooden structure, covered by a historical framing. The particularity of the historical buildings in Banat area is given by the continuous evolution of construction, using specific materials and technologies for each time period and also by the nature of shallow earthquakes which have gradually affected the structural integrity of the building itself, making it very interesting to analyze the historical structures.

Keywords: Banat, Architectural style, Brick, Wood, Historical

1. INTRODUCTION

Banat is one of the historic regions of Easter Europe (separated by the Mures, Tisa and Danube rivers and by the Carpathians on the East), which after the first world war rejoins Romania’s administrative territory, uniting a nation and overcoming the lack of identity present for the past centuries. Now this area is split between Romania (~2/3), Serbia (~1/3) and Hungary (~1%), it has an overall flat character with hills and mountains only on it’s eastern part.

Banat is a seismic active area e.g. (Fig. 1) which has been systematically monitored since the 19th century, being the most active area with crustal seismic activity and associated seismic hazard for local surface earthquakes, having the focus rings ranging between 5 and 20 km. Because of the small depth of the focuses, the Banat earthquakes are considered local, they influence small areas, with a seismic energy which is rapidly toned down leading to the decrease of the maximum effects of the earthquake.

The historical structures were and still are developed and influenced by these seismic characteristics of the area.

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The main construction material used in the architecture and historical structures from the rural part of the Banat plain are earth, twigs, straw, e.g. (Fig. 2) and as we move up from plain to hill wood is used more often, having as a source the vast forests from this region in the 18th and 19th century.

![Seismic map – Banat](image)

**Fig 1.** Seismic map – Banat

Traditional living in the western part of the country develops distinct building techniques having earth as a base material, used in the region from Prehistoric times. The oldest construction method know from the Neolithic period is the one consisting of intertwined twigs walls on which clay was applied to ensure the enclosure. The building with forked walls uses a technique of combining the straws with earth which is very good compacted and mixed using horses. A more recent technique is that of monolithic earth walls compacted with a wooden beater in wooden formworks. Another important period in the evolution of building technology is that of moulding raw materials, the raw brick (‘chirpici’) a mixture of straw and clay. The advent of the stone foundations and bricklaying announced a further step in the evolution of the building techniques. In the villages from the Banat region there still are buildings raised in traditional historic techniques, but they are in real danger because time degradation and the interventions which lack the knowledge of these old techniques. The structural system of these buildings makes them vulnerable to seismic activities and water infiltration.

![Earth house](image)

**Fig 2.** Earth house
One important typologies of historic structures found in the hilly part of Banat are the wooden churches e.g. (Fig. 3). The structure is formed out of stone foundations (drywall or with earth mortar) the wooden enclosure and the roof which can be covered with straw or wooden shingles. The structural system of the enclosure has two distinct types, the first where the whole structure is formed from horizontal beams joined in the corners (straight or inclined joinery) covered with a wooden cylindrical vault or a wooden straight roof; the second type has a general framework composed of main horizontal elements (top and bottom) and carved verticals elements in which the secondary horizontal elements are fitted in realizing the enclosure.

2. HISTORICAL STRUCTURE

Historical structures evolve in the early years of 1716, when the Habsburgic colonization and systematization of the Banat area brings about 80,000 foreign settlers : Germans, Serbians, Bulgarians, Hungarians, Italians, French, Spanish, and other romanians from Oltenia and Muntenia. Along with these, innovative construction techniques are brought, techniques that were assimilated and completed the traditional construction typology.

Timisoara becomes a major development in the Fortress, where the nature of the swampy terrain has been stabilized by major interventions on the sewerage systematization of the River Bega. Brick had become the main material used in urban areas construction. Historical basements are made on vaults and arches systems, arches that raise from the structural walls, having masonry brick foundations with a size of 15/30/7 cm, produced in factories in the neighborhood of the city. The width of the foundations is as variable as the depth that is looking to trigger a good Earth Foundation. Structural floor system is composed of structural brick walls having windows and doors with masonry arch lintels, or later with metal lintels. The slab over the ground floor is mostly executed of brick vaults on perimetrale walls, in various ways : semicilindrical vaults, basket handle vaults, horseshoe vaults or on the metallic sleepers. Over the ground floor, a structure of wooden slabs is raising, having the perimetral walls as support. This emphasizes a new historical stage both in terms of construction and modification of the area height. Urban structures in the Plain West of Romania have known several stages of development, one
of these being the end of the 19th century and early 20th century, when the major transformations were happening at the level of urban structures and the modification of the regime of height e.g. (Fig. 4). The layering of buildings is made by raising the brick walls that used as support for softwood slabs, beam next to the beam type.

The structure of the framings can be assembled in several ways having the wood from Banat Region at the basis of the structure. All these represent an overview of the structural system of the buildings heritage with historical value.

The thing that makes this built heritage an interesting fact to study about and also valuable for the community heritage is the myriad of stylistic approaches and orientations, due to the influences that came with the settlers of the Habsburg empire. Timisoara was built on a very healthy social structure in which all minorities interfered with discreet interventions within the built heritage.

The historical structures are interesting within their composition of several subsystems made up of different building materials, what makes intervention on a building to be responsible. Having knowledge of building materials and technologies helps with the preservation of identity of the built heritage.

![Fig. 4 The neobizantin style of the Serbian Episcopal palace in Timisoara](image)

2.1. **The evaluation of the historical structure**

An analysis on several types of buildings, both rural and urban environment have pointed common types of degradation. Banat is a seismic active zone, which registers a large number of low-intensity earthquakes, but which have made a permanent degradation to the built heritage fund. The infiltration of water and rain is the main cause of the destabilization of a structural system. Human irresponsible interventions and lack of training in the field of restoration brings major heritage prejudices. These are just a few of the factors that influence the value of the historical constructive system.

The interventions on historical buildings are made on the basis of a structural behavior analysis e.g. [4] in which it will be assessed by calculating the behavior of the structure always having in mind the gravitational force and horizontal seismic forces. The calculation will determine the ability of
resistance to the cutting force on the basis of simplifying assumptions and comparing it with the basic cutting force. The capacity of endurance will be computed in the structural walls. Identifying the causes of structural failure can be a result of previous interventions, interventions on the elements with load bearing properties on the structure of previous failed interventions, aging and degradation of the construction materials, lack of maintenance and inadequate functional compatibility. What is particular about the built heritage of Banat region is its permanent evolution, using specific materials and technologies for that time, as well as the nature of the small depth earthquakes which influenced the integrity of the construction in stages, making the interest in analysing the historical structures.

REFERENCES