Preserving the Original System of the Timber Roof Structure on an Example of the Handanija Mosque in Prusac

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EXTENDED ABSTRACT

In this article, the authors provide a brief presentation of their personal involvement in a process of the Inspection on the Roof Structure Design of the Handanija Mosque in Prusac. Besides the inspection, the authors had been asked to deliver their own suggestion on how to solve the roof structure in question.

The Handanija Mosque was built in 1617. The mosque was named after its founder, Handan Aga, a rich Turkish servant. The Handanija Mosque is an important example of cultural heritage of Bosnia and Herzegovina. In 2005, it has been acknowledged a National Monument of Bosnia and Herzegovina. It represents a tradition value, and through its shape and design, and proportion quality makes a unique example of classical style.

The mosque has a quadrilateral plan of 16.30 by 12.70 m in size. It belongs to a one-room type of mosque with an open porch and a stone minaret.

The Handanija Mosque was damaged during shelling from 1992 to 1995. Due to several direct hits by shells, it has undergone major damages to the walls, roof and the minaret.

The roof structure has been completely destroyed, while the rest of the structure has been severely damaged. The roof, including the inside dome, has vanished in fire. After the destruction, no visible remains of the ceiling and dome structure were left. Only the corner parts of the roof ceiling joists have remained.

As a basis for making the roof structure design, the architectural design made by the Principal was used, as well as information and details obtained at the scene in Prusac.

The design required a traditional structure with the traditional way of dressing joints.

The designed structure of hipped roof, with a 45° roof pitch, consists of structure of timber including hip rafters, purlins, and wall plates, trussed beams making the primary structure, and secondary structure in the shape of rafters.

The solution subject to the inspection modifies the roof structure within the wall line, thus excluding two studs within the wall line, and the load from trussed beams and part of the roof is transferred onto the queen truss, therefore creating a potential weak spot within the structure, taking into consideration

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the nature and susceptibility of truss-type supporting structure. Besides, the span structure also takes over the load of other span structures, without providing any guaranties for not changing the selected geometry.

The suggested solution introduces into the building of the exceptional cultural and historical importance for Bosnia and Herzegovina, a structural system of roof structure that may not be found in any other familiar building of this type dating from the period when the building was built.

The authors suggested changing the system of supporting structure, by excluding the system of trussed beams and introducing traditional components, studs, girders, diagonal braces and tie beams as typical for this type of building. A 52.5° roof pitch was suggested, thus in the tradition of autochthonous architecture of Bosnia. It also reduces the intensity of horizontal forces. With regard to evenness, concentration and positioning of studs, it makes it possible to create, along the edge of the building, the system of triangles that would increase the building resistance to the wind that during certain periods of the year may be present in that geographical area.

We would like to suggest the 52.5° roof pitch for the following reasons: in order to follow the autochthonous architecture of Central Bosnia, for the reduction in intensity of horizontal forces and taking into consideration the fact that hand cut roof covering does not always provide guaranties for the identical geometry and leaning.