

Learning from a case study: the great timber roof structures of the Cathedral of Vercelli

Clara Bertolini Cestari¹, Gianoreste Biglione¹, Luciana Cestari², Germana Corradino³, Alan Crivellaro⁴, Daniele De Luca³, Tanja Marzi¹, Pia Panosch⁵, Riccardo Pasquino³

EXTENDED ABSTRACT

The great timber roof structures of the Cathedral of Vercelli offer an extraordinary path of knowledge, diagnosis and conservation, through a collaboration between the architects of the Cultural Heritage Office of the Diocese of Vercelli – responsible for the restoration process – and experts in the field of timber structures.

The interest of the architectural complex is witnessed also by the contribution of renewed architects of Piedmont between the XVIth and XIXth centuries.

The paper goes beyond the diagnostic evaluation, giving an overview on the main consolidation interventions respectful of the conservation of the timber structure.

In general, the conservation of historical timber structures requires the knowledge both of the overall static behaviour, both of its single elements, so that the task of who is involved in its restoration/maintenance can be based on reliable data for a proper project.

Of great importance is the constructive knowledge and understanding of the structure that can be reached through an accurate geometric survey, both of the elements and their technological defects, both of the joints; on this survey is based the diagnosis for the evaluation and grading according to the resistance.

Built heritage wooden structures from past periods represent a specific category of artefacts that are of particular importance and recognized interest in the rich heritage of cultural goods relating to historic or traditional buildings. These historic buildings show diffusion at the local level, type of structure, technological characteristics, artistic and formal value, etc.

Sadly, in the majority of cases these structures, were not deemed worthy of the same attention as the buildings of which they were an integral part. They were frequently subject to inappropriate intervention, replacement, or, even worse, demolition.

It was not until fairly recently that it became generally recognized that, as far as possible, these structures should be renovated and conserved in terms of their static purpose and in a manner that is respectful of and coherent with their original concept as well as their material: wood.

Nevertheless, in practice many structural renovations carried out in recent times have betrayed the idea of conservation, sometimes even involving the unwarranted demolition of centuries-old roofs. Such

¹ Dipartimento di Progettazione Architettonica e di Disegno Industriale, Politecnico di Torino, Italy, clara.bertolini@polito.it

² Donna Luciana, Chieri, Italy, cestari@alice.it

³ Ufficio Beni Culturali, Arcidiocesi di Vercelli, Italy, beniculturali@arcidiocesi.vc.it

⁴ Dipartimento TESAF, Università di Padova, Italy, alan.crivellaro@unipd.it

⁵ Technical University of Vienna, Austria, pia_panosch@yahoo.de

arbitrary or “excessive” intervention frequently stems from difficulties in assessing the state of conservation of the material and of its real load – bearing capacity, the incorrect evaluation of the structural behaviour of these elements, or the adoption of superficial procedures guided by profit rather than by the real needs of the works in question. Despite the revival of interest in wood and the proliferation of studies on this material, its load bearing capacities continue to be questioned by operators whose inadequate knowledge and total lack of confidence are revealed in the use of consolidation techniques using supports made from innovative “new” materials thought to hold the answer to all structural problems. This is a short sighted approach that disregards the effects of such interventions in the medium and long term. Many techniques described in the current technical literature (though sometimes innovative) are failing to keep pace with a conservation trend that is emerging, not just with respect to monumental restoration but also as far as historic or merely traditional buildings are concerned.

There are too many cases of unjustifiable radical interventions where wooden ceilings have been consolidated with steel structures and layers of reinforced concrete, or roofs have been partially or completely reconstructed using steel or Glulam components. Not only do such projects share a lack of confidence in the traditional materials, construction techniques and skills, but they frequently neglect one of the fundamental steps of structural renovation project management - the diagnostic phase. The historical knowledge is fundamental for any kind of intervention.



Figure 1 – Elements of the roof timber structure over the apse of the Cathedral of Vercelli Grading according to resistance

The great timber roof structure of the Cathedral constitute the first part of restoration works of the whole architectural complex. The works are followed directly by the Cultural Heritage Office of the Diocese of Vercelli, and are aimed at the conservation and restoration of the timber roof structure, adopting techniques that are very few invasive and suitable to give back structural consistency to the whole structure, without losing the important characteristics of the building: its impressive structure, also considering the skilled carpenters, the importance of royal architects and the traditional rules of the art that those structures still preserve.

The intervention foresees the rehabilitation of all the great trusses and the relative metallic elements; also the secondary structure, where possible, will be preserved. While it is foreseen the only substitution of the covering. Part of the tiles will be preserved and an accurate maintenance will be carried out also on the copper and lid cupolas.