

# **Expertise and needs in assessing wooden structures through a study case of renovation and change of use in a traditional building from the Cevennes area (France)**

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## **Extended abstract**

This paper is dealing with the case study of an old people's home in Valleraugue (Cevennes area, France). An extension to this home was needed, and, it was envisaged to use the contiguous house which was an old un-habited building in this village. The diagnostic and expertise of this home for which one maintenance and extension was needed was an interesting case study. It was dealing with the change of use of a traditional house combining different aspects: increasing of the capacity loads on floors and roof, and, assuring fire security in a public building.

The expertise and calculation methods applied are the same for all the expertise conducted on this site. The first steps were done on site: (1) checking disorders especially for the roof, attic venting, subterranean floors and damp rooms; (2) recording the geometrical measurement of structures' elements; (3) identify the wood (softwood/hardwood) and its quality (mechanical grade). Once this is finished, it is possible to analyze the data and make the structure calculation:

- the evaluation of loads for roof and floors;
- the calculations to checking solidity (stress and creep calculation under different loads combinations);
- the calculations for fire safety.

First, a technical evaluation was done on the actual home in service for eventual repairing and maintenance. Different leaking points were found in the old building, and, a rather unusual disorder was due to an un-correct plumbing vent.

A second expertise was conducted on the house to be used for the extension. For the future extension, we had to assess the load capacity of the structure and especially of the wooden floors and roof. Due to a change of use of this building, a conversion from a private house to offices, kitchen and dining room was planned. In France, standard load capacity for private house floors is 150 daN/m<sup>2</sup> and the load capacity needed for offices, kitchen and dining room is 250 daN/m<sup>2</sup> (NF P 06-001, 1986). In addition, the installation of photovoltaic panels on roof was envisaged

This paper will describe and explicit the different disorders found in the wooden structures (roofs and floors): some of them were quite predictable, but some unusual ones were also observed. The methods of the evaluation and analysis of the existing structure will be presented in the scope of its new use, such as: (1) increasing loads on the floors; (2) improving the fire resistance of the floors; (3) adding photovoltaic panels on the roofs.

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The precise determination of wood resistance can be very useful for reducing renovation costs. However, the costs of the diagnostic have to be low, and it does not allow to realize a complex monitoring of wooden structure. Through many controls and investigations involving wood as a building material, it appeared that there is a crucial need for in-situ techniques/tools to measure the residual mechanical strength of wooden parts (for safe, sound and rotten wood).

**Keywords** Building expertise, disorders, renovation, maintenance