New uses in historic buildings. Case study: A 19th century building in Valencia

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Abstract Frequently timber floors and roof structures are serviceable for the original use of a building. The lack of upkeep during the life of the structure, as well as increased load bearing because of building reuse might also reduce its serviceability.
Identification of the construction system is significant in order to understand the structural behaviour. Instrumental technique applied *in situ* allows researchers to save time on diagnosis and minimize damage to the sound timber.
The case study is about an urban 19th century building in an historic area of Valencia, located very close to the original city foundation area. The building has brick bearing load walls, timber floors and a roof structure. A simplified diagnosis method of timber structures was performed: visual inspection carried out by qualified site surveyors using NDT, in this case the wood hardener (Pilodyn). This method proved to be adequate to determine parameters and to obtain conclusions of the mechanical characteristics of the structural elements.

Keywords *timber structures, assessment, historic buildings*

EXTENDED ABSTRACT

Historic timber structures, as part of our cultural heritage, should be preserved whenever possible. This aim should be addressed by architects and technicians who are responsible for building conservation. Evaluation of historic timber structures is a part of the preliminary conservation work to be done in traditional architecture. Very often we find timber floors and roof structures that can be serviceable for the original use of the building. A lack of proper upkeep during the lifetime of a structure, as well as an increase in load bearing owing to changes in the functions of the building, may also reduce its serviceability.
Identification of the construction system is significant to understand the structural behaviour. The recognition of the geometry of a structure, its joints and timber design, is the starting point of the task. All marks and surface finishing give information about the craftsmen involved in the construction process, helping to identify timber that was introduced in the building at different times during the building process.
An instrumental technique applied *in situ* allows researchers to save time in diagnosis and to minimize damage to sound timber. Former laboratory research done by using this device provides data about the material mechanical characteristics.
The case study is of an urban 19th building with brick walls, timber floors and roof structure in the historic area of Valencia, very close to the original city foundation. A simplified diagnosis method of

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timber structures was applied: a visual inspection performed by qualified site surveyors together with NDT, in this case the wood hardener (Pilodyn). This method proved to be adequate to determine parameters and obtain conclusions of the structural elements mechanical characteristics.
The necessary strengthening came out after the assessment process proposed, providing for the conservation of the whole structure, maintaining its essence at a reasonable cost and concluding the job in a short period of time.

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