



## DIAGNOSIS AND APPROACH

After calculations, the analysis of the elements making up the existing floor showed that overall reinforcement was required to allow for working loads of 400 kg/m<sup>2</sup>.

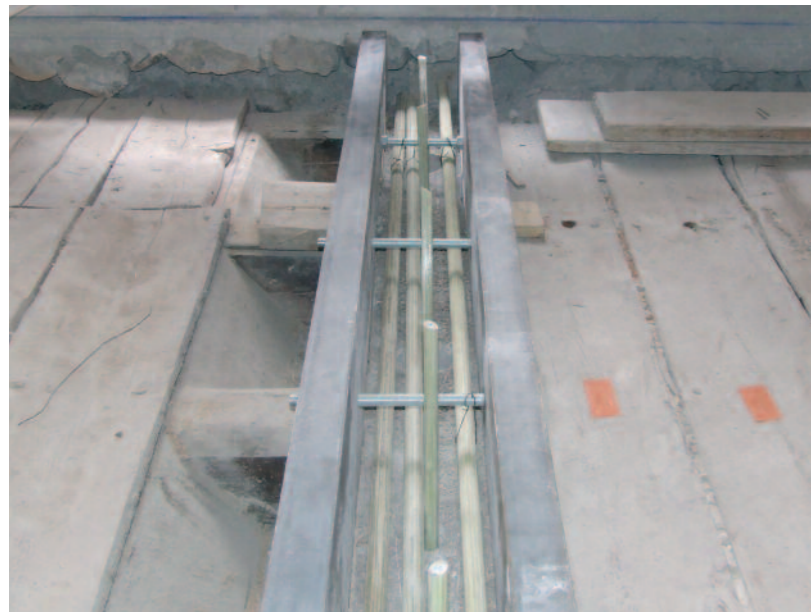
The antique joists will be preserved as is in accordance with the project, but will not be subject to any extra service load, except for their own weight.



1 - Connection work



2 - Installation of glass fibre reinforcements



3 - Compression table lined with supporting ironwork for self-bearing floor

## REINFORCEMENT OF THE BEAM

In order to meet the architect's technical requirements, the beam will be reinforced by installing a compression table made of resin mortar with glass fibre reinforcements (RENOFORS BEAM process).



4 - Pouring the compression table using a resin mortar



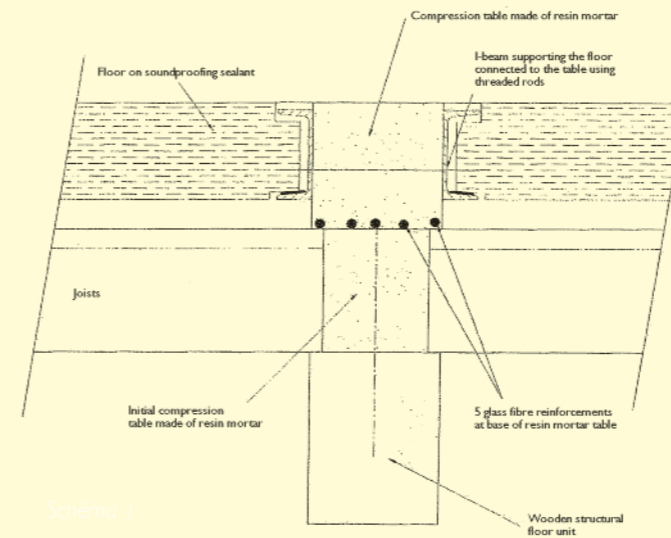
## INSTALLATION OF A SELF-BEARING FLOOR

After defining the required structural reinforcements (bending, stress, and deflection calculations) and verifying the supports, a self-bearing floor was laid (RENOPLAN process), 16 to 19.5 cm thick with a 5.3 m span.



6 - Laying of first elements of the floor

This floor rests on angle steels attached to the centre of the compression table (diagram 1) or anchored in the peripheral masonry (diagram 2).



Schema 1



5 - Laying of soundproofing sealant



7 - Supporting ironwork awaiting laying of second part of floor

8 - Completed floor



## STRENGTHENING OF PRESERVED WOODEN STRUCTURE

The upper floors of the first and second storey required the pinning of headers in some places using glass fibre reinforcements (RENOFORS WOOD process) and the threading of cracked wood structures.



Connection of the prosthesis of a restored antique joist





Restored element prior to restoration of paint work



## Identification sheet

**Client:**

Town of Embrun

**Architect:**

Olivier NAVIGLIO – ACMH

**Structure Engineering and Design:**

UBC Ingénierie

**Cost of RENOFORS intervention:**

69,325 €

**Completion time:**

1 month – 2006

## MESSAGE FROM THE ARCHITECT

The main difficulty of this reutilization project laid in the imperative necessity to preserve a 16th century painted panelled ceiling with its deformations although it could not support any load whatsoever from a structural point of view. Moreover, the vertical structures required the weight to rest on the larger side, including one of the thin parting walls lined with chimney ducts.

Furthermore, despite excellent sun exposure, Embrun, former archiepiscopal seat of the Alpes-Maritimes department, is located at an altitude of 870 m and gets several months of frost per year.

This set of constraints led us to adopt a “RENOPLAN” self-bearing floor, whose following features drew our attention:

- The service load bearing capacity of 400 kg/m<sup>2</sup> for a span of more than 6 meters
- A dry method, particularly interesting for implementation during winter or in an occupied environment, thus eliminating extra humidity which would be extremely harmful to the antique frame
- The creation of a plenum, which always is very practical

The whole was particularly well designed and planned, and was implemented very efficiently in the middle of winter 2006.

Olivier Naviglio

Head Architect at the French Historic Monuments department

## MESSAGE FROM THE CLIENT

Located opposite to the Réal porch of the Notre-Dame cathedral, the Maison des Chanonges is a major heritage item in Embrun. It is one of the rare specimens of medieval civil architecture still preserved. Its protection as a historical monument dates back to 1927, when it was recorded in the supplementary inventory, and its classification took place in 1988. The facade on the cathedral side and the two adjacent perpendicular walls date from the 13th century. A first reorganization of the interior structure took place in the 17th century, subsequent to a fire caused by the Lesdiguières troops, when the floor was rebuilt in “French style”. A second set of modifications took place in the 19th century. The town started this significant restoration in 1985 with the help of the various Head Architects from the French Historical Monuments department who succeeded one another and with support from the Regional Department of Cultural Affairs (Direction Régionale des Affaires Culturelles, DRAC).

RENOFORS was put in charge of the consolidation work of the flooring on the second floor to allow for an extra service load of 400 kg/m<sup>2</sup>. The implementation of the RENOPLAN process made it possible to adapt to the technical constraints and keep the original appearance of the floor.

The restoration of this building, which has been conducted in observance of its prestigious history, is now coming to an end and its inauguration should take place during the first semester of 2007.

Chantal Eyméoud  
Mayor of Embrun



— Surgery for construction —

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