POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE 1
Degree in Architecture
Honors theses

Joint/wood: some proposals between tradition and innovation
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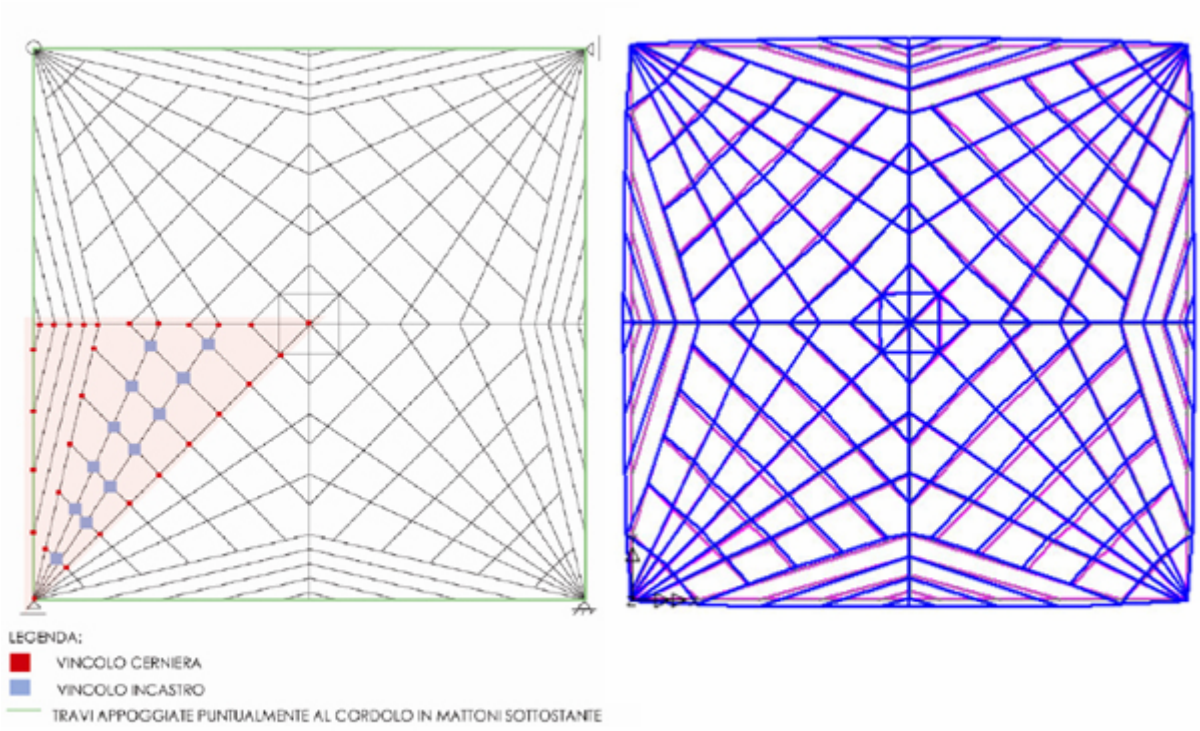
In a time where the variety of the building materials offered by industry shows a wide range of alternatives and the opportunity to find the right material for the specific purposes of a project is not considered anymore an exceptional event, building material such as wood comes strongly back into the construction scene; such reappearance reverses a trend and draws the public attention.
You might wonder why such material is being chosen again in the new millennium, in a time where everything seems possible through technology. At the root of the question there seems to be the recent significative improvement carried out by wood, compared to its traditional features; this has been possible thanks to the appearance of new building materials with wooden origin obtained by technological hybridization with other materials. Research today seems to be oriented toward “manipulation” of natural wood in order to raise the quality of performance, which is fundamental for the market development. It should be noted that metallic joints have contributed very much to the upswing of wooden buildings. After many decades, in a period where wood seemed to be definitely out of the building materials market and outrun by modern technology products such as steel and reinforced concrete, such revival has represented the beginning of a new development phase which is easily verifiable in architecture and constructions around us. It is not just a reappraisal of the past but a new expression, both in form and substance, in which a “reinvented” wood allows new employment and contributes to the birth of structures with renewed beauty.
Within such context, the obsterver is amazed by complexity of forms and extension of indoor space; they can feel that typical unvaried sense of warmth and familiarity which only wood can offer. Nowadays many architects such as Herzog, Samyn, Natterer, Piano have exploited such technology by challenging wood architecture; such trial sometimes had very interesting positive results on projects and allowed the realization of some constructions, for which such material is not always however properly used for its features.
Focusing the analysis on Turin area, the zone of the former military arsenal in Borgo Dora (a city suburb) displays lamellar wood roofing in the roofed square of “Grande Maglio”.

Following such trend, the aim of my thesis is to propose a new project solution operating on the adjacent square next to “Grande Maglio”, in order to describe a completely usable space, analysing a structure which has no other bearings except for the perimetral ones and highlighting the potentiality of the material used for covering the huge quad. A first approach to the square has brought to the definition of a regular geometrical grid in order to better define the shape of the roofing keeping a steady reference to the various structures, which have been found during the analysis of the materials, and to the constructions realised with it. The roofing projects for squared plan-spaces have been considered along with different versions. It has to do with spatial roofing where the backpieces have different pitches and create a dynamic architecture.

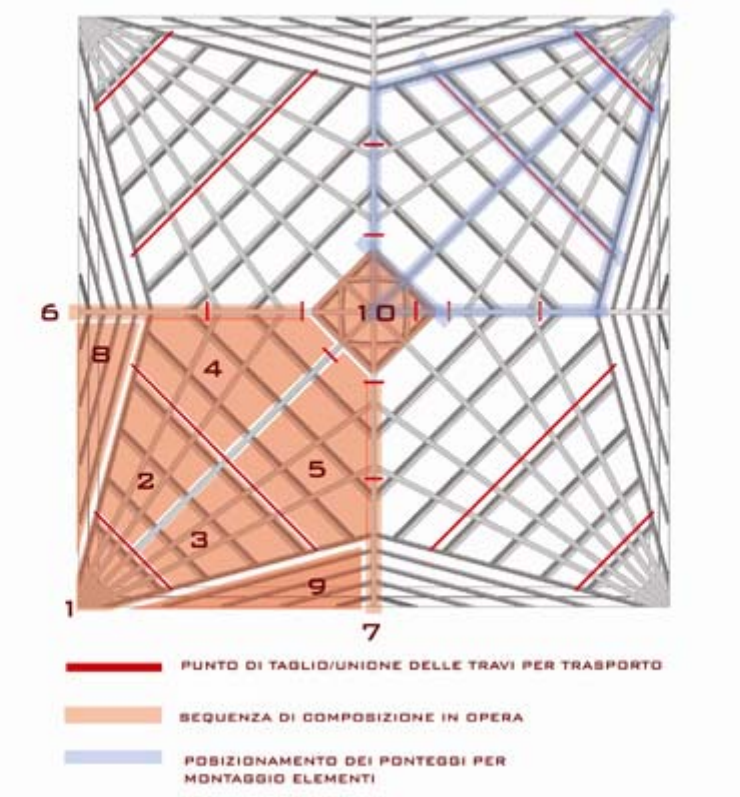
Approach to the space and definition of the geometrical grid

The recourse to the calculation and modelling programme Lusas 13.7, in which the collected data concerning structure and loads have been gathered, has enabled to determine the elements of the form. DIN 1052-1;7-8 resistance tests (concerning combined compressive and bending stress and shearing stress) and deformability (allowed strains are DIN 1052-1; 8.5.1 and the following ones) have been carried out with the original inserted sections; as a result, the limits imposed by the mechanical features of the material in use (lamellar stuck low-score wood, in accordance with security) have not been achieved.
Continuous revision of the process and a constant feedback, produced by constantly changing the figures of base and height of the sections and keepindg steady the technical scores, has been carried out. Afterwards, studies and explanation of the joints of the structural elements through the use of the modern connective technologies have been carried out.



A static scheme of the roofing and combined action of the external loads and the material weight. Layout prospect

During the planning phase, restrictions imposed by production limits have been considered, due to the specific utmost dimensions to observe. However, the major restrictions have been applied to carriage and assemblage; this is why specific study has been carried out on it.



Composition/decomposition scheme of the structural elements used

On the whole, the intended architectural image is obtained through the interaction of the lamellar wood with modern material such as glass and Rheinzink®, which allow a better appreciation of its aesthetic features. The result is alternation of opaque and transparent surfaces: glass (which allows the light filtering into the lower space) and Rheinzink® slabs (a zinc-copper-titanium alloy with aesthetic features due to its nuances obtained through time) have been used for such purpose.
Finally, management and maintenance of the roofing analysed in my thesis have been assessed: it is compulsory to keep the structure and all its parts in a normal state of preservation, not only as regards to its security but also concerning decoration, harmony and hygiene (it is a building with wide glass surfaces) by defining the cleaning methods from the interior and exterior side of the roofed space.

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