POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE
Degree in Architecture
Honors theses

High Technologies in the structural use of the engineered woods: the new material, Parallam®
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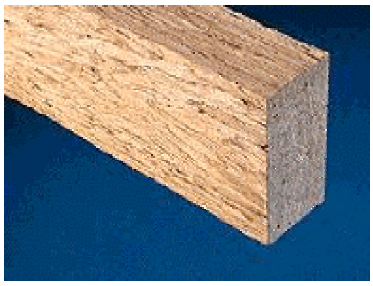
The research starts with the intention to analyze the structural results of engineered wood, from those less recent to those of more modern conception who are putting themselves at the international attention for the factory-worker innovations, for the environmental consideration who are on the basis and for high structural performances that characterize them.



Parallam®

The first step has been that to realize a careful *picture* of the "state of the art" of engineered wood, from structural panels to glulam, until the so-called Structural Composite Lumber (SCL) to which has been put more attention for their rank of technological innovation (principally the Parallam®, Timberstrand Microllam and "I-Joist".

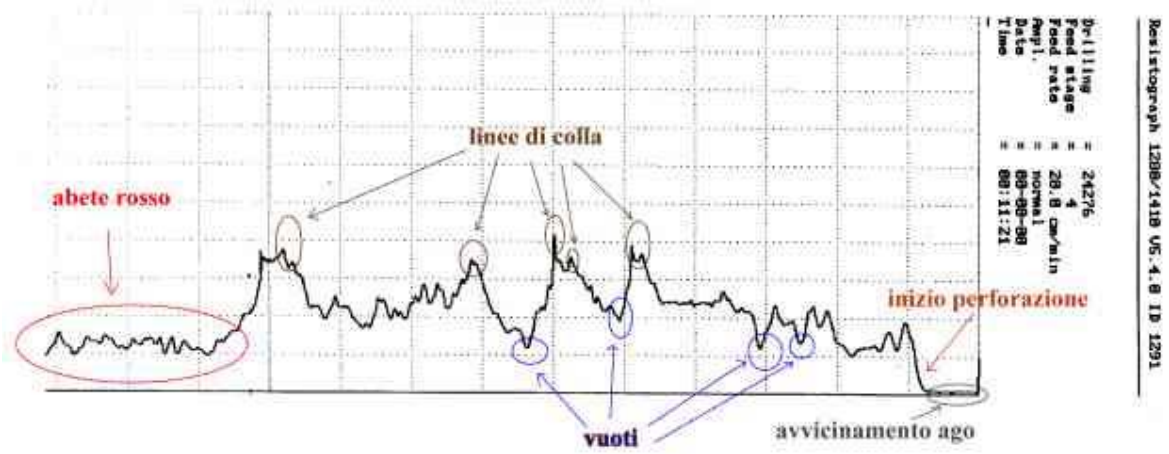
The description of these engineered woods (SCL) starts from an analysis of their technological development taking into examination their singles components, their productive process, their structural conception and their physical and mechanic characteristics.

Because of the Parallam® has been the material who had aroused more interest for its structural performances which put it more than any other, like a true alternative between sawn timber or glulam but also like an alternative to the traditional building materials, so we decided to direct the a more detailed research about this product, now not very famous, to get his complete physical and mechanic characteristic.

Then we had examined the possible and correct uses of the *SCL*, in the building trade and between "study cases", we observed the *Eurogarden* (Pict. 1) which is the first, and the only one, example in Italy of structure made of Parallam®.

Pict.1

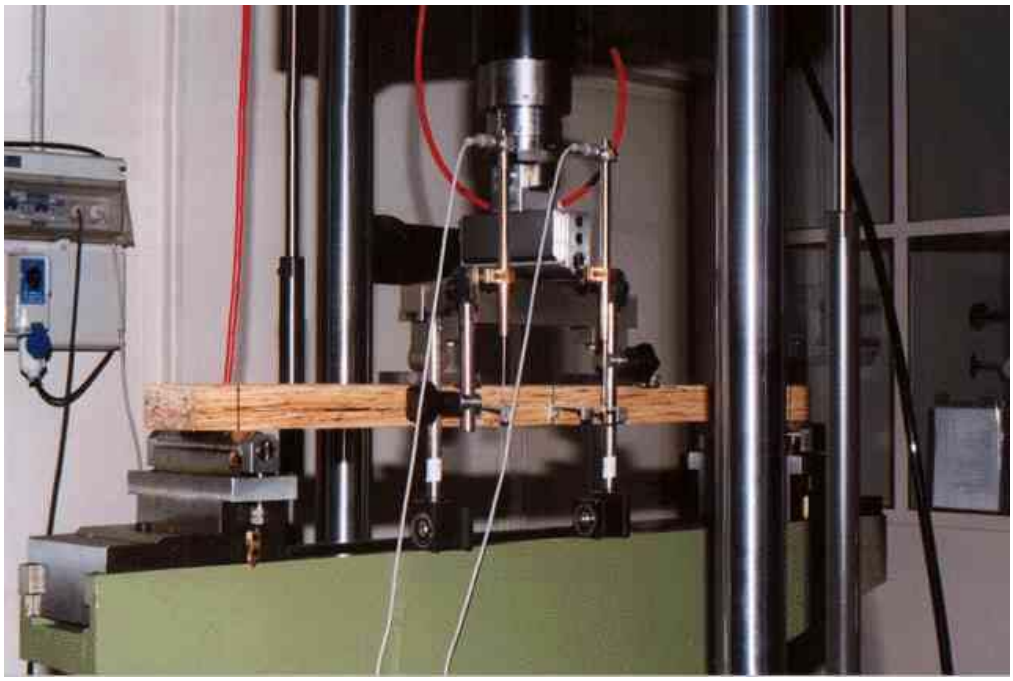
The last phase of the research has an experimental character to be able to get a thorough knowledge of Parallam through *non-destructive tests* and *destructive tests* on specimens in different dimensions. This allowed us to interpret more correctly his performances and to compare them with those declarated by the same nord-american firm-producer (the TJM), or by others strangers companies of research that point out the high strains admissible and the high module of elasticity. The non-destructive tests happened with two different instruments: The *Silvatest,* ultra-sound device to mark the module of elasticity, the temperature and the moisture and the Resistograph who reports the apparent density of the material in exam to gauge the drill-resistance by specimen and so it provides a detailed picture of his inside conditions (in this case it has been important to value the presence of empty-spaces and the resistance of the glue [pict.2].



pict. 2

The *destructive-tests* on small specimens are realized in the laboratory of *Compensati Toro S.p.A.* in Azeglio (TO), and they have been used to value the homogeneity of Parallam through an analysis of density, hardness, module of ropture and module of elasticity to bending in different static configurations.

The *use dimension tests*, which today are very important to value correctly the timber, have been carried out subsequently in the *Laboratory non-destructive tests* of *Structural Engineered Department* of the Polytechnic of Turin to determine whether the Resistance and the Module of Elasticity to bending whether the Resistance and the Module of Elasticity to Compression [pict. 3].



pict.3

The results attained have been put to confront with those of Institut fur Bautechnick of Berlin in 1993 e with those of *National Research Council Canada* of 1997. Different results have brought to many considerations in which we can point out the characteristics of this material that is able to contain in a lovely element the very peculiarities of wood (lightness, workness, renewness, etc.) with high performances of standardized industrial material who can be made in different dimensions, with the best results respect to the timber generally used in in building trade.
The main objective of the present research work is that to put the basis of departure for a best knowledge of these innovation products and of the high technologies that allow a more correct approach in the design phase in the structural uses.

A Special thank to Rosaria Gigliotti (translator)