

EVALUATION OF THE EXPERIMENTAL PRODUCTION OF EUCALYPT CLEAR BLOCKS FOR GLUED WOOD PANELS

Alexandre Monteiro de Carvalho¹
João Vicente de Figueiredo Latorraca¹
Marcio Augusto Rabelo Nahuz²

ABSTRACT

The plywood panels and particleboards are examples of wood composites materials. Materials like MDF (“medium density fiberboard”), LVL (“laminated veneer lumber”) and the sidelong-glued panels constitute a new generation of wood based product. These products use a concept that joins new manufacture technologies to the rational use of the forest resources. This work had as objective to evaluate eucalypt “clear blocks” used as raw material for wood glued panels. Clear blocks are pieces of lumber with small dimensions without defects and imperfections. The results of an analysis of the laboratory production are presented.

Key words: composite, *Eucalyptus*, wood panels

The wood based materials have been focus of countless researches and developments around the world. Although it's quite used, mainly in the called developed countries, the sawnwood has found competition of new materials that have been classified at the international market as “engineered wood products”.

There is a tendency today, not only in Brazil but also in several countries, of the substitution of the wood of native species for species originating from renewable forests. The planting of *Eucalyptus* implants itself as promising supplier of raw material for the production of wood based products. In Brazil the participation of the eucalypt at this market is still small.

A series of prejudices are attributed to this raw material, coming from the incorrect use and the lack of development of technologies that allow optimizing the characteristics of the final product. Ponce (1995) describes that the eucalypt presents some characteristics that hinders its utilization. These difficulties are not nevertheless, larger than the ones that most of the wood present.

In this study, the objective was to evaluate through an analysis of experimental production, “clear blocks” of eucalypt for wood panel, having as source of raw material a forest originally implanted for production of pulp.

Miranda (1998) shows up that the increase of wood consumption and the aloofness of the native reserves in relation to the consuming centers have been harming and burdened the raw material supply constituted by traditional species, mainly the ones of the Amazon Forest. Being so, alternatives sources of wood have been researched, standing out among them the planting of *Pinus* and *Eucalyptus*.

The idea of working with eucalypt wood based products reconciles the concept of multiple utilization of forests, with the need of development of wood products that can substitute other materials as concrete, steel, iron and plastic in structural uses and final touch at the industry of civil engineering and furniture, Carvalho (2000).

Menezes (1998) relates the pioneer experience of a great load industry of the wood segment in the confection of sidelong-glued eucalypt panels. The author describes the processing stages and concludes like promising the potential of this type of product at the market.

For the obtaining of the eucalypt “clear blocks” for glued wood panels, it was used as material a hybrid between the *Eucalyptus grandis* and the *Eucalyptus urophylla*, implanted in Mogi-Guaçu, state of São Paulo, Brazil. At the sampling, the trees were at the age of 7 years.

¹ Departamento de Produtos Florestais, Instituto de Florestas, Universidade Federal Rural do Rio de Janeiro. Endereço: UFRRJ/IF/DPF - Rod. BR 465, km 07, 23890-000, Seropédica/RJ - Brasil. e-mail: amcarvalho@ufrj.br , latorraca@ufrj.br

² Divisão de Produtos Florestais, Instituto de Pesquisas Tecnológicas do Estado de São Paulo - IPT. Endereço: Av. Prof. Almeida Prado, 532, Cidade Universitária, 05508-901, São Paulo/SP - Brasil. e-mail: mnahuz@ipt.br

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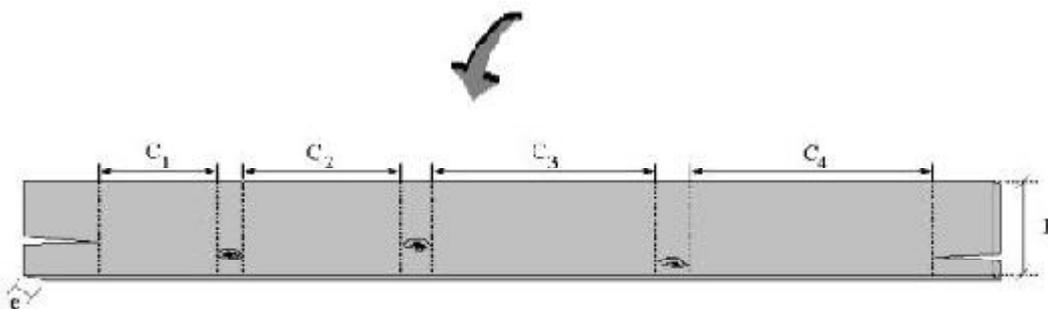
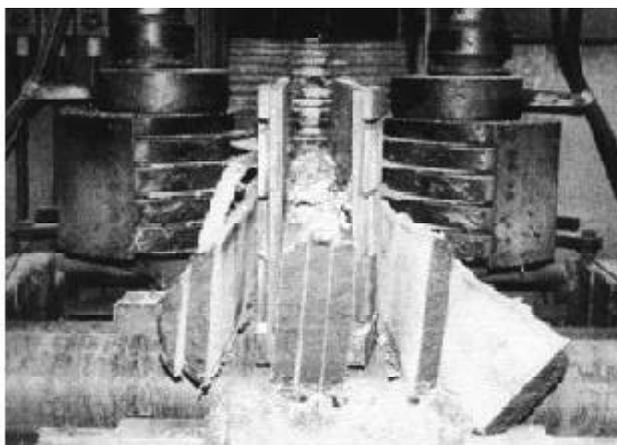
For wood supply were randomly selected inside of a commercial planting of an industry of pulp and papers, 50 trees. From each tree, a log of 4 meters in length was removed from its basis. The trees with basis diameter smaller than 20 centimeters, and diameter to 4 meters smaller than 12 centimeters were discarded.

The sampled material was taken to the installations of the Forest Products Division of the Institute of Technologies Researches - IPT in São Paulo.

To proceed it was realized the cut of the logs to the boards confection (27 millimeters of thickness each one). The method of cutting was the multiple saws, where

through simultaneous cuts the log goes through parallel saws far 27 millimeter from each other (Figure 1).

After the boards laterals discernment, the sawnwood (boards) yield was calculated in the humid condition, being the volume in m3 of each board. The boards were piled up at covered places for a period of 120 days for drying. In the same way the sawnwood boards yield was determined in dry condition. To proceed the volumes and yields of the “clear blocks” were determined. “Clear blocks” are characterized as pieces of smaller dimension where the main defects in the boards are removed, knots, twist, rottenness, and others.



$$V_{c.b.} = (C_1 \times L \times e) + (C_2 \times L \times e) + (C_3 \times L \times e) + (C_4 \times L \times e)$$

Figure 1. Production of the boards by parallel cut and measurement design of the volume into clear blocks in each board. (Vc.b. = volume (m3) in “clear blocks” presents in the board; C1, C2, C3 and C4 = length (m) of the “clear blocks”; L = width (m); e = thickness (m))

The “clear blocks” transformation into sidelong glued wood panels is very efficient. The panels yield can be considered the same one determined for the “clear blocks”. The process design of the glued wood panels assembly and examples of the utilization can be observed in the Figure 2.



Figure 2. Process design of assembly of the glued wood panels and examples of the use of glued eucalypt wood panels at the furniture industry and at the civil engineering (projects developed at the IPT – Institute of Technological Researches of the São Paulo State).

The boards were produced with the dimensions: 27 millimeters of thickness, length of 4 meters and variable width, obtained at the initial cut operation of the 50 logs. The boards yield results are presented in Table 1.

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Table 1. Boards yields for the 50 studied logs.

Yields	Average	Min.(%)	Max.(%)	C.V
Humid condition	41.17	30.31	47.65	7.52
Dry condition	39.71	29.04	45.78	7.80

The yield valued in dry conditions (around 14% of humidity) it was 1,46% smaller than the one valued in the humid condition. The board yield was quite satisfactory considering the low diameter and the reduced age of cutting.

The available information in the literature about the processing of low diameter logs is scarce. The equipments and the operators of the sawmill industry give preference to the utilization of the wood of larger volume, Ponce (1995). In the Table 2 and 3 are presented the yield results of the “clear blocks” confection, also corresponding to the sidelong glued wood panels yield. In the Table 2, the yields were calculated in function of the initial logs volumes. Already in the Table 3 the yields presented were calculated from the volume of the produced boards, the difference represents the loss in the boards conversion into wood glued panels without defects or imperfection.

Table 2. “Clear blocks” or panel yields calculated in function of the logs volume.

Tabela 2. Rendimento em “clear blocks” ou em painéis calculado em função do volume das toras.

Medium yield (%)	29.98
Standard diversion	4.14
C.V. (%)	13.82

Table 3. Obtained volume and conversion yield of the boards in “clear blocks” panels.

Total volume in boards obtained	Total Volume in “clear blocks” panels	Conversion yield of the boards into “clear blocks” panels
2,2002 m3	1,6521 m3	75.09%

The discarded wood in the transformation of the boards into “clear blocks” concern, mainly, to the occurrence of the knots and cracks. The average yields of 29.98% in the logs conversion into “clear blocks” panel demonstrates the potential of the obtaining of this kind of material from

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eucalypt species. The variation at the yield (C.V. of 13.82%) demonstrates the heterogeneity among the 50 logs or trees.

CONCLUSIONS

- The sidelong-glued wood panels produced from the “clear blocks” represent a material where the acceptance of young eucalypt trees (until 10 years old) is possible. Due to the reduced dimensions, the defects that traditionally happen in eucalypt boards, as the warping are minimized.
- The yields obtained in the lab production indicate a good potential for production in industrial scale of the studied panels.
- Works for the development of wood based products must be motivated with the use of reforestation wood as the eucalypt.
- The concept of the multiple wood utilization, that diversifies the final forest use, can be used to join value to the raw material produced in the forest.

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