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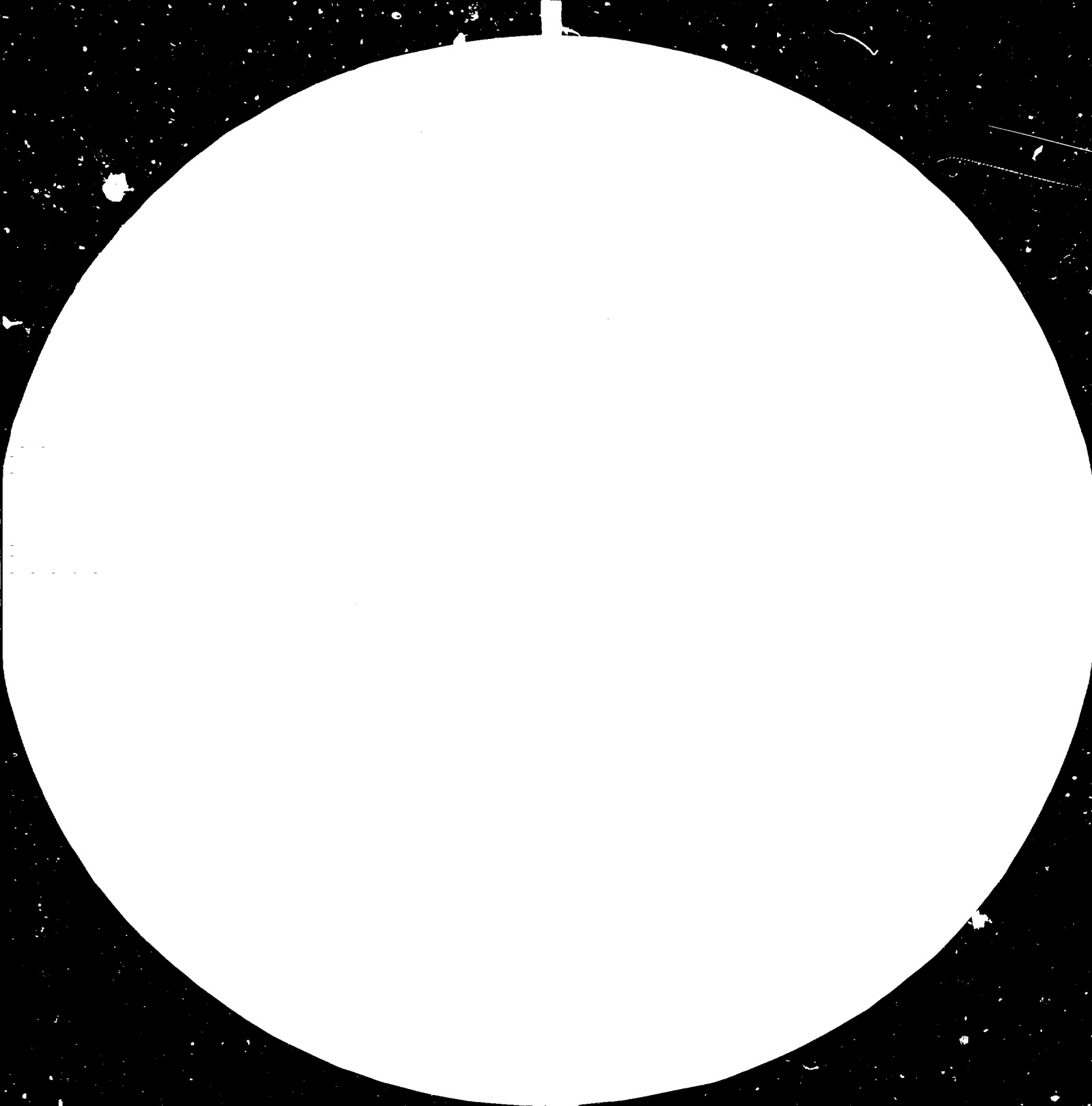
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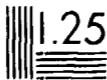
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Technical Course on Criteria for the
Selection of Woodworking Machines
Milan, Italy, 10 - 26 May 1982

EQUIPMENT FOR GLUED LAMINATED WOOD*

by

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Introduction

Wooden constructions are fast regaining popularity, as a result of the awakening interest being shown in the outstanding qualities offered by laminates to the building industry, a market demanding construction materials featuring the following characteristics: strength, sufficient ductility for use in earthquake-prone areas, low weight for easy transportation and erection, high working rates, good temperature and sound insulating properties, consistently high performance standards.

Technologically, however, Italy has lagged regrettably behind over the past 150 years, only starting to gradually introduce advanced methods and processes some fifteen years ago.

With the advent of iron and reinforced concrete in the building industry, around the middle of the nineteenth century, and the stimulus to employ local materials, such as tiles made from clay - which are available in plentiful supply, and ultimately pre-stressed reinforced concrete, wood has been relegated to commodity-side uses, such as framework, lagging and interior decoration.

As regards building construction, wood has chiefly been employed for chalets, holiday homes and construction site shacks, thus underlining the idea that wooden constructions are only of a temporary nature. This is definitely not the case in other countries, especially in northern Europe and North America, where the tradition of wood is deeply rooted to consolidated building techniques and features a greatly different forestry policy approach.

Hence, Italy's young construction timber industry is now forging ahead, with regulations, instrumentation, machinery and work programmes provided by countries boasting vast and successful experience in the field, such as central and northern Europe, Canada and the United States. Considerable success has also been achieved in Italy over the past few years, with timber being used for large-scale and sophisticated structures, including a large number of buildings

featuring spans of over 60 meters, and, depending on the static systems adopted, even over 100 meters; all this has of course implied a host of new production problems, which our industry has tackled and is solving without necessarily being forced to depend on foreign experience.

Production process, machinery and equipment

Before actually describing the machinery and equipment involved, the various stages in the production of laminates will be summed-up, in an attempt to outline a typical factory set-up. The production cycle thus comprises:

- (a) Drying of timber to uniform residual moisture level of 10 - 12 percent;
- (b) Stabilizing the planks;
- (c) Identifying and eliminating plank defects, and moisture measurement;
- (d) Plate cutting, end milling of planks, and relative jointing to form sheets of the required lengths;
- (e) Planing and gluing of laminas;
- (f) Pressing of laminas;
- (g) Planing, edging and impregnation of beams, and application of metal fittings;
- (h) Warehouse storage;
- (i) Transportation to construction site;
- (j) Erection at construction site.

The machinery and equipment involved in the production can basically be grouped into the following three categories:

- A. Preparation and inspection equipment;
- B. Machines for making and completing laminates;
- C. Handling equipment.

The equipment included in Group A. is virtually responsible for the success of the overall process, since it guarantees upstream the continuous high quality of the end product. Group A. thus basically consists of: timber drying plant, quality identification and elimination of defects, automatic residual moisture inspection plant, elimination from line of parts above or below tolerance limits, air conditioning system for gluing line, so humidity and temperature levels are constant at all times; glueing pressure control equipment, and equipment for testing the mechanical features of the finished products.

Apart from the drying equipment, the other devices and instruments are widely and successfully employed in many other branches of production, and are thus not specific to the timber industry.

Group B. included the machines that actually make the laminate, and follow the equipment listed above in this order:

1. Plate cutting plant, formation of comb-joints, head-to-head glueing and pressing, and cutting of laminas to required lengths;
2. Lamina stacking and storing line;
3. High-speed lamina planing and glueing line, this must be fast enough to prevent oxidation of timber surfaces, which would affect the atomic and molecular bond between glue and wood - polymerization.
4. Pressing equipment (form- and pressure-adjustable benches);
5. Beam planing, shaping and edging plants;
6. Beam impregnation and painting plants.

This second section of the process requires suitable handling equipment, depending on whether planks, laminas or beams are involved.

The machines in Group C. are related to a rational "cascade"-type layout of the laminate-production machinery. The group includes chain conveyors, traversing machines, cranes and trucks, all suited

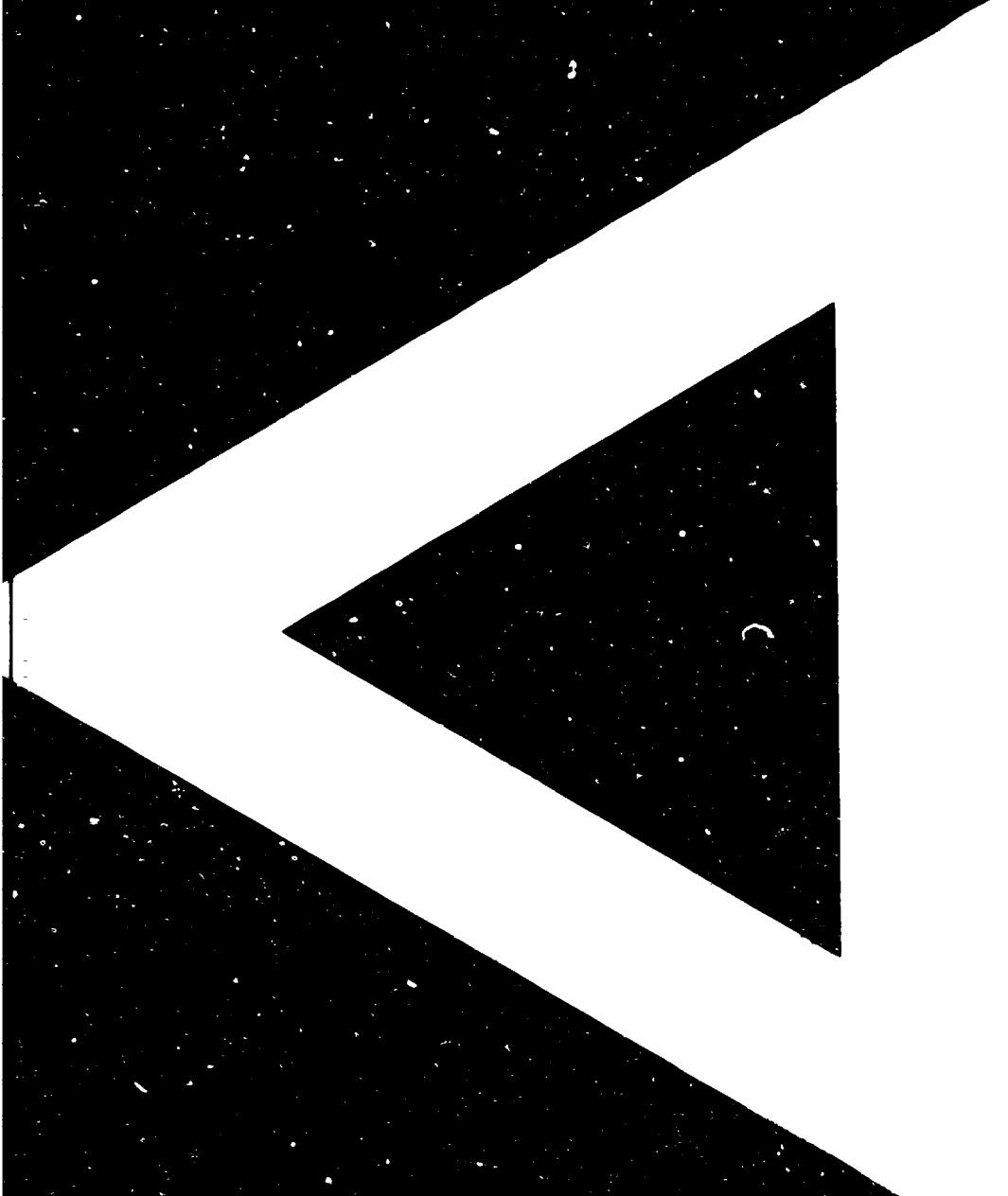
to the size of whatever is being handled. Ideally, the picture should be that of a long air-conditioned tunnel, with no interruptions on the production line, caused by parts handling or hold-ups. In other words, the production process must be carefully and rationally designed.

The vast technological development and breakthroughs achieved by Italy's woodworking machinery producers can offer laminate manufacturers a significant advantage in making up for lost time, thus giving this important sector the opportunity to emerge effectively in terms of quality and competitiveness, with respect to foreign markets. In fact, the problems of our laminate makers are shared by their foreign competitors, so greater efforts should be made towards ensuring that this potentially powerful sector will succeed in achieving higher levels of automation and rationalization on its production side.

It is felt that there is still much room for expansion. Positive results will undoubtedly be attained by introducing new machines and perfecting production lines by means of a broader use of electronics.

The crux of the matter is the need to develop new machines that are specifically designed for the laminate industry; this involves shifting to a greater scale - from today's small sizes to lengths of up to 40/50 meters - but above all, it must be realized that laminates do not only enhance the natural characteristics of wood, but add many more possibilities.





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