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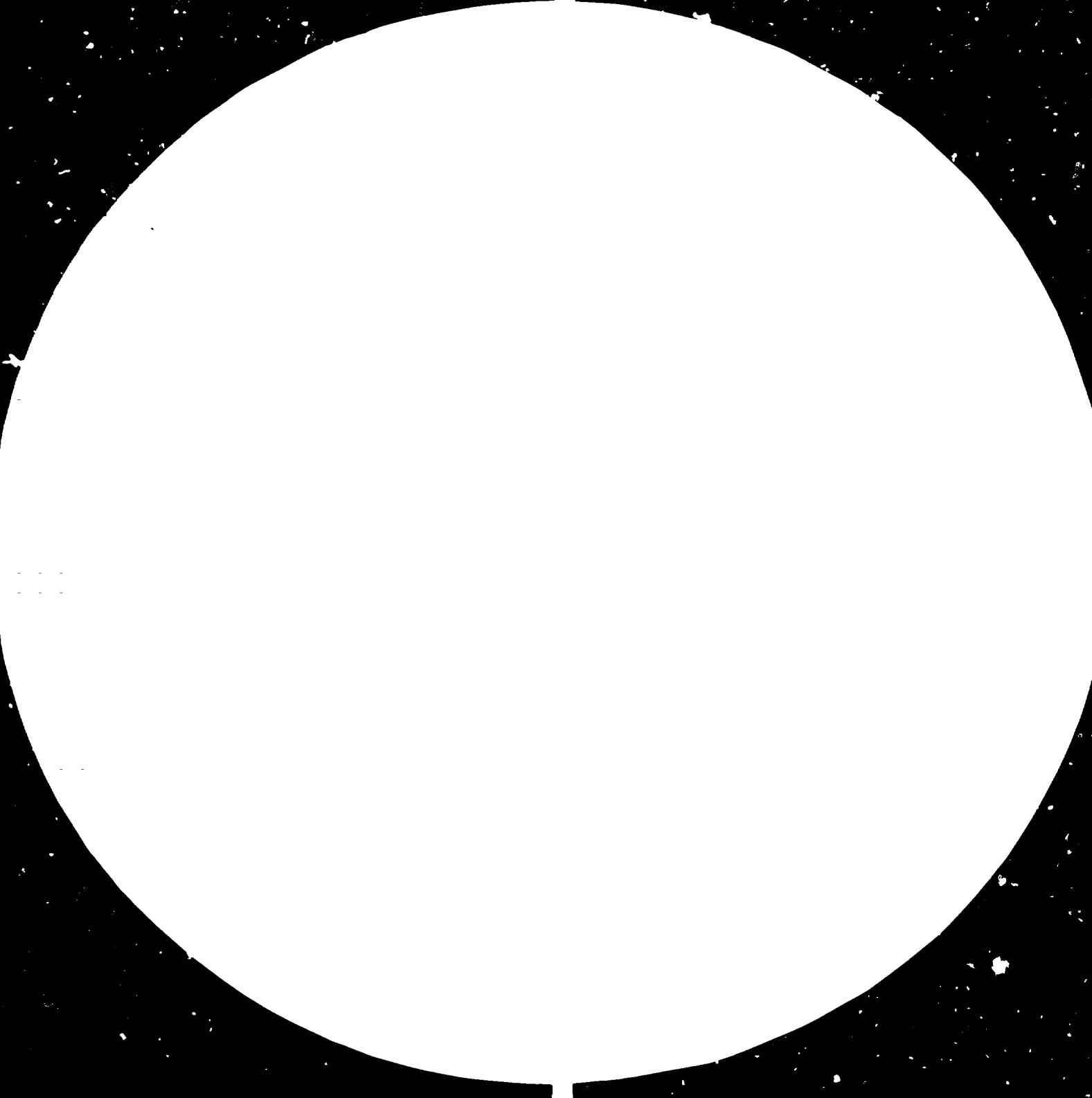

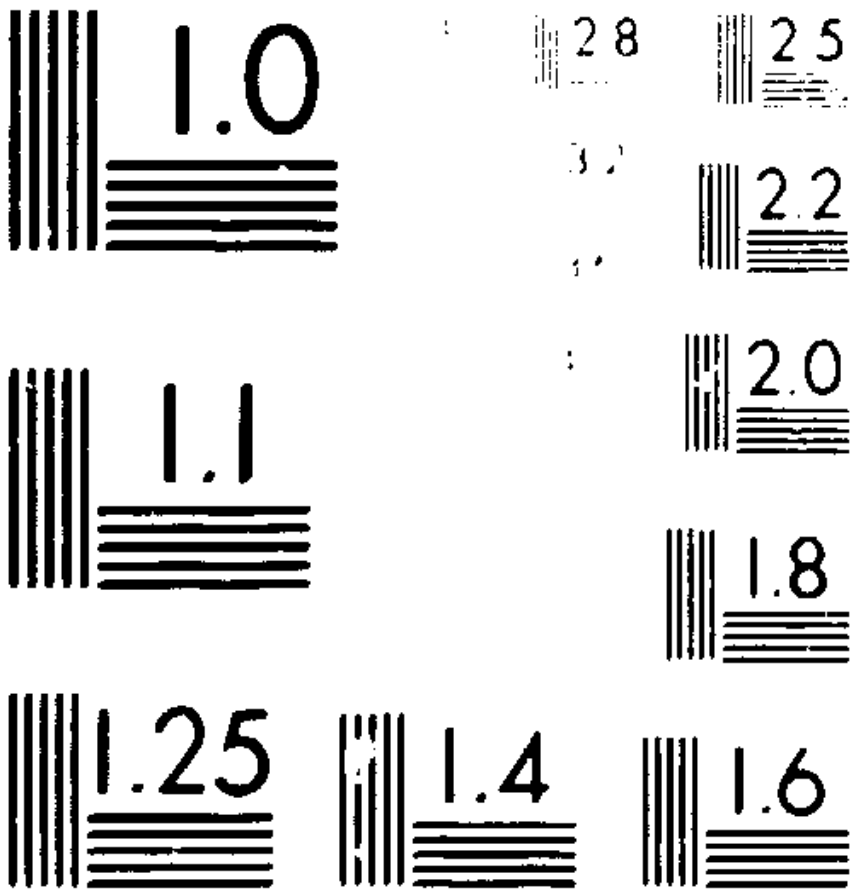
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TRANSSHIPMENT AND HANDLING OF PRIMARY WOOD PROUDCTS 1/

by

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INTRODUCTION:

Wood terminals at seaports are essential and integral parts of transport routes and of the production process of wood products, their operations are determined mostly by the demanding nature of the overseas wood export trade, by the specific nature of seaborne transport, and by the great susceptibility of wood to various physical and biological degradation processes caused by bad handling, leading quickly to loss of quality or even, in the last instance to total destruction. The efficient operation of the terminals enhances the value of goods shipped and reduces costs, thus improving the exporters' position in times of recession.

On the other hand, world wood production and consumption are still rising, in spite of attempts at replacing wood with other materials. Competition for the markets is sharp and will allow success only to exporters backed by a well organized production system, producing good quality wood at costs as low as possible.

1. Basic characteristics of white sawn softwood

The wood terminal of the Port of Koper is reserved exlcusively for the overseas export of white sawn softwood of a quality fitted for use in building and construction. Their terminal itself is adapted to the specific requirements of the wood species and the quality in which it is sold.

Wood, after being felled - since it is an organic matter - is subject to many physical and specially biologic destructive processes that can strongly affect its value. Wood contains up to 60 percent cellulose and, since cellulose is a form of different sugars, it is a very good foodstuff for different fungi, insects, etc. These organisms find existence conditions particularly in wood with a high moisture content; and, at a favourable temperature they could reproduce so fast that they could easily totally destroy the wood. The only remedy is immediate handling of sawnwood at all phases of its transportaion route to the final consumer and is therefore of utmost importance. In the terminal, wood is stacked into proper piles, allowing enough air circulation and protection against precipitations.

2. Production process and transportation:

The activity is divided into two parts:

2.1 Forest exploitation:

This activity consists of managing the forest resources so as to permanentlyensure the supply of enough wood for the industry using up to date scientific methods. Both the regeneration and exploitation are closely related and cannot be treated separately. The basic theme is to fell less than the increment. The question is theoretically simple, but it is not so in practice, because the installed industrial capacity and the rapidly developing economy call upon the foresters to deliver ever increasing quantities of wood.

The last phase of forestry activities - felling, bucking, and transport of the logs from the forest to the auxiliary depots alongside forest roads, and finally the transport of the logs to storage yards in the sawmills, is a measure of an adequate management. There are many examples of bad management in the past.

These activities are carried out by specialized work organizations.

2.2 Primary transformation of wood:

Primary transformation of wood belongs in a narrower sense to the sawmills; the end product being sawnwood of different kinds. The basic raw material in our sawmilling industry are either softwood or hardwood species. Among the former, are spruce, fir, pine and larch. They predominate in volume, but although the volume of sawn hardwood does not exceed that of sawn softwoods, it is very important for our furniture industry. Besides Romania, Yugoslavia is the main producer and exporter of beech and oack sawnwood. The capacity of sawnwood per year in Slovenia is about 900.000 m^3, produced by over 70 important sawmills.

The primary transformation of wood is divided into five main activities.

2.2.1 Transformation of logs: sawmilling

The Yugoslav sawmilling industry uses framesaws, suitable for softwoods, bandsaws - mostly vertical - suitable for hardwoods and a combination of both. Various circular saws are used in further processing for cutting to smaller pieces, trimming, heading, edging, etc.

2.2.2 Rough sorting of softwood

Although the Yugoslav standard for softwood provides five grades of quality, sawmills sort the goods in three quality groups:

- Second and better quality: This wood is to be considered as raw material for use by the furniture and building industries and for sheeting, and requires a lot of further processing. The stability of the wood is specially important in furniture and joinery, so this wood has to be dried carefully to moisture less than 10 percent. In order to achieve this state, it is necessary to use drying kilns. Only a small part of this category of wood can be air dried. The usual share of this quality in the total capacity of a sawmill is up to 30 percent.

- Third and fourth quality: It represents the biggest part in a sawmill's production. This wood, sawn into different sizes, is used by the building industry for shuttering, supporting and scaffoldings. We must say that 99 percent of wood of this quality is exported. The acceptable moisture content is less stringent and varies between 17 and 22 percent. For economic reasons, kiln drying is not used, air drying is sufficient to attain this level of moisture content.

- Fifth quality: It is used for the less demanding works in the building industry.

2.2.3 Storage and drying

As explained above, the sawmills are only drying sawnwood of second and better quality, because they use it for further processing

or sell them directly. Other qualities are usually not dried or kept at the store yards of the sawmills.

2.2.4 Delivery of freshly sawn wood to the export's stores in the port for further handling before shipment

This is the final act of all woodworking processes and offers at the end (if properly done), to all concerned adequate financial remuneration.

3. The wood terminal at the port of Koper - an integral part of the transport and processing of sawnwood.

This terminal represents a very important and integral part in the processing of wood and its transport. It must be pointed out that from the very beginning this terminal has been our main preoccupation since it ensures permanently smooth and good operations.

The wood terminal in the port of Koper covers about 50.000 m^2 of land and an agreement with the port authorities has been reached recently for an extension of another 50.000 m^2. Its capacity is about 2[illegible]30.000 m^3 of permanent stock and up to 100.000 m^3 of sawnwood exported per year. The open store yard serves for air drying, which is the most important and the most sensitive phase of the whole process.

Two covered warehouses of about 6.500 m^2 each, in which already dried timber, ready for shipment is stored, belong to the terminal.

All types of operations have been taken over by a specialized service of the port of Koper and the operators of the terminal cooperate on the basis of a year by year contract. The responsibility for quantities received, tariffs and methods of payment, financing and investing in new equipment, etc. The operator's staff in the terminal is not numerous: only three persons are employed. Their duty is to control the quality of the sawnwood and the quality of the handling, parallel book-keeping, issuing instructions and dispositions of shipments, in one word they are a kind of super control body, a link between the terminal and the company's head office in Ljubljana.

3.1 Conditions for the choice of location and creation of the wood terminal.

3.1.1 The need for optimal and permanent stock of wood

An optimal and permanent stock of wood is necessary in order to allow having a sufficient volume of well seasoned timber of the various specifications required at the time of the ship's arrival at hand. Because of relatively large volumes loaded per single shipment (up to 5.000 m^3), we estimate, on the basis of experience, that an optimal permanent stock has to be between 25 and 30.000 m^3.

3.1.2 Specific requirements of particular markets

Specific requirements of particular markets for good handling of wood for overseas transport (heading, marking, packing) demand a unified approach to these operations. Such a unification can be achieved at one place only.

3.1.3 Climatic conditions

Favourable climatic conditions are important for efficient wood drying. Yugoslavia is known for its long and snowy winters. The months of November through April are particularly disadvantageous for air-drying, and a big majority of our sawmills are situated inland. In Koper, no such problem exists: the influences of the Mediterranean climate offer ideal conditions for air-drying of wood. The temperature is seldom below zero, there is enough wind and a favourable humidity.

3.1.4 Adequate area in the port

The great bulk of the sawnwood requires a relatively large space. This fact is important as ports usually have problems of availability of land that is very expensive. In this respect, the port of Koper is in a favourable position.

3.1.5 Adequate communications with the port

Good and efficient communications with the port are very important in the choice of location. The port of Koper has a very convenient position in this respect, for road and railway netword are well connected with the port. About 60 percent of the wood is transported by rail, the rest by road. The importance of transport became an essential part in the price of any commodity. On the other hand, where sawmills have no connection with the rail network, there is no other solution but to use trucks.

3.1.6 Assurance of lading capacity and frequency of ship calls

The port of Koper is relatively young, but is developing rapidly. With respect to wood transshipment, there are no particular complaints of the frequency of ship calls, berthing and quality of work. The port authorities knew very well how to create a necessary reputation in the world and they did succeed in this. Taking into account business contacts with receivers of goods and shipowners all are satisfied with the efficiency of the port of Koper.

3.1.7 Gravitation of the great part of timber to the port

This is also a very important criterion for the choice of location. About 90 percent of the timber going through the port has a convenient gravitation to the port of Koper. The average transport distance is about 130 km. On the Adriatic coast of Yugoslavia, there are 11 other ports, larger as well as smaller parts (all to the South of Koper) which are also active in timber transportation. It has to be mentioned also that the port of Koper has a particularly good position for handling cargo in transit from central and eastern European countries.

3.1.8 Assurance of sufficient labour supply

Labour in ports is known to be very hard to ensure because it requests a lot of dangerous and hard physical work, which has to be carried out under all weather conditions. The port of Koper has been

faced for years with growing migration of manpower, causing an almost permanent shortage of workers having the required skills. This shortage results in efforts being made to find solutions to solve this problem.

3.1.9 The advantage of the duty free zone

One of the facilities existing in the duty free zone is that investors do not have to pay custom duties on equipment imported for use in this zone. Once in the free zone, all timber is under customs control which often makes the exporters not operative.

3.2 Special conditions for the foundation of a wood terminal at the port of Koper

It is not very often that a big portion of a woodworking process has been moved from the sawmills and placed in a port, since the latter's basic responsibility is the taking over of goods ready for transshipment.

The foundation of the wood terminal in the port of Koper is directly related to the incapacity of the Slovene woodworking industry to finalize the process to the very end by itself. This particularity of the Slovene and also the Yugoslav sawmills forced export organizations to search for the way and place where such an activity could be carried out. The only answer was the port of Koper where all timber is gathered for further transfer to its final destination overseas. There were many objections at the beginning, mostly arising from the fact that the port is not a sawmiller by profession and of many other reasons closely linked with this activity. However, the wood terminal is operating: if not quite perfectly, at least it offers the exporters and the sawmilling industry fundamental conditions for the export of Yugoslav sawnwood.

Beside the physical incapacity of the sawmilling industry, there are economic reasons for ceding the activity to the exporter. Sawnwood in fresh state could contain even more than 100 percent moisture. On the other hand, the moisture percentage requested on overseas markets is approximately 18 percent. To reach this level, wood has to be kept in store yards for three to

six months. Financing the stock is the exporter's responsibility as he pays the sawmill's invoice upon the arrival of the freshly sawn wood at the terminal. The cost of financing represented, in the past, a relatively moderate expense as credits and interest rates were relatively cheap. But today's interest rates are very high, and cost of financing is an essential part in any economic consideration.

4. Phases of work in the wood terminal

There are nine essential phases of work, as follows:

4.1 Receipt of shipments and control of sawnwood upon arrival, both with respect to quality and specification.

4.2 Making-up of stacks of sawnwood of appropriate dimensions for drying. For better air circulation through the stack, one inch thick cleats are inserted between the planks.

4.3 Removal of stacks to the open storage area and construction of drying piles. The sizes of piles depend on the available mechanizaton (forklifts) and the stability of piles (depending on soil conditions). Usual sizes of piles are: height about 3 m, width 1,2 m and length 3 to 4 meters. In one pile, there is 10 to 15 m^3 of wood. The orientation of the piles has to take into account the direction of the prevailing winds so as to ensure the best possible air circulation for better and faster drying.

4.4 Covering the piles for protection against precipitations. Covering seems to be a simple work but it is a cause of complaints to the port direction. Piles of usually 4 m length are covered by two 2 m long corrugated iron sheets. Because of strong winds, and negligent work, piles get uncovered resulting in wetting instead of drying.

4.5 Drying to the predetermined level of humidity. As already said, wood requires up to 6 months (average three months) to become dry enough for export. The duration of drying depends on the season, the thickness of the wood, weather conditions and the way the piles are formed.

4.6 Removal of dry wood from the open store yard. Dry sawnwood is transported to the double blade circular saws for smooth cutting of the heads of the planks, to obtain the exact length required. Smooth heads are important for stamping marks on.

4.7 Formation of transport packs. Regulations regarding the packing for oversea transport to some discharging ports (specially in the Persian Gulf) are very strict. High penalties are imposed in case of non-fulfilment of these conditions. They regulate the sizes of each pack, the way it is to be bound by steel straps, the number and width of straps and protection with plastic against rain. A lot of attention has thus to be paid to this operation.

4.8 Marking: This is usually prescribed by buyers; it has, beside the practical value - to avoid mixing of similar cargoes on board the ship - also a function of decoration or better outside appearance and publicity. Marking on both ends of each plank is made using rubber stamps and oil paint and represents a tedious manual work, if we take into account that a lot of 5.000 m^3 requires up to 1 million prints.

4.9 Placing of packs in the covered warehouses: In oversea transport one has to take into account the frequent delays in the arrivals of ships. Before the ware house was built, the already dried and packed timber had to wait outside to be loaded, exposed to rain and damages. By placing the packs into warehouses, damage of timber before shipment is avoided.

The process ends with the transportation of the packs alongside ship and they are finally loaded on board.

5. Deficiencies of the existing terminal

Problems encountered relate to the quality of work; these are almost always related to the shortage of manpower and the poor organization of work. At rush periods, there are bottle-necks in some phases of work. The consequences of this situation is as follows:

- declining flexibility and expediecy of export, and,
- protests and claims on quality and quantity shipped by the buyers.

The above deficiencies occur due to lack of time for preparing the timber and cause difficulties in booking the shipping space. Sailors are very special men, they do not care much about the ship's delay, but they protest strongly when cargo is not ready in time whenever the ship does come in time. The consequences are usually litigations about demurrage charges, time sheets and other items particular to marine transport.

6. Automation of work in the wood terminal

Because of the above mentioned reasons, Slovenijales, has decided to invest in an automatic line for the mechanizatior of almost all phases of work in the wood terminal. The investment is quite big, but in the long run it will assure better and faster handling of sawnwood. In the modern sawmilling industry in the developed countries, these devices have become a normal part of the woodworking process. In Yugoslavia, on the other hand, there are only two or three sawmills who have decided to invest in this kind of modernization. Since we did not succeed in obtaining information that such a device had already been installed in any port, and because of relatively bad experiences in this field, we were obliged to study the matter intensively.

Our service for technology and investment consulted a lot of world producers of these devices and after a long investigation, the conclusions were positive. It was, namely, necessary to take into consideration the particularities of our sawmilling industry (as already mentioned above) which is not capable to carry out all transforming processes itself. This, and the fact of the chronic lack of workers in the port (which is going to become even worse) decided in favour of carrying out this investment.

A general description of this automatic line would be in short as follows:

Timber that arrives by truck or wagon, will be placed on a conveyor. On the way down conveyor, each piece passes through a sorting section where,

through a press button operation, a man sorts the wood into compartments. Further on, pieces are automatically measured by an electronic device connected to a computer, where the exact volume handled is stored. At the end of the line, wood is stacked semi-automatically. On leaving the line stacks are transfered to the open storeyard for air drying. When the drying is completed, the sawnwood is again put at the starting point of the conveyor, measured again, the ends are sawn by circular saws and finally pressed into transport packs. It is foreseen that only four operative workers (apart from the maintenance staff) will serve the device. The advantage over today's methods of operation with 30 to 40 workers are evident and justify the investment. A capacity of about 50.000 m^3 in one shift is expected.

7. Transport of wood overseas

Booking of shipping space required a great deal of experience and an in-depth knowledge of various regulations, standards and customs.

Practically all the timber, passing through the terminal is shipped to ports in the Persian Gulf, the Middle East and North Africa. Normally, only Yugoslav shipowners are employed; the service of foreign shipowners are used only on rare occasions, when sales on an FOB basis have been made.

The problems of overseas trasnport of timber relate to:

- The high average of age of the Yugoslav fleet reduces the stowage effectiveness because of badly constructed holds and narrow spaces. There is however one concession with respect to shipping sawnwood, namely that it is allowed internationally to load one third of the quantity of sawnwood on deck.

- Many importing countries increasingly prescribe, because of quicker discharging and in order to avoid demurrage, limits to ship's age, which reduces the shipping space available.

- Sawnwood is a relatively not an attractive cargo to shipowners as it does not stand high rates and does not offer good use of space because of its bulk.

- Finally, although Yugoslav shipowners' freight rates are somewhat uncompetitive, this is usually compensated by their accurate and safe delivery of the goods shipped.

8. Possibility of application of such a terminal for other kinds of wood

All kinds of wood have common characteristics, such as a very high moisture content, that could reach in some species even 200 percent of the weight of the oven-dry wood. On drying, wood loses water and thus reduces its total volume. Inner tensions, caused by this process, result in cracking, warping and cupping of the sawnwood.

The differences between various kinds of wood, for example: water content, weight, resistance to fungi and insects, possible end uses, various sizes and also different value of a wood, necessarily call for its different handling, although the handling is in principle the same.

Beech, for instance, is a raw material for furniture, and is sawn into about ten times more sizes and qualities in comparison to the sawn softwood timber shipped through the Koper terminal. Lengths of beech are from 0,5m up to 6m, while 90 percent of softwoods are 4 m long.

On the other hand, softwood, discolored by fungal attack, is still normally used in building, while discoloration of Beech or other hardwoods are considered to be a serious defect and is not tolerated.

One must not forget that hardwood could be twice, and tropical wood even five times, more expensive than softwood.

The application of an automatic line, identical to the one described above, is not possible for Beech, Oak, Sapelli or other species of tropical wood, because it has been designed for wood having a lower density and not such a wide range of lengths. (One piece of hardwood can weigh more than 200kgs.)

This does not mean that this kind of terminal cannot be applied for any kind of wood if its particularities are taken into consideration.