

# 3-N LUMBER FROM OIL PALM TRUNK

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Each year, the oil palm industry produces more than 15 million cubic metre of oil palm trunks (OPT) during replanting. Despite their possible use as wood, the material is largely wasted. Some of the problems are a low recovery of sawn timber after seasoning, and the poor inherent physical and mechanical characteristics of the wood.

Without chemical pre-treatment, oil palm lumber is generally susceptible to attack by fungi and borers. In addition, the undried wood exposed to humidity changes tends to warp and crack. The dried lumber is of low density and with poor mechanical properties. All these detract from value of the wood.

MPOB has developed a process to improve wood by resin impregnation and densification, i.e., resin infusion and compression. The product, called 3-N lumber, is densified oil palm lumber with improved strength. It is non-absorbent, non-swelling and not susceptible to attack by pathogens.

## MANUFACTURING PROCESS

OPT are sawn into planks 100 mm thick. After drying, the lumber is impregnated with a polyester resin using a modified technique to ensure that the resin diffuses uniformly within the lumber matrix. The technique obviates having patches which are resin-rich and resin-starved, as well as dry patches in the lumber matrix. Figure 1 illustrates the process in the manufacture of 3-N lumber.

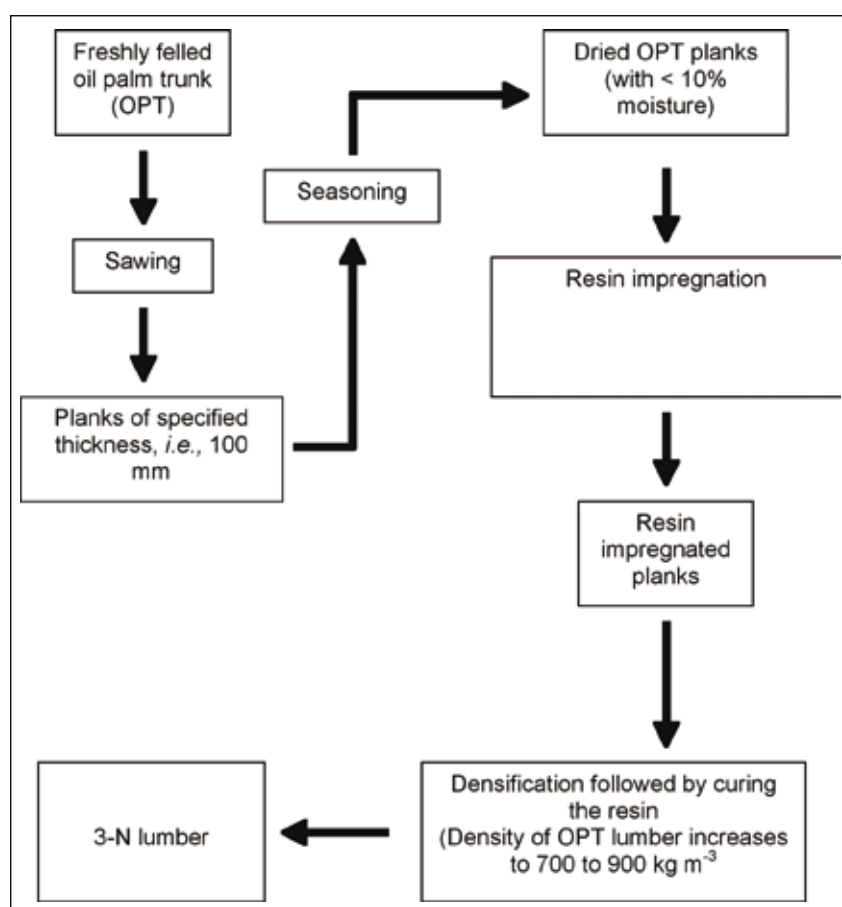


Figure 1. Process flow of 3-N lumber productions.

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## PROPERTIES

The physical and mechanical properties of 3-N lumber are shown in *Table 1*.

### ADVANTAGES OF 3-N LUMBER

- Can be worked very much like wood with ordinary tools;
- Dimensionally stable, and longer life for products used in damp and wet areas;
- Resistant to swelling and attack by pathogens;
- Good machining properties (sawing, boring, nailing and sanding);
- Splinter free, does not crack; and
- Can be painted.

## ECONOMICS OF PRODUCTION

The production cost is estimated at RM700 m<sup>-3</sup>, with 63% variable costs and 37% fixed costs, including interest and depreciation.

### POTENTIAL END-USES

- Buildings (exterior and interior claddings, wall panels, sub-flooring, doors, window sills, window frames and handrails);
- Furniture (legs for indoor and outdoor furniture, table tops, frames for upholstered furniture and kitchen cabinets).
- Packaging (pallets and containers).

TABLE 1. PHYSICAL AND MECHANICAL PROPERTIES OF 3-N LUMBER

Property	Unit	Value	Test method I.C used
Density	kg m <sup>-3</sup>	809.53	ASTM D792
Thickness swelling			
a) After 3 hr soaking	%	0.26	ASTM D570
b) After 18 hr soaking	%	2.54	ASTM D570
Bending strength	N mm <sup>-2</sup>	27.17	ASTM D3039
Impact strength	kJ m <sup>-2</sup>	24.81	ASTM D4812

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