TREATMENT OF OIL PALM LUMBER

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Malaysia is the world's second producer of palm oil with 4.3 million hectares of the crop producing 15.9 million tonnes of the oil. As the crop is grown in a cycle of 25 – 30 years, it is estimated that more than 70 000 ha will have to be replanted every year, requiring the felling of about 9 million palms. Can the trunks be used instead of being wasted?

The oil palm trunk has several inherent flaws as lumber - inconsistent weight, moisture content, size and density, and high parenchyma tissue. These increase its cost of processing and manufacturing. However, some of the flaws can be ameliorated with proper drying and conditioning.

MPOB offers a new improved technology for drying and conditioning oil palm trunk using a kiln dryer. The recovery of lumber is increased and its quality improved (*Figure 1*).

Figure 1. Oil palm lumber drying in the kiln drier.

DRYING OF OIL PALM TRUNK

The oil palm trunk has a number of potential uses - lumber, pulp and paper, reconstituted boards, bio-composites, animal feed and fuel – but almost all would require its initial drying. There are many advantages for doing so:

- provide dimensional stability to the material, so that it can be cut or trimmed to exact dimensions;
- reduce degradation - warping, cupping, splitting and checking of the products made from it;
- prevent biological staining, such as from fungi and insect attack; and
- reduce its weight, making it easier to handle and cheaper to transport.

A freshly fell oil palm trunk has 100%-500% moisture (Kilmann and Lim, 1985), with a gradient of drier to wetter up the plant and from the outer to inner stem. Thus, the outer and lower zone is the driest.

Therefore, drying the oil palm trunk requires a special schedule than for normal woods which tend to be more uniformly wet/dry.

The properties of oil palm *vs*. other woods are shown in *Table 1*.

TABLE 1. PROPERTIES OF OIL PALM *vs*. OTHER WOODS

Property	Oil palm	Coconut	Rubber
Density (kg m^{-3})	220-550	250-850	530
MOE (MPa)	800-8 000	5 300	8 800
MOR (MPa)	8-45	36	50
Compression (MPa)	8-25	24	25
Hardness (N)	350-2 450	4 230	4 320

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The large ranges in MOE and MOR of oil palm wood show its extreme variability compared with other woods. Proper treatment is needed to make the lumber a more consistent product.

The drying schedule for oil palm lumber using a kiln dryer has been optimized to recover 56% sawn lumber (*Table 2*) as compared to only about 28% by the normal schedules.

The heating schedule has also been optimized to minimize drying degrades from the normal 10%-15% (*Table 3*). The major drying degrades of oil palm lumber are end checking, honey combing and collapse (*Figure 2*).

TABLE 2. RECOVERY OF OIL PALM LUMBER FROM THE TRUNK

Portion of trunk	Recovery (%)
Top	9
Middle	15
Bottom	32
Total	56

TABLE 3. MINIMIZED DRYING DEGRADES FROM OPTIMIZED HEATING SCHEDULE

Defect	
Collapse	2%
Twisting	-
Cupping/end checking	1%
Honey combing	0.5%

End checking Honey combing Collapse

Figure 2. Drying degrades of oil palm lumber.

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KILMANN, W and LIM, S C (1985). Anatomy and properties of oil palm stem. *Proc. of the National Symposium on Oil Palm By-products for Agro-based Indsutries*. PORIM, Bangi.

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