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Timber Notes - Light Hardwoods I

by

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Trade name: Meranti Bakau

Species: *Shorea uliginosa* (meranti bakau)

1. Tree type and distribution: Found in coastal swamp forests in the west of the Peninsular Malaysia. Abundant and characteristic dominant tree near the mouths of the Bernam River and the Klang and Langat rivers in Selangor.

2. Wood characteristics: Heartwood light red-brown and distinct from the sapwood which is lighter-coloured. Not lustrous. Stripe figure on radial surface. Texture coarse and even. Grain interlocked.

3. Timber classification: LHW

4. Wood density: Ranges from 595 to 755 kg m-3 air dry.

5. Drying and relative movement: Air drying 15 mm and 40 mm boards takes 2 months and 31/2 months respectively. For kiln drying, schedule H is recommended.

6. Machining properties: Easy to machine and produces a moderately smooth surface. Good nailing property.

7. Durability: Non-durable under exposed conditions.

8. Strength grouping: C

9. Strength properties:

Property (MPa)	Green	Air dry
Modulus of rupture	68	-
Modulus of elasticity	14700	-
Maximum crushing strength	35.9	-

10. Uses: Suitable for general light construction, furniture manufacture, flooring, plywood and pallets.

Trade name: Dark Red Meranti (DRM)

Species: *Shorea acuminata* (meranti rambai daun), *S. curtisii* (meranti seraya), *S. curtisii* spp. *grandis* (meranti seraya daun besar), *S. pauciflora* (meranti nemusu), *S. hemsleyana* (meranti daun besar), *S. singkawang* (meranti sengkawang merah), *S. singkawang* v. *scabrosa* (meranti sengkawang bulu), *S. macrantha* (meranti kepong hantu), *S. palembanica* (meranti tengkawang ayer), S. platycarpa (m.paya) (part), S. platyclados (meranti bukit) and S. ovata (meranti sarang punai bukit).

1. Tree type and distribution: As there are so many species involved, their distribution may vary from species to species. *Shorea platycarpa* is commonly found in islands of drier soil or low-lying areas near the swamps; *S. curtisii* is found to be gregarious on the tops and upper slopes of ridges from about 180 to 1100 m., *S. pauciflora, S. acuminata* and *S. singkawang* can be found in low-lying but well drained jungles and also occasionally in higher altitudes. *Shorea platyclados* and *S. ovata* are two species confined mainly to upper dipterocarp forest zones at an altitude of between 760 and 1070 m.

2. Wood characteristics: Heartwood dark pink-brown, dark-red and weathering to dark red-brown. Sapwood yellowish with a grey tinge and distinct. Planed surface lustrous with prominent strip figure. Texture coarse and even. Grain interlocked and sometimes wavy. White-coloured resin canals may be seen on the surface. Pin holes may be prominent on some species.

3. Timber classification: LHW

4. Wood density: Ranges from 560 to 865 kg m^{-3} air dry.

5. Drying and relative movement: Air drying of 15 and 40 mm boards takes between 2 and 3, and 3 and 5 months respectively. For kiln drying, Schedule F is recommended. *Shorea platyclados* and *S. curtisii* both have Type I Movement. *Shorea pauciflora* has a Type II Movement.

6. Machining properties: Easy to saw, plan, turn, bore, peel and produces smooth planed surface.

7. Durability: Non-durable under exposed conditions.

8. Strength grouping: C

9. Strength properties: Minimum average based on tests carried out on *S. curtisii*, *S. pauciflora*, *S. singkawang* and *S. platyclados*.

Property (MPa)	Green	Air dry
Modulus of rupture	55	74
Modulus of elasticity	10 100	11 200
Maximum crushing strength	30	38.8

10. Uses: Extremely popular general utility timber. Suitable for furniture manufacture, high class interior finishing, flooring, panelling and partitioning, mouldings and skirtings, fancy doors, sliced and rotary cut veneers.

Trade name: Light Red Meranti

Species: *Shorea acuminata* (meranti rambai daun) (part), *S. dasyphylla* (m. batu), *S. hemleyana* (m. daun besar) (part), *S. johorensis* (m. pepijat), *S. lepidota* (m. langgang), *S. leprosula* (m. tembaga), *S. macrantha* (m. kepong hantu) (part), *S. ovalis* (m. kepong), *S. palembanica* (m. tengkawang ayer) (part), *S. parvifolia* (m. sarang punai), *S. platycarpa* (m. paya) (part), *S. teysmanniana* (m.bunga).

1. Tree type and distribution: Widely distributed. *S. platycarpa* and *S. teysmanniana* are generally found in deep peat swamps. *Shorea palembanica* is found on the banks of jungle streams and at low altitudes, *S. ovalis* in low lying areas to altitudes of over 450 m. *Shorea acuminata*, *S. leprosula*, *S. dasyphylla* and *S. parvifolia* are common in well-drained soils up to 760 m, *S. hemsleyana* and *S. macrantha* are of very restricted distribution in low-lying swamp forests.

2. Wood characteristics: Heartwood light red or pink brown and distinct from sapwood which is lighter in colour. Texture coarse but even. Grain interlocked or wavy. Stripe figure on radial surface.

3. Timber classification: LHW

4. Wood density: Ranges from 385 to 755 kg m^{-3} air dry.

5. Drying and relative movement: Air drying 15 mm and 40 mm boards takes 2 months and 3 months respectively. For kiln drying, schedule F is recommended. Both *S. parvifolia* and *S.parvifolia* have Type IV Movement.

6. Machining properties: Easy to resaw, plan, bore and turn. 'Pick-up' of grain may occur on planed quater sawn surface, otherwise smooth. Nailing property is good.

7. Durability: Non-durable. Susceptible to termite attack.

8. Strength grouping: C

9. Strength properties: Values based on minimum average test values carried out on *S. accuminata*, *S. hemsleyana*, *S. laeprosula*, *S. parvifolia* and *S. teysmanniana*.

Property (MPa)	Green	Air dry
Modulus of rupture	50	63
Modulus of elasticity	9300	10200
Maximum crushing strength	25.6	34.5

10. Uses: Suitable for joinery, utility furniture, shop and office fittings, show cases, counter tops, panelling, ceiling, light-duty flooring and interior partitions. Also suitable for sliced and rotary-cut veneer.

Trade name: Yellow Meranti

Species: *S. blumutensis* (damar hitam kelim), *S. dolichocarpa* (damar hitam katup),*S.faguetiana* (damar hitam siput), *S.gibbosa* (-), *S.hopeifolia* (damar hitam siput jantan),*S.kuantanensis* (damar hitam siput besar), *S. longisperma* (damar hitam bulu), *S. maxima* (damar hitam sengkawang putih)*S. multiflora* (damar hitam pipit), *S. peltata* (damar hitam telepok).

1. Tree type and distribution: Commonly found in most areas of well-drained jungle throughout Peninsular Malaysia except in the extreme northwest and on the Langkawi Islands. Yellow meranti are better represented in hilly jungle from 150 m to 600 m where species such as *S. multiflora* and *S. Faguetiana* are gregarious. Species like *S. gibbosa* and *S. longisperma* are common in low-lying forests in parts of Johore.

2. Wood characteristics: Heartwood light-brown weathering to light brown. Sapwood lighter in colour and moderately distinct. Texture moderately coarse but even. Grain straight to interlocked.

3. Timber classification: LHW

4. Wood Density: Air dry density of the timber ranges from 510 to 875 kg m^{-3}, averaging 670 kg m^{-3}. Density values for the individual species are: *S. dolichocarpa* (655 - 875) (average: 740), *S. Faguetiana* (625 - 800) (average: 690) *S. hopeifolia* (510-745) (average: 625), *S. longisperma* (535-690) (average: 625), *S. multiflora* (550-780) (average: 675).

5. Drying and relative movement: Air drying of 15 mm and 40 mm boards takes about 3 months and 5 months respectively. For kiln drying, schedule J is recommended. Type II Movement.

6. Machining properties: Easy to resaw, cross-cut and plan. Planed surface is smooth to moderately smooth. Nailing property ranges from good to poor depending on the species.

7. Durability: Non-durable. Susceptible to powder-post beetle attacks in the sapwood.

8. Strength grouping: C

9. Strength properties: Data based on tests carried on out on *Shorea multiflora*

Property (MPa)	Green	Air dry
Modulus of rupture	57	67
Modulus of clasticity	11 000	12 100
Maximum crushing strength	30.2	40.6

10. Uses: Suitable for general utilily purposes, planking, light construction, panelling and partitioning, furniture manufacture, flooring and pallets. A popular plywood species.

Trade name: White Meranti

Species: *S.assamica* forma *globifera* (meranti pipit), *S. bentongensis* (m. mengkai),*S. bracteolata* (m. pa'ang), *S. dealbata* (m. bumbong), *S. gratissima* (m.laut), *S. hypochra* (m. temak), *S. lamellata* (m. lapis), *S. resinosa* (m. belang), *S. henryna* (m. jerit) and *S. roxburghii* (m. temak nipis).

1. Tree type and distribution: Found in all types of dipterocarp forest up to 600 m altitude and occasionally higher. The trees are generally large and well-shaped.

2. Wood characteristics: Heartwood and sapwood not well differentiated when fresh but on exposure moderately differentiated from the heartwood, which turns yellow-brown. Planed surface lustrous with subtle ribbon figure. Texture moderately coarse and even. Grain interlocked.

3. Timber classification: LHW

4. Wood density: Ranges from 512 to 992 kg m^{-3} air dry, averaging 670 kg m^{-3}.

5. Drying and relative movement: Air drying of 15 mm and 40 mm boards takes 2 to 3 and 3 to 5 months respectively. Schedule J is recommended for kiln drying. Type II Movement.

6. Machining properties: Easy to slightly difficult to resaw in the green condition and slightly difficult to very difficult in the air dry condition. Cross-cutting is easier in the green than air dry condition. Planing is easy to slightly difficult and surfaces produced are smooth to rough.

7. Durability: Non-durable. Sapwood is susceptible to attack by 'pin-holes' borers and infestation of blue stain fungi.

8. Strength grouping: C

9. Strength properties: Data based on test carried out on *Shorea henryana.*

Property (MPa)	Green	Air dry
Modulus of rupture	109	132
Modulus of elasticity	18 400	19 400
Maximum crushing strength	41.14	61.8

10. Uses: Suitable for general utility purposes, planking, stair stringers, treads and railing, light to medium construction, panelling and partitioning, furniture-manufacture and flooring. A popular plywood species.

Meranti bakau

Dark red meranti

Light red meranti

White meranti

Yellow meranti

BACKGROUND INFORMATION

1. Tree type and distribution

The distribution and size of tree are given.

2. Wood characteristics

The colours of sapwood and heartwood colour, figure, appearance on planed surface and any other characteristic features of the timber.

3. Wood density

Green density of freshly sawn board, defined as green mass divided by green volume. It varies with the freshness of the log in the log yard before processing and seasoning. Air dry density is the average mass divided by volume at 15 per cent moisture content.

4. Timber classification

Under the Malaysian Grading Rules (1984), timbers are classified as Heavy Hardwood (HHW) when their density exceeds 800 kg m^{-3} and the timbers are naturally durable. Medium Hardwoods (MHW) are timbers with density exceeding 720 kg m^{-3} but lack sufficient natural durability. Light Hardwoods (LHW) are timber with density below 720 kg m^{-3} and not naturally durable in exposed condition.

5. Drying and relative movement

Air drying time for 15 mm and 40 mm boards and moisture content are from Grewal (1979). ‘Airseasoning Properties of Some Malaysian Timbers’, Timber Trade Leafet No. 41. Suitable kiln drying schedule is mentioned [Schedules based on Grewal (1988), 'Kiln Drying Characteristic of Some Malaysian Timbers', Timber Trade Leaflet No.42]. The Relative Movement (whenever is available) is defined as the change in dimension of a piece of timber when exposed to the service conditions of 60 % RH / 30 ^{0}C and 95 % RH/30 ^{0}C respectively, and expressed as percentage of the value at 60 % RH/30 ^{0}C. The Movement Ratings stated are based on values of the corresponding tangential movement [Choo *et al*. (1998), "Movement of Seasoned Timber In Service", FRIM Technical Information Handbook No. 19].

Movement Rating	Tangential Movement
Type I	< 1.5 %
Type II	1.5 % to 2.0 %
Type III	2.1 % to 2.5 %
Type IV	2.6 % to 3.0 %
Type V	> 3.1 %

6. Machining properties

Comments are made on the comparative ease or difficulty of sawing, planing, turning, boring, peeling, gluing and other wood working properties.

7. Durability

Durability ratings of Malaysian Timbers are based on performance of test-stacks in grave yard testing. Test-stacks of 50 x 50 x 600 mm are buried in test grounds and their performance monitored. The number of years that the timber can last under such conditions is used to classify the durability of the timber. Under the system, timbers are classified as follows;

Rating	Number of years
Very durable	more than 10 years
Durable	5-10 years
Moderately durable	2-5 years
Non-durable	0-2 years

Susceptibility to fungal and termite attacks may be mentioned.

8. Strength grouping

In the strength grouping of timber under each trade name, ranking is allocated from A (strongest) to D. Minimum values for strength groups based on common grade for dry timber (below 19 % moisture content). (units are in MPa).

Strength group	A	B	C	D
Modulus of elasticity	9,700	6,600	5,500	3,100
Bending and tension parallel to grain	12.41	9.65	7.24	4.83
Compression parallel to grain	11.03	7.93	5.51	4.14
Compression perpendicular to grain	1.45	0.90	0.55	0.45
Shear parallel to grain	1.45	0.90	0.62	0.62

8. Strength properties

Values are from Lee *et al*. 1979, 'The Strength Properties of Some Malaysian Timbers'.
Malaysian Forest Service Trade Leaflet No.34.

9. Uses

Various past and potential uses are given, but the list is obviously not exhaustive.