Appendix 1: Strength Groups of Timbers and Their Applications

APPLICATION	STRENGTH GROUP* *(Engku Abdul Rahman, 1988a,b)*	STRENGTH GROUP** *(MS 544:Part 2:2001)*
Structural Components		
i. COLUMNS, BEAMS, BEARERS, STUDS, JOIST, TIES & STRUTS	A & B	SG1, SG2, SG3 & SG4
ii. FORM WORK	A, B & C	SG1, SG2, SG3, SG4 & SG5
Roofing		
i. RAFTERS, TIES, STRUTS, PURLINS & BRACING	A & B	SG1, SG2, SG3 & SG4
ii. BATTENS	A, B & C	SG1, SG2, SG3, SG4 & SG5
Staircase		
i. STRINGERS, TREADS, TRIMMER BEAM & HANDRAIL	A & B	SG1, SG2, SG3 & SG4
ii. BALUSTRADES	A, B & C	SG1, SG2, SG3, SG4, SG5 & SG6
Flooring		
i. FLOOR BOARDING & PARQUETRY	A & B	SG1, SG2, SG3, SG4 & SG5
ii. SKIRTINGS	A, B & C	SG1, SG2, SG3, SG4, SG5 & SG6
Walling		
i. WALL, PARTITION, FRAMING & EXTERNAL WALL BOARDING	A, B & C	SG1, SG2, SG3, SG4, SG5 & SG6
ii. INTERNAL WALL BOARDING, SLATE SCREENS	A, B, C & D	SG1, SG2, SG3, SG4, SG5, SG6 & SG7
iii. FACIA BOARDS	A & B	SG1, SG2, SG3 & SG4
Ceiling Frames		
i. COVER BATTENS TO JOINT OF CEILING SHEETS	A & B	SG1, SG2, SG3 & SG4
ii. CEILING STRIPS AND SOFFIT BATTENS	A, B & C	SG1, SG2, SG3, SG4, SG5 & SG6
Door & Window Frames		
i. DOOR, WINDOW AND VENT FRAMES, INCLUDING THEIR STOPS AND GROUNDS	A & B	SG1, SG2, SG3 & SG4
ii. DOOR LEAVES, WINDOW AND VENT SASHES	A, B & C	SG1, SG2, SG3, SG4, SG5 & SG6
Furniture		
i. BUILT-IN FITTINGS, FURNITURE GENERALLY AND WORKSHOP FURNITURE	A, B & C	SG1, SG2, SG3, SG4, SG5 & SG6
ii. SCIENCE LABORATORY TOPS	A & B	SG1, SG2, SG3 & SG4
Beading Fillets & Edgings Generally	A, B & C	SG1, SG2, SG3, SG4, SG5 & SG6

* The strength groups mentioned here are based on Engku Abdul Rahman's (1988a,b) classification wherever possible. For timbers that have not been classified by Engku Abdul Rahman, their strength grouping is based on Burgess (1958).

** Malaysian Standard Code of Practice for Structural Use of Timber (MS 544:Part 2:2001).

Appendix 2: Strength Grouping of Timbers

Naturally Durable				
SG1	**SG2**	**SG3**	**SG4**	**SG5**
BALAU*	BELIAN	BEKAK*	GIAM*	TEMBUSU
BITIS	MATA ULAT*	DELEK	MALABERA	
CHENGAL*	KEKATONG*	KERANJI*	MERBAU*	
PENAGA			RESAK*	

Requiring Treatment					
SG2	**SG3**	**SG4**	**SG5**	**SG6**	**SG7**
DEDARU	KELAT	BERANGAN	BABAI	BAYUR	ARA
KEMPAS*	KEMBANG SEMANGKOK*	DEDALI	MALABERA	DAMAR MINYAK	BATAI
MERBATU*	KULIM*	DERUM	BALEK ANGIN BOPENG	DURIAN*	GERONGGANG*
MERTAS	PAUH KIJANG	KAPUR*	BINTANGOR*	JELUTONG*	LARAN
	PENYAU	KASAI*	BRAZIL NUT	JONGKONG	PELAJAU
	PERAH	KERUNTUM	DARK RED MERANTI	KASAH	PULAI*
	PETALING	MEMPENING	GERUTU*	LIGHT RED MERANTI*	SESENDOK*
	RANGGU	MERANSI	KEDONDONG*	MACHANG*	TERENTANG*
	RU	MERANTI BAKAU*	KELEDANG*	MEDANG*	
	SURIAN BATU	MERAWAN*	KERUING*	MELANTAI*	
	TUALANG*	MERPAUH*	KETAPANG	MERSAWA*	
		NYALIN	KUNGKUR	SENGKURAT	
		PERUPOK	RUBBERWOOD*	TERAP*	
		PUNAH*	MELUNAK*	YELLOW MERANTI*	
		RENGAS*	MEMPISANG*		
		SIMPOH*	MENGKULANG*		
			NYATOH*		
			PENARAHAN*		
			PETAI		
			RAMIN*		
			SENGKUANG		
			SEPETIR*		
			TETEBU		
			WHITE MERANTI*		

* Commercially available

Source: Malaysian Standard Code of Practice for Structural Use of Timber (MS 544:Part 2:2001).

Appendix 3: Hazard Types and Required Treatment

	HAZARD TYPE	**DRY SALT RETENTION REQUIRED (kg/m3 (lb/ft3)**
Mild	Interior timber not used in contact with the ground	5.60 (0.35)
Moderate	Exterior timber not used in contact with the ground	8.00 (0.50)
Severe	Exterior timber used in contact with the ground	12.00 (0.75)
Very Severe	Timber used in constant contact with fresh water	16.00 (1.00)
Extremely Severe	Timber used in marine environment	24.00 (1.50)

Appendix 4: Moisture Content (M-C) of Timber for Various Applications (In Tropical Conditions)

APPLICATION	MAXIMUM M-C AT TIME OF INSTALLATION FOR NON AIR-CONDITIONED APPLICATIONS	MAXIMUM M-C AT TIME OF INSTALLATION FOR AIR-CONDITIONED APPLICATIONS (KILN-DRIED)
Structural Components		
I. EXTERNAL-COLUMNS, BEAMS, BEARERS, STUDS, JOINTS,	30% (THICKNESS EXCEEDING 100MM)	N.A
TIES & STRUT	25% (THICKNESS NOT EXCEEDING 100MM)	N.A
ii. INTERNAL	19%	12%
Roofing		
i. RAFTERS, TIES, STRUTS, PURLINS & BRACING	25%	N.A.
ii. BATTENS	25%	N.A.
Staircase		
i. STRINGERS, TREADS, TRIMMER BEAMS & HANDRAILS	19%	12%
ii. BALUSTRADES	19%	12%
Flooring		
i. FLOOR BOARDING & PARQUETRY	19%	12%
ii. SKIRTINGS	19%	12%
Walling		
i. WALL, PARTITION, FRAMING	19%	12%
ii. EXTERNAL WALL BOARDING	19%	N.A.
iii. INTERNAL WALL BOARDING, SLATES & SCREENS	19%	12%
iv. FACIA BOARDS	19%	N.A.
Ceiling Frames		
i. COVER BATTENS TO JOINTS OF CEILING SHEETS	25%	N.A.
ii. CEILING STRIPS AND SOFFIT BATTENS	19%	12%
Door & Window Frames		
i. DOOR, WINDOW AND VENT FRAMES, INCLUDING THEIR STOPS AND GROUNDS	19%	12%
ii. DOOR LEAVES, WINDOW AND VENT SASHES	19%	12%
Furniture		
i. BUILT-IN FITTINGS AND FURNITURE GENERALLY	19%	12%
ii. WORKSHOP FURNITURE	19%	12%
iii. SCIENCE LABORATORY TOPS	19%	12%
Beading Fillets & Edgings generally	19%	12%