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USAGE TREND OF TIMBER BASED ON IDENTIFICATION SERVICES

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INTRODUCTION

The Wood Anatomy Laboratory (WAL) FRIM has been providing wood identification services to the timber industry and government agencies since the British era. Individuals and agencies that seek the service include contractors, engineers, architects, the forest departments (Peninsular, Sabah and Sarawak), Malaysian Timber Industry Board (MTIB), Jabatan Kerja Raya (JKR), Perbadanan Kemajuan Negeri Selangor (PKNS) and other government agencies. This paper attempts to compile and analyse the usage trend of timber so as to provide a certain input for everyone that is related to timber industry regarding the demand and supply status of this valuable, yet sustainable, material. The information regarding the application of timber in the industry is obtained based on the requests for identification service for the period from 1998 to 2018 as rendered by WAL.

TYPES OF TIMBER RECEIVED, THEIR CLASSIFICATION AND STRENGTH GROUPING

Malaysia produces mainly hardwood timbers and some softwood timbers. Malaysian hardwood timbers are classified into heavy hardwoods, medium hardwoods and light hardwoods based on their density and natural durability (Lim & Chung 2002). There are 14 timber groups classified under heavy hardwoods, 36 under medium hardwoods and 47 under light hardwoods and 3 under softwoods based on The Malaysian Grading Rules for Sawn Hardwood Timber 2009 (Anonymous 2009) (Table 1). The strength groupings of the timber are based on MS 544:Part 2:2001 where strength group 1 (SG1) is the strongest, whilst strength group 7 is the weakest (Table 2). Figure 1 to 3 show some wood specimens of heavy hardwood, medium hardwood and light hardwood respectively.

Table 1 List of timber group based on The Malaysian Grading Rules for Sawn Hardwood Timber 2009 (Anonymous 2009)

Heavy hardwood	Medium hardwood	Light hardwood	Softwood
1.Balau	1.Alan batu	1.Alan bunga	1.Damar minyak
2.Balau, red	2.Bekak	2.Ara	2.Podo
3.Belian	3.Derum	3.Babai	3.Sempilor
4.Bitis	4.Entapuloh	4.Bayur	
5.Chengal	5.Geriting/Teruntum	5.Berangan	
6.Giam	6.Kandis	6.Bintangor	
7.Kekatong	7.Kapur	7.Binuang	
8.Keranji	8.Kasai	8.Dedali	
9.Malagangai	9.Kayu malam	9.Durian	
10.Merbau	10.Kedang belum/Tulang daing	10.Geronggang	
11.Penaga	11.Kelat	11.Gerutu	
12.Penyau	12.Keledang	12.Jelutong	
13.Resak	13.Kempas	13.Jongkong	

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Heavy hardwood	Medium hardwood	Light hardwood	Softwood
14.Tembusu	14.Keruing	14.Kedondong	
	15.Keruntum	15.Kelumpang	
	16.Kulim	16.Kembang semangkok	
	17.Mata ulat	17.Ketapang	
	18.Mempening	18.Kungkur	
	19.Mengkulang	19.Laran/Kelempayan	
	20.Meransi	20.Machang	
	21.Merawan	21.Mahang	
	22.Merbatu	22.Medang	
	23.Merpauh	23.Melantai/Kawang	
	24.Mertas	24.Melunak	
	25.Nyalin/Minyak berok	25.Mempisang	
	26.Pauh kijang	26.Meranti bakau	
	27.Perah	27.Meranti, dark red	
	28.Petaling	28.Meranti, light red	
	29.Punah	29.Meranti, white	
	30.Ranggu	30.Meranti, yellow	
	31.Rengas	31.Merbulan	
	32.Semayur	32.Mersawa	
	33.Senumpul	33.Nyatoh	
	34.Simpoh	34.Pelajau/Pelong	
	35.Tampoi	35.Penarahan	
	36.Tualang	36.Perupok	
		37.Petai	
		38.Pulai	
		39.Ramin	
		40.Rubberwood	
		41.Sengkuang	
		42.Sentang	
		43.Sepetir	
		44.Sesendok	
		45.Terap	
		46.Terentang	
		47.White seraya	

Figure 1 Some wood specimens of heavy hardwood timber

Table 2 List of timber group based on the Strength Group (SG) (MS 544 : Part 2 : 2001)

SG1	SG2	SG3	SG4	SG5	SG6	SG7
A) Naturally Durable						
1.Balau*	1.Belian	1.Bekak*	1.Giam*	1.Teak		
2.Bitis	2.Mata ulat*	2.Delek	2.Malabera	2.Tembusu		
3.Chengal*	3.Kekatong*	3.Keranji*	3.Merbau*			
4.Penaga			4.Resak*			
B) Requiring Treatment						
	4.Dedaru	4.Balau, red*	5.Berangan	3.Alan bunga*	1.Bayur	1.Ara
	5.Kempas*	5.Kelat	6.Dedali	4.Babai/Gapis	2.Damar minyak	2.Batai
	6.Merbatu*	6.Kembang semangkok*	7.Derum	5.Balek angin bopeng/Balek angin	3.Durian*	3.Geronggang*
	7.Mertas	7.Kulim*	8.Kapur*	6.Bintangor*	4.Jelutong*	4.Laran/Kelempayan
		8.Pauh kijang	9.Kasai*	7.Brazil nut	5.Jongkong	5.Pelajau/Pelong
		9.Penyau	10.Keruntum	8.Gerutu*	6.Kasah	6.Pulai*
		10.Perah	11.Mempening	9.Kedondong*	7.Machang*	7.Sesendok*
		11.Petaling	12.Meransi	10.Keledang*	8.Medang*	8.Terentang*
		12.Ranggu	13.Meranti bakau*	11.Keruing*	9.Melantai/Kawang*	
		13.Ru/Agoho	14.Merawan*	12.Ketapang	10.Meranti, light red*	
		14.Surian batu	15.Merpauh*	13.Kungkur	11.Meranti, yellow*	
		15.Tualang*	16.Nyalin/Minyak berok	14.Rubberwood/Malaysian oak*	12.Mersawa*	
			17.Perupok	15.Melunak*	13.Sengkurat/Jenitri	
			18.Punah*	16.Mempisang*	14.Terap*	
			19.Rengas*	17.Mengkulang*		
			20.Simpoh*	18.Meranti, dark red*		
				19.Meranti, white*		
				20.Nyatoh*		
				21.Penarahan*		
				22.Petai		
				23.Ramin*		
				24.Sengkuang		
				25.Sepetir*		
				26.Tetebu/Kayu kundur		

NOTES: 1. For naturally durable timbers, sapwood should be excluded. If sapwood is included, preservative treatment is necessary. (Source-MS 360:1986)
2. For timber requiring treatment, they should be amenable to preservative treatment.
3.* = Commercially available

Figure 2 Some specimens of medium hardwood timber

Figure 3 Some specimens of light hardwood timber

Heavy hardwood are timbers with an air-dry density of 800–1120 kgm^{-3} at 15 % moisture content (MC). Most of the timbers under this group are naturally durable and mostly used in heavy construction such as pilling, heavy duty flooring, parquet, flooring and powerline post. Most of the strength group 1 (SG1) timbers can be found under the group of heavy hardwood timbers. The medium hardwoods are those with an air-dry density ranging between 720–800 kgm^{-3} at 15 % MC. The timbers are moderately durable, and used mainly for moderately heavy to heavy construction purposes such as beams, columns, roof truss members, parquet flooring, door and window frames. This class of timbers comprise a number of the strength group 2, 3 and 4 timbers (SG2, SG3, SG4). Light hardwood are timbers having an air-dry density of 400–720 kgm^{-3} at 15 % MC. The timbers are non-naturally durable especially in tropical country and are mainly used in light construction such as light duty flooring, paneling, non-structural components and general utility timbers. Most of the strength groups 5,6 and 7 (SG5, SG6, SG7) timbers are placed under this class.

The types of timber received by WAL, their classification and strength grouping that had been used in the timber industry based on the data from 1998 to 2018 are shown in Table 3. A total of 5685, 2393, 19 and 13 specimens been identified under heavy hardwood, medium hardwood, light hardwood and softwood respectively. For the heavy hardwood a total of 13 types of timber had been identified with the majority made up of keranji (SG3), balau (SG1), kekatong (SG2) and chengal (SG1) probably due to their popularity as construction material and availability. Other popular heavy hardwoods were merbau (SG4), resak (SG4) and red balau (SG3).

There were 30 types of timber identified as medium hardwoods with kempas (SG2) being the most popular timber, and this timber is generally used for structural and flooring purposes. Other popular timbers from medium hardwoods include tualang (SG3), rengas (SG4), perah (SG3), keruing (SG5) and merawan (SG4). A total of 38 types of light hardwood timbers had been identified with dark red meranti (SG5) being the most popularly used for the door and window frames, followed by nyatoh (SG5) that

was popularly used as furniture. Other timbers used from light hardwood include light red meranti (SG6), durian (SG6) and kedondong (SG5). Softwood timbers were rarely used as only few specimens of damar minyak, podo and sempilor had been identified during the period; these timbers were usually peeled for veneers in the making of plywood.

Table 3 Types of timber identified during the period 1998 to 2018

Classification	Strength Group	Timber groups (Trade names)	Total timber groups identified in 20 years
Heavy Hardwood	1	Balau	1375
	1	Belian	76
	1	Bitis	56
	1	Chengal	808
	1	Penaga	15
	2	Kekatong	911
	3	Red balau	233
	3	Keranji	1612
	4	Giam	32
	4	Merbau	280
	4	Resak	259
	5	Tembusu	10
	U	Malagangai	18
		Total	**5685**
Medium Hardwood	2	Kempas	1579
	2	Mata ulat	37
	2	Merbatu	40
	2	Mertas	63
	3	Bekak	31
	3	Kelat	54
	3	Kulim	28
	3	Pauh kijang	30
	3	Perah	193
	3	Petaling	3
	3	Tualang	133
	4	Derum	24
	4	Kapur	91
	4	Kasai	73
	4	Mempening	57
	4	Meransi	11
	4	Merawan	140
	4	Merpauh	72
	4	Minyak berok/Nyalin	74
	4	Punah	8
	4	Rengas	210
	4	Simpoh	33
	5	Keledang	27
	5	Keruing	129
	5	Mengkulang	30
	U	Kandis	21
	U	Kayu malam	11
	U	Senumpul	36
	U	Tampoi	5
	U	Tulang daing	13
		Total	**3256**

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Classification	Strength Group	Timber groups (Trade names)	Total timber groups identified in 20 years
Light Hardwood	3	Kembang semangkok	21
	4	Berangan	7
	4	Dedali	9
	4	Meranti bakau	7
	4	Perupok	31
	5	Bintangor	53
	5	Dark red meranti	871
	5	Gerutu	52
	5	Kedondong	135
	5	Ketapang	3
	5	Melunak	51
	5	Mempisang	25
	5	Nyatoh	273
	5	Penarahan	42
	5	Petai	3
	5	Ramin	38
	5	Rubberwood	47
	5	Sepetir	20
	5	White meranti	56
	6	Durian	102
	6	Jelutong	38
	6	Jongkong	2
	6	Light red meranti	184
	6	Machang	9
	6	Medang	89
	6	Melantai	7
	6	Mersawa	42
	6	Terap	17
	6	Yellow meranti	18
	7	Ara	17
	7	Geronggang	8
	7	Pulai	18
	7	Pelajau	4
	7	Sesenduk	11
	7	Terentang	14
	U	Kelumpang	8
	U	Mahang	15
	U	Sentang	8
		Total	**2393**
Softwood	U	Damar minyak	10
	U	Podo	7
	U	Sempilor	2
		Total	**19**

Note: U = Undetermined strength group

Figure 4 shows that heavy hardwoods are the most widely used, followed by the medium hardwoods and light hardwoods in 20 years. This is understandable since the construction industry normally require the use of timber with higher strength. Figure 4 also provides some indication that the use of timber in the timber industry has been declining since 2006.

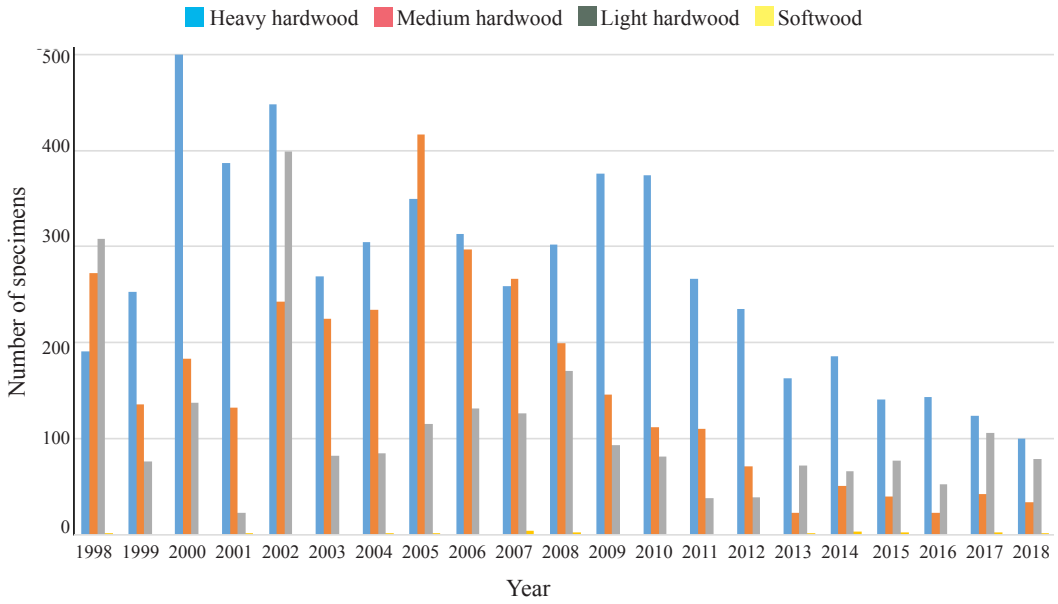

Figure 4 Number of wood specimens received and their classification from 1998 to 2018

Based on the strength grouping (Figure 5), the most popular timbers used within 20 years were from the strength groups 1, 2 and 3 (SG1, SG2, SG3) such as keranji (SG3), kempas (SG2) and balau (SG1). As shown in Figure 5, there were 135 specimens identified to be used from the "undetermined" strength group. Most of the timbers from the "undetermined" strength group were commonly used for general utility, light framing, crafts and furniture.

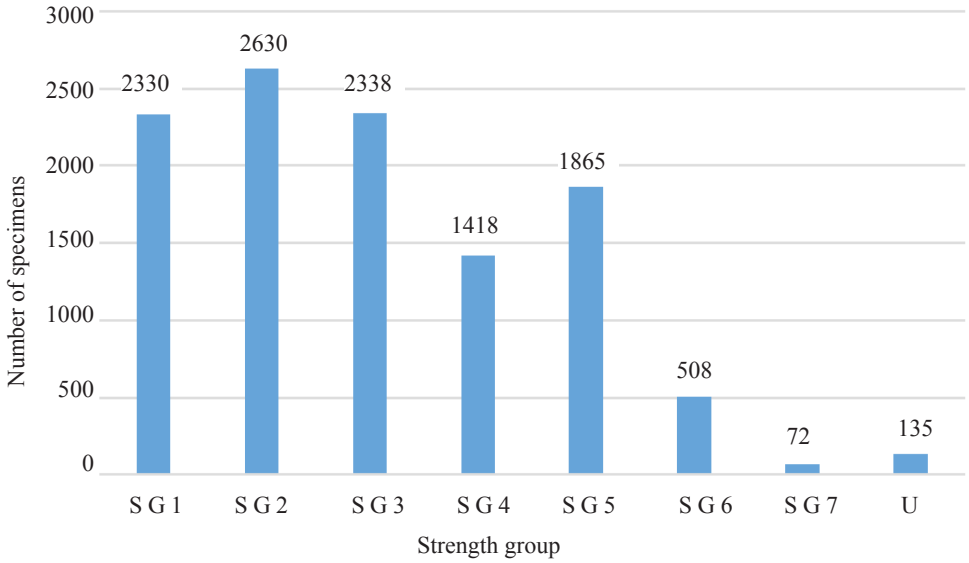

Figure 5 The used of timber based on the strength group within 20 years

CONCLUSION

From the results obtained, it shows that commercial timbers from the heavy hardwood class are the most widely used, particularly from the strength group SG1 to SG3, followed by the medium hardwoods and light hardwoods classes. Also, there is an indication of decreasing use of timber in the timber industry. But, government agencies such as JKR that has contributed the effort in promoting the use of Malaysian timbers for government development projects should be able to reverse this trend. Hence, similar approach should also be applied by other government agencies as well as players in different industry sectors to maintain Malaysian timbers as a popular material for construction, furniture, handicraft and other timber based products.

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This paper attempts to compile and analyse the usage trend of timber, based on the samples received for the identification service offered by the Wood Anatomy Laboratory of FRIM for the period from 1998 to 2018. From the results obtained, it shows that commercial timbers from the heavy hardwood class are the most widely used, particularly from the strength group SG1 to SG3, followed by the medium hardwoods and light hardwoods classes. Also, there is an indication of decreasing use of timber in the timber industry.

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