

CLADDING, DECKING AND FLOORING

- Getting the best from local resources -

Colin MacKenzie
Timber Queensland



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Cairns boardwalk



“Treetops” at Taragindi

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Unit at Kangaroo Point



Content

- Key properties
- Information sources
- Some species attributes vs application
- Some points to consider
 - Cladding
 - Decking
 - Flooring

Some key properties

Property	Cladding	Decking	Flooring
Strength	-	+	+
Density (Hardness)	-	+	+
Durability	+	+	-
Stability	+	+	+
- Moisture content, Shrinkage and UTM			
Termite resistance	+	+	+
Bushfire resistance	+	+	-

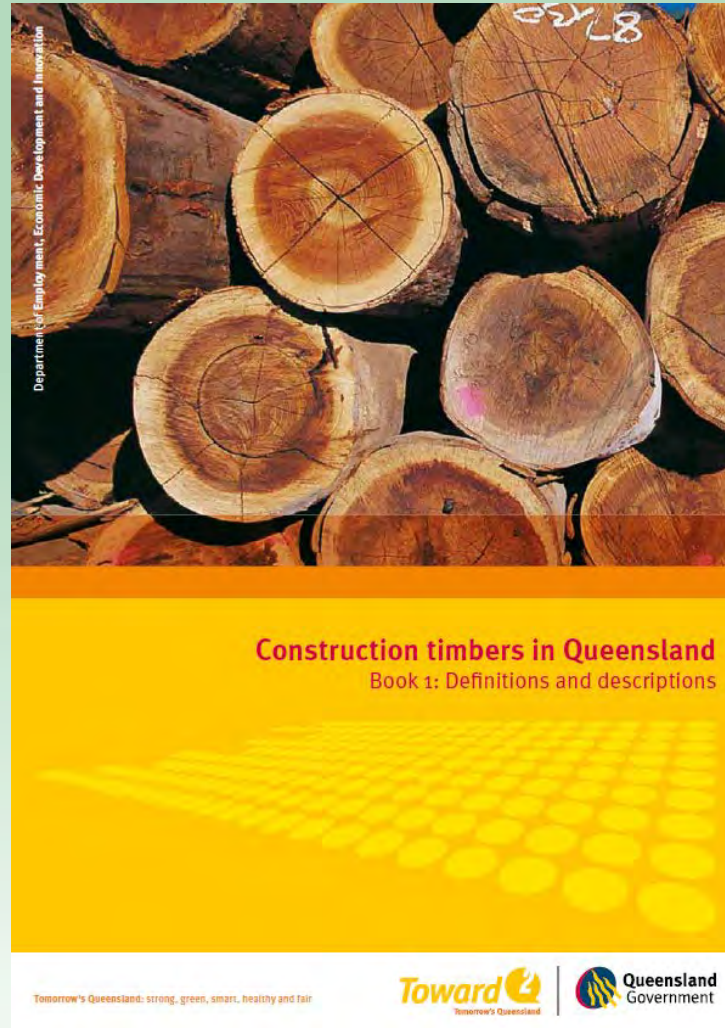
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Timbers and their properties

8	9	10	11	12	13	14								15	
						Common Uses									
						In Ground	Framing Above Ground-Exposed	Framing Above Ground-Protected	Decking	Cladding	Internal Flooring	Panelling	External Joinery		Internal Joinery
Tangential Shrinkage %	% Unit Tangential Movement	#Durability Class (*Termite Resistant)	Lyctid Susceptibility	Bushfire Rated	Colour										Availability varies region by region
8.5	0.35	4/3	S	-	W	-	-	S	-	-	0	0	-	0	R
4.2	-	1/1	S	-	W	-	-	-	0	-	0	-	-	-	L
13.3	0.36	4/3	NS	-	W	-	-	-	-	-	0	0	-	0	R
10.6	0.36	3/2	NS	✓	W-P	-	-	0	-	-	-	-	-	-	L
7.0	-	2/1	S	✓*	R	-	0	0	0	0	0	0	-	-	R
5.0	-	2/2	S	-	W	P	0	-	0	-	0	0	-	-	L
4.5	-	1/1	NS	-	B	-	-	-	0	-	-	-	-	-	L
4.7	0.32	4/3	NS	-	P	-	-	0	-	0	0	0	-	0	L
4.0	-	1*/1	S	-	R	0	-	-	-	-	-	-	-	-	L
7.3	0.37	2*/1	NS	✓	W	-	0	0	0	0	0	0	-	-	R

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No Excuses!



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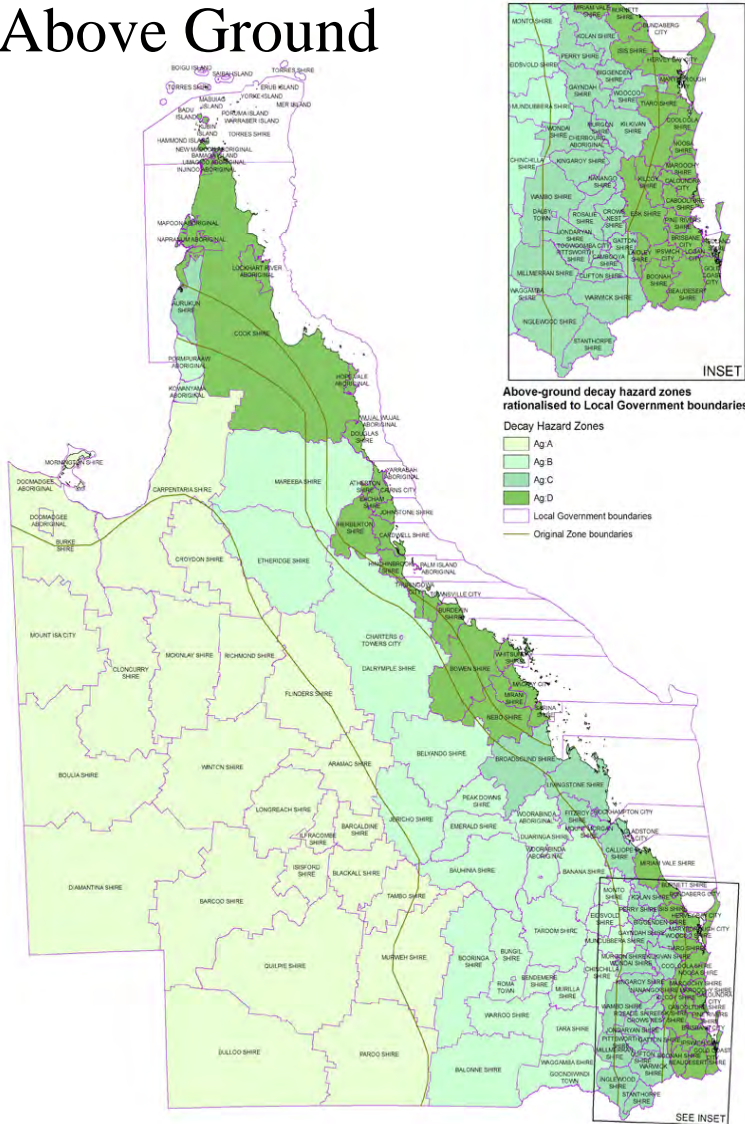
Book 1 – Target Design Life

Building member	Environment	Target design life (yrs)	Application (Column no. in Schedules A, B and C)
architraves	protected	15	12
balusters	exposed	50	16
	protected	50	15
barge boards	exposed	15	13
battens	between stumps	5	11
	under lining or cladding	50	15
	external wall	15	13
	greenhouse	15	13
	pergola	15	13
	roof, ceiling	50	15
beams	exposed	50	16
	protected	50	15
bearers	exposed	50	16
	protected	50	15

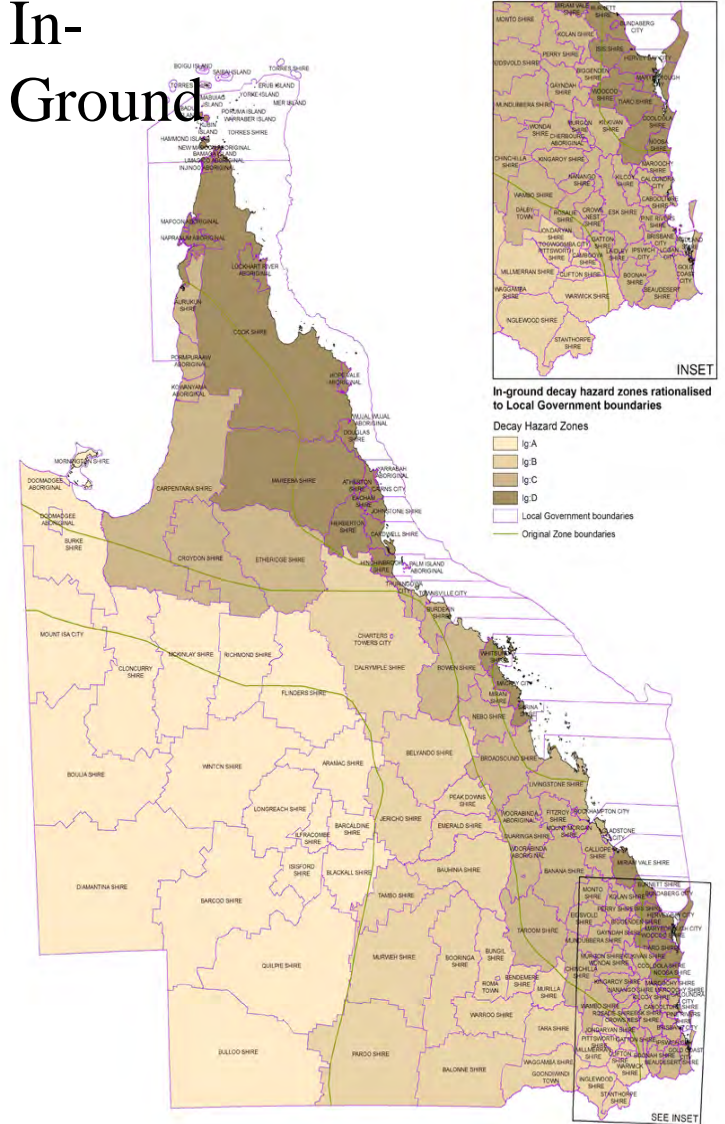
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CTIQ – Book 1 – Hazard Zones

Above Ground



In-Ground



CTIQ - Layout – Book 2

Schedule B - Part 1- nomenclature, origin and properties of Australian grown species. Page numbers refer to Book 1

1 (p.9)	2 (page 9)	3 (page 9)		4 (p.10)	5 (p.10)	6 (p.11)				7 (p.14)		8 (p.14)		9 (p.16)	10 (p.17)
		Timber species and origin				Timber properties		Strength groups (page 11)		Joint groups (page 14)		Natural durability ratings (page 14)			
Index number	Standard trade name	Origin	Binary	S (green)	SD (dry)	J (green)	JD (dry)	Above ground	In-ground	Lycine susceptibility	Termite resistance	Properties			
												11	12		
331	cedar, southern	Acridosiphon apiculatus	Qs	1120	(2)	(2)	1	1	2	2	NS	NR			
332	cedar, yellow	Ptilotella pachymeris	Qn	815	(4)	(4)	1	2	3	3	NS	NR			
333	poppermint, New England	Scapholobos nova-angliae	Qs, A	900	4	4	1	2	(3)	3	NS	NR			
334	poppermint, Queensland	Scapholobos exarata	QnCs	1010	(2)	(3)	1	1	1	1	S	R			
335	popperwood	Cinnamomum laubati	Qnc	480	(7)	(8)	1	4	(4)	4	S	NR			
336	persimmon, grey	Diospyros pentanera	QnCs, A	735	5	4	1	3	(4)	4	S	NR			
337	peripetak	Balanos australiana	Qnc	865	(4)	3	1	2	(4)	4	(5)	NR			
338	pine, Banggai	Pinus kesya	QnCs	495	(7)	(8)	1	4	(4)	4	NS	NR			
339	pine, black	Plummaria amara	Qn	495	6	7	1	4	(4)	4	NS	NR			
340	pine, brown	Plummaria grayi	Qnc	550	(7)	(7)	1	4	(4)	4	NS	NR			
341	pine, brown	Plummaria ladei	Qnc	705	(5)	(6)	1	3	(4)	4	NS	NR			
342	pine, Caribbean	Plummaria elliotii	QnCs, A	560	(6)	(7)	1	4	(4)	4	NS	NR			
343	pine, hoop	Messerschmidia cuneiformis	Qncs, A	560	6	5	4	4	4	4	NS	NR			

Schedule B - Part 2- applications and conditions for commercial mixtures of unidentified species. Page numbers refer to Book 1

1 (p.9)	2 (page 9)	5 years				15 year target design life				50 year target design life			
		11 (p.31)	12 (p.32)	13 (page 33)	14 (page 34)	15 (p.35)	16 (page 36)	17 (page 37)	18 (p.27)				
Index number	Standard trade name	A: Above-ground applications		B: In-ground applications		C: Above-ground decay hazard zone (page 19)		D: In-ground decay hazard zone (page 22)		E: All decay zones			
		11	12	13	14	15	16	17	18				
331	cedar, southern	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
332	cedar, yellow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
333	poppermint, New England	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
334	poppermint, Queensland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
335	popperwood	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
336	persimmon, grey	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
337	peripetak	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
338	pine, Banggai	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
339	pine, black	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
340	pine, brown	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
341	pine, brown	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
342	pine, Caribbean	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
343	pine, hoop	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Fold-out guides for PART 1 of the Schedules

Blue highlight indicates hardwood, Yellow highlight indicates softwood

--- dash Indicates no reliable data available at time of publication

Column 4—Origins		
Code	Geographical source	Code
A	Non - Queensland states	NA
N	New South Wales	E
Qs	Southern Queensland	AF
Qc	Central Queensland	NZ
Qn	Northern Queensland	AP
S	South Australia	Asia / Pacific areas
T	Tasmania	
V	Victoria	
W	Western Australia	

Column 7—Joint groups		
Code	Geographical source	Code
A	Non - Queensland states	NA
N	New South Wales	E
Qs	Southern Queensland	AF
Qc	Central Queensland	NZ
Qn	Northern Queensland	AP
S	South Australia	Asia / Pacific areas
T	Tasmania	
V	Victoria	
W	Western Australia	

Column 8—Interpreting natural durability ratings		
Durability class	Above-ground life expectancy	In-ground life expectancy
1	> 40 years	> 25 years
2	15 to 40 years	15 to 25 years
3	7 to 15 years	5 to 15 years
4	Less than 7 years	Less than 5 years

Column 9—Interpreting lycine susceptibility codes		
Code used in schedules	Lycine susceptibility status	Termites resistance status
NS	Non - susceptible to lycine attack	Highly resistant
(S)	Considered (in legal terms) lycine susceptible	Low QR, no resistance QR, no reliable data available
S	Confirmed lycine susceptible	

Column 6—Strength groups		
Unseasoned strength group	S1	S2
SD1	SD2	SD3
SD4	SD5	SD6
SD7	SD8	

Column 10—Interpreting termite resistance codes		
Code used in schedules	Termite resistance status	
R	Highly resistant	
NR	Low QR, no resistance QR, no reliable data available	

Fold-out guides for PART 2 of the Schedules

Blue highlight indicates hardwood, Yellow highlight indicates softwood

✓ Approved Subject to conditions of use and treatment requirements specified in Part 1 X Not approved

Columns 12 to 17—Conditions of use codes			
Code	Condition	Code	Condition
C1	Decapped for in-ground contact if untreated	C11	Pole frame construction poles must be set in stumps.
C2	Minimum dimension - 100 x 100 mm	C12	Single species only, free of heart
C3	Minimum dimension - 150 x 150 mm	C13	Decapped where in-ground-min diameter 200 mm
C4	Minimum dimension - 200 x 200 mm	C14	Decapped where in-ground-min diameter 300 mm
C5	Round timber only - treatment H3 min	C15	Decapped where in-ground-min diameter 400 mm
C6	Round timber > 200 mm diameter - H4 min	C16	Seasoned
C7	Round timber > 200 mm diameter - H5 min	C17	weather exposed door joints & railings must comply with industry recommendations
C8	Round timber > 100 mm diameter - H5 min	H3	Minimum H3 level of preservative treatment
C9	Round timber > 100 mm diameter - H5 min	H4	Minimum H4 level of preservative treatment
C10	Flat seasoned - max MC 20%	H5	Minimum H5 level of preservative treatment

Column 18—Advisory Codes			
Code	Condition	Code	Condition
A1	High shrinkage	A6	Included bark sometimes present
A2	Density, hardness & strength vary with origin and species	A7	Favours sometimes affected by resin bleed
A3	Gum veins common	A8	Lam resins common
A4	Paint / protect against Queensland pine beetle	A9	Corrodes ferrous fastenings when wet
A5	Usually woody		

Columns 11 to 17—Applications	
Column	Application
11	5 year target design life applications
12	15 year target design life applications: protected, non-structural building applications
13	15 year target design life applications: weather-exposed, structural and/or non-structural building applications
14	15 year target design life applications: in-ground, accessible, structure building applications
15	50 year target design life applications: protected, structural and/or non-structural building applications
16	50 year target design life applications: weather-exposed, structural and/or non-structural building applications
17	50 year target design life applications: in-ground, structural building applications

Columns 13 to 17—Decay hazard zones	
Above-ground decay hazard zones	In-ground decay hazard zones
AgA: Least potential for above-ground decay	IgA: Least potential for in-ground decay
AgB: Lower than AgC - greater than AgA	IgB: Lower than IgC - greater than IgA
AgC: Lower than AgD - greater than AgB	IgC: Lower than IgD - greater than IgB
AgD: greatest potential for above-ground decay	IgD: greatest potential for in-ground decay

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Properties of various timbers

Property	HWD (spotted gum, ironbark)	HWD (Other)	Cypress	Softwood (Hoop, Slash etc)
Strength	S2	S2 to S5	S5	S5/S6
Density (Hardness)	900 kg/m ³ + High	600 kg/m ³ +	700 kg/m ³	500 to 650 kg/m ³
Natural Durability	AG Class 1	AG Class 1 to Class 4	AG Class 1	AG Class 4
Stability (shrinkage, UTM)	6.2% 0.38	Low to V High	2.5% 0.26	4.0 to 5.0% 0.23 to 0.3
Termite resistant	Yes	Some (eg BBT/Kwila)	Yes	No/yes
Bushfire resistant	Yes	Some (eg BBT/Kwila)	No	No

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Also need to consider:

- Resistance to weathering (horizontal vs vertical)
 - Dense hwd's generally good, swd not as good
- Stability – MC, straight grained
- Shrinkage – swd < hwd
- Fixings – hwd vs swd, splitting/pre-drilling, corrosion resistance



Raised grain,
earlywood/latewood
bands



Dense hwd
weathers well
but more
challenging to
restrain

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Correct fixings critical



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Points to consider

Cladding

- Allow for movement - rebates, overlaps
- Dark paint = more shrinkage/checks
- Colour match undercoat
- Wider = greater shrinkage/expansion
- Use vapour permeable sarking
- Appropriate & galvanised nails etc
- Knot sealer may be required

Cladding



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Allow for movement

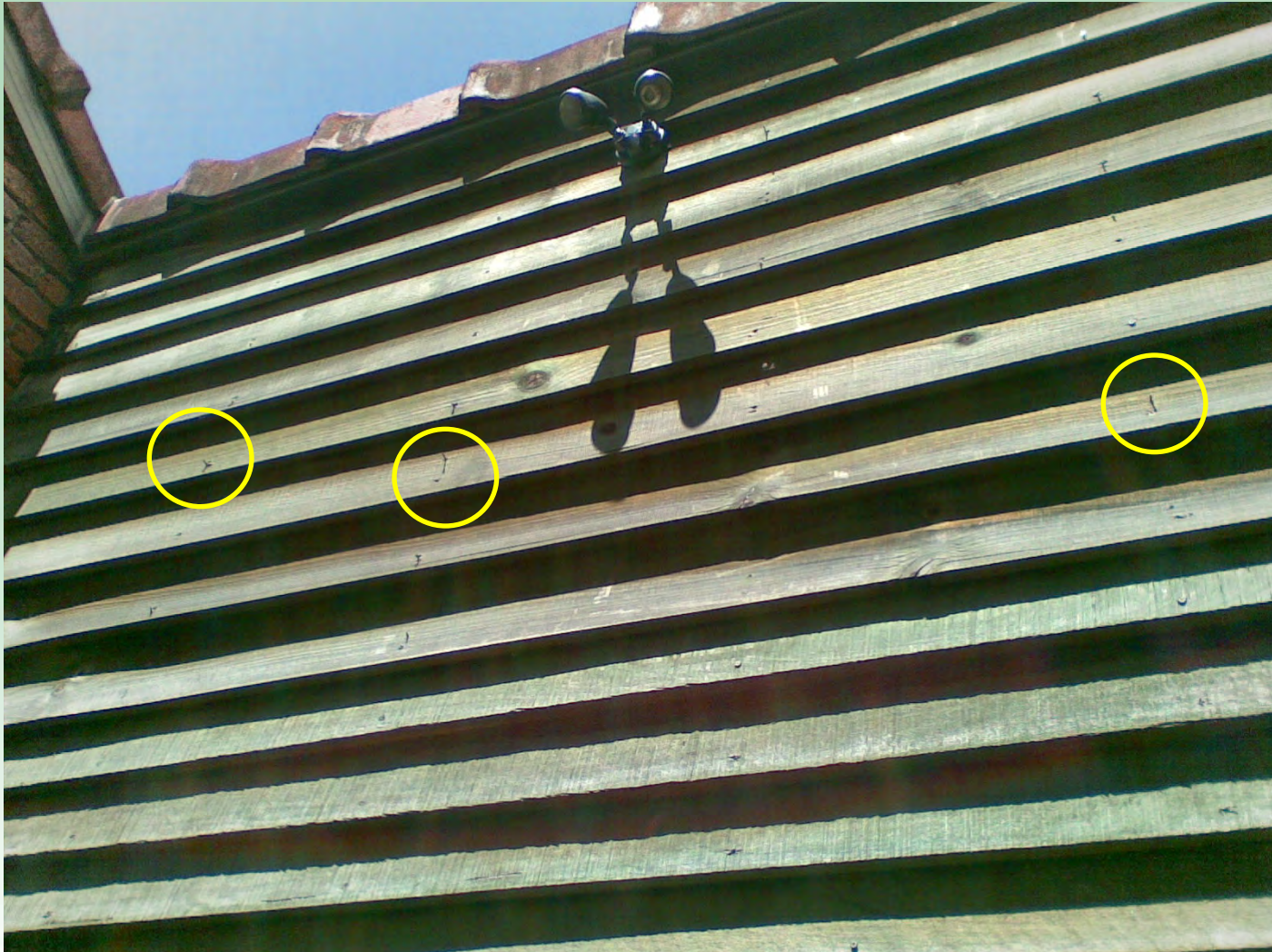


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Use the correct nails



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Knot sealer may
be required
(Cypress, hoop,
radiata etc)

e.g. two pack
polyurethane

For 'natural' finish, apply WRP's



e.g. Zinc Napthenate

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Points to consider

Decking

- Allow for movement – shrinkage/expansion
- Wider = more shrinkage/expansion/cupping
- Galvanised/stainless nails or screws
- Close to ground/slab high moisture under
 - ✓ Narrow boards
 - ✓ Wider gaps
 - ✓ Ventilation under
 - ✓ Rapid draining
- Minimise unsightly stains (iron, pollen etc)
- Maintenance critical for performance

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Allow for expansion and shrinkage



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Decks close to/on ground/slab



Increase gaps, provide edge ventilation,
rapid drainage and use narrow boards

Correct moisture content can be critical



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Minimise splitting



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Joist strips



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Stains caused by pollutants

e.g. pollen, iron
filings, jet fuel fallout
etc

Apply a finish all
round before laying

Reeded side up or reeded side down?



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Maintain for maximum life



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Commercial decking



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Commercial decking

Table 4 Allowable Decking Board Spans

Point Loads	Size (mm x mm)	Allowable Decking Board Spans					
		F7	MGP12	F14	F17	F22	F27
Point Load 2.7 kN (Light Pedestrian Traffic)	35 x 70	580	700	700	740	760	800
	35 x 90	660	780	760	800	840	880
	35 x 120	720	860	840	880	920	960
	35 x 140	760	900	880	920	960	1020
	45 x 70	780	920	900	940	980	1040
	45 x 90	840	1000	980	1020	1080	1120
Point Load 4.5 kN (Light Pedestrian Traffic)	45 x 120	940	1100	1080	1140	1180	1200
	45 x 140	980	1160	1140	1200	1200	1200
	35 x 70	340	480	700	740	760	800
	35 x 90	420	600	760	800	840	880
	35 x 120	560	780	840	880	920	960
	35 x 140	640	900	880	920	960	1020
(Light Pedestrian Traffic)	45 x 70	580	800	900	940	980	1040
	45 x 90	700	960	980	1020	1080	1120
	45 x 120	920	1100	1080	1140	1180	1200
	45 x 140	980	1160	1140	1200	1200	1200
	35 x 70	NS	NS	340	440	560	640

A minimum gap of 6 mm is recommended between decking boards to allow for good drainage and ventilation around boards.

Unseasoned decking boards should be laid tight together, with subsequent shrinkage creating the required gaps. As an example, if unseasoned spotted gum decking (45 x 120 mm) was butted together on installation, the final gap between the boards would be approximately 6% of 120 = 7-8 mm.

Seasoned decking should be installed with the required 6 mm

Design

AS/NZS 1170 (2002), Structural design actions, provides guidance on the loads required to be considered for most commercial and industrial applications.

Decking Boards

Table 4 gives the allowable spans for various grades and sizes of timber decking for a uniform distributed load up to 5 kPa and point live loads as indicated.

Joists and Bearers

Tables 5 and 6 provide joist sizes and Tables 7 and 8 provide bearer sizes.

- Keep the contact area between members to a minimum.
- Make all joints self draining.
- Where the contact area is excessive or durability in the joint may be a problem, use a preservative paste (e.g., Koppers CN Emulsion) or a bitumastic type sealer on the contact surfaces.
- Avoid bolt or nail configurations which are likely to cause splitting as the timber seasons.
- Seal all end-grain with a suitable sealer (e.g., Mobilcer-M Wax Emulsion).

Ensure the joint provides enough structural ventilation capability.

Dancing with the stars



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Flooring



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I Google'd images, "timber flooring"
and this is what appeared



So, I'd like to reinforce
a few key points
made by Dave and
chuck in a couple of
others.

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Points to consider

Flooring

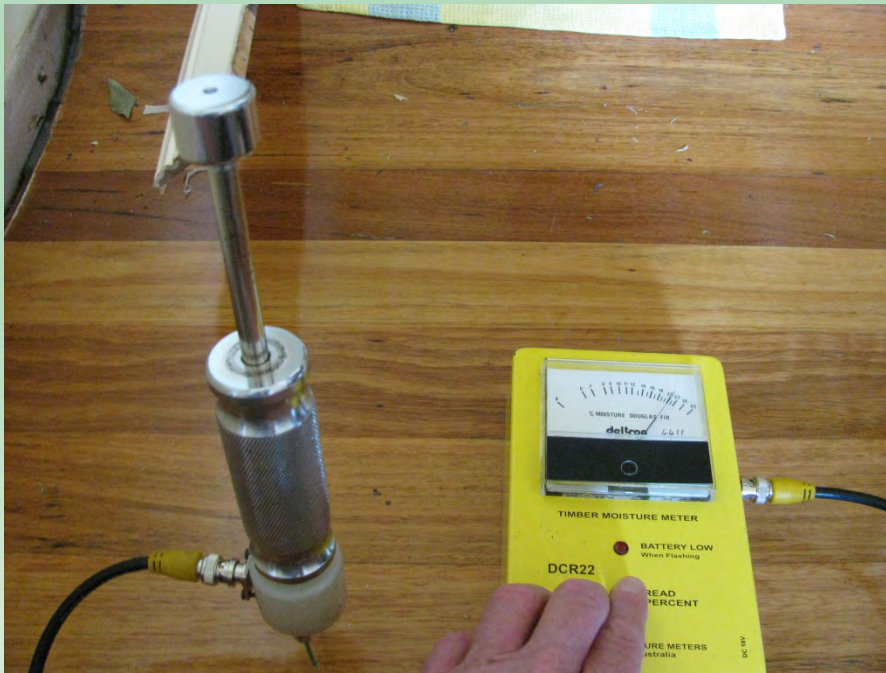
- Determine EMC and likely EMC range for site
- Always assess/measure MC before laying
- Wider boards more problematic
- Dense species need robust/stronger fixings
- Don't skimp on expansion joints/allowance
- Possible impacts of different finishes

Assess EMC/environment



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Measure MC before laying



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Wide boards more problematic Dense species – stronger fixings



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Fixing methods are critical



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Don't skimp on expansion



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Type of finish



The higher the gloss, the more evident minor surface blemishes

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More Information

TQ Technical Data Sheets



Technical Data Sheet

Treated Pine Cladding 3

Recommended Practice / March 2006

Issued by: Timber Queensland Limited

Introduction
Treated Pine provides a long life span but attention must be given to finishing and maintenance.

The most common and copper azole preservative is used to protect against preservative attack. Preservative is exposed to sunlight and becomes rough.

Some treatments



Technical Data Sheet

Cypress & Hardwood Cladding 5

Recommended Practice / March 2006

Issued by

Introduction

Treatment Before Fixing



Technical Data Sheet

Residential Timber Decks 4

Recommended Practice / March 2006

Issued by: Timber Queensland Limited

D's recommendations for residential decks etc which are exposed to the most common timber species and deck

and stress grades refer to AS 1684 construction. For commercial and technical Data Sheet 7. For decks close to less than 400 mm above ground, use AS 1684. For decks above ground use

Table 1 Species Selection

Species	Posts in Ground	Post and Framing Above Ground	Decking
PRESERVATIVE TREATED PINE (Corribean, Hoop, Radiata, Slab)	✓HS Treatment	✓HS Treatment	✓HS Treatment (See Note 2)
MIXED OPEN FOREST			



Technical Data Sheet

Residential Timber Decks Close to or on the Ground 13

Recommended Practice / March 2006

Issued by: Timber Queensland Limited

Introduction

When designing and building timber decks where timber is less than 400 mm from or on the ground, considerations must be

under the deck, covered with gravel or sand to keep it in place. This will help keep soil moisture from affecting the timber as well as preventing any vegetation growth.



Technical Data Sheet

Timber Floors Recommended Installation Practices 18

Recommended Practice / March 2006

Issued by: Timber Queensland Limited

Introduction

This data sheet outlines the recommended practices for laying timber strip floors over timber and engineered timber joists (it does not include steel joists), structural sub-floors such as plywood, particleboard and concrete. When laying a timber strip floor over joists, either directly on the joists or on sheet flooring fixed to joists, adequate sub-floor ventilation is essential for the satisfactory performance of the floor. Sub-floor ventilation recommendations are therefore included in this data sheet. The data sheet provides minimum fixing recommendations. Note that top nailing is a more robust fixing method than floors secretly fixed with adhesives. Top nailed floors can therefore accommodate greater movement.

should be given to alternative measures as outlined above and particular attention should be paid to ensuring that the sub-floor space remains dry throughout all seasons. The type of vent may also need to be considered with buildings in bushfire areas which limits the mesh size used in vents.

If there are doubts over the sub-floor humidity (areas of high water table, reduced airflow due to minimum clearances between the sub-floor framing and ground, external structures etc.) a polyethylene membrane may be laid over the soil (taped at joints and fixed to stumps and walls). This can significantly



Technical Data Sheet

Commercial, Industrial & Marine Timber Decks 7

Recommended Practice / April 2009

Issued by: Timber Queensland Limited

Introduction

Timbers natural appeal, strength and environmental credentials continue to make it the ideal choice for decking in commercial, industrial and marine structures, including:

- boardwalks
- pontoons
- bridges
- loading docks
- jetties
- marinas
- foot bridges
- vehicle parking

Scope

This data sheet provides details for the design, specification and construction of timber decks in fully exposed environments (including marine) in applications for light pedestrian traffic (2.7 kN or 4.5 kN point loads), heavy pedestrian traffic (9.0 kN point loads) and light vehicular traffic (13 kN point loads) with uniform

Surface Texture

Experience has shown that timber with a sawn upper face has a greater long term weathering ability than a dressed surface therefore should be rough sawn all round or sized on and one face (underside) only.

Arrises and Corners

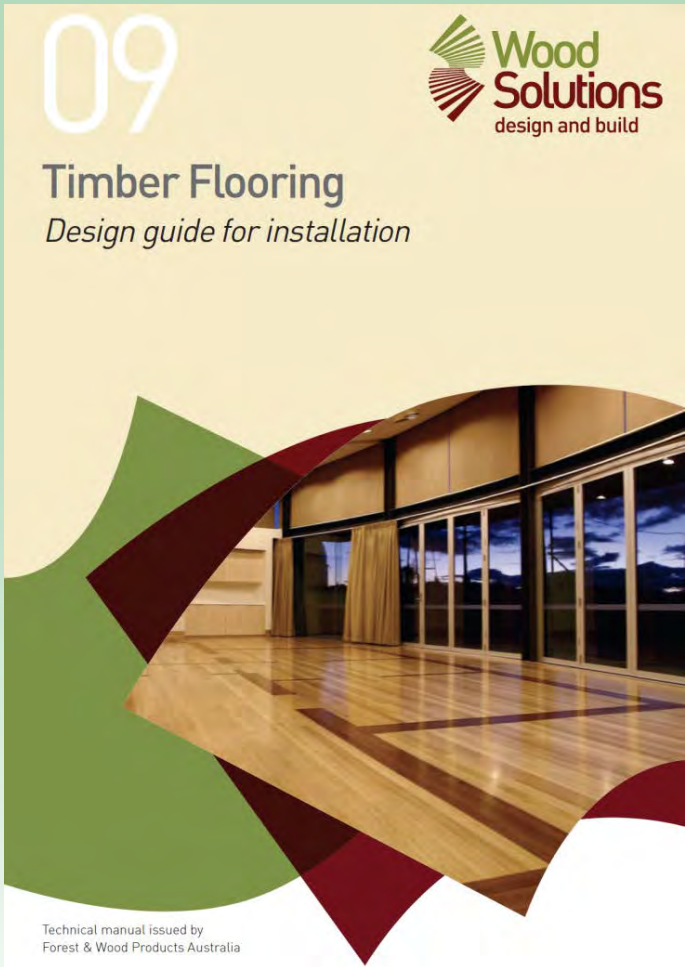
A 3 mm arris should be specified on the top corner of seasoned decking is available with rounded corners. Such of arrises or corners will reduce the incidence of splintering and improve the performance of coatings.

Table 1 Suitable Species

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More Information



Technical Design Guide Timber Flooring



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Cladding, decking and flooring

SUMMARY:

- Local resources provide you with access to diverse range of world's best timbers
- Correct design, specification, installation and maintenance will ensure satisfactory long term performance
- Information to support this is readily available

Thank you

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