



Timber, Durability & External Applications

Specifying Timber

Timber is available in a wide range of species, each with their own specific properties and capacity in terms of strength and durability. It is important to specify the most appropriate product for the application and carry out the necessary maintenance and attention to detail to ensure its long term performance.

The service performance of any timber component in weather exposed situations or high moisture environments depends on protecting it from absorption of moisture. High moisture content in timber promotes timber degradation while timber kept dry does not decay. The preferred detailing suggested in this publication is aimed at reducing the ingress of water into the timber component by providing non-permeable surfaces and details which do not trap water.

Table 1 – Hazard Levels and Applications

Hazard Class	Exposure	Service Conditions	Biological Hazard
H1	Inside above ground	Fully Protected Well ventilated	Borers only
H2	Inside above ground	Protected from wetting and leaching	Borers and termites
H3	Outside above ground	Moderate wetting and leaching	Decay borers and termites
H4	Outside in ground	Severe wetting & leaching	Severe decay, borers & termites
H5	Ground Contact	Extreme wetting, leaching &/or critical use	Very severe decay, borers & termites
H6	Marine waters Nth & Sth	Prolonged immersion in sea water	Marine wood borers and decay
H6SW	Marine waters Sth only	Prolonged immersion in sea water	Marine wood borers and decay

The following information and diagrams offer guidance in acceptable uses of timber components in weather exposed areas. The natural durability and Hazard Level treatments are detailed in tables 1–3.

Table 2 – Natural Durability Classes

Natural Durability Class	Heartwood Service Life (years)		
	Fully Protected	Above Exposed	In Ground
Class 1	50+	50+	25+
Class 2	50+	30	15–25
Class 3	50+	15	8–15
Class 4	50+	5–8	<5

Table 3 – Treatment Chemicals & Hazard Levels

Type		Hazard Level					
		H1	H2	H3	H4	H5	H6
Water	Boron	✓					
	CCA	✓	✓	✓	✓	✓	✓
	ACQ	✓	✓	✓			
Solvent	LOSP	✓	✓	✓			
	CCA + Creosote						✓

With the compliments of:





Table 4 – Natural Durability Classification of Heartwood of some Common Timbers

Class 1	Class 2	Class 3	Class 4
Belian	Blackbutt	Brush Box	Baltic Pine
Cypress (white)	Kwila (Merbau)	Mixed Open Forest Hwds from Nth NSW or Sth Qld	Caribbean Pine
Ironbark	Spotted Gum	Rose Gum/Flooded Gum	Douglas Fir (Oregon)
Tallowood	Western Red Cedar	Sydney Blue Gum	Radiata Pine
Turpentine	River Red Gum	Taun	Slash Pine
Yellow Cedar	Balau	Kempas	Mountain Ash (Tasmanian Oak)
Northern Box	Teak	Kapur	Alpine Ash (or Victorian Ash)
		American White Oak	Keruing
			Kauri (East Asian)

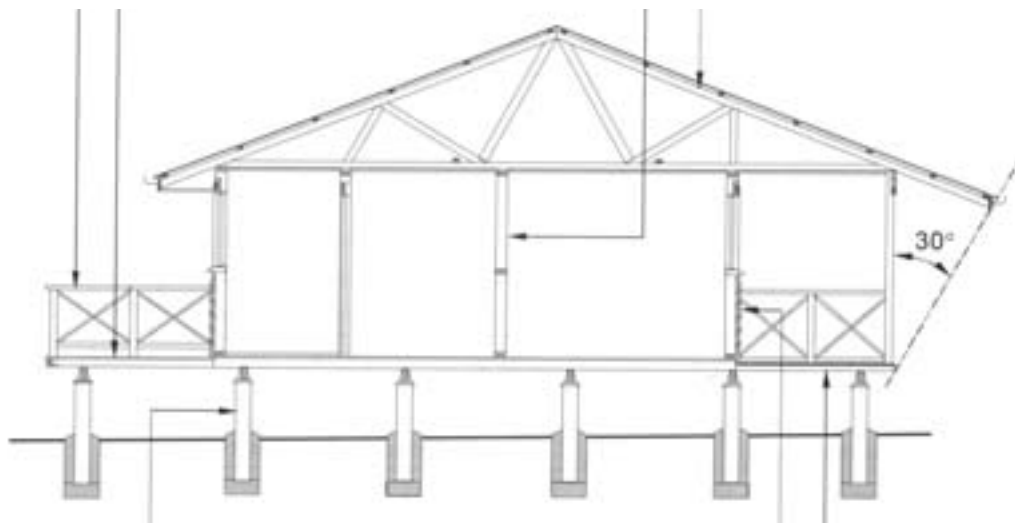
Note: Untreated Class 3 and 4 timber shall not be used for weather exposed structural members, i.e. post and joists and bearers of decks or unprotected beams protruding from the house.

External, above-ground exposed

- Durability class 1 or 2 timber, with sapwood removed or preservative treated to H3
- Softwood preservative treated to H3
- Some durability class 3 or 4 timbers are suitable in some locations for these applications

Internal, fully protected and ventilated
(see Note 2)

- Durability class 1, 2, 3 or 4 timber (any timber)



In-ground contact

- Durability class 1 or 2 timber, with sapwood removed or preservative treated to H5
- Softwood preservative treated to H5

External, above-ground, protected
(see Note 1)

- Durability class 1, 2, 3 or 4 timber

>Diagram 1 – Species Selection for Durability

- Notes:**
- 1 External timbers are regarded as protected if they are covered by a roof projection (or similar) at 30° to the vertical and they are well detailed and maintained (painted or stained and kept well ventilated).
 - 2 Framing in extremely damp or unventilated locations should have the durability required for external above-ground situations.
 - 3 All horizontal exposed timbers i.e. bearers and joists, should be coated with a film forming coating i.e. paint, oil based water repellent, etc, to enhance long term performance.



Detailing for Durability

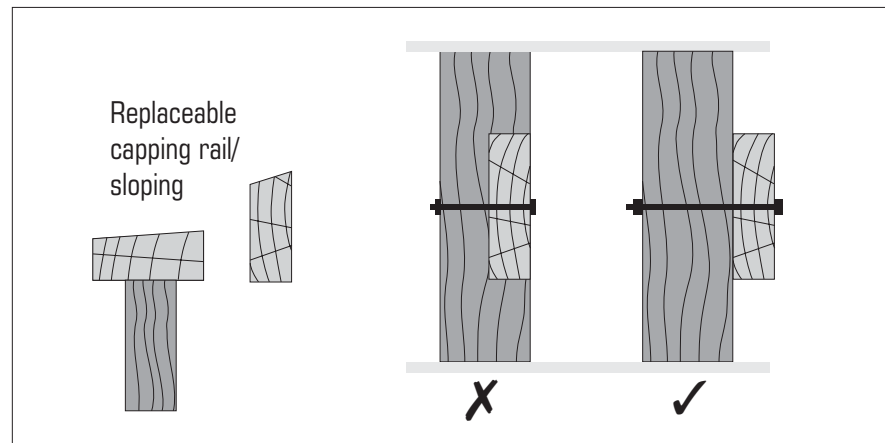
Attention to detail is most important, i.e. quality of timber, workmanship, fixings, finishes and maintenance. Failure to maintain high standards of quality in any of these factors expressed below may lead to a shortened service life.

> Timber

The timber used should be free of core wood (material within 50mm of the trees centre) and free of splits, checks, loose knots and cavities. Timber should preferably be free of sapwood (lighter coloured wood found on the outer layer of the tree).

> Joints and Connections

Use corrosion resistant fasteners ie hot dipped galvanised, stainless steel or composite bolts, nails or nailed metal connectors. All timber-to-timber interfaces for all joints should have a seal



> Diagram 2 – Detailing for Durability

coating of preservative formulation. Preservative formulation should also be applied inside bolt holes and to the end grain of the timber. Housed, checked or birdsmouth joints and all other details that may trap water should be avoided. Some treatment chemicals used may react with the fasteners, ensure manufacturers instructions are followed in this regard.

Table 5 – Timber Selection Guide

Application	Conditions of Use	Heartwood Durability	Preservative Treatment of Sapwood Hazard Level (H) Required
Verandah posts, stumps or poles supported on brackets Verandah decking and supporting bearers and joists Roof beams, rafters or other members protruding from a building to form a pergola or other exposed structure	Clear of the ground and exposed to the weather	Class 1 or 2 Some Class 3 and some untreated Class 4 timbers are suitable for non-critical applications providing appropriate design, installation, finishing and maintenance practices are used	H3
Posts, stumps or poles set into the ground	In-ground contact or persistently damp situations	Class 1 Class 2 timbers can be used where the members can be easily replaced or are protected from full weather exposure	H4, H5



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> Finishing

Refer to manufacturers' specification regarding method of application, number of coats and maintenance. Suggested finishes are:

- pigmented oil based stains, or
- pigmented paint over an oil based primer.

A wax free preservative pre-treatment is recommended for both finish systems.

Unpigmented finishes including clear film finishes have limited life when exposed to UV-light (sunlight) and should be avoided.

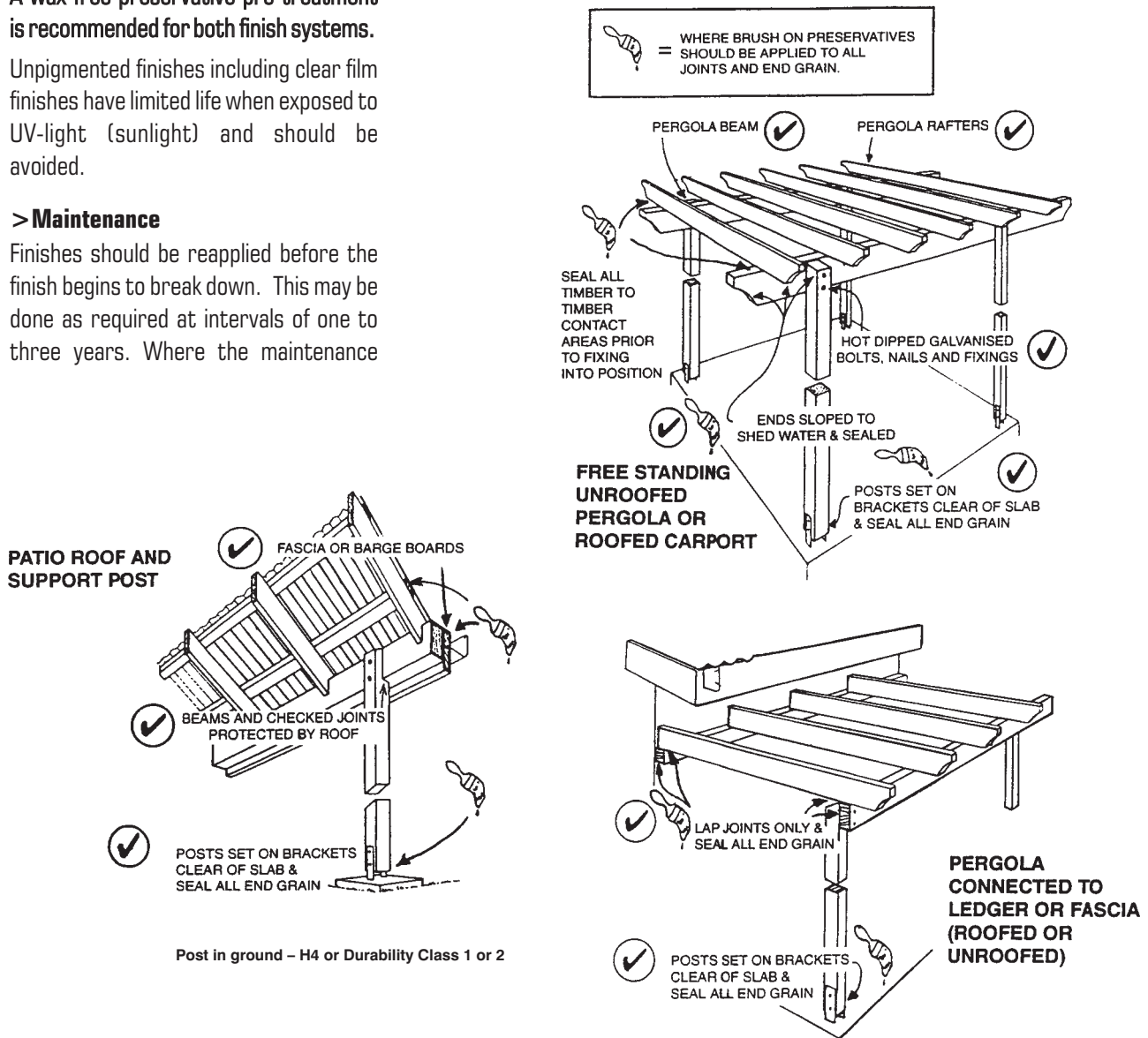
> Maintenance

Finishes should be reapplied before the finish begins to break down. This may be done as required at intervals of one to three years. Where the maintenance

schedule is followed, along with good detailing, timber will continue to look good and maintain its capacity for many years.

Note: This information brochure is intended to give guidance to designers, builders and owners who are aware that

species of Durability class 3 and 4 are generally not recommended for full weather exposed environments. However, providing special attention is paid to design, construction and regular maintenance, satisfactory performance can be obtained when used in weather exposed applications outlined herein.



>Diagram 3 – Good Building Practice

For further information on this brochure, contact the Timber Advisory Service on free call 1800 044 529 or email showroom@tdansw.asn.au Level 6, 525 Elizabeth Street, Surry Hills NSW 2010. General Information on the use of timber can also be found at the web page www.timber.net.au

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