

Timber Decks

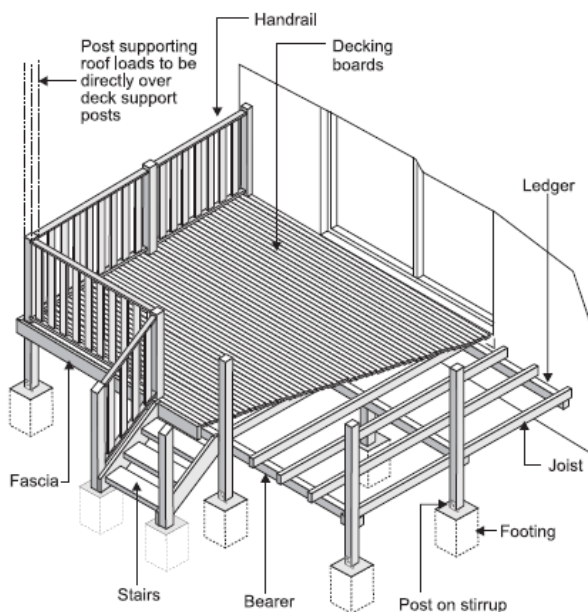
Technical Note. March 2007

This Technical Note contains general information for residential timber decks and floor frame structures for veranda's, patios etc which are exposed to the weather.

The information is of a general nature and should not be used for reliance. Information on timber sizes is restricted to commonly used timber species and timber sizes available in Tasmania.

For technical enquiries and further information contact an accredited Building Surveyor for advice.

For alternative timber species, sizes, spans and stress grades refer to AS 1684.2 2000, Residential Timber-Framed Construction.



TYPICAL DECK CONSTRUCTION

Permits

Under the Tasmanian Building Regulations construction of **ALL timber decks in Tasmania require a Building Permit** contact a Building Surveyor (Listed in the Yellow Pages) or your Local Council for advice.

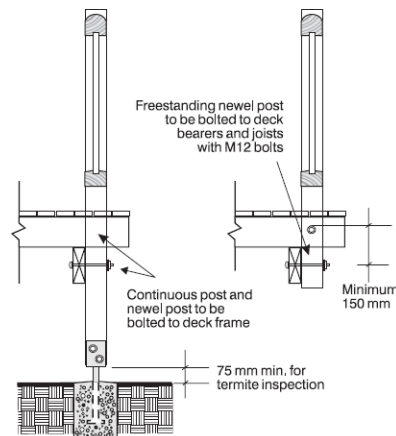
Applications are to be submitted with construction plans drawn to a drafting standard and specification detailing the building work and a Certificate of Likely Compliance from a Building Surveyor.

Plans are to be drawn to scale in ink, to "Drafting Standard" and include:-

- Site plan detailing the location and use of ALL existing buildings, the location of the proposed deck and accurate setback dimensions from front, rear and side boundaries.
- Floor frame plan of the deck showing the location and size of ALL concrete pads, timber members, species and structural grade including; stumps, bearers, joists, ledger and decking floor frame plan is to include details on spans and spacings of all members.

- Cross sectional detail of the deck construction showing concrete pad, stump bearer, joist and ledger connections with details of fixings, bolts nails and brackets. Fully noted and dimensioned with the size of the deck ALL material sizes and maximum spans for timber.
- Details on height and construction of timber handrail and balustrading. Nominating height of handrail (1.0 m minimum from finished deck level) and construction of balustrade (Gaps less than 125mm)

Contact a Building Surveyor or your Local Council for further advice.



DECK CROSS-SECTION DETAIL

Timber Selection

Posts in contact with the ground shall be either preservative treated pine or In-ground Durability Class 1 hardwood, with any sapwood preservative treated.

Decking and deck framing above ground shall be either preservative treated pine or Above Ground Durability Class 1 hardwood. Hardwood decking boards and deck framing containing sapwood must be preservative treated.

Preservative treatment for posts in the ground and timber framing on the ground must be to hazard treatment level H5. For timber framing greater than 150mm above the ground preservative treatment is to be H3.

Decking timbers can be either preservative treated H3 or durability class 1 hardwood.

Member Design & Span Tables

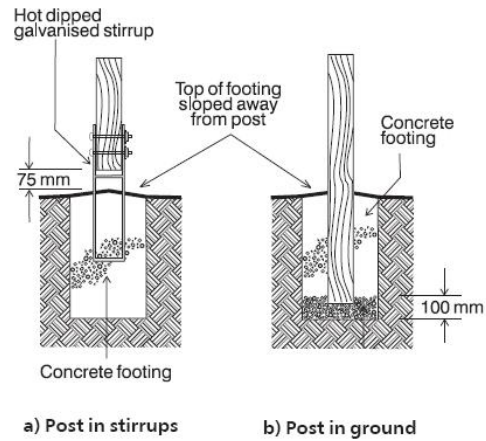
Australian Standard 1684.2 2000 Residential Timber Framed Construction is the technical document which is used to select the most appropriate sized timber members for deck construction. The timber size will depend on the structural member, its span, support, species and structural grade.

The most commonly used material for timber decks in Tasmania is Treated Pine; Extracts of Tables 49 and 50 from AS 1684.2 details optioned sizes for F5 graded Treated Pine Bearers and Joists have been included in this technical note for information.

PLEASE NOTE: The sizes for bearers and joists do not allow for the support of roof and/or wall loads. Decks supporting roof structures must be designed to support such roof loads by way of continuous posts through to concrete pads or the posts are to be positioned directly over deck stumps and concrete pads.

For alternative sizes, spans and stress grades or for members supporting roof loads, refer to AS 1684.2 2000 Residential Timber-Framed Construction.

Post stirrups and proprietary connectors such as; joist hangers, framing anchors, connectors etc, are to be either hot dipped galvanised or stainless steel. Bolts, screws and nails shall also be hot dipped galvanised or stainless steel (**not zinc plated**).



TYPICAL CONCRETE PAD CONSTRUCTION

Concrete pad caps are to be sloped (weather struck) from posts to shed water.

Attaching Deck Frame to Other Structures

When attaching deck frames to an existing building, timber ledgers can be fixed to the existing house framing (studs, joists or bearers) with 12 mm dia. hot dipped galvanised bolts or coach screws. Size of ledger beam, the number of and spacing of fixings will depend on the available structural fixing points of the existing structure.

Ledgers may be fixed with masonry anchors to structural brick or block walls in accordance with manufacturer's instructions.

Note: Brick veneer or other single skin brick walls may not be structurally adequate and require additional piers or freestanding posts. Seek appropriate professional advice.

Installing Bearers

Bearers shall be securely fixed to posts in one of the following methods;

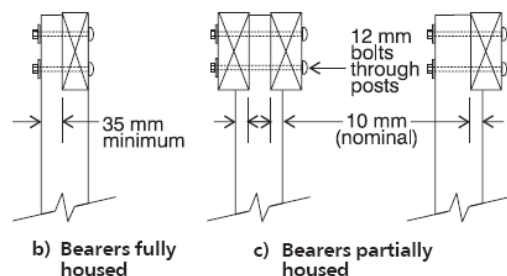
- Where bearers sit on top of posts/stumps, fixed with proprietary post caps or brackets in accordance with manufacturer's instructions, or
- Bearers can be housed into posts/stumps and bolted through with two 12 mm dia. bolts. (Minimum 35 mm of post to remain after housing), or
- Install double bearers either side of post can be partially housed (10 mm nominal) into side of posts and bolted through with two 12 mm dia. bolts. This allows for posts/stumps to continue up to support handrails or roof framing.

Bracing

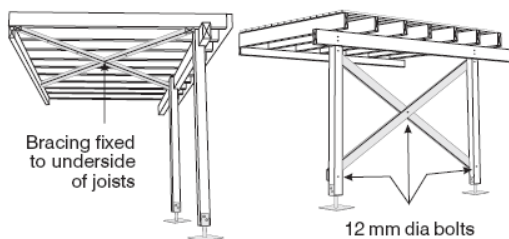
Decks are to be braced to prevent lateral movement. Bracing may include Timber or metal double diagonal braces and knee bracing.

The bracing is fixed diagonally between posts, and the wall with each brace fixed off to the underside of each joists with batten screws or two galvanised nails.

To further minimise lateral movement in freestanding decks in addition to diagonal bracing, posts may be embedded in the concrete pad to increase the resistance to lateral movement.



HOUSED STUMP & BEARER FIXING

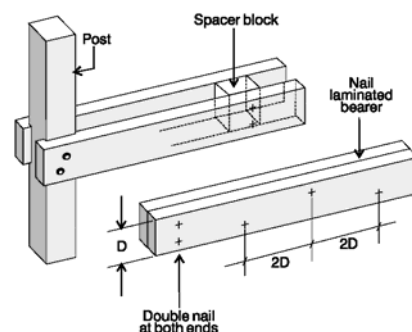


TYPICAL METHODS OF BRACING

Concrete Pads & Posts

Concrete pads are to be appropriately sized depending on the size of the structure and soil conditions. Where posts are cast into concrete pads such timber is to be preservative treated pine to hazard level H5 or for hardwood in-ground Durability Class 1, alternatively posts can be fixed to hot dip galvanised steel stirrups set in the concrete pads.

Double bearers may be either set on each side of the post/stump with mid-span blocking or nail-laminated together with staggered nails, at spacing equal to twice the bearer depth.



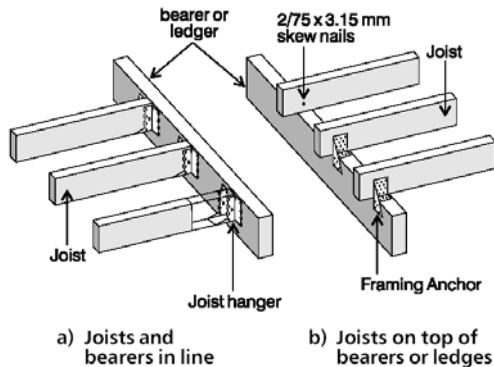
DOUBLE BEARER & NAIL LAMINATED BEARER

Installing Joists

Joists to be fixed to top of the bearers or ledgers at 400 to 450 mm maximum spacing with either two 75 mm x 3.15 mm skew nails or proprietary framing anchors or brackets. Joist spacing will be determined by the thickness of the timber decking used.

Alternatively, joists may be installed level and between bearers and/or ledgers and fixed to proprietary joist hangers in accordance with manufacturer's recommendations.

Note: Nails for proprietary connectors to be hot dipped galvanised.



METHOD OF JOIST FIXING TO BEARERS

Span Tables allow for an acceptable amount of deflection (movement) in the floor structure under normal domestic loadings. This movement can be minimised by the selection of larger sized timber members for the particular application. For further information seek appropriate professional advice.

Where depth of joist is greater than four times the width, solid blocking is to be fixed between joists at each support. For joists spans over 3 m, additional solid blocking should be provided in evenly spaced rows as follows:-

- For spans over 3.0 m to 4.2 m - one row
- For spans over 4.2 m - two rows equally spaced.

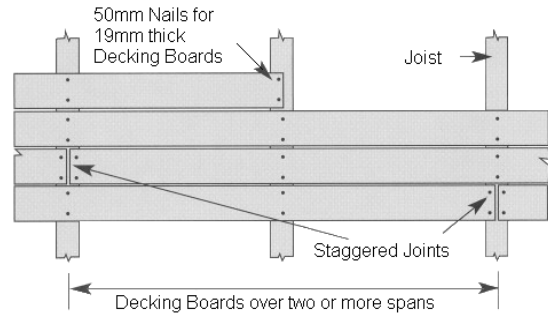
Decking

Standard decking sizes available in Tasmania are:-

Treated Pine	90 mm wide x 22 mm thick
	70 mm wide x 22 mm thick
Hardwood	68 mm wide x 19 mm thick
Kwila (Merbau)	90 mm wide x 19 mm thick
	70 mm wide x 19 mm thick
Jarrah	65 mm wide x 22 mm thick

Narrow boards can shed water more readily and are therefore less prone to cupping and twisting. Reeded or ribbed decking may be fixed with ribbed face up or down. However where fixed with ribbed face up (for a "non-slip" surface), ongoing maintenance should be considered; Frost and ice fill the ribs contributing to dirt and mould build up in the grooves which can make surfaces slippery and accelerate decay.

Generally decking shall be spaced with 3 to 5 mm gaps with butt joints staggered as shown (i.e. joints on adjoining boards are not joined on the same joist).



LOCATION OF DECKING JOINTS

Each board shall be fixed at every joist crossing with two nails. Alternatively, proprietary fixings may be used in accordance with manufacturer's instructions.

Nails shall be hot dipped galvanised or stainless steel (**not zinc plated**). To avoid splitting; nails should be kept 12 mm from edges and ends of boards, and nail holes at joints should be predrilled (80% nail diameter).

Nails shall be driven flush with surface (nails should not be punched). To prevent decking from lifting or loosening over time nails at intermediate fixings shall either be offset or driven at slightly opposing angles.

Finishing

All decks shall have a finish applied as protection against the weathering effects of sun and rain.

Note: Unprotected timber exposed to the weather will fade to a silver-grey colour and could distort and develop splitting and surface checking.

One coat of a water repellent preservative or an oil based primer plus one coat of the selected finish should be applied to top surface of joists and to all surfaces of decking (including cut ends) prior to fixing.

Additional coats to be applied to the finished surface of decking after construction (Application of coatings to manufacturer's instructions). Recoating is necessary every five to seven years, depending upon exposure. Additional preparation (sanding, repriming etc.) is frequently necessary.

Maintenance

Frequent wetting of decks is to be avoided (sweep or clean, don't hose). Provide adequate ventilation to allow rapid drying after rain or watering. Pot plants to be located on trays and prevented from overflowing. Avoid the planting of shrubs or creepers which permanently shade or grow onto the deck, framing or rails etc.

Reapplication of finishes will be required at regular intervals. Application of finishes is to be carried out in accordance with the manufacturer's recommendations.

For technical enquiries and further information contact an accredited Building Surveyor for advice.

Softwood (Radiata Pine) F5 Span Tables –

Extract form AS 1684.2 - 2000

Radiata Treated Pine is the most commonly used timber framing for deck construction.

For timber framing of other species and structural grades refer to the Australian Standard 1684.2 – 2000 for correct sizes.

PLEASE NOTE: Timber used in external situation and subject to the effects of weathering MUST be treated for exterior use to treatment level H3 for above ground use and H5 for below ground use.

Size DxB (mm)	Floor Load Width (mm)																	
	1200			2400			4800			1200			2400			4800		
	Maximum Bearer Span (mm)																	
	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever				
	Single Span						Continuous Span											
2/90x35	1200	300						1200	300									
2/90x45	1400	400	1000	300				1400	400	1000	300							
2/140x35	1900	500	1400	400	1000	300		1900	500	1300	300							
2/140x45	2200	600	1600	400	1100	300		1900	500	1400	400	1000	300					
2/190x35	2600	700	1900	500	1300	300		2600	700	1900	500	1300	300					
2/190x45	2900	800	2100	600	1500	400		2900	800	2100	600	1500	400					
2/240x35	3300	900	2300	600	1600	400		3300	900	2300	600	1600	400					
2/240x45	3700	1100	2700	800	2000	600		4000	1200	2700	800	1900	600					
2/290x35	4000	1200	2800	800	2000	600		4000	1200	2800	800	2000	600					
2/290x45	4500	1300	2300	900	2300	600		4500	1300	3200	900	2300	600					

NOTES:

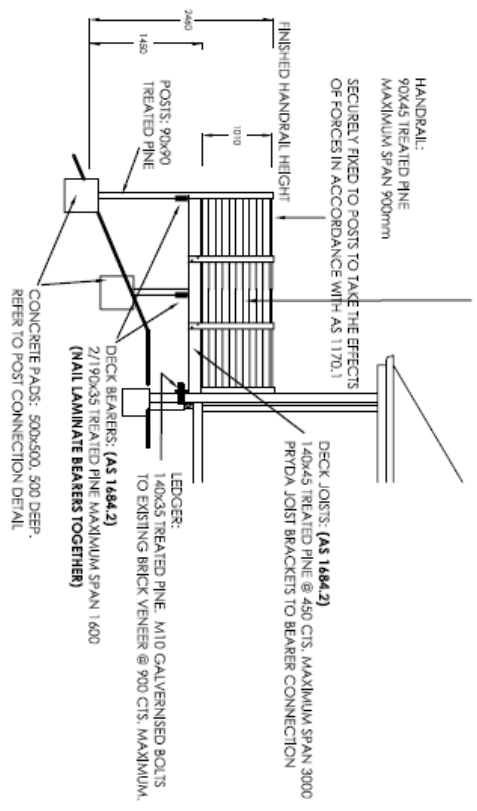
- i) Maximum Bearer Span is based on supporting a maximum decking mass of 20kg/m².
- ii) Cantilevers shall not exceed 30% of the actual backspan.
- iii) Minimum bearing length = 50mm at end supports and 100mm at internal supports for continuous members.
- iv) Multiple members shall be nailed together as per AS 1684.2 Clause 2.3.

Size DxB (mm)	Joist Spacing(mm)																	
	300			450			600			300			450			600		
	Maximum Floor Joist Span (mm)																	
	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever	Span	Cantilever				
	Single Span						Continuous Span											
90x35	1000	300						1200	300	1100	300	1100	300					
90x45	1200	400	1100	300	1100	300		1600	400	1400	400	1300	300					
140x35	2400	700	2100	600	1800	500		2500	700	2100	600	1800	500					
140x45	2800	800	2400	700	2000	600		2900	800	2400	700	2000	600					
190x35	3400	1000	2800	800	2400	700		3400	1000	2800	800	2400	700					
190x45	3800	1100	3200	900	2800	800		3900	1100	3200	900	2800	800					
240x35	4300	1300	3500	1000	3100	900		4300	1200	3500	1000	3100	900					
240x45	4800	1400	400	1200	3500	1000		4900	1400	4000	1200	3500	1000					

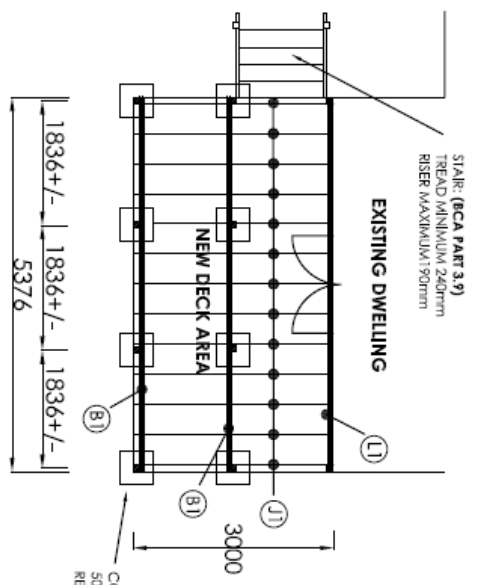
NOTES:

- i) Maximum Deck Joist Span is based on supporting decking mass of 20kg/m².
- ii) Cantilevers shall not exceed 30% of the actual backspan.
- iii) Joists crippled over supports MUST be considered as Single Plan Joists.
- iv) Where joist size D/B > 4 Restraint may be required. Refer to AS 1684.2 Clause 4.2.2.3.

BALUSTRADE: (BCA Volume 2 PART 3.9)
 BALUSTRADE & BARRIERS MUST BE SUITABLY CONSTRUCTED AND SECURED TO TAKE THE EFFECTS OF FORCES IN ACCORDANCE WITH AS 1170.1
 3mm STAINLESS STEEL WIRE @ 100mm SPACINGS 90x90 TP SUPPORT POSTS MAXIMUM SPACING 900mm, WIRE TENSION 1705 N (NEWTONS) OR 174 KG (for alternative refer to Table 3.9.2.1)
 FOR TIMBER BALUSTERS - HANDRAIL HEIGHT 1.0 METRE MINIMUM WITH TIMBER BALUSTERS RAILS OR PICKETS WITH LESS THAN 125mm GAP.



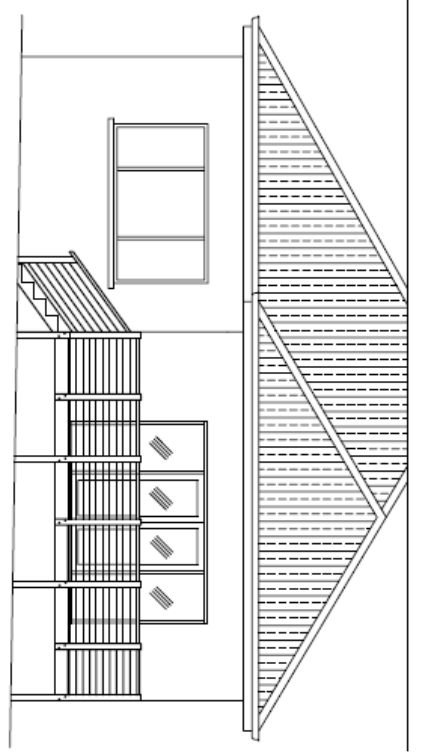
CONSTRUCTION SECTION



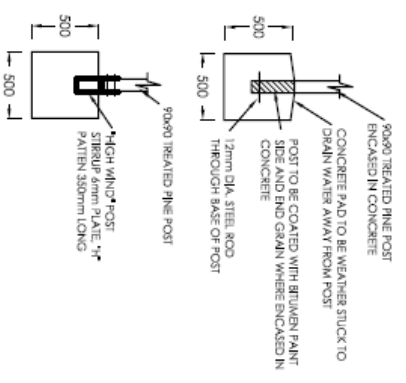
FLOOR FRAME LAYOUT

- L1 - LEDGER: (AS 1684.2) 140x45 TREATED PINE, M10 DYNA BOLTS TO BRICK VENEER @ 900 CTS.
- J1 - DECK JOISTS: (AS 1684.2) 140x45 TREATED PINE @ 450 CTS, MAXIMUM SPAN 3000 PRIVYA JOIST BRACKETS TO END CONNECTION
- B1 - DECK BEARERS: (AS 1684.2) 27190x35 TREATED PINE MAXIMUM SPAN 1600 (NAIL LAMINATE BEARERS TOGETHER)
- CONCRETE PADS: 500x500, 500 DEEP. REFER TO POST CONNECTION DETAIL.

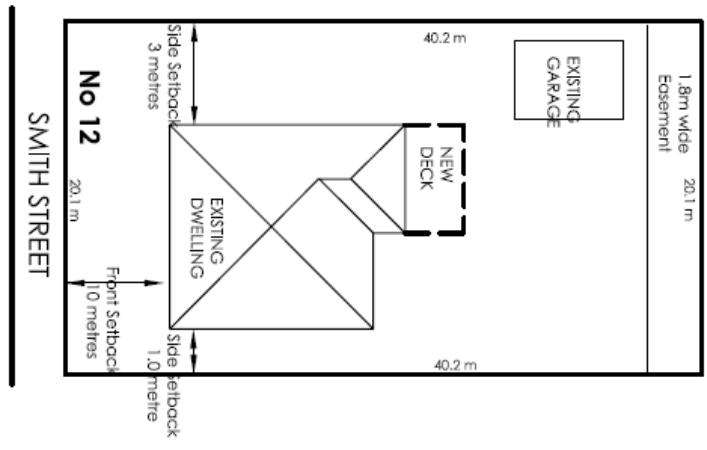
SAMPLE PLAN ONLY
NOT FOR REPRODUCTION



ELEVATION



ALTERNATIVE CONCRETE PAD DETAILS



SITE PLAN

New Deck to Dwelling	Owner: John Smith	Scale: 1:100	Date: March 2007
12 Smith Street Smith Town	Builder: OWNER	Designer: OWNER	Drawing: 1 of 1