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Plywood Box Beam Span Tables for Detached Housing Construction

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Introduction / /

Plywood box beams are lightweight, simple to fabricate, conventionally stable and, with good design, structurally efficient and economical. The options provided in the following span tables are designed according to limit state design theory and for winds speeds up to N3. The span tables open up new options for beams incorporated into walls, portal frames and other typical long span applications.

Plywood webbed beams consist of flanges, webs and web stiffeners as shown in Figure 1.

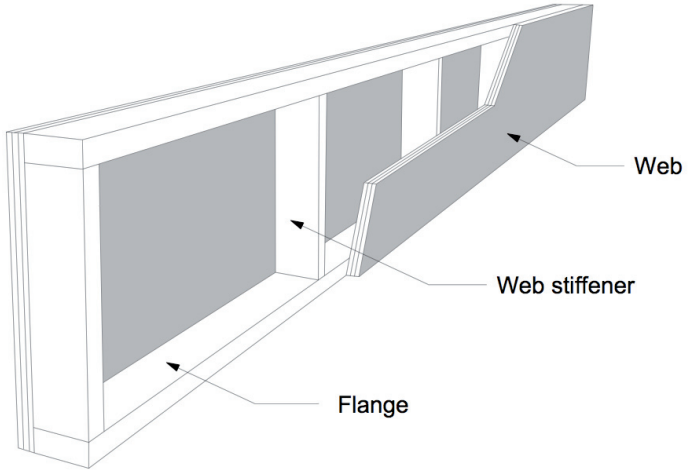

Figure 1: Cut-away view of a plywood box beam

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August 2008

STRUCTURAL CERTIFICATION
OF
PLYWOOD SHEATHED BOX BEAM SPAN TABLES

The span tables contained herein have been independently checked by the writer through the rigorous application of the fundamental principles of structural analysis and design procedures. The checking schedule involved randomly choosing a box beam candidate from each of their various structural applications and applying a comprehensive checking procedure.

For the checks, design loads were derived from application of guidelines provided in AS/NZS 1170.1 : 2002, loading combinations from those given in AS/NZS 1170.0 : 2002 and wind loads from AS/NZS 1170.2 : 2002.

Structural design procedures conformed to the requirements of AS 1720.1 : 1997. Serviceability criteria generally followed the guidelines given in AS/NZS 1170.0 : 2002.

During the checking process reference was also made to the PAA Design Guide for Plywood Webbed Beams for Domestic Housing (1996). This document curtailed beam spans at 3.6m, and design was performed in accordance with the requirements of the Basic Working Stress philosophy.

As a professional engineer, competent in the engineering of timber structures and their components, I certify the box beams referred to in this Manual as being structurally adequate regarding the specific requirements of AS 1684.1 : 1999 as it refers to the various members.

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Limitations and Beam Design Data //

General

The criteria specified in this publication are specifically for conventional timber-framed buildings and applicable to single and two-storey constructions built within the limits or parameters below (Note: for any details not dealt with below assumptions and design conditions in AS1684 apply).

Wind classification

Beam spans in the Span Tables are for wind loads up to N3 as described in AS4055 Wind Loads for Houses. For this wind classification the maximum building height limitation of 8500 mm, as given in AS4055, shall apply.

Plan

Building shapes shall be essentially rectangular, square, L-shaped or a combination of essentially rectangular elements including splayed-end and boomerang-shaped buildings.

Number of storeys of timber framing

The maximum number of storeys of timber framing shall not exceed two.

Building Width

The maximum width of a building shall be 16000 mm excluding eaves.

Wall height

The maximum wall height shall be 3000 mm floor to ceiling as measured at common external walls i.e. not gable or skillion ends.

Roof pitch

The maximum roof pitch shall be 35° (70:100).

Roof type

Roof construction shall be hip, gable, skillion, cathedral, trussed or pitched, or in any combination of these.

Building masses

Building masses appropriate for the member being designed shall be determined prior to selecting and designing from the Span Tables in this publication. Where appropriate, the maximum building masses relevant to the use of each member span table are noted under the Table. The roof mass shall be determined for the various types of roof construction for input to the Span Tables. For further guidance refer AS1684 Part 2, Appendix B. For counter beams, strutting beams, combined hanging strutting beams, and the like, the mass of roof framing is also accounted for in the Span Tables. The mass of a member being considered has been accounted for in the design of that member.

Size Tolerances

When using the Span Tables no (0 mm) undersize tolerances on timber sizes shall be permitted.

Moisture content

A moisture content of 15% or lower applies.

Bearing

The minimum bearing for specific beam members (bearers, lintels, hanging beams, strutting beams, combined strutting/hanging beams, counter beams, combined counter/strutting beams etc.) shall be as given in the Notes to the Span Tables. Unless indicated otherwise, all beams shall bear on their supporting element, a minimum of 35 mm at their ends or 70 mm at the continuous part of the member, by their full breadth (thickness). Reduced bearing area shall

only be used where additional fixings are provided to give equivalent support to the members. Where the bearing area is achieved using a non-rectangular area such as a splayed joint, the equivalent bearing area shall not be less than that required above.

Durability

All span tables assume that the beam is to be located in an interior environment.

Material Properties and Key Design Data

The minimum structural properties adopted for timber flange and web stiffener materials are in accordance with Table 2.4 (for timber) and Table 5.1 (for Plywood) of AS1720.1. Timber Joint groups for various species are in accordance with Table 2.1 of AS1720.1. In addition, properties for LVL are handled separately below.

Laminated veneer lumber (LVL 10):

- Bending (f'b) 42 N/mm^2
- Tension (f't) 27 N/mm^2
- Shear (f's) 5.3 N/mm^2
- Compression (f'c) 40 N/mm^2
- Modulus of Elasticity (e) 10 700 N/mm^2

Other assumptions

- All beams are simply supported single spans
- Applied loads are static and applied vertically
- Applied loads for lintel and bearer beams have generally been input as evenly distributed discrete loads. Lintels have also been designed to include concentrated loads from roofs.
- Applied loads for strutting beams spanning perpendicular to the rafters and combined strutting and hanging beams have been input as discrete loads at every second rafters spacing (Note"Web stiffeners should be added at point load application points).
- Applied loads for strutting beams spanning parallel to the rafters have been input as a single mid-span load.
- Rafter and joist spacings 600 mm centres, maximum.
- All beams are required to be laterally restrained at their supports. Intermediate lateral restraint to the top edge of lintel and bearer beams is provided by the rafters or joists. Additional lateral restraint is required to strutting and combined hanging and strutting beams. Specific requirements are adjacent to individual Span Tables and guidance is also provided in Figure 13.
- Roof Load Width (RLW) and Floor Load Width (FLW) are measures of the width of the load area being supported by the member. Examples are shown for each being type.
- Roof Load Area (RLA) for strutting beams spanning parallel to the rafters is a measure of the load area being supported by the member.
- Span is defined as the face-to-face distance between points capable of giving full support to structural members.

Load Terminology Used in the Span Tables //

Roof load width (RLW)

RLW is used as a convenient indicator of the roof loads that are carried by some roof members and then by support structures such as lintels. Roof load width (RLW) is simply half the particular member's span, between support points, plus any overhang, and is measured on the rake of the roof.

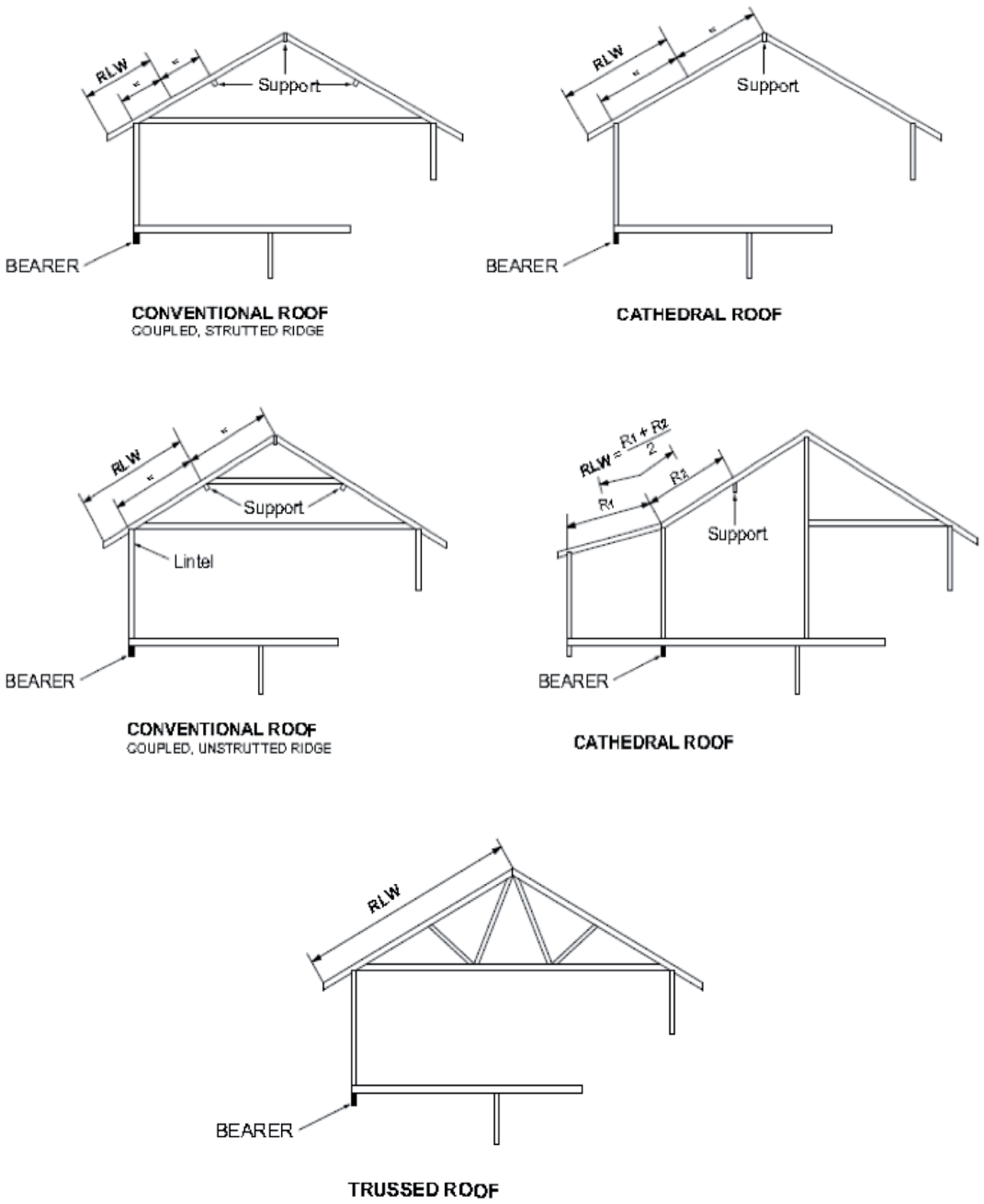


Figure 2: Method for Calculating Roof Load Width for Lintels

Roof load area (RLA)

The area supported by a member is the contributory area measured in the roof, that imparts load onto supporting members. The roof area shall be used as an input to Span Tables for strutting beams and combined strutting/hanging beams and combined strutting/counter beams. The typical roof area supported by strutting beams is shown in Figure 3.

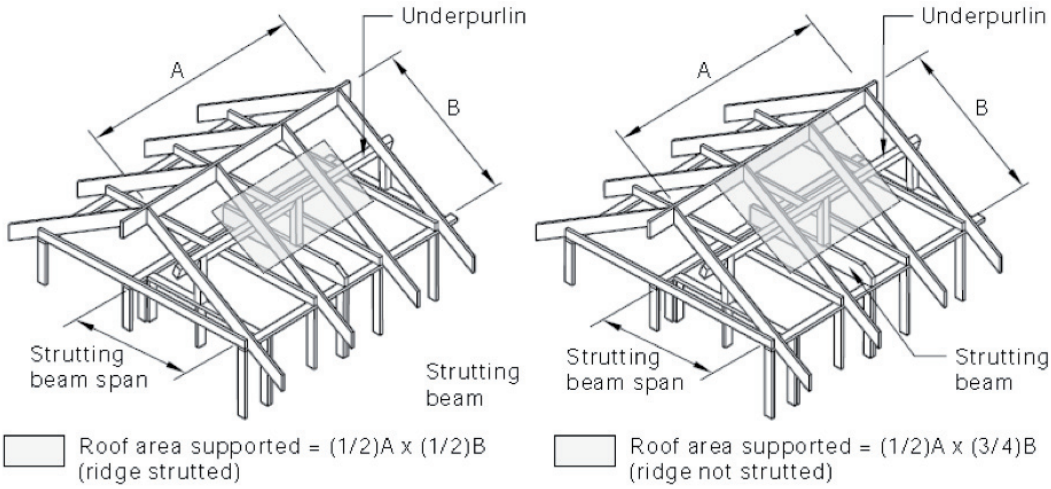
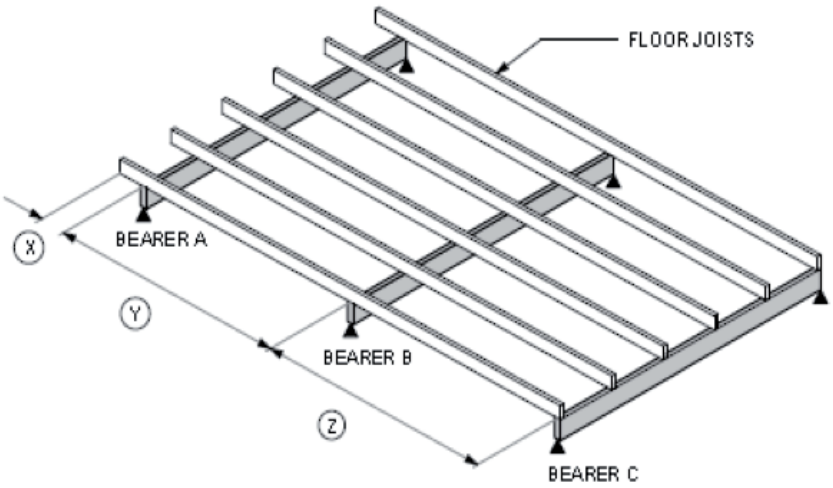


Figure 3: Roof load area for Strutting beams (and similar)

Floor load width (FLW)

FLW is the contributory width of floor, measured horizontally, that imparts floor load to a bearer or similar. So floor load width (FLW) is simply half the floor joist span on either side of the bearer, added together. The only exception is where there is a cantilever. In this situation, the total cantilever distance is included.



BEARER	FLOOR LOAD WIDTH ' FLW'
A	$FLW = X + \frac{Y}{2}$
B	$FLW = \frac{Y+Z}{2}$
C	$FLW = \frac{Y}{2}$

Figure 4: Method for Calculating Floor Load Width for Bearers

Ceiling load width (CLW)

Ceiling load width (CLW) is the contributory width of ceiling, usually measured horizontally, that imparts ceiling load to a supporting member. CLW shall be used as an input to Span Tables for counter beams and strutting/hanging beams. An example of its method of calculation is shown in Figure 5.

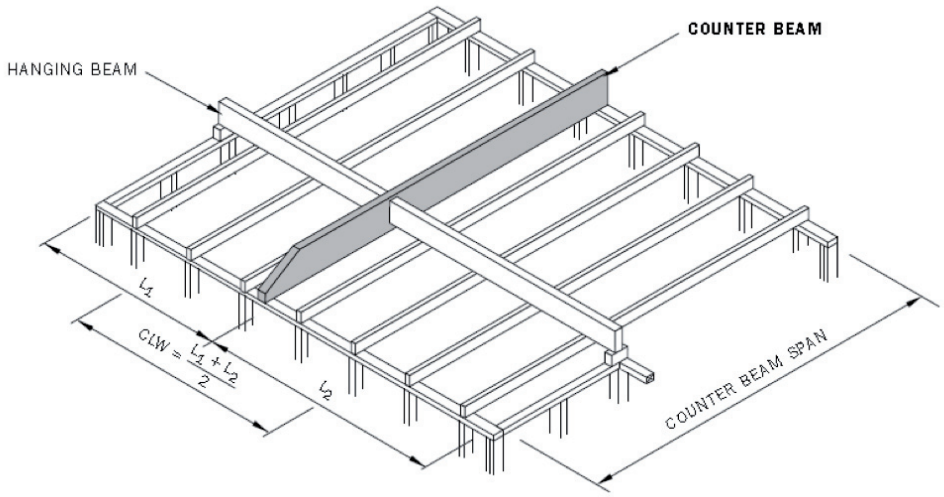


Figure 5: Method for Calculating Ceiling Load Width for Counter Beams

Beam Components and Fabrication //

Flanges

Flange sizes in the following span tables utilise commonly available MGP and F-Grade seasoned softwood, seasoned hardwood and Laminated Veneer Lumber. Options include:

- MGP 10; 90 x 45 mm; JD 5
- MGP 12; 90 x 45 mm; JD 4
- F5; 90 x 45 mm; JD 5
- F17; 90 x 65 mm; JD 4
- Structural Grade LVL 10; 90 x 45mm; JD 5

A benefit of these timbers is that they are commonly available in all regions of Australia. The use of higher stress graded timber does not necessarily lead to higher beam spans as stress grade is not the governing feature of the beam design – nail holding between the web and flange is more important.

All timber used in conjunction with this span table should be stress graded in accordance with the relevant Australian Standards. Further to this, Structural Laminated Veneer Lumber (LVL) must be manufactured to AS/NZS 4357.0:2005 and in accordance with EWPAA branded structural LVL (see Figure 6 below). This ensures an engineered product of known and consistent physical and mechanical properties. Also note that that some chemical treatments may adversely affect structural properties and advice should be sought from the manufacturer prior to any treatment. The design properties of structural LVL as well as product dimensions are published by the individual manufacturers. In the span tables in this manual, LVL must attain a Modulus of Elasticity of 10 MPa. For further information on LVL go to www.paa.asn.au.

Figure 6: Branding for LVL products

Plywood Webs

Plywood webs for box beams called up in the span tables are according to the following specification:

- Thickness: 7 mm minimum thick
- Structural grade: F8 (minimum)
- Grain direction: must run parallel to the beam span
- Face Grade: D/D minimum (i.e. structural non-aesthetic grade)
- Branding: EWPAA structurally tested

Plywood must be manufactured to AS/NZS 2269. This is the only plywood suitable for use in plywood box beam applications in these span tables. Under this scenario, a permanent Type A phenolic resin is used to bond the individual timber veneers. The Type A bond is distinctly dark in colour and is durable and permanent under conditions of stress.

EWPAA branded structural plywood is manufactured under a rigorous product quality control and product certification system and should be branded with the "PAA Tested" stamp (see Figure 7 below).

Figure 7: Branding for Plywood products

For the faces of plywood sheets, five face veneer qualities are possible including A, S, B, C and D. Structural plywood can be economically specified with appropriate face and back veneer qualities to suit the specific application. Where appearance is not important and the prime consideration is structural performance, D/D grade is most appropriate. For further information on plywood go to www.paa.asn.au.

Web Stiffeners

Web stiffeners are made from the same material as flanges and are required to control buckling in plywood webs. Web stiffeners must be located at a maximum of 600 mm spacings and must be located at or in addition to positions of high load concentration to counter localised web buckling (e.g. at the ends of beams and under roof beam point loads). They must also be positioned to support plywood web butt joints.

Nailing

Plywood webs are to be fastened to flanges and web stiffeners using:

- 2.87 mm minimum diameter flathead nails
- 32 mm long if ring shanked; 35 mm long it straight shanked
- Nails spaced 50 mm apart (maximum)
- Nailing at the edge of plywood sheets should been no closer than 5 nail diameters from the edge (e.g. 15 mm for 2.87mm diameter nails).
- To avoid splitting in flange and web stiffeners, nails should be staggered 6 mm about the centre line of the flange (or web stiffener) as shown in Figure 8.

Note: The requirements of AS1720 have been varied with respect to recommend the nail spacings. Nail spacings have been reduced and staggered along the flange as detailed above and in Figure 7.

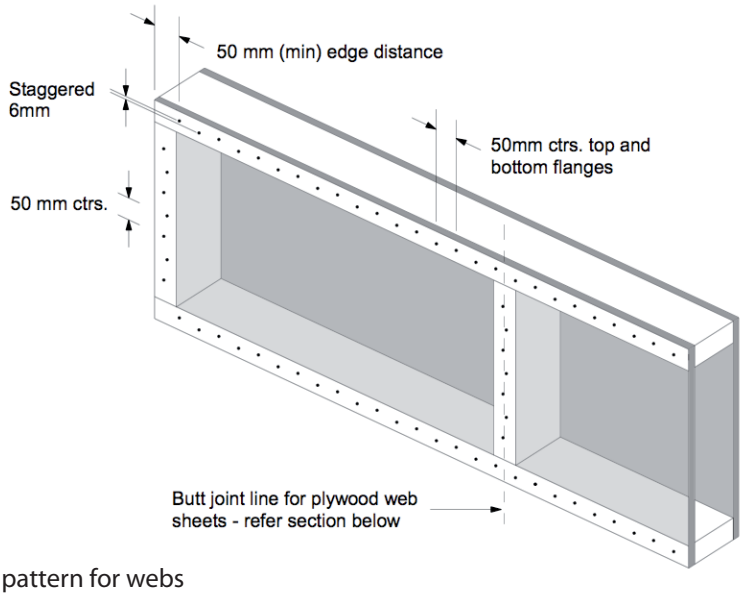


Figure 8: Staggered nailing pattern for webs

When specifying the type of nail to be used, the likelihood of corrosion should be considered. Hot dipped galvanised nail should be used in high humidity or mildly corrosive environments, or where treated plywood or timber is used. Stainless steel nails may be required in highly corrosive environments.

When fabricating flange and web stiffener framework, normal frame nailing techniques (in accordance with AS1684) may be used but care should be taken not to split the timber. Of note, this nailing is only required to assist fabrication of the framework as it is not structurally required once the plywood webs have been fixed i.e. using nailing requirements mentioned above.

Adhesive

Adhesive helps provide a stiffer beam but due to the difficulty in reliably achieving full adhesive bond onsite, the beams in the span tables are based on nail holding/shear capacity. Even so, it is strongly recommended that an appropriate construction adhesive be used as an additional measure. Run a continuous bead of adhesive between the structural timber and plywood.

Joints and Splices

Butt joints in plywood webs must be located on web stiffeners as shown in Figure 8. Joints must be alternated either side of the beam on alternative stiffeners. Here, webs must be nailed to stiffeners in the same manner as specified previously under "Nailing" but due to two sheets being joined over the same stiffener, care should be taken to angle nails towards the centre of the web stiffener to avoid splitting the edges of the stiffener.

Flange joints/splices should where practical be continuous length flanges which serves to avoid the need for splices. Where joints or splices are necessary, construct using timber splice plates as shown in Figure 9. Splices should be placed away from locations of high moment (e.g. away from the centre of simply supported beams) and where concentrated loads occur.

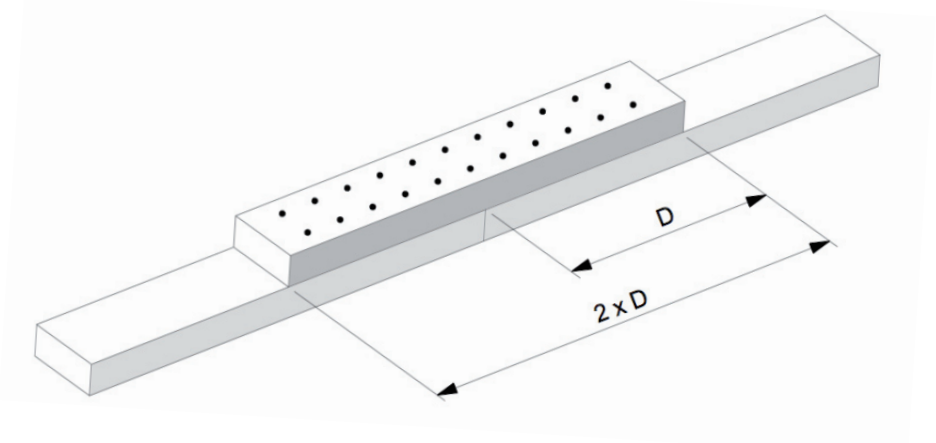


Figure 9: Timber splice plate

Installation //

Lintels

Box beam lintels may be fabricated as separate units and then installed into a timber stud frame, or, lintels can be fabricated and installed as an integral part of a timber stud frame. In the latter, relevant parts of the wall frame must be constructed using flange and web stiffener sizes and spacings, taken from the span tables. The area is then sheathed as required on both sides with structural plywood, again taken from the span tables.

Where lintel box beams are built into the wall they must not include the top plate of the wall into the beam. Lintels assumptions require top plates in addition to the beam capacity and they also provide a function of continuity in the wall framing.

Further construction requirements are shown in Figure 10 and Figure 11 below.

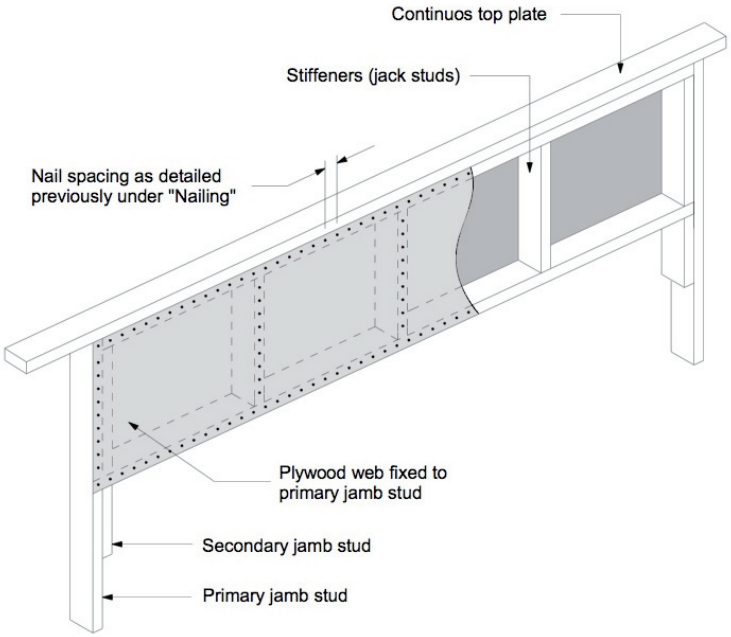


Figure 10: Beams fabricated as part of the wall frame

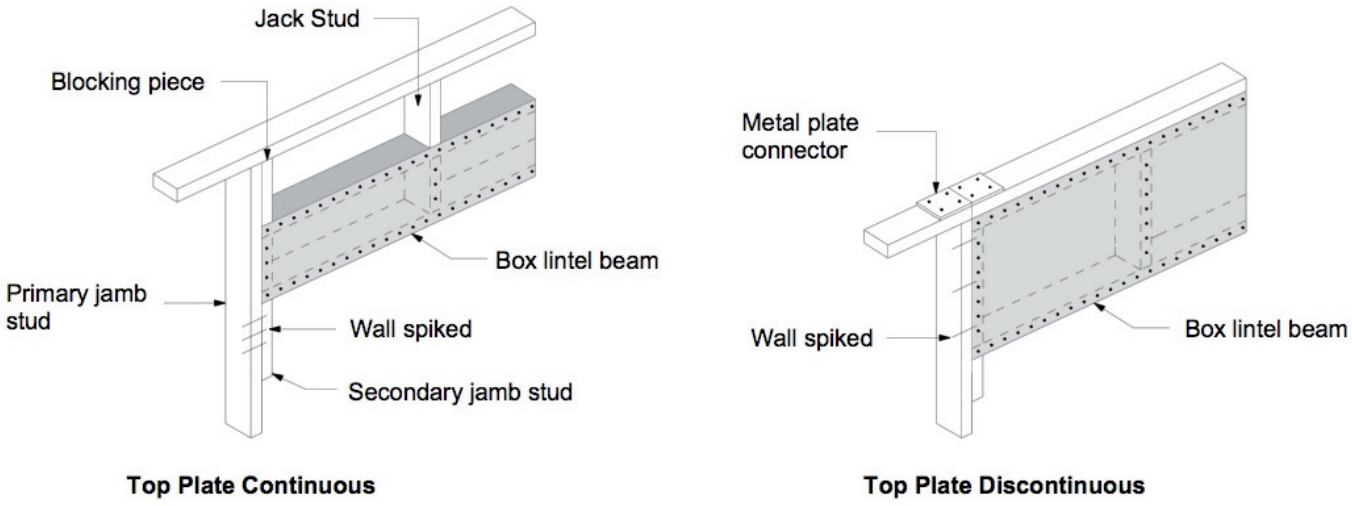
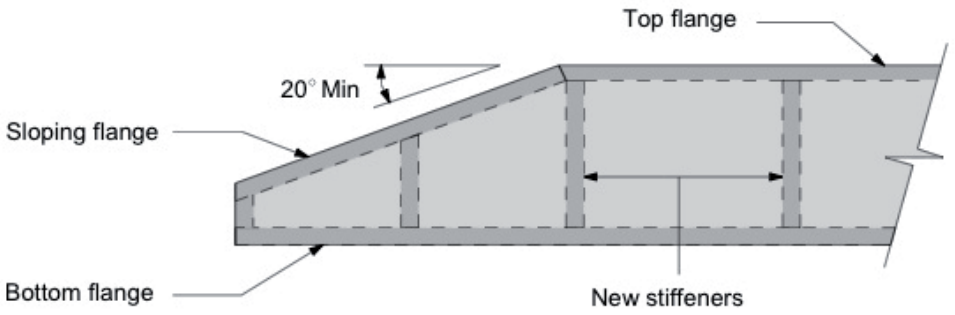


Figure 11: Beams fabricated separately

Strutting and combined strutting hanging beams

Installation requirements for plywood box beam, strutting and hanging beams are as detailed in AS1684. Figure 12 provides additional fabrication and installation details where box beams require tapered ends – as required for certain roof types.



2 Fit paired trimmer joists with 7mm F11 plywood plate on both sides and bolt assembled beam to rafter with two M12 bolts as shown

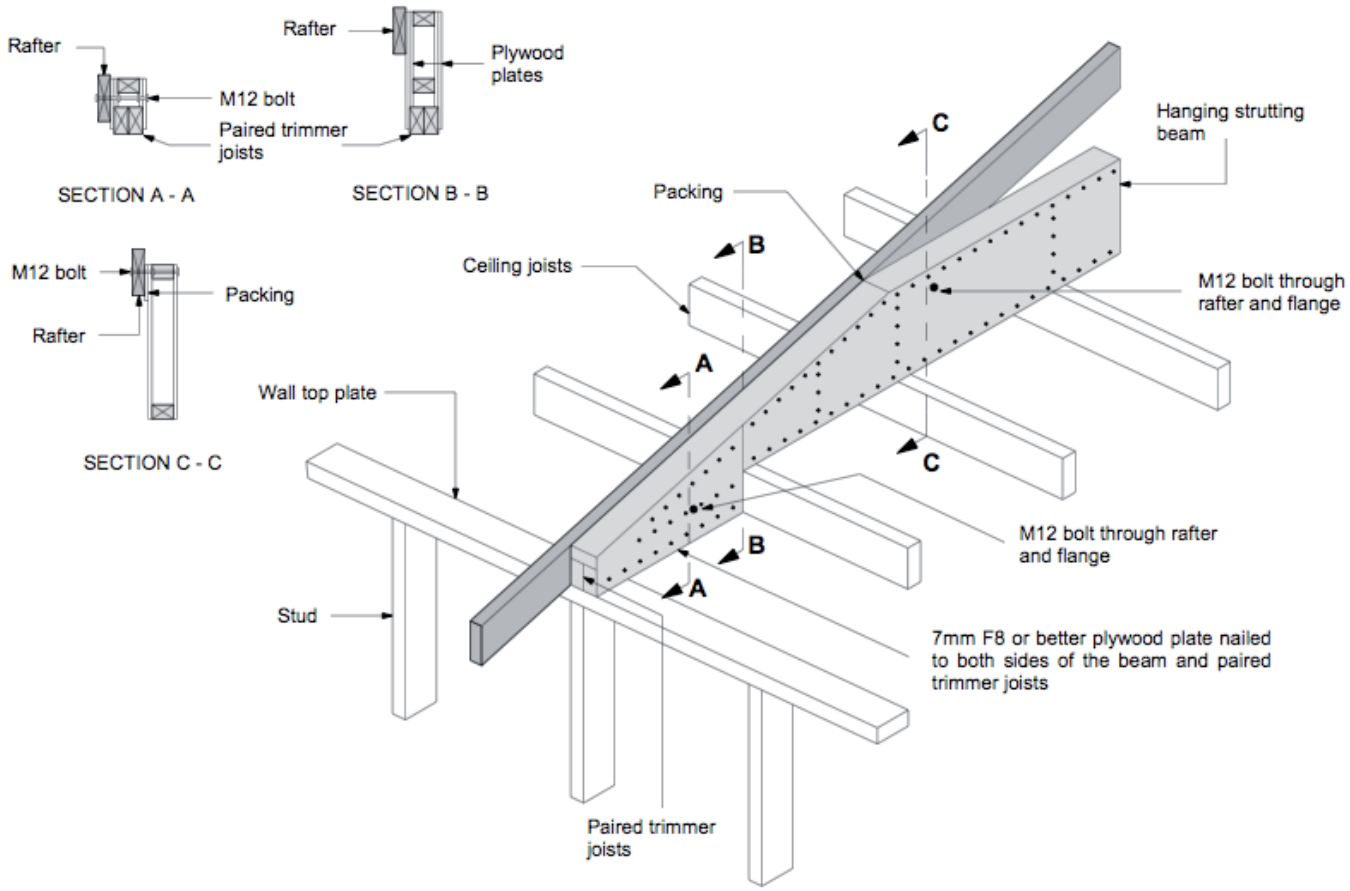


Figure 12: Treatment of tapered ends in strutting and hanging beams

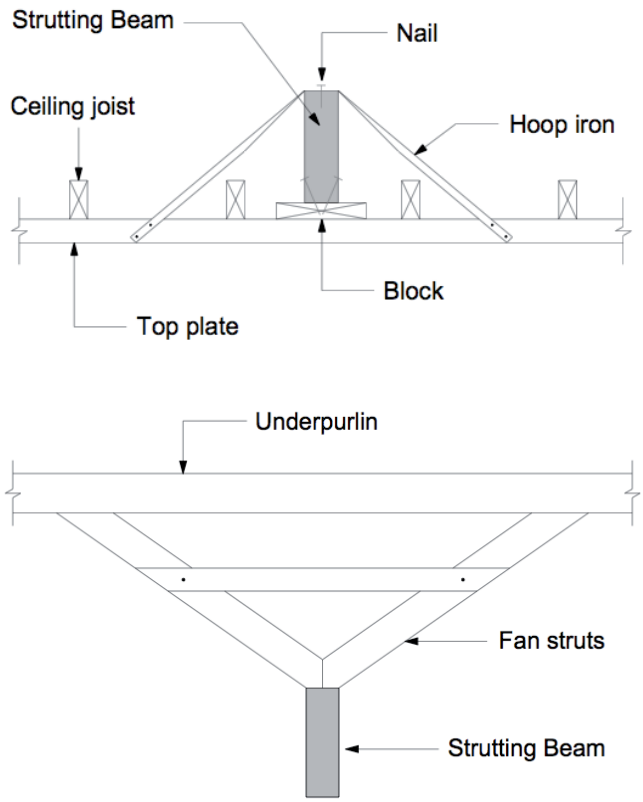


Figure 13: Possible end and intermediate restraint details

Referenced Documents

The following Australian and New Zealand standards have been applied:

- AS/NZS 2269: 2004 Plywood structural
- AS 4055: 2006 Wind loads for housing
- AS1720.1: 1997 Timber structure- Part 1 Design Method
- AS 1684: 2006 Residential timber framed construction
- AS/NZS 4357.0: 2005 Structural Laminated Veneer Lumber

Table 1 Ply Box Single Span Lintel Beam Single/Upper Storey										
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3										
Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Sheet Roof 600 mm Rafters Spacing									
		Roof Load Width									
		2700	3000	3300	3600	3900	4200	4500	4800	5100	5400
		Maximum Beam Span (mm)									
F5	400	4500	4300	4200	4100	4000	3900	3800	3700	3600	3500
F5	600	5800	5600	5500	5300	5200	5000	4900	4800	4600	4500
F5	800	6900	6700	6500	6300	6200	6000	5900	5700	5500	5400
F5	1200	8000	8000	8000	8000	7800	7600	7500	7300	7200	7000
MGP 10	400	4700	4500	4400	4200	4200	4100	4000	3800	3600	3600
MGP 10	600	6100	5900	5700	5600	5400	5300	5100	5000	4900	4800
MGP 10	800	7200	7000	6800	6600	6400	6300	6100	6000	5900	5800
MGP 10	1200	8000	8000	8000	8000	8000	7900	7800	7600	7500	7300
LVL 10	400	4700	4600	4400	4300	4200	4100	4000	3800	3600	3600
LVL 10	600	6200	6000	5800	5600	5500	5300	5200	5000	4900	4800
LVL 10	800	7300	7100	6800	6700	6500	6300	6200	6000	5900	5800
LVL 10	1200	8000	8000	8000	8000	8000	8000	7800	7700	7500	7400
MGP 12	400	4900	4700	4500	4300	4200	4200	4100	4000	3900	3800
MGP 12	600	6300	6100	5900	5700	5600	5400	5300	5100	5000	4900
MGP 12	800	7500	7200	7000	6800	6600	6500	6300	6200	6000	5900
MGP 12	1200	8000	8000	8000	8000	8000	8000	8000	7800	7700	7500
F17	400	4900	4700	4500	4400	4200	4200	4100	4000	3900	3800
F17	600	6400	6200	6000	5800	5600	5500	5300	5200	5100	4900
F17	800	7500	7300	7100	6900	6700	6500	6400	6200	6100	6000
F17	1200	8000	8000	8000	8000	8000	8000	8000	7900	7700	7600

Notes

i) Maximum Lintel Spans are based on the support of a maximum total sheet roof, framing and ceiling mass of 40 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B of AS1684.2.

ii) Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams.

iii) Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3 of AS1684.2.

iv) Minimum bearing length = 35 mm at end supports.

v) When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

vi) For Roof Load Width determination, refer to Figure 2.

Table 2 Ply Box Single Span Lintel Beam Single/Upper Storey											
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Sheet Roof 1200 mm Rafters Spacing									
		Roof Load Width									
		2700	3000	3300	3600	3900	4200	4500	4800	5100	5400
		Maximum Beam Span (mm)									
F5	400	4500	4400	4200	4100	4000	3800	3400	3300	3200	3000
F5	600	5700	5600	5400	5300	5000	4800	4400	4200	3900	3700
F5	800	6800	6600	6400	6200	6000	5600	5300	5100	4900	4700
F5	1200	8000	8000	8000	8000	7800	7400	6900	6500	6200	5900
MGP 10	400	4700	4600	4400	4200	3500	3400	3200	3100	2300	2300
MGP 10	600	6000	5800	5600	5500	5400	5100	4800	4600	4300	4100
MGP 10	800	7200	6900	6700	6500	6300	6000	5700	5400	5200	5000
MGP 10	1200	8000	8000	8000	8000	8000	7800	7400	7000	6600	6300
LVL 10	400	4800	4600	4400	4200	3500	3300	3200	3100	2300	2200
LVL 10	600	6200	6000	5800	5700	5500	5400	5300	5200	5100	4900
LVL 10	800	7500	7200	7000	6800	6600	6400	6200	6100	6000	5800
LVL 10	1200	8000	8000	8000	8000	8000	8000	8000	7800	7700	7500
MGP 12	400	4900	4700	4500	4400	4300	4200	4000	3700	3400	3300
MGP 12	600	6200	6000	5800	5600	5500	5400	5200	5100	5000	4900
MGP 12	800	7400	7200	6900	6700	6500	6400	6200	6100	5900	5800
MGP 12	1200	8000	8000	8000	8000	8000	8000	8000	7800	7600	7500
F17	400	4900	4700	4600	4400	4300	4200	4100	4000	3800	3700
F17	600	6300	6100	5900	5700	5500	5400	5300	5200	5100	5000
F17	800	7500	7300	7000	6800	6600	6400	6300	6100	6000	5900
F17	1200	8000	8000	8000	8000	8000	8000	8000	7900	7700	7500

Notes

i) Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams. Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3 of AS1684.2. Remember minimum bearing length = 35 mm at end supports. When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

ii) For Roof Load Width determination, refer to Figure 2.

Table 3 Ply Box Single Span Lintel Beam Single/Upper Storey											
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Tile Roof 600 mm Rafters Spacing									
		Roof Load Width									
		1800	2400	3000	3600	4200	4800	5400	6000	6600	7200
		Maximum Beam Span (mm)									
F5	400	3600	3400	3300	3100	3000	2800	2700	2500	2400	2400
F5	600	4400	4200	4200	4000	3900	3800	3700	3600	3500	3400
F5	800	5300	5100	4900	4700	4600	4500	4300	4200	4200	4100
F5	1200	6800	6600	6300	6200	6000	5800	5700	5600	5400	5300
MGP 10	400	3600	3600	3200	3000	3000	2700	2600	2400	2400	2400
MGP 10	600	4500	4400	4200	4200	4000	3900	3800	3600	3400	3200
MGP 10	800	5500	5300	5100	4900	4800	4600	4500	4300	4200	4200
MGP 10	1200	7000	6800	6600	6400	6200	6000	5900	5700	5600	5400
LVL 10	400	3600	3500	3200	3000	2900	2700	2500	2400	2400	2400
LVL 10	600	4600	4400	4200	4200	4000	3900	3700	3600	3400	3200
LVL 10	800	5600	5400	5100	4900	4800	4600	4500	4400	4300	4200
LVL 10	1200	7100	6800	6600	6400	6200	6000	5900	5700	5600	5500
MGP 12	400	3600	3600	3500	3300	3100	3000	2800	2600	2500	2400
MGP 12	600	4700	4500	4300	4200	4100	4000	3800	3700	3600	3600
MGP 12	800	5700	5400	5200	5000	4800	4700	4500	4400	4300	4200
MGP 12	1200	7200	6900	6700	6500	6300	6100	6000	5800	5700	5500
F17	400	3600	3600	3500	3300	3100	3000	2800	2600	2500	2400
F17	600	4700	4500	4300	4200	4100	4000	3900	3700	3600	3600
F17	800	5700	5500	5300	5100	4900	4700	4600	4400	4300	4200
F17	1200	7200	7000	6700	6500	6300	6100	6000	5800	5700	5600

Notes

i) Maximum Lintel Spans are based on the support of a maximum total tile roof, framing and ceiling mass of 90 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B of AS1684.2.

ii) Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams. Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3 of AS1684.2.

iii) Minimum bearing length = 35 mm at end supports.

iv) When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

v) For Roof Load Width determination, refer to Figure 2.

Table 4 Ply Box Single Span Lintel Beam Single/Upper Storey										
Flanges: 90 x45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3										
Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Tile Roof 1200 mm Rafters Spacing								
		Roof Load Width								
		2700	3000	3300	3600	3900	4200	4500	4800	5100	5400
		Maximum Beam Span (mm)								
F5	400	3100	2300	2200	2100	2000	1900	1900	1800	1800	1700
F5	600	4400	4300	4100	4000	3900	3700	3500	3300	3200	3000
F5	800	5300	5100	4900	4800	4600	4500	4400	4100	3900	3700
F5	1200	6700	6500	6200	6100	5900	5700	5600	5400	5100	5000
MGP 10	400	2300	2200	2100	2000	1900	1800	1800	1800	1600	1500
MGP 10	600	4600	4400	4300	4100	4000	3800	3700	3600	3400	3300
MGP 10	800	5500	5300	5100	4900	4800	4600	4500	4400	4200	4000
MGP 10	1200	7000	6700	6400	6200	6100	5900	5700	5600	5400	5200
LVL 10	400	2300	2200	2100	2000	1900	1800	1800	1700	1600	1500
LVL 10	600	4700	4500	4400	4200	4100	3900	3800	3700	3600	3500
LVL 10	800	5600	5400	5200	5100	4900	4700	4600	4500	4400	4200
LVL 10	1200	7200	6900	6600	6400	6200	6000	5900	5700	5600	5500
MGP 12	400	3400	3200	3000	2300	2200	2100	2000	1900	1900	1800
MGP 12	600	4700	4500	4300	4200	4100	3900	3800	3700	3600	3500
MGP 12	800	5600	5400	5200	5000	4900	4700	4600	4500	4400	4300
MGP 12	1200	7100	6800	6600	6400	6200	6000	5800	5700	5600	5400
F17	400	3500	3400	3200	3100	3000	2900	2300	2200	2100	2100
F17	600	4700	4500	4400	4200	4100	3900	3800	3700	3600	3500
F17	800	5600	5400	5200	5100	4900	4800	4600	4500	4400	4300
F17	1200	7200	6900	6600	6400	6200	6000	5900	5700	5600	5500

Notes

i) Maximum Lintel Spans are based on the support of a maximum total tile roof, framing and ceiling mass of 90 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B of AS1684.2.

ii) Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams.

iii) Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3 of AS1684.2.

iv) Minimum bearing length = 35 mm at end supports.

v) When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

vi) For Roof Load Width determination, refer to Figure 2.

Table 5 Ply Box Single Span Lintel Beam Single/Upper Storey + Conc Load											
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Sheet Roof 600 mm Rafters									
		Under Purlin or Hanging Beam									
		2400 mm					4200 mm				
		Strutting Beam Span (mm)									
		3600	4200	4800	5400	6000	3600	4200	4800	5400	6000
		Maximum Beam Span (mm)									
F5	400	4900	4700	4500	4400	4100	4500	4000	3300	2900	2400
F5	600	6300	6100	5900	5700	5600	6000	5700	5500	5100	4800
F5	800	7600	7300	7100	6900	6700	7200	6900	6700	6500	6200
F5	1200	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
MGP 10	400	5200	5000	4700	4200	3600	4200	3600	3000	2400	2200
MGP 10	600	6700	6500	6300	6100	5900	6300	6100	5900	5700	5300
MGP 10	800	8000	7700	7500	7300	7100	7600	7300	7100	6900	6600
MGP 10	1200	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
LVL 10	400	5300	5000	4500	4100	3600	4200	3500	3000	2400	2200
LVL 10	600	6800	6600	6300	6100	6000	6400	6200	5900	5700	6000
LVL 10	800	8000	7800	7600	7400	7200	7700	7400	7200	6900	6700
LVL 10	1200	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
MGP 12	400	5400	5200	5000	4800	4600	5000	4800	4100	3500	3000
MGP 12	600	7000	6700	6500	6300	6100	6600	6300	6100	5900	5700
MGP 12	800	8000	8000	7800	7600	7300	7900	7600	7300	7100	6900
MGP 12	1200	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
F17	400	5400	5300	5100	4900	4700	5100	4800	4600	4400	4000
F17	600	7100	6800	6600	6400	6200	6700	6400	6200	6000	5800
F17	800	8000	8000	7900	7600	7400	8000	7700	7400	7200	7000
F17	1200	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000

Notes

i) Maximum Lintel Spans are based on the support of a maximum total sheet roof and ceiling framing mass of 40 kg/m^2 and tile roof, framing and ceiling mass of 90 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B, AS1684.
Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams.

ii) Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3.

iii) Minimum bearing length = 35 mm at end supports. Subscript values indicate the minimum additional bearing length where required at end supports and internal supports.

iv) When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

v) For Roof Load Width determination, refer to Figure 2.

Table 6 Ply Box Single Span Lintel Beam Single/Upper Storey + Conc Load

Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3

Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Sheet Roof 1200 mm Rafters									
		Under Purlin or Hanging Beam									
		2400 mm					4200 mm				
		Strutting Beam Span (mm)									
		3600	4200	4800	5400	6000	3600	4200	4800	5400	6000
		Maximum Beam Span (mm)									
F5	400	3800	3700	3500	3400	3300	3700	3300	2800	2300	2000
F5	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
F5	800	5000	4800	4700	4600	4400	5000	4800	4600	4500	4400
F5	1200	5700	5600	5500	5400	5300	5800	5700	5600	5400	5300
MGP 10	400	3800	3700	3600	3300	3000	3500	2900	2300	2000	1800
MGP 10	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
MGP 10	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
MGP 10	1200	5700	5600	5600	5400	5300	5800	5700	5600	5400	5300
LVL 10	400	3900	3700	3600	3300	3000	3500	2900	2300	2000	1800
LVL 10	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
LVL 10	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
LVL 10	1200	5700	5600	5600	5400	5300	5800	5700	5600	5400	5300
MGP 12	400	3900	3700	3600	3500	3400	3800	3600	3400	2900	2400
MGP 12	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
MGP 12	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
MGP 12	1200	5700	5600	5600	5500	5300	5800	5700	5600	5400	5300
F17	400	3900	3700	3600	3500	3400	3800	3600	3500	3300	3200
F17	600	4500	4400	4200	4200	4100	4500	4300	4200	4200	4000
F17	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
F17	1200	5700	5600	5600	5500	5300	5800	5700	5600	5400	5300

Notes

i) Maximum Lintel Spans are based on the support of a maximum total sheet roof and ceiling framing mass of 40 kg/m^2 and tile roof, framing and ceiling mass of 90 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B, AS1684.

ii) Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams.

iii) Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3.

iv) Minimum bearing length = 35 mm at end supports. Subscript values indicate the minimum additional bearing length where required at end supports and internal supports.

v) When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

vi) For Roof Load Width determination, refer to Figure 2

Table 7 Ply Box Single Span Lintel Beam Single/Upper Storey + Conc Load

Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3

Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Tiled Roof 600 mm Rafters									
		Maximum Under Purlin or Hanging Beam Span (mm)									
		2400 mm					4200 mm				
		Strutting Beam Span (mm)									
		3600	4200	4800	5400	6000	3600	4200	4800	5400	6000
		Maximum Beam Span (mm)									
F5	400	3600	3000	2500	2400	2000	2300	1800	1700	NA	NA
F5	600	4900	4600	4500	4000	3800	4400	4000	3700	3100	2700
F5	800	5800	5600	5400	5300	5100	5400	5200	4900	4500	4300
F5	1200	7500	7300	7000	6800	6600	7100	6800	6600	6300	6100
MGP 10	400	3100	2700	2400	2100	1800	1900	1800	1500	NA	NA
MGP 10	600	5100	4900	4700	4300	3800	4700	3800	3200	2700	2300
MGP 10	800	6100	5900	5700	5500	5400	5700	5400	5300	5000	4700
MGP 10	1200	7900	7600	7300	7100	6900	7400	7100	6800	6600	6400
LVL 10	400	3000	2600	2400	2000	1800	1900	1800	1500	NA	NA
LVL 10	600	5200	4900	4700	4300	3800	4600	3700	3100	2600	2200
LVL 10	800	6200	5900	5700	5500	5400	5800	5500	5300	5100	4800
LVL 10	1200	7900	7600	7400	7100	6900	7500	7200	6900	6600	6400
MGP 12	400	3600	3600	3000	2600	2400	2500	2200	1800	1700	1500
MGP 12	600	5300	5100	4800	4600	4100	4800	4600	4000	3600	3000
MGP 12	800	6300	6100	5800	5600	5400	5900	5600	5400	5200	4900
MGP 12	1200	8000	7800	7500	7300	7100	7700	7300	7000	6800	6500
F17	400	3700	3600	3600	3600	3000	3600	3000	2400	2100	1800
F17	600	5400	5100	4900	4700	4100	4900	4600	4000	3800	3600
F17	800	6400	6100	5900	5700	5500	6000	5700	5400	5200	5000
F17	1200	8000	7900	7600	7300	7100	7700	7400	7100	6800	6600

Notes

i) For guidance on roof and ceiling mass refer to Appendix B, AS1684.

ii) Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams.

iii) Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3.

iv) When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

v) For Roof Load Width determination, refer to Figure 2

Table 8 Ply Box Single Span Lintel Beam Single/Upper Storey + Conc Load											
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Tiled Roof 1200 mm Rafters Spacing									
		Maximum Under Purlin or Hanging Beam Span (mm)									
		2400 mm					4200 mm				
		Struting Beam Span (mm)									
		3600	4200	4800	5400	6000	3600	4200	4800	5400	6000
		Maximum Beam Span (mm)									
F5	400	2800	2300	2000	1800	1600	1800	1500	NA	NA	NA
F5	600	4500	4300	4200	4200	4000	4400	4000	3700	3400	3200
F5	800	5000	4800	4700	4600	4400	5000	4800	4600	4500	4200
F5	1200	5700	5600	5500	5400	5300	5800	5700	5600	5400	5300
MGP 10	400	2400	2100	1900	1600	1400	1600	NA	NA	NA	NA
MGP 10	600	4500	4300	4200	4200	4100	4400	4200	3600	3100	2700
MGP 10	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
MGP 10	1200	5700	5600	5600	5400	5300	5800	5700	5600	5400	5300
LVL 10	400	2400	2000	1800	1600	1400	1600	NA	NA	NA	NA
LVL 10	600	4500	4300	4200	4200	4000	4400	4100	3500	3100	2700
LVL 10	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
LVL 10	1200	5700	5600	5600	5400	5300	5800	5700	5600	5400	5300
MGP 12	400	3300	2800	2300	2100	1900	2100	1800	1500	NA	NA
MGP 12	600	4500	4300	4200	4200	4100	4400	4300	4200	4000	3900
MGP 12	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
MGP 12	1200	5700	5600	5600	5500	5300	5800	5700	5600	5400	5300
F17	400	3900	3700	3300	2900	2400	3000	2400	2000	1800	1500
F17	600	4500	4400	4200	4200	4100	4500	4300	4200	4200	3900
F17	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
F17	1200	5700	5600	5600	5500	5300	5800	5700	5600	5400	5300

Notes

i) For guidance on roof and ceiling mass refer to Appendix B, AS1684.

ii) Lintels to internal wall openings supporting ceiling joist only shall be sized as hanging beams.

iii) Lintels in gable or skillion end walls not supporting roof loads shall be determined as per Clause 6.3.6.3.

iv) When lintels are used to their maximum design limits, deflections of up to 10 mm (deadload) or 15 mm (live load) may be expected.

v) For Roof Load Width determination, refer to Figure 2.

vi) NA - Not applicable

Table 9 Ply Box Single Span Strutting Beam											
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Roof Load Area (m^2)									
		2.5	5	7.5	10	12.5	15	17.5	20	22.5	25
		Maximum Beam Span (mm)									
		Sheet Roofs									
F5	400	5100	2500	1700	NA	NA	NA	NA	NA	NA	NA
F5	600	8000	4300	2900	2100	1700	NA	NA	NA	NA	NA
F5	800	8000	6300	4200	3100	2500	2100	1800	1600	NA	NA
F5	1200	8000	8000	7300	5500	4400	3700	3100	2700	2400	2200
MGP 10	400	4800	2400	1600	NA	NA	NA	NA	NA	NA	NA
MGP 10	600	7900	4000	2600	2000	1600	NA	NA	NA	NA	NA
MGP 10	800	8000	5700	3800	2800	2300	1900	1600	NA	NA	NA
MGP 10	1200	8000	8000	6400	4800	3900	3200	2700	2400	2100	1900
LVL 10	400	4700	2400	1600	NA	NA	NA	NA	NA	NA	NA
LVL 10	600	7800	3900	2600	1900	1500	NA	NA	NA	NA	NA
LVL 10	800	8000	5600	3700	2800	2200	1800	1600	NA	NA	NA
LVL 10	1200	8000	8000	6300	4700	3800	3100	2700	2300	2100	1900
MGP 12	400	5600	2800	1900	NA	NA	NA	NA	NA	NA	NA
MGP 12	600	8000	4600	3100	2300	1800	1500	NA	NA	NA	NA
MGP 12	800	8000	6600	4400	3300	2600	2200	1900	1600	NA	NA
MGP 12	1200	8000	8000	7300	5500	4400	3600	3100	2700	2400	2200
F17	400	6700	3400	2200	1700	NA	NA	NA	NA	NA	NA
F17	600	8000	5500	3700	2700	2200	1800	1500	NA	NA	NA
F17	800	8000	7800	5200	3900	3100	2600	2200	1900	1700	NA
F17	1200	8000	8000	8000	6500	5200	4300	3700	3200	2900	2600

Notes

i) Maximum spans are based on the support of roof mass only up to a maximum sheet roof mass of 20 kg/m^2 and tiled roof mass of 60 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B, AS1684.2. The mass of rafters and underpurlins is accommodated in the span calculations.

ii) Where the depth to breadth ratio exceeds 3:1 G.I. strapping or similar restraint to the top edge of the beam is to be provided at the strutting points and at beam ends. Refer to Clause 7.2.26 of AS1684.2.

iii) Beam ends can not be chamfered.

iv) A minimum initial clearance of 25 mm shall be provided at mid-span between the underside of the strutting beam and the tops of ceiling joist, ceiling lining or ceiling battens as appropriate.

v) Minimum bearing length = 70 mm at end supports.

vi) For design parameters refer to Figure 3.

vii) NA - Not applicable

Table 10 Ply Box Single Span Strutting Beam											
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Roof Load Area (m^2)									
		2.5	5	7.5	10	12.5	15	17.5	20	22.5	25
		Maximum Beam Span (mm)									
		Tiled Roofs									
F5	400	3800	1900	NA	NA	NA	NA	NA	NA	NA	NA
F5	600	6400	3200	2100	1600	NA	NA	NA	NA	NA	NA
F5	800	8000	4700	3100	2300	1800	1500	NA	NA	NA	NA
F5	1200	8000	8000	5400	4100	3200	2700	2300	2000	1800	NA
MGP 10	400	3500	1800	NA	NA	NA	NA	NA	NA	NA	NA
MGP 10	600	5800	2900	1900	NA	NA	NA	NA	NA	NA	NA
MGP 10	800	8000	4200	2800	2100	1700	NA	NA	NA	NA	NA
MGP 10	1200	8000	7100	4800	3600	2800	2400	2000	1800	1600	1400
LVL 10	400	3500	1700	NA	NA	NA	NA	NA	NA	NA	NA
LVL 10	600	5800	2900	1900	NA	NA	NA	NA	NA	NA	NA
LVL 10	800	8000	4100	2800	2100	1600	NA	NA	NA	NA	NA
LVL 10	1200	8000	7000	4700	3500	2800	2300	2000	1700	1500	NA
MGP 12	400	4200	2100	NA	NA	NA	NA	NA	NA	NA	NA
MGP 12	600	6800	3400	2300	1700	NA	NA	NA	NA	NA	NA
MGP 12	800	8000	4900	3200	2400	1900	1600	NA	NA	NA	NA
MGP 12	1200	8000	8000	5400	4000	3200	2700	2300	2000	1800	1600
F17	400	5000	2500	1600	NA	NA	NA	NA	NA	NA	NA
F17	600	8000	4100	2700	2000	1600	NA	NA	NA	NA	NA
F17	800	8000	5800	3800	2900	2300	1900	1600	NA	NA	NA
F17	1200	8000	8000	6400	4800	3800	3200	2700	2400	2100	1900

Notes

i) Maximum spans are based on the support of roof mass only up to a maximum sheet roof mass of 20 kg/m^2 and tiled roof mass of 60 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B, AS1684.2. The mass of rafters and underpurlins is accommodated in the span calculations.

ii) Where the depth to breadth ratio exceeds 3:1 G.I. strapping or similar restraint to the top edge of the beam is to be provided at the strutting points and at beam ends. Refer to Clause 7.2.26 of AS1684.2.

iii) Beam ends can not be chamfered.

iv) A minimum initial clearance of 25 mm shall be provided at mid-span between the underside of the strutting beam and the tops of ceiling joist, ceiling lining or ceiling battens as appropriate.

v) Minimum bearing length = 70 mm at end supports.

vi) For design parameters refer to Figure 3.

vii) NA - Not applicable

Table 11 Ply Box Single Span Strutting/Hanging Beam Perpendicular to Rafters - Sheet Roof										
Chord Stress Grade	Box Beam Depth (mm)	Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Class: N1, N2 & N3								
		Roof Load Width (mm)								
		1200	1800	2400	3000	3600	4200	4800	5400	6000
		Maximum Beam Span (mm)								
F5	400	5100	4100	3600	3200	2900	2600	2200	1900	1700
F5	600	6700	5400	4700	4200	3800	3500	3300	3100	2900
F5	800	8000	6500	5600	5000	4600	4200	4000	3700	3500
F5	1200	8000	8000	7300	6600	6000	5500	5200	4900	4600
MGP 10	400	5500	4500	3900	3400	2800	2300	2000	1800	1600
MGP 10	600	7200	5800	5000	4500	4100	3800	3600	3200	2800
MGP 10	800	8000	7000	6000	5400	4900	4600	4300	4000	3800
MGP 10	1200	8000	8000	7800	7000	6300	5900	5500	5200	4900
LVL 10	400	7500	5600	4200	3300	2700	2300	2000	1700	1500
LVL 10	600	8000	8000	7400	5900	4900	4100	3600	3100	2800
LVL 10	800	8000	8000	8000	8000	7000	5900	5100	4500	4000
LVL 10	1200	8000	8000	8000	8000	8000	8000	8000	7500	6700
MGP 12	400	7100	5800	5000	4200	3400	2900	2500	2200	1900
MGP 12	600	8000	7500	6500	5800	5300	4900	4200	3700	3300
MGP 12	800	8000	8000	7700	6900	6300	5800	5500	5100	4700
MGP 12	1200	8000	8000	8000	8000	8000	7500	7000	6600	6200
F17	400	7800	6900	6000	4800	4000	3400	3000	2700	2400
F17	600	8000	8000	8000	6700	5600	4800	4200	3700	3400
F17	800	8000	8000	8000	8000	7200	6100	5400	4800	4300
F17	1200	8000	8000	8000	8000	8000	8000	7700	6800	6100

Notes

i) Maximum spans are based on the support of a maximum sheet roof mass of 20 kg/m^2 plus a ceiling mass of 12 kg/m^2 (including ceiling joists) and a maximum tile roof mass of 60 kg/m^2 plus a ceiling mass of 12 kg/m^2. For guidance on roof and ceiling mass refer to Appendix B, AS1684.2. The mass of rafters, underpurlins and ceiling joists etc. is accommodated in the span calculations.

ii) Where the depth to breadth ratio exceeds 3:1, G.I. strapping or similar restraint is to be provided to the top edge of the beam at beam ends. Refer to AS1684.2 Clause 7.2.26.

iii) Where hanging beam spans are not the same each side of the strutting/counter beam, the average of the spans may be used.

iv) Minimum bearing length = 70 mm at end supports. Subscript values indicate the minimum additional bearing length where required at end supports and internal supports.

v) For design parameters refer to Figure 3.

vi) RLW = Max of Roof Span/2 or Ceiling Joist Span/2 which ever is the greatest.

Table 12 Ply Box Single Span Strutting/Hanging Beam Perpendicular to Rafters - Tiled Roof										
Chord Stress Grade	Box Beam Depth (mm)	Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Class: N1, N2 & N3								
		Roof Load Width (mm)								
		1200	1800	2400	3000	3600	4200	4800	5400	6000
		Maximum Beam Span (mm)								
F5	400	4100	3400	2800	2200	1800	1500	NA	NA	NA
F5	600	5400	4500	3900	3400	3100	2900	2600	2200	2000
F5	800	6500	5400	4600	4100	3800	3500	3200	3000	2700
F5	1200	8000	6900	6000	5400	4900	4500	4200	4000	3700
MGP 10	400	4500	3400	2500	2000	1600	1400	NA	NA	NA
MGP 10	600	5900	4800	4200	3700	3100	2700	2300	2000	1800
MGP 10	800	7000	5700	5000	4400	4000	3700	3400	3000	2700
MGP 10	1200	8000	7400	6400	5700	5200	4800	4500	4200	4000
LVL 10	400	5000	3300	2500	2000	1600	1400	NA	NA	NA
LVL 10	600	8000	6300	4700	3700	3100	2600	2300	2000	1800
LVL 10	800	8000	8000	6900	5500	4500	3900	3300	2900	2600
LVL 10	1200	8000	8000	8000	8000	7600	6400	5600	4900	4400
MGP 12	400	5900	4200	3100	2500	2100	1700	1500	NA	NA
MGP 12	600	7600	6200	5400	4500	3700	3200	2800	2400	2200
MGP 12	800	8000	7400	6400	5700	5200	4500	3900	3400	3100
MGP 12	1200	8000	8000	8000	7300	6600	6100	5700	5000	4500
F17	400	6700	5200	3900	3100	2600	2200	1900	1700	1500
F17	600	8000	7500	6100	4900	4000	3400	3000	2600	2300
F17	800	8000	8000	7500	6000	5000	4200	3700	3200	2900
F17	1200	8000	8000	8000	8000	6800	5800	5100	4500	4000

Notes

i) Maximum spans are based on the support of a maximum sheet roof mass of 20 kg/m^2 plus a ceiling mass of 12 kg/m^2 (including ceiling joists) and a maximum tile roof mass of 60 kg/m^2 plus a ceiling mass of 12 kg/m^2.

ii) For guidance on roof and ceiling mass refer to Appendix B, AS1684.2. The mass of rafters, underpurlins and ceiling joists etc. is accommodated in the span calculations.

iii) Where the depth to breadth ratio exceeds 3:1, G.I. strapping or similar restraint is to be provided to the top edge of the beam at beam ends. Refer to AS1684.2 Clause 7.2.26.

iv) Where hanging beam spans are not the same each side of the strutting/counter beam, the average of the spans may be used.

v) Minimum bearing length = 70 mm at end supports. Subscript values indicate the minimum additional bearing length where required at end supports and internal supports.

vi) For other design parameters refer to Figure 2 and 3.

vii) RLW = Max of Roof Span/2 or Ceiling Joist Span/2 which ever is the greatest.

viii) NA - Not applicable

Table 13 Ply Box Single Span Bearers Supporting Floor Load Only										
Chord Stress Grade	Box Beam Depth (mm)	Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Class: N1, N2 & N3								
		Floor Load Width (mm)								
		3000	3300	3600	3900	4200	4500	4800	5100	5400
		Maximum Beam Span (mm)								
F5	400	2900	2600	2200	NA	NA	NA	NA	NA	NA
F5	600	4400	4100	4000	3600	3400	3100	2900	2700	2500
F5	800	5200	5000	4800	4600	4400	4200	3900	3700	3500
F5	1200	6800	6500	6200	5900	5700	5500	5300	5000	4700
MGP 10	400	2700	2300	1800	NA	NA	NA	NA	NA	NA
MGP 10	600	4400	4000	3600	3300	3100	2900	2700	2500	2200
MGP 10	800	5600	5400	5100	4800	4400	4100	3800	3600	3400
MGP 10	1200	7200	6900	6600	6300	6000	5800	5600	5400	5300
LVL 10	400	2700	2300	1800	NA	NA	NA	NA	NA	NA
LVL 10	600	4400	4000	3600	3300	3000	2800	2600	2500	2100
LVL 10	800	5800	5600	5100	4700	4400	4000	3800	3500	3300
LVL 10	1200	7400	7100	6900	6700	6500	6300	6100	5900	5500
MGP 12	400	3200	2900	2600	2200	NA	NA	NA	NA	NA
MGP 12	600	4900	4700	4200	3900	3600	3300	3100	2900	2700
MGP 12	800	5900	5700	5500	5300	5100	4700	4400	4100	3900
MGP 12	1200	7500	7200	7000	6800	6600	6400	6200	6000	5600
F17	400	3700	3400	3100	2800	2600	2400	2000	NA	NA
F17	600	4900	4700	4600	4200	3900	3600	3300	3100	2900
F17	800	5900	5700	5500	5200	4800	4400	4100	3900	3600
F17	1200	7600	7300	7000	6800	6600	6100	5700	5300	5000

Notes

i) Maximum Bearer Spans are based on the support of a maximum flooring mass of 40 kg/m^2.
ii) Minimum bearing length = 50 mm at end supports.
iii) For design parameters refer to Figure 4.7.
iv) For Floor Load Width refer to Figure
v) NA - Not applicable

Table 10 Ply Box Single Span Floor Bearers - Floor load width 3600 mm									
Supporting single or upper storey loadbearing walls									
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3									
Chord Stress Grade	Box Beam Depth (mm)	Roof Load Width (mm)							
		3000	4200	5400	6600	3000	4200	5400	6600
		Maximum Beam Span (mm)							
		Sheet Roofs				Tiles Roof			
F5	400	NA	NA	NA	NA	NA	NA	NA	NA
F5	600	NA	NA	NA	NA	NA	NA	NA	NA
F5	800	2200	2100	2000	1900	1900	1700	NA	NA
F5	1200	3400	3200	3000	2900	2900	2600	2400	2200
MGP 10	400	NA	NA	NA	NA	NA	NA	NA	NA
MGP 10	600	1800	1700	NA	NA	NA	NA	NA	NA
MGP 10	800	2600	2500	2300	2200	2200	2000	1800	NA
MGP 10	1200	4000	3800	3600	3500	3400	3100	2800	2600
LVL 10	400	NA	NA	NA	NA	NA	NA	NA	NA
LVL 10	600	1800	1700	NA	NA	NA	NA	NA	NA
LVL 10	800	2600	2400	2300	2200	2200	2000	1800	NA
LVL 10	1200	4100	3800	3700	3500	3500	3100	2900	2600
MGP 12	400	NA	NA	NA	NA	NA	NA	NA	NA
MGP 12	600	2000	1900	1800	1700	1700	NA	NA	NA
MGP 12	800	2700	2600	2500	2300	2300	2100	1900	1800
MGP 12	1200	4100	3900	3700	3500	3500	3200	2900	2700
F17	400	NA	NA	NA	NA	NA	NA	NA	NA
F17	600	1700	NA	NA	NA	NA	NA	NA	NA
F17	800	2300	2200	2100	2000	2000	1800	NA	NA
F17	1200	3600	3400	3200	3100	3100	2800	2500	2300

Notes

i) Maximum Bearer Spans supporting roof loads are based on the support of a maximum total sheet roof, framing and ceiling mass of 40 kg/m^2, a maximum total tile roof, framing and ceiling mass of 90 kg/m^2 and a maximum floor mass of 40kg/m^2. For guidance on determination of roof mass refer to Appendix B AS1684.2

ii) Minimum bearing length = 50 mm at end supports.

iii) For design parameters refer to Figure 4.6 AS1684.2

iv) Bearers cannot support walls at right angles to bearer.

v) Table does not cover where bearers support roof point loads.

vi) NA - Not applicable

Table 15 Ply Box Single Span Floor Bearers - Floor load width 4200 mm									
Supporting single or upper storey loadbearing walls									
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3									
Chord Stress Grade	Box Beam Depth (mm)	Roof Load Width (mm)							
		3000	4200	5400	6600	3000	4200	5400	6600
		Maximum Beam Span (mm)							
		Sheet Roofs				Tiles Roof			
F5	400	NA	NA	NA	NA	NA	NA	NA	NA
F5	600	NA	NA	NA	NA	NA	NA	NA	NA
F5	800	1800	1700	1700	1600	1600	NA	NA	NA
F5	1200	2800	2700	2600	2500	2500	2200	2100	NA
MGP 10	400	NA	NA	NA	NA	NA	NA	NA	NA
MGP 10	600	NA	NA	NA	NA	NA	NA	NA	NA
MGP 10	800	2200	2100	2000	1900	1900	1800	NA	NA
MGP 10	1200	3400	3300	3100	3000	3000	2700	2500	2300
LVL 10	400	NA	NA	NA	NA	NA	NA	NA	NA
LVL 10	600	NA	NA	NA	NA	NA	NA	NA	NA
LVL 10	800	2200	2100	2000	1900	1900	1800	1600	NA
LVL 10	1200	3400	3300	3100	3000	3000	2700	2500	2300
MGP 12	400	NA	NA	NA	NA	NA	NA	NA	NA
MGP 12	600	NA	NA	NA	NA	NA	NA	NA	NA
MGP 12	800	2300	2200	2100	2000	2000	1800	1700	NA
MGP 12	1200	3500	3300	3200	3100	3000	2800	2600	2400
F17	400	NA	NA	NA	NA	NA	NA	NA	NA
F17	600	NA	NA	NA	NA	NA	NA	NA	NA
F17	800	1900	1900	1800	1700	1700	1500	1400	NA
F17	1200	3000	2900	2800	2700	2600	2400	2200	2100

Notes

i) Maximum Bearer Spans supporting roof loads are based on the support of a maximum total sheet roof, framing and ceiling mass of 40 kg/m2, a maximum total tile roof, framing and ceiling mass of 90 kg/m^2 and a maximum floor mass of 40kg/m^2. For guidance on determination of roof mass refer to Appendix B AS1684.2

ii) Minimum bearing length = 50 mm at end supports.

iii) For design parameters refer to Figure 4.6 AS1684.2

iv) Bearers cannot support walls at right angles to bearer.

v) Table does not cover where bearers support roof point loads.

vi) NA - Not applicable

Table 16 Ply Box Single Span Lintel Beam Single/Upper Storey + Conc Load

Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3

Chord Stress Grade	Box Beam Depth (mm)	Lintels Single/Upper Storey Sheet Roof 1200 mm Rafters									
		Under Purlin or Hanging Beam									
		2400 mm					4200 mm				
		Strutting Beam Span (mm)									
		3600	4200	4800	5400	6000	3600	4200	4800	5400	6000
		Maximum Beam Span (mm)									
F5	400	3800	3700	3500	3400	3300	3700	3300	2800	2300	2000
F5	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
F5	800	5000	4800	4700	4600	4400	5000	4800	4600	4500	4400
F5	1200	5700	5600	5500	5400	5300	5800	5700	5600	5400	5300
MGP 10	400	3800	3700	3600	3300	3000	3500	2900	2300	2000	1800
MGP 10	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
MGP 10	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
MGP 10	1200	5700	5600	5600	5400	5300	5800	5700	5600	5400	5300
LVL 10	400	3900	3700	3600	3300	3000	3500	2900	2300	2000	1800
LVL 10	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
LVL 10	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
LVL 10	1200	5700	5600	5600	5400	5300	5800	5700	5600	5400	5300
MGP 12	400	3900	3700	3600	3500	3400	3800	3600	3400	2900	2400
MGP 12	600	4500	4300	4200	4200	4100	4400	4300	4200	4100	4000
MGP 12	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
MGP 12	1200	5700	5600	5600	5500	5300	5800	5700	5600	5400	5300
F17	400	3900	3700	3600	3500	3400	3800	3600	3500	3300	3200
F17	600	4500	4400	4200	4200	4100	4500	4300	4200	4200	4000
F17	800	5000	4900	4700	4600	4500	5000	4800	4700	4500	4400
F17	1200	5700	5600	5600	5500	5300	5800	5700	5600	5400	5300

Notes

i) For design parameters refer to Figure 4.6 AS1684.2

ii) Bearers cannot support walls at right angles to bearer.

iii) Table does not cover where bearers support roof point loads.

iv) NA - Not applicable

Table 17 Ply Box Single Span Floor Bearers - Floor load width 5400 mm									
Supporting single or upper storey loadbearing walls									
Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3									
Chord Stress Grade	Box Beam Depth (mm)	Roof Load Width (mm)							
		3000	4200	5400	6600	3000	4200	5400	6600
		Maximum Beam Span (mm)							
		Sheet Roofs				Tiles Roof			
F5	400	NA	NA	NA	NA	NA	NA	NA	NA
F5	600	NA	NA	NA	NA	NA	NA	NA	NA
F5	800	NA	NA	NA	NA	NA	NA	NA	NA
F5	1200	2100	2000	NA	NA	NA	NA	NA	NA
MGP 10	400	NA	NA	NA	NA	NA	NA	NA	NA
MGP 10	600	NA	NA	NA	NA	NA	NA	NA	NA
MGP 10	800	NA	NA	NA	NA	NA	NA	NA	NA
MGP 10	1200	2500	2500	2400	2300	2300	2100	2000	NA
LVL 10	400	NA	NA	NA	NA	NA	NA	NA	NA
LVL 10	600	NA	NA	NA	NA	NA	NA	NA	NA
LVL 10	800	NA	NA	NA	NA	NA	NA	NA	NA
LVL 10	1200	2600	2500	2400	2300	2300	2100	2000	NA
MGP 12	400	NA	NA	NA	NA	NA	NA	NA	NA
MGP 12	600	NA	NA	NA	NA	NA	NA	NA	NA
MGP 12	800	NA	NA	NA	NA	NA	NA	NA	NA
MGP 12	1200	2600	2500	2400	2300	2300	2200	2000	NA
F17	400	NA	NA	NA	NA	NA	NA	NA	NA
F17	600	NA	NA	NA	NA	NA	NA	NA	NA
F17	800	NA	NA	NA	NA	NA	NA	NA	NA
F17	1200	2200	2200	2100	2000	2000	1900	NA	NA

Notes

i) Maximum Bearer Spans supporting roof loads are based on the support of a maximum total sheet roof, framing and ceiling mass of 40 kg/m^2, a maximum total tile roof, framing and ceiling mass of 90 kg/m^2 and a maximum floor mass of 40kg/m^2. For guidance on determination of roof mass refer to Appendix B AS1684.2

ii) Minimum bearing length = 50 mm at end supports.

iii) For design parameters refer to Figure 4.6 AS1684.2

iv) Bearers cannot support walls at right angles to bearer.

v) Table does not cover where bearers support roof point loads.

vi) NA - Not applicable

Table 18	Ply Box Single Span Counter Beam							
Chord Stress Grade	Box Beam Depth (mm)	Flanges: 90 x 45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3							
		Ceiling Load Width							
		2400	3000	3600	4200	4800	5400	6000	6600
		Maximum Beam Span (mm)							
F5	400	3800	3500	3200	2900	2700	2600	2400	2300
F5	600	5000	4500	4100	3800	3600	3300	3200	3000
F5	800	6100	5400	5000	4600	4300	4100	3800	3700
F5	1200	8000	7200	6600	6100	5700	5400	5100	4800
MGP 10	400	3600	3300	3100	2800	2600	2500	2400	2200
MGP 10	600	4800	4300	3900	3600	3400	3200	3000	2900
MGP 10	800	5800	5200	4700	4400	4100	3800	3600	3500
MGP 10	1200	7500	6700	6200	5700	5300	5000	4800	4500
LVL 10	400	3600	3300	3000	2800	2600	2500	2300	2200
LVL 10	600	4800	4300	3900	3600	3400	3200	3000	2900
LVL 10	800	5700	5100	4700	4300	4100	3800	3600	3500
LVL 10	1200	7500	6700	6100	5600	5300	5000	4700	4500
MGP 12	400	4100	3600	3300	3100	2900	2700	2600	2400
MGP 12	600	5200	4700	4200	3900	3700	3500	3300	3100
MGP 12	800	6200	5600	5100	4700	4400	4100	3900	3700
MGP 12	1200	8000	7200	6600	6100	5700	5300	5100	4800
F17	400	4400	4000	3600	3400	3100	3000	2800	2700
F17	600	5700	5100	4600	4300	4000	3800	3600	3400
F17	800	6800	6100	5500	5100	4800	4500	4300	4100
F17	1200	8000	7800	7100	6600	6200	5800	5500	5300

Notes

i) Maximum spans are based on the support of a maximum ceiling mass of 12 kg/m^2.

ii) Where hanging beam spans are not the same each side of the counter beam, the average of the spans may be used.

iii) Minimum bearing length = 70 mm at end supports.

iv) For design parameters refer to Figure 2.

Table 19 Ply Box Single Span Ridge and Intermediate Beam											
Flanges: 90 x45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Sheet Roof									
		Roof Load Width									
		2700	3000	3300	3600	3900	4200	4500	4800	5100	5400
		Maximum Beam Span (mm)									
F5	400	3000	2900	2600	2400	2200	2000	1800	1700	1600	1500
F5	600	4000	3900	3700	3600	3500	3400	3100	2900	2700	2500
F5	800	4900	4700	4500	4400	4200	4100	4000	3900	3700	3500
F5	1200	6300	6000	5800	5700	5500	5300	5200	5100	5000	4700
MGP 10	400	3000	2700	2400	2200	2000	1900	1700	1600	1500	1400
MGP 10	600	4200	4000	3800	3600	3300	3100	2900	2700	2500	2300
MGP 10	800	5000	4800	4700	4500	4300	4200	4100	3800	3600	3400
MGP 10	1200	6500	6200	6000	5800	5600	5500	5300	5200	5100	4900
LVL 10	400	3000	2700	2400	2200	2000	1800	1700	1600	1500	1400
LVL 10	600	4200	4000	3800	3600	3300	3000	2800	2600	2500	2300
LVL 10	800	5100	4900	4700	4500	4400	4200	4000	3800	3500	3300
LVL 10	1200	6500	6300	6000	5800	5700	5500	5400	5200	5100	5000
MGP 12	400	3100	3000	2800	2600	2400	2200	2000	1900	1800	1600
MGP 12	600	4200	4000	3900	3700	3600	3500	3300	3100	2900	2700
MGP 12	800	5100	4900	4700	4600	4400	4300	4100	4000	3900	3800
MGP 12	1200	6600	6400	6100	5900	5700	5600	5400	5300	5100	5000
F17	400	3100	3000	2800	2700	2600	2500	2400	2300	2100	2000
F17	600	4300	4100	3900	3700	3600	3500	3400	3300	3100	2900
F17	800	5200	5000	4800	4600	4400	4300	4200	4000	3900	3600
F17	1200	6700	6400	6200	6000	5800	5600	5400	5300	5200	5000
F17	1200	6700	6400	6200	6000	5800	5600	5400	5300	5200	5000

Notes

i) Maximum spans are based on the support of roof or roof plus ceiling mass for a cathedral roof. For guidance on roof and ceiling mass refer to Appendix B, AS1684.2.

ii) No birdsmouth or notching allowed.

iii) Minimum bearing length = 35 mm at end supports and 70 mm

Table 20 Ply Box Single Span Ridge and Intermediate Beam											
Flanges: 90 x45 mm, Ply webs: 7 mm F8, Wind Classification: N1, N2 & N3											
Chord Stress Grade	Box Beam Depth (mm)	Tiled Roof									
		Roof Load Width									
		2700	3000	3300	3600	3900	4200	4500	4800	5100	5400
		Maximum Beam Span (mm)									
F5	400	3000	2900	2600	2400	2200	2000	1800	1700	1600	1500
F5	600	4000	3900	3700	3600	3500	3400	3100	2900	2700	2500
F5	800	4900	4700	4500	4400	4200	4100	4000	3900	3700	3500
F5	1200	6300	6000	5800	5700	5500	5300	5200	5100	5000	4700
MGP 10	400	3000	2700	2400	2200	2000	1900	1700	1600	1500	1400
MGP 10	600	4200	4000	3800	3600	3300	3100	2900	2700	2500	2300
MGP 10	800	5000	4800	4700	4500	4300	4200	4100	3800	3600	3400
MGP 10	1200	6500	6200	6000	5800	5600	5500	5300	5200	5100	4900
LVL 10	400	3000	2700	2400	2200	2000	1800	1700	1600	1500	1400
LVL 10	600	4200	4000	3800	3600	3300	3000	2800	2600	2500	2300
LVL 10	800	5100	4900	4700	4500	4400	4200	4000	3800	3500	3300
LVL 10	1200	6500	6300	6000	5800	5700	5500	5400	5200	5100	5000
MGP 12	400	3100	3000	2800	2600	2400	2200	2000	1900	1800	1600
MGP 12	600	4200	4000	3900	3700	3600	3500	3300	3100	2900	2700
MGP 12	800	5100	4900	4700	4600	4400	4300	4100	4000	3900	3800
MGP 12	1200	6600	6400	6100	5900	5700	5600	5400	5300	5100	5000
F17	400	3100	3000	2800	2700	2600	2500	2400	2300	2100	2000
F17	600	4300	4100	3900	3700	3600	3500	3400	3300	3100	2900
F17	800	5200	5000	4800	4600	4400	4300	4200	4000	3900	3600
F17	1200	6700	6400	6200	6000	5800	5600	5400	5300	5200	5000

Notes

i) Maximum spans are based on the support of roof or roof plus ceiling mass for a cathedral roof. For guidance on roof and ceiling mass refer to Appendix B, AS1684.2.

ii) No birdsmouth or notching allowed.

iii) Minimum bearing length = 35 mm at end supports and 70 mm