

April 2008

**GANG-NAIL® GANGLAM
Manual**

**The GANGLAM SYSTEM is available only through GANG-NAIL
Fabricators throughout New Zealand**

Refer to the MiTek New Zealand website for up to date GANGLAM SYSTEM information and
a GANG-NAIL Fabricator listing

www.mitek.nz.co.nz

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Producer Statement PS1- Design

ISSUED BY: MiTek New Zealand Ltd
TO BE SUPPLIED TO: Building Consent Authorities in New Zealand
IN RESPECT OF: GANGLAM Design Manual, 04/2008
AT: Various Locations in New Zealand

MiTek New Zealand Ltd has provided engineering design services in respect of the requirements of Clause B1 of the NZ Building Code for

All Part only as specified – GANGLAM Members

of the proposed building work.

The selection charts within this design manual have been prepared in accordance with **Compliance Documents and Verification Method B1/VM1** of the NZ Building Code and in accordance with sound and widely accepted engineering principles.

On behalf of MiTek New Zealand Ltd, and subject to:

1. The verification of the design assumptions within this manual
2. All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that the use of GANGLAM Members in the proposed building, if constructed in accordance with the drawings, specifications and other documents provided, will comply with the relevant provisions of the Building Code.

MiTek New Zealand Ltd holds a current policy of Professional Indemnity Insurance of not less than \$500,000.

On behalf of MiTek New Zealand Ltd

Date: December 2008



.....
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Description

GANGLAM is a concept of building up large beam sections from smaller components by edge joining standard section sizes together with GANG-NAIL connector plates.

These shear plates are normally pressed onto one face with nominal stitch plates on the other face. In some cases, the plates can be totally concealed between the timber layers.

The GANGLAM system uses readily available materials and is quick to fabricate. This enables the product to be supplied with minimal delay and at minimal cost.

Each beam is custom made to measure, and can be cambered to suit any application. Extra deep or long multi-span beams can be detailed to requirements.

Testing

GANGLAM beams have been tested in the test laboratories of MiTek New Zealand Ltd and by the Forest Research Institute. Much of the evidence of performance has also been tested on site since its inception around 1981.

Sizes

Although GANGLAM beams may be constructed to any depth and width, the common sizes are as follows:

330 x 45	380 x 45	430 x 45
480 x 45	530 x 45	580 x 45

Wider beams are usually achieved by nailing 45mm layers side by side.

Sizes smaller than 2/330 x 45 can be 2/45mm wide solid timber components or 1/90mm wide solid timber component.

2/290 x 45 can be 2/290 x 45 GANGLAM or 2/290 x 45 solid timber or 290 x 90 solid timber.

Timber Specification

Normal: Minimum MSG8 mechanically stress graded or VSG8 visually graded.

Architectural: Select visually acceptable MSG or VSG Grade as above.

Treatment: Refer to NZS 3602.

Moisture Content: **All GANGLAM beams are made dry, 18% or less at time of fabrication.**

Size: Components are 45mm thick gauged timber.

Storage and Handling

Consideration for the storage and handling of GANGLAM beams are the same as for trusses in general. However particular care is required to ensure the beams stay dry by avoiding exposure to wet weather. Stacking is best done with fillets in between to allow air circulation. The beams are normally marked to identify the right way up and special load bearing points if any. **GANGLAM beams are not suitable for applications exposed to the weather.**

Strength

The tables have been designed to the limit state design provisions of NZS 3603 (Amendment 4), NZS 3604 and AS/NZS 1170. Some of the criteria are highlighted as follows (based on MSG8 timber):

Bending Strength	- fb	14.0 MPa (MSG8)
Duration of Load Factor	- k1	0.6 (Dead only) 0.8 (Floor Live Load) 1.0 (Wind, Seismic and Roof Live Load)
Modulus of Elasticity	- E - E _{lb}	8.0 GPa (GANGLAM) 5.4 GPa (Solid Sawn Timber)
Creep Factor	- k2	2.2 (GANGLAM) 2.0 (Solid Swan Timber)

Deflection

The tables have been designed in general compliance with AS/NZS 1170.0:2002 Serviceability Limit State.

Long-term Deflection	L/300 but not greater than 15mm
Short-term Deflection	L/400 but not greater than 12mm for liveliness control

Camber

GANGLAM beams should be cambered SPAN/300 but not exceeding 24mm at mid-span between supports. Jig with additional camber to achieve specified camber when released. Beams should be marked to indicate the right way up. No camber is required for cantilever beams.

Design Data

The tables herein have been designed according to the following loads:

Roof	LOAD	EXAMPLE	DISTRIBUTED	CONCENTRATED
	Dead Load	Light Weight Roof	0.25 kPa	
		Heavy Weight Roof	0.65 kPa	
		Ceiling	0.20 kPa	
	Live Load	Maintenance Load	0.25 kPa	1.1 kN

- Note: 1) 750mm overhang has been included in the derivation of the tables.
 2) Spans are horizontal measurements.
 3) For heavy roofs over 30 degree pitch, multiply the roof span by 1.17 before using the tables:

$$\text{Nominal Roof Span} = 1.17 \times \text{Actual Roof Span}$$

Floor	LOAD	EXAMPLE	DISTRIBUTED	CONCENTRATED
	Dead Load	Particle board floor (including ceiling)	0.5 kPa	
	Live Load	Domestic	1.5 kPa	1.8 kN
		Offices for general use	2.5 kPa	2.7 kN
		Assembly areas, fixed seating	3.0 kPa	2.7 kN

Wall Dead Load = 0.6 kN/m line load

Snow 0.5 kPa snow load has been allowed in the tables. For higher snow loads up to 1.0 kPa, multiply the actual roof span by the figure below before using the tables:

$$\text{Light Roof: Nominal Roof Span} = 1.53 \times \text{Actual Roof Span}$$

$$\text{Heavy Roof: Nominal Roof Span} = 1.37 \times \text{Actual Roof Span}$$

Wind Design covers Very High Wind Zones as in NZS 3604:1999 unless stated otherwise.

Multi-Span Beams

Beam spans selected from the tables may be increased by 10% in multi-span situations. The length of the shorter span must not be less than half the longer span.

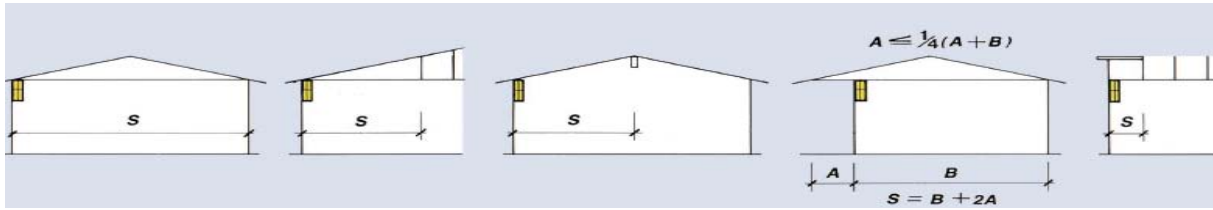


TABLE 1:
LINTEL SUPPORTING ROOF AND CEILING ONLY

		LINTEL SIZE	MAXIMUM LINTEL SPAN (m)										
			SUPPORTED ROOF SPAN 'S' (m)										
			5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
LIGHT ROOF	SOLID TIMBER	2/90 x 45	1.38	1.32	1.27	1.22	1.18	1.14	1.11	1.06	1.03	0.99	0.96
		2/115 x 45	1.85	1.76	1.69	1.63	1.57	1.53	1.47	1.42	1.37	1.32	1.28
		2/140 x 45	2.15	2.05	1.97	1.90	1.84	1.78	1.72	1.65	1.60	1.54	1.50
		2/190 x 45	2.92	2.79	2.67	2.58	2.49	2.42	2.33	2.25	2.17	2.10	2.03
		2/240 x 45	3.51	3.39	3.29	3.20	3.12	3.05	2.95	2.84	2.74	2.65	2.57
		2/290 x 45	3.94	3.81	3.69	3.59	3.50	3.42	3.35	3.29	3.19	3.09	2.99
	GANGLAM	2/330 x 45	4.76	4.60	4.45	4.33	4.22	4.13	4.04	3.97	3.90	3.83	3.77
		2/380 x 45	5.29	5.11	4.95	4.82	4.70	4.59	4.50	4.41	4.33	4.26	4.19
		2/430 x 45	5.81	5.60	5.43	5.28	5.15	5.04	4.93	4.84	4.75	4.67	4.60
		2/480 x 45	6.31	6.09	5.90	5.74	5.60	5.47	5.36	5.26	5.16	5.08	5.00
		2/530 x 45	6.80	6.56	6.35	6.18	6.03	5.89	5.77	5.66	5.56	5.47	5.38
		2/580 x 45	7.27	7.02	6.80	6.61	6.45	6.30	6.17	6.06	5.95	5.78	5.60
HEAVY ROOF	SOLID TIMBER	2/90 x 45	1.12	1.07	1.02	0.99	0.95	0.93	0.90	0.88	0.86	0.83	0.81
		2/115 x 45	1.49	1.42	1.37	1.32	1.27	1.23	1.20	1.17	1.14	1.11	1.08
		2/140 x 45	1.74	1.66	1.59	1.54	1.48	1.44	1.40	1.37	1.33	1.30	1.26
		2/190 x 45	2.36	2.25	2.16	2.08	2.01	1.95	1.90	1.85	1.81	1.76	1.70
		2/240 x 45	2.99	2.85	2.73	2.63	2.55	2.47	2.40	2.34	2.29	2.22	2.15
		2/290 x 45	3.36	3.25	3.15	3.06	2.97	2.88	2.80	2.73	2.67	2.59	2.51
	GANGLAM	2/330 x 45	4.06	3.92	3.80	3.70	3.60	3.52	3.45	3.38	3.32	3.27	3.19
		2/380 x 45	4.52	4.36	4.22	4.11	4.01	3.92	3.84	3.76	3.70	3.63	3.58
		2/430 x 45	4.96	4.78	4.63	4.51	4.40	4.30	4.21	4.13	4.05	3.99	3.93
		2/480 x 45	5.38	5.19	5.03	4.89	4.77	4.67	4.57	4.48	4.40	4.33	4.26
		2/530 x 45	5.80	5.59	5.42	5.27	5.14	5.03	4.92	4.83	4.74	4.66	4.59
		2/580 x 45	6.20	5.98	5.80	5.64	5.50	5.38	5.27	5.17	5.07	4.99	4.91

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

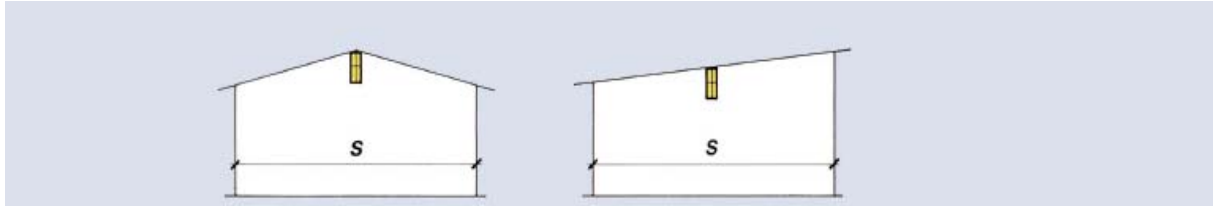


TABLE 2:
RIDGE BEAM SUPPORTING ROOF AND SARKING OR CEILING (RAFTERS @ 1200mm MAX CRS)

		LINTEL SIZE	MAXIMUM LINTEL SPAN (m)										
			SUPPORTED ROOF SPAN 'S' (m)										
			5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
LIGHT ROOF	SOLID TIMBER	2/190 x 45	3.19	3.00	2.85	2.73	2.62	2.53	2.45	2.38	2.29	2.21	2.13
		2/240 x 45	4.03	3.79	3.60	3.44	3.31	3.20	3.10	3.01	2.89	2.79	2.69
		2/290 x 45	4.66	4.42	4.20	4.02	3.86	3.73	3.61	3.51	3.37	3.25	3.14
	GANGLAM	2/330 x 45	5.63	5.38	5.17	5.00	4.86	4.73	4.61	4.42	4.24	4.09	3.95
		2/380 x 45	6.26	5.98	5.75	5.56	5.40	5.26	5.14	5.03	4.89	4.71	4.55
		2/430 x 45	6.86	6.56	6.31	6.10	5.93	5.77	5.64	5.52	5.41	5.31	5.15
		2/480 x 45	7.45	7.12	6.85	6.63	6.44	6.27	6.12	5.99	5.87	5.76	5.66
GANGLAM	2/530 x 45	8.03	7.67	7.38	7.14	6.93	6.75	6.59	6.45	6.32	6.21	6.10	
	2/580 x 45	8.59	8.21	7.90	7.64	7.42	7.22	7.05	6.90	6.77	6.64	6.53	
HEAVY ROOF	SOLID TIMBER	2/190 x 45	2.58	2.43	2.31	2.21	2.12	2.05	1.98	1.93	1.88	1.83	1.79
		2/240 x 45	3.26	3.07	2.91	2.79	2.68	2.59	2.51	2.43	2.37	2.31	2.26
		2/290 x 45	3.80	3.58	3.40	3.25	3.13	3.02	2.92	2.84	2.77	2.70	2.63
	GANGLAM	2/330 x 45	4.80	4.59	4.37	4.18	4.02	3.88	3.76	3.65	3.56	3.43	3.31
		2/380 x 45	5.34	5.10	4.91	4.75	4.61	4.47	4.33	4.21	4.09	3.95	3.82
		2/430 x 45	5.86	5.59	5.38	5.21	5.06	4.92	4.81	4.70	4.61	4.47	4.32
		2/480 x 45	6.36	6.08	5.85	5.65	5.49	5.35	5.22	5.11	5.01	4.92	4.82
GANGLAM	2/530 x 45	6.85	6.54	6.30	6.09	5.91	5.76	5.62	5.50	5.39	5.30	5.20	
	2/580 x 45	7.33	7.00	6.74	6.52	6.33	6.16	6.02	5.89	5.77	5.67	5.57	

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

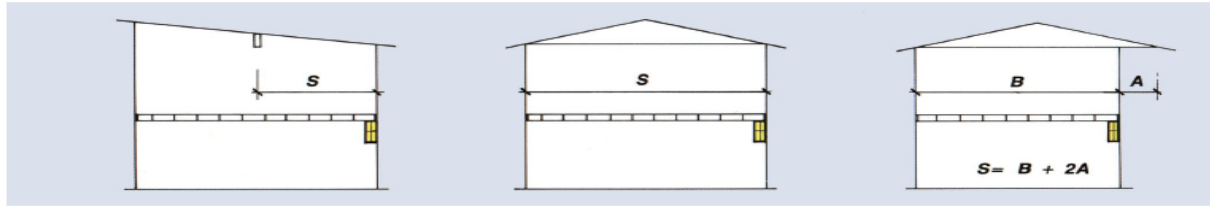


TABLE 3:
LINTEL SUPPORTING ROOF AND LOAD-BEARING WALL (2.4m MAX WALL HEIGHT)

	LINTEL SIZE	MAXIMUM LINTEL SPAN (m)											
		SUPPORTED ROOF SPAN 'S' (m)											
		5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	
LIGHT ROOF	SOLID TIMBER	2/90 x 45	1.15	1.11	1.09	1.06	1.04	1.02	1.00	0.98	0.95	0.92	0.90
		2/115 x 45	1.53	1.49	1.45	1.41	1.38	1.35	1.33	1.30	1.27	1.23	1.20
		2/140 x 45	1.78	1.73	1.69	1.65	1.61	1.58	1.55	1.52	1.48	1.44	1.40
		2/190 x 45	2.42	2.35	2.29	2.24	2.19	2.14	2.10	2.06	2.01	1.95	1.90
		2/240 x 45	3.05	2.97	2.89	2.83	2.76	2.71	2.65	2.61	2.54	2.47	2.40
		2/290 x 45	3.42	3.35	3.29	3.23	3.18	3.13	3.08	3.04	2.96	2.88	2.80
	GANGLAM	2/330 x 45	4.13	4.05	3.97	3.90	3.83	3.77	3.72	3.67	3.62	3.58	3.52
		2/380 x 45	4.59	4.50	4.41	4.33	4.26	4.20	4.13	4.08	4.02	3.97	3.93
		2/430 x 45	5.04	4.94	4.84	4.76	4.68	4.60	4.54	4.47	4.42	4.36	4.31
		2/480 x 45	5.47	5.36	5.26	5.16	5.08	5.00	4.93	4.86	4.79	4.74	4.68
		2/530 x 45	5.89	5.77	5.66	5.56	5.47	5.39	5.31	5.23	5.16	5.10	5.04
		2/580 x 45	6.31	6.18	6.06	5.95	5.85	5.76	5.68	5.60	5.53	5.46	5.39
HEAVY ROOF	SOLID TIMBER	2/90 x 45	1.00	0.97	0.94	0.91	0.89	0.86	0.84	0.82	0.80	0.78	0.76
		2/115 x 45	1.33	1.29	1.25	1.21	1.18	1.15	1.13	1.10	1.07	1.04	1.01
		2/140 x 45	1.56	1.50	1.46	1.41	1.38	1.34	1.31	1.28	1.25	1.21	1.18
		2/190 x 45	2.11	2.04	1.98	1.92	1.87	1.82	1.78	1.74	1.69	1.64	1.60
		2/240 x 45	2.67	2.58	2.50	2.43	2.36	2.31	2.25	2.20	2.13	2.07	2.02
		2/290 x 45	3.09	3.00	2.91	2.83	2.76	2.69	2.63	2.57	2.49	2.42	2.36
	GANGLAM	2/330 x 45	3.73	3.64	3.55	3.48	3.41	3.35	3.29	3.23	3.13	3.05	2.97
		2/380 x 45	4.15	4.04	3.95	3.86	3.79	3.72	3.66	3.60	3.54	3.49	3.41
		2/430 x 45	4.55	4.43	4.33	4.24	4.16	4.08	4.01	3.95	3.89	3.83	3.78
		2/480 x 45	4.94	4.82	4.70	4.60	4.51	4.43	4.36	4.29	4.22	4.16	4.11
		2/530 x 45	5.32	5.19	5.07	4.96	4.86	4.77	4.69	4.62	4.55	4.48	4.43
		2/580 x 45	5.70	5.55	5.42	5.31	5.20	5.11	5.02	4.94	4.87	4.80	4.73

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

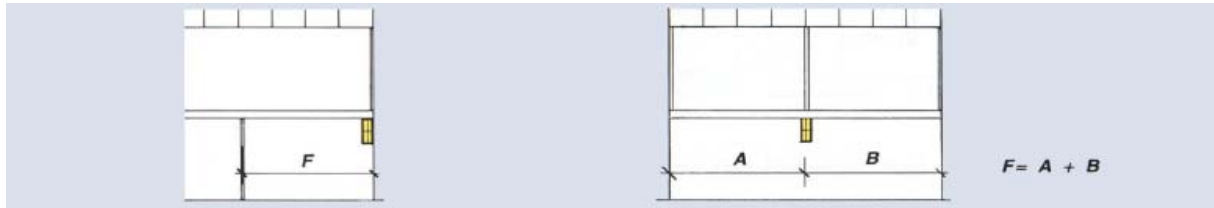


TABLE 4:
LINTEL SUPPORTING FLOOR AND WALL (2.4m MAX WALL HEIGHT)

	LINTEL SIZE	MAXIMUM LINTEL SPAN (m)										
		FLOOR SPAN F (m)										
		2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4
SOLID TIMBER	2/90 x 45	1.07	1.05	1.04	1.03	1.01	0.96	0.92	0.88	0.85	0.82	0.80
	2/115 x 45	1.53	1.47	1.42	1.38	1.34	1.28	1.23	1.18	1.13	1.10	1.06
	2/140 x 45	1.78	1.72	1.66	1.61	1.57	1.49	1.43	1.37	1.32	1.28	1.24
	2/190 x 45	2.42	2.33	2.26	2.19	2.13	2.03	1.94	1.86	1.80	1.74	1.68
	2/240 x 45	3.05	2.94	2.85	2.76	2.69	2.56	2.45	2.36	2.27	2.19	2.12
	2/290 x 45	3.42	3.33	3.25	3.18	3.11	2.99	2.86	2.75	2.65	2.56	2.48
GANGLAM	2/330 x 45	4.13	4.02	3.92	3.83	3.76	3.68	3.60	3.46	3.33	3.22	3.12
	2/380 x 45	4.59	4.47	4.36	4.26	4.18	4.10	4.02	3.96	3.84	3.71	3.59
	2/430 x 45	5.04	4.90	4.78	4.68	4.58	4.49	4.42	4.34	4.28	4.19	4.06
	2/480 x 45	5.47	5.32	5.19	5.08	4.97	4.88	4.79	4.72	4.64	4.58	4.51
	2/530 x 45	5.89	5.74	5.59	5.47	5.36	5.26	5.16	5.08	5.00	4.93	4.86
	2/580 x 45	6.31	6.14	5.99	5.85	5.73	5.62	5.53	5.44	5.35	5.27	5.20

NOTE: THESE LINTELS DO NOT SUPPORT LOADS FROM OTHER BEAMS OR RAFTERS

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

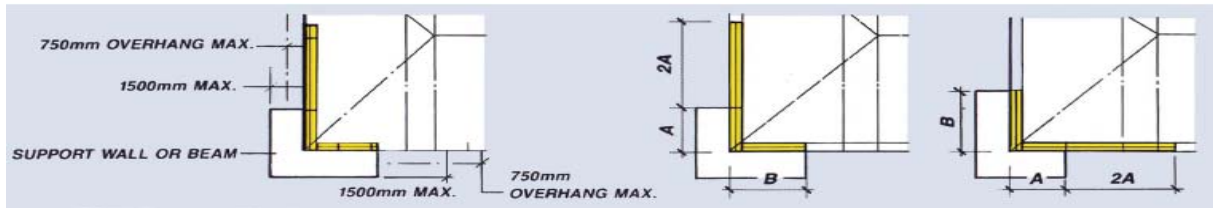


TABLE 5:
CANTILEVERED LINTEL FOR CORNER BAY UNDER HIP ROOF

		LINTEL SIZE	MAXIMUM CANTILEVER (DIMENSION A) (m)					
			SUPPORTED LINTEL SPAN (DIMENSION B) (m)					
			1.8	2.4	3.0	3.6	4.2	4.8
LIGHT ROOF	SOLID TIMBER	2/90 x 45	-	-	-	-	-	-
		2/115 x 45	-	-	-	-	-	-
		2/140 x 45	0.64	-	-	-	-	-
		2/190 x 45	0.99	0.83	0.66	-	-	-
		2/240 x 45	1.38	1.16	0.99	0.89	0.78	0.69
		2/290 x 45	1.70	1.44	1.23	1.14	1.05	0.93
	GANG-LAM	2/330 x 45	2.40	2.05	1.77	1.65	1.55	1.44
		2/380 x 45	2.89	2.50	2.17	2.02	1.90	1.79
		2/430 x 45	3.28	2.96	2.58	2.41	2.27	2.15
HEAVY ROOF	SOLID TIMBER	2/90 x 45	-	-	-	-	-	-
		2/115 x 45	-	-	-	-	-	-
		2/140 x 45	-	-	-	-	-	-
		2/190 x 45	0.73	0.61	-	-	-	-
		2/240 x 45	1.02	0.85	0.72	0.63	-	-
		2/290 x 45	1.27	1.06	0.91	0.84	0.75	0.66
	GANG-LAM	2/330 x 45	1.80	1.52	1.31	1.21	1.13	1.03
		2/380 x 45	2.18	1.86	1.60	1.49	1.39	1.30
		2/430 x 45	2.57	2.21	1.91	1.78	1.67	1.55

NOTE: 1) CHOOSE OPTION WHERE 'A' IS LESS THAN 'B'
2) LINTEL 'B' TO BE SELECTED FROM TABLE 1

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

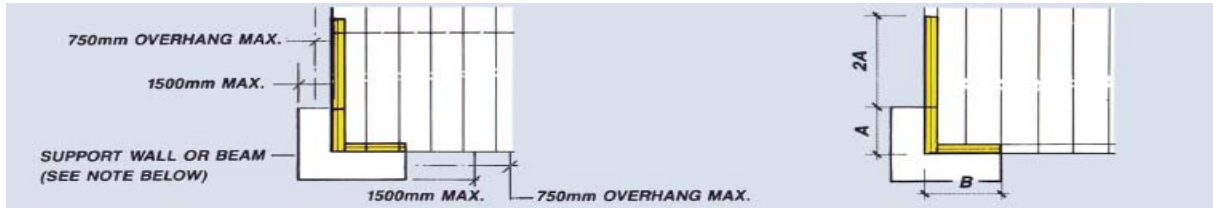


TABLE 6:
CANTILEVERED LINTEL FOR CORNER BAY UNDER GABLE ROOF

		LINTEL SIZE	DIMENSION B (m)	MAXIMUM CANTILEVER (DIMENSION A) (m)								
				TRUSS SPAN (m)								
				3.0	5.0	7.0	9.0	10.0	11.0	13.0	15.0	
LIGHT ROOF	SOLID TIMBER	2/140 x 45	3.0	0.55	0.41	0.33	-	-	-	-	-	-
			4.0	0.44	0.32	-	-	-	-	-	-	
			5.0	0.37	-	-	-	-	-	-	-	
		2/190 x 45	3.0	0.86	0.74	0.59	0.49	0.45	0.42	0.37	-	
			4.0	0.77	0.58	0.46	0.38	0.35	-	-	-	
			5.0	0.66	0.48	0.38	0.31	-	-	-	-	
	2/240 x 45	3.0	1.21	1.05	0.93	0.78	0.72	0.67	0.58	0.52		
		4.0	1.08	0.92	0.73	0.60	0.55	0.51	0.45	0.39		
		5.0	0.99	0.76	0.60	0.49	0.45	0.42	0.36	0.32		
	2/290 x 45	3.0	1.50	1.31	1.17	1.05	0.97	0.90	0.79	0.70		
		4.0	1.35	1.16	0.98	0.81	0.75	0.69	0.60	0.54		
		5.0	1.23	1.02	0.80	0.66	0.61	0.56	0.49	0.43		
GANGLAM	2/330 x 45	3.0	2.13	1.87	1.69	1.55	1.49	1.39	1.22	1.09		
		4.0	1.93	1.67	1.50	1.26	1.16	1.08	0.94	0.83		
		5.0	1.77	1.53	1.24	1.03	0.95	0.88	0.76	0.68		
	2/380 x 45	3.0	2.59	2.29	2.07	1.90	1.83	1.75	1.54	1.38		
		4.0	2.35	2.05	1.84	1.59	1.47	1.37	1.20	1.06		
		5.0	2.17	1.87	1.57	1.31	1.20	1.12	0.97	0.86		
HEAVY ROOF	SOLID TIMBER	2/140 x 45	3.0	0.40	0.29	-	-	-	-	-	-	
			4.0	0.31	-	-	-	-	-	-	-	
			5.0	0.26	-	-	-	-	-	-	-	
		2/190 x 45	3.0	0.63	0.53	0.42	0.35	-	-	-	-	
			4.0	0.56	0.41	0.33	-	-	-	-	-	
			5.0	0.47	0.34	-	-	-	-	-	-	
	2/240 x 45	3.0	0.89	0.77	0.66	0.55	0.51	0.47	0.41	0.37		
		4.0	0.79	0.65	0.52	0.43	0.39	0.36	-	-		
		5.0	0.72	0.54	0.42	0.35	-	-	-	-		
	2/290 x 45	3.0	1.11	0.96	0.86	0.75	0.69	0.64	0.56	0.50		
		4.0	0.99	0.85	0.70	0.58	0.53	0.49	0.43	0.38		
		5.0	0.91	0.73	0.57	0.47	0.43	0.40	0.35	0.31		
	GANGLAM	2/330 x 45	3.0	1.59	1.38	1.24	1.13	1.06	0.99	0.87	0.77	
			4.0	1.43	1.23	1.08	0.89	0.82	0.76	0.67	-	
			5.0	1.31	1.02	0.89	0.73	0.67	-	-	-	
		2/380 x 45	3.0	1.93	1.69	1.52	1.39	1.34	1.25	1.10	0.98	
			4.0	1.75	1.51	1.35	1.14	1.05	0.97	0.85	0.75	
			5.0	1.60	1.33	1.12	0.93	0.85	0.79	-	-	

NOTE: 1) CHOOSE OPTION WHERE 'A' IS LESS THAN 'B'
2) LINTEL 'B' TO BE SELECTED FROM TABLE 1

= regular duty plating = heavy duty plating = super heavy duty plating

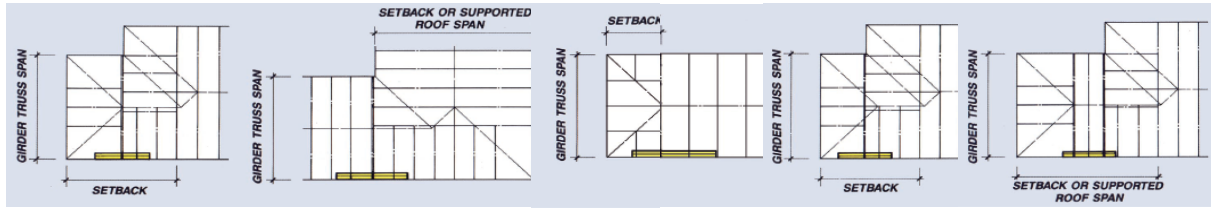


TABLE 7A:
LINTEL SUPPORTING GIRDER / SETBACK TRUSSES WITH LIGHT ROOF

	LINTEL SIZE	SETBACK (m)	MAXIMUM LINTEL SPAN (m)										
			GIRDER TRUSS SPAN (m)										
			5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
SOLID TIMBER	2/140 x 45	1.2	2.14	2.03	1.95	1.81	1.70	1.60	1.51	1.43	1.36	1.30	1.24
		2.4	1.83	1.64	1.49	1.36	1.25	1.15	1.07	1.00	0.94	0.89	0.84
		3.6	1.50	1.32	1.17	1.05	0.96	0.88	0.81	0.75	0.70	0.66	0.62
		4.8	1.25	1.08	0.95	0.85	0.77	0.70	0.64	0.59	0.55	0.51	0.48
	2/190 x 45	1.2	2.83	2.73	2.65	2.58	2.51	2.38	2.26	2.16	2.06	1.98	1.90
		2.4	2.64	2.53	2.31	2.13	1.98	1.85	1.73	1.63	1.54	1.46	1.39
		3.6	2.38	2.12	1.91	1.74	1.60	1.47	1.37	1.28	1.20	1.13	1.06
		4.8	2.05	1.80	1.61	1.45	1.32	1.21	1.11	1.03	0.97	0.90	0.85
	2/240 x 45	1.2	3.41	3.30	3.20	3.12	3.04	2.97	2.91	2.85	2.78	2.67	2.57
		2.4	3.21	3.09	2.99	2.90	2.76	2.59	2.44	2.31	2.19	2.08	1.98
		3.6	3.05	2.92	2.72	2.49	2.30	2.14	1.99	1.87	1.76	1.66	1.58
		4.8	2.91	2.61	2.34	2.13	1.95	1.80	1.67	1.55	1.45	1.37	1.29
	2/290 x 45	1.2	3.97	3.84	3.73	3.63	3.54	3.46	3.39	3.33	3.27	3.21	3.16
		2.4	3.76	3.62	3.50	3.40	3.31	3.23	3.15	3.01	2.86	2.73	2.61
		3.6	3.59	3.44	3.32	3.21	3.05	2.84	2.67	2.51	2.37	2.25	2.14
		4.8	3.44	3.29	3.13	2.86	2.64	2.44	2.27	2.13	2.00	1.89	1.79
6.0		3.31	3.09	2.78	2.52	2.30	2.12	1.97	1.83	1.72	1.61	1.52	
7.5		3.09	2.71	2.42	2.17	1.98	1.81	1.67	1.55	1.45	1.35	1.27	
GANGLAM	2/330 x 45	1.2	4.70	4.56	4.43	4.31	4.21	4.12	4.04	3.96	3.89	3.83	3.77
		2.4	4.49	4.33	4.19	4.07	3.97	3.87	3.79	3.71	3.64	3.57	3.43
		3.6	4.30	4.14	4.00	3.87	3.76	3.67	3.55	3.35	3.18	3.02	2.88
		4.8	4.14	3.97	3.83	3.70	3.54	3.30	3.09	2.90	2.74	2.59	2.46
		6.0	4.00	3.83	3.68	3.42	3.15	2.92	2.72	2.54	2.39	2.25	2.13
	2/380 x 45	1.2	5.26	5.09	4.95	4.83	4.71	4.61	4.52	4.44	4.36	4.29	4.22
		2.4	5.04	4.86	4.71	4.58	4.46	4.36	4.26	4.17	4.09	4.02	3.95
		3.6	4.84	4.66	4.50	4.37	4.25	4.14	4.04	3.96	3.88	3.71	3.55
		4.8	4.67	4.49	4.33	4.19	4.07	3.96	3.82	3.60	3.41	3.23	3.07
		6.0	4.52	4.33	4.17	4.03	3.91	3.64	3.40	3.19	3.00	2.84	2.69
	2/430 x 45	1.2	5.79	5.61	5.46	5.32	5.20	5.09	4.99	4.90	4.81	4.74	4.66
		2.4	5.57	5.38	5.21	5.07	4.94	4.83	4.72	4.63	4.54	4.46	4.39
		3.6	5.37	5.17	5.00	4.85	4.72	4.60	4.50	4.40	4.31	4.23	4.16
		4.8	5.19	4.99	4.81	4.66	4.53	4.41	4.30	4.21	4.10	3.90	3.71
		6.0	5.03	4.83	4.65	4.50	4.36	4.24	4.11	3.87	3.65	3.46	3.28
	2/480 x 45	1.2	6.31	6.12	5.95	5.80	5.67	5.55	5.44	5.34	5.25	5.17	5.09
2.4		6.08	5.88	5.70	5.54	5.41	5.28	5.17	5.07	4.97	4.89	4.81	
3.6		5.88	5.66	5.48	5.32	5.18	5.05	4.94	4.83	4.74	4.65	4.57	
4.8		5.70	5.48	5.29	5.12	4.98	4.85	4.74	4.63	4.54	4.45	4.34	
6.0		5.53	5.31	5.12	4.95	4.81	4.68	4.56	4.46	4.29	4.07	3.87	
2/530 x 45	1.2	6.81	6.61	6.43	6.27	6.13	6.00	5.89	5.78	5.68	5.59	5.51	
	2.4	6.58	6.37	6.18	6.01	5.86	5.73	5.61	5.50	5.40	5.30	5.22	
	3.6	6.38	6.15	5.95	5.78	5.63	5.49	5.37	5.26	5.15	5.06	4.97	
	4.8	6.19	5.95	5.75	5.58	5.42	5.28	5.16	5.05	4.94	4.85	4.76	
	6.0	6.02	5.78	5.58	5.40	5.24	5.10	4.98	4.87	4.76	4.67	4.47	
2/580 x 45	1.2	7.31	7.09	6.90	6.73	6.58	6.44	6.32	6.21	6.10	6.00	5.91	
	2.4	7.07	6.84	6.64	6.46	6.31	6.17	6.04	5.92	5.81	5.71	5.62	
	3.6	6.86	6.62	6.41	6.23	6.07	5.92	5.79	5.67	5.56	5.46	5.37	
	4.8	6.67	6.42	6.21	6.02	5.86	5.71	5.58	5.46	5.35	5.25	5.15	
	6.0	6.50	6.24	6.03	5.84	5.67	5.52	5.39	5.27	5.16	5.06	4.96	

 = regular duty plating
 = heavy duty plating
 = super heavy duty plating

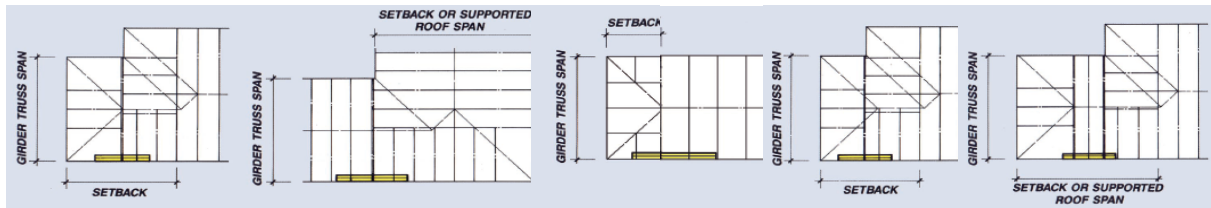


TABLE 7B:
LINTEL SUPPORTING GIRDER / SETBACK TRUSSES WITH HEAVY ROOF

	LINTEL SIZE	SETBACK (m)	MAXIMUM LINTEL SPAN (m)										
			GIRDER TRUSS SPAN (m)										
			5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
SOLID TIMBER	2/140 x 45	1.2	1.68	1.59	1.52	1.45	1.36	1.27	1.20	1.13	1.08	1.02	0.98
		2.4	1.44	1.28	1.15	1.05	0.96	0.88	0.82	0.76	0.71	0.67	0.63
		3.6	1.15	1.00	0.88	0.79	0.72	0.66	0.60	0.56	0.52	0.49	0.46
		4.8	0.94	0.81	0.71	0.63	0.57	0.52	0.47	0.44	0.40	0.38	0.35
	2/190 x 45	1.2	2.38	2.26	2.16	2.08	2.01	1.93	1.83	1.74	1.65	1.58	1.51
		2.4	2.13	2.01	1.83	1.68	1.55	1.44	1.34	1.26	1.19	1.12	1.06
		3.6	1.86	1.64	1.47	1.33	1.22	1.12	1.03	0.96	0.90	0.84	0.80
		4.8	1.58	1.37	1.22	1.09	0.99	0.90	0.83	0.77	0.71	0.67	0.63
	2/240 x 45	1.2	2.88	2.78	2.70	2.62	2.56	2.50	2.44	2.36	2.25	2.16	2.08
		2.4	2.69	2.58	2.49	2.35	2.19	2.04	1.92	1.81	1.71	1.62	1.54
		3.6	2.54	2.35	2.12	1.94	1.78	1.65	1.53	1.43	1.34	1.26	1.20
		4.8	2.28	2.01	1.80	1.62	1.48	1.36	1.26	1.17	1.09	1.02	0.96
	2/290 x 45	1.2	3.35	3.24	3.14	3.06	2.98	2.92	2.85	2.80	2.75	2.70	2.66
		2.4	3.15	3.03	2.93	2.84	2.76	2.69	2.63	2.57	2.49	2.37	2.26
		3.6	2.99	2.87	2.76	2.67	2.59	2.45	2.29	2.15	2.03	1.92	1.82
		4.8	2.85	2.73	2.62	2.45	2.25	2.08	1.93	1.81	1.69	1.59	1.51
6.0		2.74	2.61	2.37	2.14	1.95	1.79	1.66	1.54	1.44	1.35	1.27	
7.5		2.61	2.30	2.04	1.83	1.66	1.52	1.40	1.30	1.21	1.13	1.06	
10.0	2.18	1.88	1.65	1.46	1.32	1.20	1.10	1.01	0.94	0.88	0.82		
GANGLAM	2/330 x 45	1.2	3.98	3.85	3.74	3.64	3.55	3.48	3.40	3.34	3.28	3.22	3.17
		2.4	3.77	3.63	3.52	3.41	3.32	3.24	3.16	3.10	2.98	2.85	2.72
		3.6	3.60	3.45	3.33	3.23	3.13	2.97	2.79	2.63	2.48	2.35	2.24
		4.8	3.45	3.30	3.18	2.99	2.76	2.56	2.38	2.23	2.10	1.98	1.88
		6.0	3.32	3.17	2.91	2.64	2.42	2.23	2.07	1.93	1.80	1.70	1.60
		7.5	3.18	2.85	2.54	2.29	2.08	1.91	1.76	1.63	1.52	1.43	-
		10.0	2.71	2.35	2.07	1.85	1.67	1.52	1.40	1.29	-	-	-
		10.0	2.71	2.35	2.07	1.85	1.67	1.52	1.40	1.29	-	-	-
	2/380 x 45	1.2	4.45	4.31	4.18	4.08	3.98	3.89	3.81	3.74	3.68	3.62	3.56
		2.4	4.24	4.08	3.95	3.84	3.74	3.65	3.57	3.49	3.42	3.36	3.30
		3.6	4.06	3.90	3.76	3.64	3.54	3.45	3.37	3.24	3.07	2.92	2.78
		4.8	3.90	3.73	3.60	3.48	3.37	3.18	2.98	2.80	2.64	2.49	2.36
		6.0	3.76	3.59	3.46	3.30	3.03	2.81	2.61	2.44	2.29	2.16	2.04
		7.5	3.61	3.44	3.19	2.89	2.64	2.43	2.25	2.09	1.96	1.84	1.73
		10.0	3.40	2.98	2.64	2.37	2.15	1.96	1.81	1.67	1.56	-	-
		10.0	3.40	2.98	2.64	2.37	2.15	1.96	1.81	1.67	1.56	-	-
	2/430 x 45	1.2	4.90	4.75	4.62	4.50	4.39	4.30	4.21	4.13	4.06	3.99	3.93
		2.4	4.69	4.52	4.38	4.26	4.15	4.05	3.96	3.88	3.80	3.73	3.67
		3.6	4.50	4.33	4.18	4.05	3.94	3.84	3.75	3.66	3.59	3.50	3.34
		4.8	4.33	4.16	4.01	3.88	3.76	3.66	3.57	3.38	3.20	3.03	2.88
		6.0	4.19	4.01	3.86	3.73	3.61	3.41	3.18	2.98	2.81	2.65	2.51
		7.5	4.03	3.85	3.69	3.53	3.23	2.98	2.77	2.58	2.42	2.28	2.15
		10.0	3.80	3.62	3.26	2.93	2.67	2.44	2.25	2.09	1.95	1.83	-
		10.0	3.80	3.62	3.26	2.93	2.67	2.44	2.25	2.09	1.95	1.83	-
	2/480 x 45	1.2	5.34	5.18	5.03	4.91	4.79	4.69	4.60	4.51	4.44	4.36	4.30
		2.4	5.12	4.95	4.79	4.66	4.54	4.43	4.34	4.25	4.17	4.09	4.03
		3.6	4.93	4.75	4.59	4.45	4.33	4.22	4.12	4.03	3.95	3.87	3.80
		4.8	4.76	4.57	4.41	4.27	4.14	4.03	3.94	3.85	3.75	3.56	3.39
		6.0	4.61	4.42	4.25	4.11	3.98	3.88	3.75	3.52	3.32	3.14	2.98
		7.5	4.44	4.24	4.08	3.94	3.81	3.54	3.29	3.08	2.89	2.72	2.58
		10.0	4.20	4.01	3.84	3.50	3.19	2.93	2.71	2.52	2.35	2.21	2.08
		10.0	4.20	4.01	3.84	3.50	3.19	2.93	2.71	2.52	2.35	2.21	2.08
	2/530 x 45	1.2	5.77	5.60	5.44	5.31	5.19	5.08	4.98	4.88	4.80	4.72	4.65
		2.4	5.55	5.36	5.20	5.06	4.93	4.81	4.71	4.61	4.53	4.45	4.37
		3.6	5.35	5.16	4.99	4.84	4.71	4.59	4.48	4.39	4.30	4.22	4.15
		4.8	5.18	4.98	4.80	4.65	4.52	4.40	4.29	4.20	4.11	4.03	3.91
		6.0	5.02	4.81	4.64	4.48	4.35	4.23	4.13	4.03	3.85	3.65	3.47
		7.5	4.85	4.64	4.46	4.30	4.17	4.05	3.83	3.59	3.38	3.19	3.02
		10.0	4.60	4.38	4.21	4.05	3.73	3.43	3.18	2.96	2.77	2.60	2.46
		10.0	4.60	4.38	4.21	4.05	3.73	3.43	3.18	2.96	2.77	2.60	2.46
	2/580 x 45	1.2	6.19	6.01	5.84	5.70	5.57	5.45	5.34	5.25	5.16	5.07	5.00
		2.4	5.97	5.77	5.59	5.44	5.31	5.18	5.07	4.97	4.88	4.79	4.72
		3.6	5.77	5.56	5.38	5.22	5.08	4.95	4.84	4.74	4.65	4.56	4.48
		4.8	5.59	5.37	5.19	5.03	4.88	4.76	4.64	4.54	4.45	4.36	4.28
		6.0	5.43	5.20	5.02	4.85	4.71	4.58	4.47	4.37	4.27	4.16	3.96
		7.5	5.24	5.02	4.83	4.67	4.52	4.40	4.28	4.11	3.87	3.66	3.47
		10.0	4.98	4.76	4.56	4.40	4.26	4.13	3.95	3.67	3.42	3.21	2.85
		10.0	4.98	4.76	4.56	4.40	4.26	4.13	3.95	3.67	3.42	3.21	2.85

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

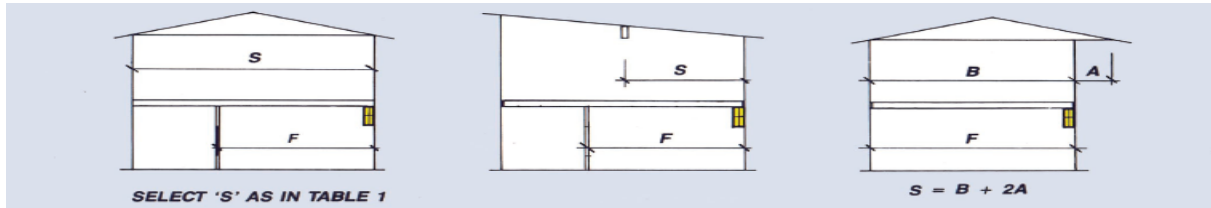


TABLE 8A:
LINTEL SUPPORTING LIGHT ROOF, WALL AND FLOOR JOISTS (2.4m MAX WALL HEIGHT)

	LINTEL SIZE	FLOOR SPAN 'F' (m)	MAXIMUM LINTEL SPAN (m)										
			SUPPORTED ROOF SPAN 'S' (m)										
			5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
SOLID TIMBER	2/90 x 45	2.5	0.95	0.93	0.92	0.90	0.88	0.87	0.86	0.84	0.83	0.82	0.81
		4.0	0.93	0.91	0.89	0.88	0.86	0.85	0.84	0.83	0.81	0.80	0.79
		5.5	0.89	0.88	0.87	0.86	0.85	0.83	0.82	0.81	0.80	0.79	0.78
		7.0	0.82	0.81	0.80	0.79	0.79	0.78	0.77	0.76	0.76	0.75	0.74
	2/115 x 45	2.5	1.43	1.40	1.36	1.34	1.31	1.28	1.26	1.24	1.22	1.20	1.18
		4.0	1.33	1.31	1.29	1.27	1.26	1.24	1.22	1.21	1.19	1.17	1.16
		5.5	1.19	1.18	1.16	1.15	1.14	1.13	1.11	1.10	1.09	1.08	1.07
		7.0	1.09	1.08	1.07	1.06	1.05	1.04	1.03	1.02	1.01	1.00	0.99
	2/140 x 45	2.5	1.70	1.66	1.62	1.59	1.56	1.53	1.50	1.48	1.45	1.43	1.41
		4.0	1.56	1.53	1.51	1.49	1.47	1.45	1.43	1.41	1.39	1.38	1.36
		5.5	1.39	1.38	1.36	1.34	1.33	1.31	1.30	1.28	1.27	1.26	1.25
		7.0	1.27	1.26	1.25	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.16
2/190 x 45	2.5	2.31	2.25	2.20	2.16	2.11	2.07	2.04	2.00	1.97	1.94	1.91	
	4.0	2.11	2.08	2.05	2.02	1.99	1.96	1.94	1.91	1.89	1.87	1.84	
	5.5	1.89	1.87	1.84	1.82	1.80	1.78	1.76	1.74	1.73	1.71	1.69	
	7.0	1.73	1.71	1.69	1.67	1.66	1.64	1.63	1.61	1.60	1.58	1.57	
2/240 x 45	2.5	2.92	2.85	2.78	2.72	2.67	2.62	2.57	2.53	2.49	2.45	2.42	
	4.0	2.67	2.63	2.59	2.55	2.51	2.48	2.45	2.42	2.39	2.36	2.33	
	5.5	2.39	2.36	2.33	2.30	2.28	2.25	2.23	2.20	2.18	2.16	2.14	
	7.0	2.18	2.16	2.14	2.11	2.09	2.07	2.06	2.04	2.02	2.00	1.98	
2/290 x 45	2.5	3.39	3.33	3.28	3.22	3.18	3.13	3.09	3.05	3.01	2.96	2.92	
	4.0	3.22	3.17	3.13	3.08	3.04	3.00	2.96	2.92	2.88	2.85	2.81	
	5.5	2.88	2.85	2.81	2.78	2.75	2.72	2.69	2.66	2.63	2.61	2.58	
	7.0	2.63	2.61	2.58	2.56	2.53	2.51	2.48	2.46	2.44	2.42	2.40	
GANGLAM	2/330 x 45	2.5	3.99	3.92	3.85	3.79	3.74	3.68	3.63	3.59	3.55	3.50	3.47
		4.0	3.90	3.83	3.77	3.72	3.67	3.62	3.57	3.53	3.49	3.45	3.42
		5.5	3.50	3.46	3.42	3.38	3.34	3.30	3.27	3.23	3.20	3.17	3.14
		7.0	3.20	3.17	3.14	3.11	3.08	3.05	3.02	2.99	2.96	2.94	2.91
	2/380 x 45	2.5	4.44	4.36	4.28	4.22	4.15	4.09	4.04	3.99	3.94	3.90	3.85
		4.0	4.33	4.26	4.19	4.13	4.08	4.02	3.97	3.93	3.88	3.84	3.80
		5.5	4.03	3.99	3.94	3.89	3.85	3.81	3.76	3.72	3.68	3.65	3.61
		7.0	3.68	3.65	3.61	3.58	3.54	3.51	3.48	3.44	3.41	3.38	3.35
	2/430 x 45	2.5	4.87	4.78	4.70	4.63	4.56	4.49	4.43	4.38	4.32	4.27	4.23
		4.0	4.75	4.67	4.60	4.53	4.47	4.41	4.36	4.31	4.26	4.21	4.17
		5.5	4.57	4.51	4.46	4.40	4.35	4.31	4.26	4.21	4.17	4.13	4.09
		7.0	4.17	4.13	4.09	4.05	4.01	3.97	3.93	3.90	3.86	3.83	3.80
	2/480 x 45	2.5	5.29	5.19	5.10	5.02	4.95	4.88	4.81	4.75	4.70	4.64	4.59
		4.0	5.16	5.08	5.00	4.92	4.86	4.79	4.73	4.68	4.63	4.57	4.53
		5.5	5.05	4.97	4.90	4.84	4.77	4.71	4.66	4.61	4.56	4.51	4.47
		7.0	4.65	4.61	4.56	4.52	4.47	4.43	4.39	4.35	4.31	4.27	4.24
	2/530 x 45	2.5	5.70	5.59	5.50	5.41	5.33	5.26	5.19	5.12	5.06	5.00	4.95
		4.0	5.56	5.47	5.38	5.30	5.23	5.16	5.10	5.04	4.98	4.93	4.88
		5.5	5.44	5.36	5.28	5.21	5.14	5.08	5.02	4.96	4.91	4.86	4.81
		7.0	5.14	5.09	5.04	4.99	4.94	4.89	4.85	4.80	4.76	4.72	4.68
	2/580 x 45	2.5	6.09	5.98	5.88	5.79	5.70	5.62	5.55	5.48	5.41	5.35	5.29
		4.0	5.95	5.85	5.76	5.68	5.60	5.52	5.46	5.39	5.33	5.27	5.22
		5.5	5.82	5.73	5.65	5.57	5.50	5.43	5.37	5.31	5.25	5.20	5.15
		7.0	5.62	5.57	5.51	5.46	5.40	5.35	5.29	5.24	5.18	5.13	5.08

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

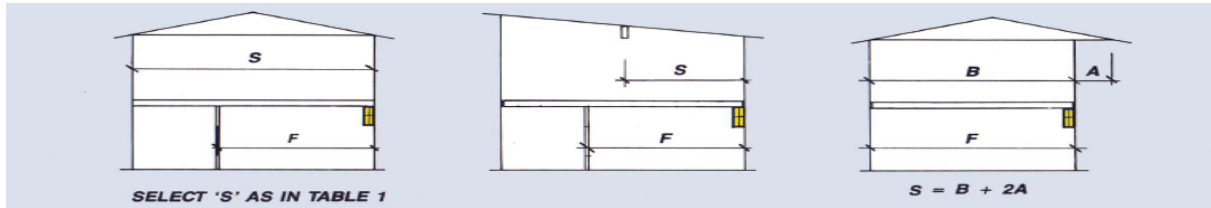


TABLE 8B:
LINTEL SUPPORTING HEAVY ROOF, WALL AND FLOOR JOISTS (2.4m MAX WALL HEIGHT)

	LINTEL SIZE	FLOOR SPAN 'F' (m)	MAXIMUM LINTEL SPAN (m)										
			SUPPORTED ROOF SPAN 'S' (m)										
			5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
SOLID TIMBER	2/90 x 45	2.5	0.86	0.83	0.81	0.79	0.77	0.75	0.74	0.72	0.71	0.70	0.68
		4.0	0.84	0.82	0.80	0.78	0.76	0.74	0.73	0.71	0.70	0.69	0.68
		5.5	0.82	0.80	0.78	0.76	0.75	0.73	0.72	0.70	0.69	0.68	0.67
		7.0	0.77	0.76	0.75	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.66
	2/115 x 45	2.5	1.27	1.22	1.19	1.15	1.12	1.09	1.07	1.04	1.02	1.00	0.98
		4.0	1.23	1.20	1.16	1.13	1.10	1.08	1.05	1.03	1.01	0.99	0.97
		5.5	1.12	1.09	1.07	1.05	1.03	1.02	1.00	0.98	0.97	0.95	0.94
		7.0	1.03	1.01	1.00	0.98	0.96	0.95	0.94	0.92	0.91	0.90	0.89
	2/140 x 45	2.5	1.51	1.46	1.42	1.38	1.35	1.32	1.29	1.25	1.21	1.18	1.15
		4.0	1.43	1.40	1.37	1.34	1.31	1.28	1.26	1.22	1.19	1.16	1.13
		5.5	1.30	1.28	1.25	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.10
		7.0	1.20	1.18	1.16	1.14	1.13	1.11	1.09	1.08	1.06	1.05	1.03
	2/190 x 45	2.5	2.05	1.98	1.93	1.88	1.83	1.79	1.75	1.70	1.65	1.60	1.56
		4.0	1.94	1.90	1.85	1.81	1.78	1.74	1.71	1.66	1.62	1.57	1.54
		5.5	1.77	1.73	1.70	1.67	1.64	1.61	1.58	1.56	1.53	1.51	1.49
		7.0	1.63	1.60	1.58	1.55	1.53	1.50	1.48	1.46	1.44	1.42	1.40
	2/240 x 45	2.5	2.58	2.50	2.43	2.37	2.31	2.26	2.21	2.14	2.08	2.03	1.97
		4.0	2.46	2.40	2.34	2.29	2.24	2.20	2.16	2.10	2.04	1.99	1.94
		5.5	2.23	2.19	2.15	2.11	2.07	2.03	2.00	1.97	1.94	1.91	1.88
		7.0	2.06	2.02	1.99	1.96	1.93	1.90	1.87	1.85	1.82	1.80	1.77
	2/290 x 45	2.5	3.10	3.03	2.94	2.86	2.79	2.73	2.67	2.59	2.51	2.45	2.39
		4.0	2.97	2.90	2.83	2.77	2.71	2.66	2.60	2.54	2.47	2.40	2.34
		5.5	2.70	2.64	2.59	2.54	2.50	2.46	2.42	2.38	2.34	2.30	2.27
		7.0	2.49	2.45	2.41	2.37	2.33	2.30	2.26	2.23	2.20	2.17	2.14
GANGLAM	2/330 x 45	2.5	3.65	3.56	3.48	3.41	3.35	3.29	3.24	3.14	3.05	2.97	2.90
		4.0	3.58	3.50	3.43	3.36	3.29	3.23	3.16	3.08	3.00	2.92	2.85
		5.5	3.28	3.21	3.15	3.09	3.04	2.98	2.94	2.89	2.84	2.80	2.76
		7.0	3.02	2.97	2.92	2.88	2.83	2.79	2.75	2.71	2.67	2.64	2.60
	2/380 x 45	2.5	4.05	3.96	3.87	3.80	3.73	3.66	3.60	3.55	3.50	3.42	3.34
		4.0	3.98	3.90	3.82	3.75	3.68	3.62	3.57	3.51	3.45	3.36	3.28
		5.5	3.77	3.70	3.63	3.56	3.50	3.44	3.38	3.33	3.27	3.22	3.18
		7.0	3.48	3.42	3.37	3.31	3.26	3.21	3.17	3.12	3.08	3.04	3.00
	2/430 x 45	2.5	4.45	4.34	4.25	4.16	4.09	4.02	3.95	3.89	3.84	3.79	3.74
		4.0	4.37	4.27	4.19	4.11	4.04	3.97	3.91	3.86	3.80	3.75	3.71
		5.5	4.27	4.18	4.10	4.03	3.96	3.89	3.82	3.76	3.70	3.65	3.60
		7.0	3.94	3.87	3.81	3.75	3.69	3.64	3.58	3.53	3.48	3.44	3.39
	2/480 x 45	2.5	4.83	4.71	4.61	4.52	4.44	4.36	4.29	4.23	4.17	4.11	4.06
		4.0	4.75	4.64	4.55	4.46	4.39	4.31	4.25	4.19	4.13	4.08	4.03
		5.5	4.67	4.57	4.49	4.41	4.33	4.27	4.20	4.15	4.09	4.04	3.99
		7.0	4.40	4.32	4.25	4.18	4.12	4.06	4.00	3.94	3.89	3.84	3.79
	2/530 x 45	2.5	5.20	5.08	4.97	4.87	4.78	4.70	4.63	4.56	4.49	4.43	4.37
		4.0	5.11	5.00	4.90	4.81	4.72	4.65	4.58	4.51	4.45	4.39	4.34
		5.5	5.03	4.93	4.83	4.75	4.67	4.60	4.53	4.47	4.41	4.35	4.30
		7.0	4.86	4.77	4.70	4.62	4.55	4.48	4.42	4.35	4.29	4.24	4.18
	2/580 x 45	2.5	5.56	5.43	5.32	5.21	5.12	5.03	4.95	4.87	4.81	4.74	4.68
		4.0	5.47	5.35	5.24	5.14	5.05	4.97	4.90	4.83	4.76	4.70	4.64
		5.5	5.38	5.27	5.17	5.08	5.00	4.92	4.85	4.78	4.72	4.66	4.60
		7.0	5.30	5.20	5.11	5.02	4.94	4.87	4.80	4.73	4.67	4.62	4.56

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

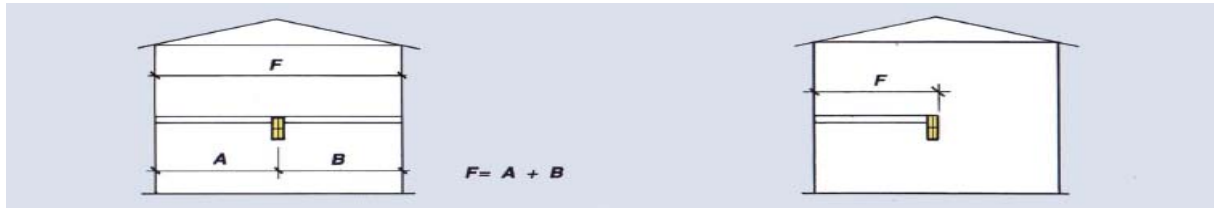


TABLE 9A:
1.5 kPa L.L. FLOOR BEAM SUPPORTING JOISTS

GANGLAM BEAM SIZE	MAXIMUM FLOOR BEAM SPAN (m)					
	JOIST SPAN 'F' (m)					
	2.4	3.6	4.8	6.0	7.2	8.4
2/290 x 45*	3.98	3.98	3.73	3.34	3.04	2.82
2/330 x 45*	4.70	4.70	4.39	3.93	3.59	3.32
2/380 x 45*	5.41	5.41	5.06	4.53	4.13	3.83
2/430 x 45	6.12	6.07	5.65	5.12	4.68	4.33
2/480 x 45	6.83	6.59	6.13	5.72	5.22	4.83
2/530 x 45	7.54	7.10	6.61	6.25	5.76	-
2/580 x 45	8.25	7.60	7.07	6.69	-	-
3/290 x 45*	4.62	4.62	4.57	4.16	3.80	3.52
3/330 x 45*	5.44	5.44	5.17	4.89	4.48	4.14
3/380 x 45	6.26	6.18	5.75	5.44	5.15	4.77
3/430 x 45	7.09	6.78	6.31	5.97	5.70	-
3/480 x 45	7.91	7.36	6.85	6.48	-	-
3/530 x 45	8.74	7.93	7.38	6.98	-	-
3/580 x 45	9.39	8.48	7.89	-	-	-

*BEAM AT MAXIMUM SPAN FOR VIBRATION CONTROL

TABLE 9B:
2.5 kPa L.L. FLOOR BEAM SUPPORTING JOISTS

GANGLAM BEAM SIZE	MAXIMUM FLOOR BEAM SPAN (m)					
	JOIST SPAN 'F' (m)					
	2.4	3.6	4.8	6.0	7.2	8.4
2/290 x 45	3.80	3.45	2.99	2.67	2.44	2.26
2/330 x 45	4.70	4.07	3.52	3.15	2.88	2.66
2/380 x 45	5.39	4.68	4.06	3.63	3.31	3.07
2/430 x 45	5.91	5.30	4.59	4.11	3.75	-
2/480 x 45	6.42	5.80	5.12	-	-	-
2/530 x 45	6.92	6.25	5.66	-	-	-
2/580 x 45	7.40	6.69	-	-	-	-
3/290 x 45	4.62	4.31	3.73	3.34	3.04	2.82
3/330 x 45	5.41	4.89	4.39	3.93	3.59	-
3/380 x 45	6.02	5.44	5.06	4.53	-	-
3/430 x 45	6.60	5.97	5.55	-	-	-
3/480 x 45	7.17	6.48	-	-	-	-
3/530 x 45	7.72	6.98	-	-	-	-
3/580 x 45	8.26	7.47	-	-	-	-

TABLE 9C:
3.0 kPa L.L. FLOOR BEAM SUPPORTING JOISTS

GANGLAM BEAM SIZE	MAXIMUM FLOOR BEAM SPAN (m)					
	JOIST SPAN 'F' (m)					
	2.4	3.6	4.8	6.0	7.2	8.4
2/290 x 45	3.80	3.18	2.75	2.46	2.25	2.08
2/330 x 45	4.59	3.75	3.25	2.90	2.65	2.45
2/380 x 45	5.15	4.32	3.74	3.34	3.05	-
2/430 x 45	5.65	4.88	4.23	3.78	-	-
2/480 x 45	6.13	5.45	4.72	-	-	-
2/530 x 45	6.61	5.97	-	-	-	-
2/580 x 45	7.07	6.39	-	-	-	-
3/290 x 45	4.57	3.97	3.43	3.07	2.80	2.60
3/330 x 45	5.17	4.67	4.05	3.62	-	-
3/380 x 45	5.75	5.20	4.66	-	-	-
3/430 x 45	6.31	5.70	-	-	-	-
3/480 x 45	6.85	6.19	-	-	-	-
3/530 x 45	7.38	-	-	-	-	-
3/580 x 45	7.89	-	-	-	-	-

= regular duty plating
 = heavy duty plating
 = super heavy duty plating



TABLE 10:
LONGSPAN GANGLAM FLOOR JOISTS

FLOOR L.L. (kPa)	JOIST CRS (mm)	MAXIMUM JOIST SPAN 'J' (m)						
		JOIST SIZE (x 45mm WIDTH)						
		290	330	380	430	480	530	580
1.5	400	4.90	5.54	6.16	6.75	7.34	7.90	8.45
	450	4.75	5.38	5.98	6.56	7.12	7.67	8.21
	600	4.42	5.00	5.56	6.10	6.63	7.14	7.64
2.5	400	4.42	5.00	5.56	6.10	6.63	7.14	7.64
	450	4.30	4.86	5.40	5.93	6.44	6.93	7.42
	600	3.91	4.52	5.03	5.52	5.99	6.45	6.90
3.0	400	4.29	4.85	5.39	5.92	6.42	6.92	7.40
	450	4.16	4.71	5.24	5.74	6.24	6.72	7.19
	600	3.61	4.25	4.87	5.35	5.80	6.25	6.69

TABLE 11A
GANGLAM RAFTERS FOR LIGHT WEIGHT ROOF WITH NO CEILING (HIGH WIND)

SPACING (m)	MAXIMUM RAFTER SPAN 'S' (m)						
	RAFTER SIZE (x 45mm WIDTH)						
	290	330	380	430	480	530	580
0.9	6.26	7.08	7.87	8.54	9.07	9.57	10.06
1.2	5.69	6.35	6.93	7.43	7.89	8.32	8.74
1.8	4.73	5.26	5.72	6.13	6.50	6.85	7.19
2.4	4.16	4.61	5.01	5.36	5.68	5.98	6.27
3.0	3.78	4.18	4.53	4.84	5.12	5.39	5.65
3.6	3.51	3.86	4.18	4.46	4.72	4.96	5.19
4.2	3.30	3.62	3.91	4.17	4.40	4.62	4.84
4.8	3.13	3.43	3.70	3.94	4.15	4.36	4.56

NOTE: FOR WIND UPLIFT, BOTTOM EDGE RESTRAINTS ARE REQUIRED AT 1.2m CRS OVER MIDDLE HALF OF RAFTER SPAN. RESTRAINTS ARE NOT REQUIRED IF PURLINS HALF THE RAFTER DEPTH OR MORE ARE FIXED INTO THE SIDE OF THE RAFTERS

TABLE 11B
GANGLAM RAFTERS FOR LIGHT WEIGHT ROOF WITH CEILING

SPACING (m)	MAXIMUM RAFTER SPAN 'S' (m)						
	RAFTER SIZE (x 45mm WIDTH)						
	290	330	380	430	480	530	580
0.9	5.40	6.11	6.79	7.45	8.09	8.69	9.13
1.2	5.03	5.69	6.30	6.76	7.18	7.56	7.94
1.8	4.33	4.80	5.22	5.59	5.92	6.23	6.54
2.4	3.82	4.23	4.58	4.90	5.18	5.45	5.72
3.0	3.48	3.84	4.15	4.43	4.68	4.92	5.16
3.6	3.24	3.56	3.84	4.09	4.32	4.53	4.75
4.2	3.05	3.34	3.60	3.83	4.04	4.24	4.43
4.8	2.90	3.17	3.41	3.62	3.82	4.00	4.18

TABLE 11C
GANGLAM RAFTERS FOR HEAVY WEIGHT ROOF WITH CEILING

SPACING (m)	MAXIMUM RAFTER SPAN 'S' (m)						
	RAFTER SIZE (x 45mm WIDTH)						
	290	330	380	430	480	530	580
0.9	4.57	5.21	5.79	6.36	6.90	7.33	7.70
1.2	4.11	4.74	5.30	5.73	6.07	6.40	6.71
1.8	3.51	4.03	4.45	4.76	5.03	5.29	5.55
2.4	3.12	3.57	3.93	4.19	4.42	4.64	4.86
3.0	2.84	3.25	3.58	3.81	4.01	4.21	4.40
3.6	2.63	3.00	3.32	3.53	3.71	3.89	4.06
4.2	2.46	2.81	3.11	3.32	3.49	3.65	3.81
4.8	2.32	2.64	2.93	3.15	3.30	3.45	3.60

= regular duty plating
 = heavy duty plating
 = super heavy duty plating

Fixing Specifications

By comparing the shaded colour in the selection charts with the Fixing Index Table below, you are able to select the duty of the beam (Refer GANGLAM Plate Maximum Spacing Table on Page 21) e.g. 2/330 x 45 Regular Duty. Within that duty select the correct wind area as per NZS 3604 e.g. High Wind. Go to the GANGLAM depth selected e.g. 330 and find out your fixing index, e.g. 'B'.

You then look to the GANGLAM Site Connections on Page 19 for the fixing required for both the beam end and its support base e.g. beam end 4T10 on top, 4T10 and Strap Nail both sides - support base, 3/4T10's & 2 Bottom Plate Anchor Fixings.

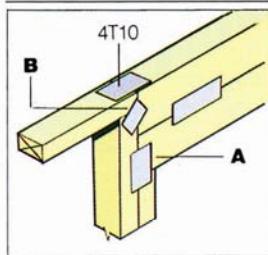
Please read the following notes carefully before selecting fixings.

1. These fixings have been capacity designed. Other fixings may be designed for use in lieu of these details.
2. All fixings should be LUMBERLOK unless otherwise specified.
3. All Nailon, Multigrip, Strapfixing, Joist Hangers etc to be fully nailed using 30mm x 3.15 dia. LUMBERLOK Product Nails.
4. All splices in beams are factory made.
5. Site penetrations of 50mm dia. maximum may be made along the beam centreline only. Holes must be clear of all connectors and be at least 1200mm apart.
6. Site fixings are to be placed with equal area on beam and support or support and base.

GANGLAM FIXING INDEX								
GANGLAM DUTY	WIND	GANGLAM DEPTH (mm)						
		290	330	380	430	480	530	580
REGULAR	L	A	A	A	A	A	A	A
	M	A	A	A	A	A	A	A
	H	B	B	E	E	E	E	E
	VH	B	B	F	F	F	F	F
HEAVY	L	A	A	A	A	A	A	A
	M	B	B	C	C	C	C	C
	H	D	D	F	F	F	F	F
	VH	D	D	F	F	F	F	F
SUPER	L	A	A	A	A	A	A	A
	M	B	D	E	E	E	E	E
	H	D	G	G	G	G	G	G
	VH	D	G	G	G	G	G	G
UNDERSTUDS		SINGLE	SINGLE*	DOUBLE	DOUBLE	DOUBLE	DOUBLE	DOUBLE

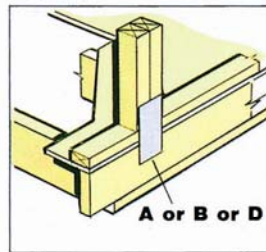
*NOTE: ALL 'G' FIXINGS REQUIRE DOUBLE UNDERSTUDS.

Site Connections



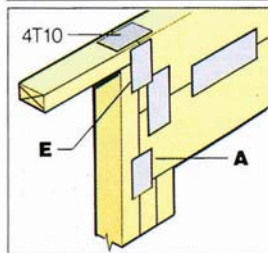
BEAM END — TYLOK

- A** 4T10 both sides
- B** As **A** plus Strap Nail both sides



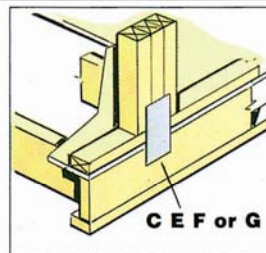
SUPPORT BASE — TWO STUDS ONTO TIMBER

- A** 8T10 one side only
- B** 10T15 one side only
- D** 200 x 110 x 1mm Nylon one side only



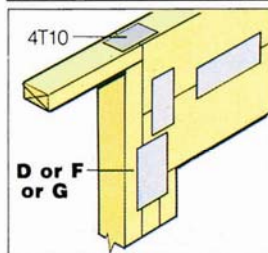
BEAM END — DOUBLE TYLOK

- E** As **A** plus 4T10 both sides



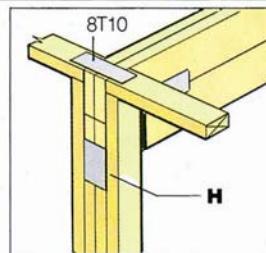
SUPPORT BASE — 3 STUDS ONTO TIMBER

- C** 10T15 one side only
- E** 200 x 110 x 1mm Nylon one side only
- F** 280 x 110 x 1mm Nylon one side only
- G** 360 x 110 x 1mm Nylon one side only



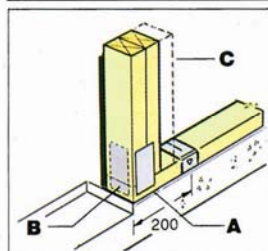
BEAM END — NAILON

- D** or **C** 200 x 110 x 1mm Nylon outside plus 4T10 inside
- F** 200 x 110 x 1mm Nylon both sides
- G** 280 x 110 x 1mm Nylon both sides



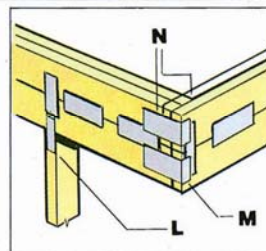
BEAM POCKET

- H** 6T15 TYLOK plate (Typical)



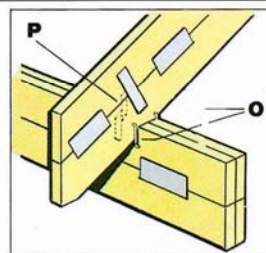
SUPPORT BASE — TYLOK ONTO CONCRETE

- A** 4T10 both sides 1 BOTTOM PLATE FIXING ANCHOR
- B** as **A** plus 4T10 to end stud plus BOTTOM PLATE ANCHOR
- C** as **B** but with double understud to beam



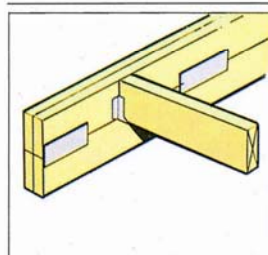
CANTILEVERED BEAM & SUSPENDED LINTEL

- L** 200mm Strapfixing both sides at each support (All cases)
- M** 1/200 x 50 x 110 x 1mm Nailon cleat & Multi-grip inside (Typical)
- N** 2 x **M** on Heavy roof over 200 x 100 suspended Lintel size (Typical)



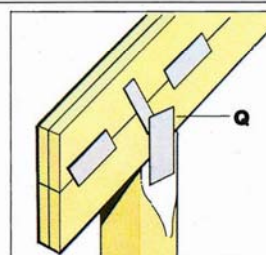
RAFTER TO BEAM

- O** 2 wire dogs with blocking for **A** to **D** index
- P** CT200 with 4 nails each end both sides for **E** to **G** (birdsmouth rafter only)



JOIST OR PURLIN TO GANGLAM

Joist or Purlin fixings may be selected by referring to the Maxspan brochure

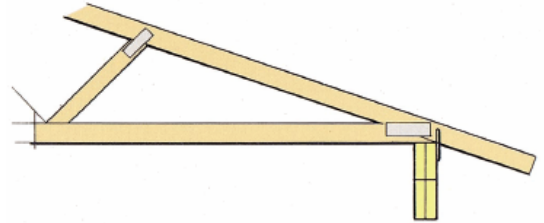


POLE TO GANGLAM

- Q** 200 x 110 x 1mm Nylon both sides onto pole cut for bearing and face cut for Nailon

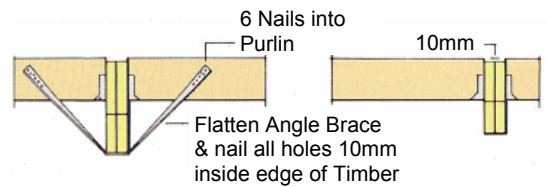
Top Edge Restraint

All GANGLAM lintels and rafters are to be restrained along their top edge at 900mm centres maximum for heavy roof and 1200mm centres maximum for light roof. Floor beams or joists are restrained along their top edge at 600mm centres maximum for beams up to 380mm deep and 450mm centres maximum for beams up to 580mm deep.



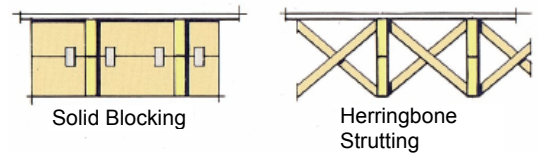
Bottom Edge Restraint

GANGLAM rafters subject to wind uplift are to be restrained along their bottom edge at 1.2m centres over middle half of rafter span. Bottom edge restraints are not required where purlins half the depth or more are fixed onto the side of the rafter.



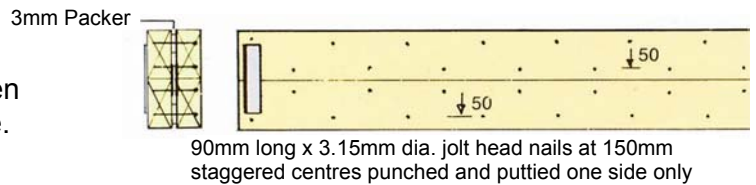
Joists

GANGLAM joists - to use solid blocking or herringbone strutting as per NZS 3604.



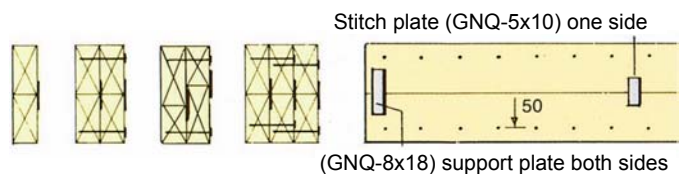
Architectural GANGLAM

Architectural GANGLAM Beams have no splices and all shear plates are in between layers with no stitch plates on the outside.



Multilayered Beams

Multilayered beams should be nailed together with 90mm x 3.15 dia. nails at 150mm centres along the top and bottom edges. Bolting together may be required if four or more layers are used.



GANGLAM Plate

The GNQ-10x25 plate is pressed on only one side of each 45mm layer for regular and heavy duty GANGLAM, and both sides for super duty GANGLAM. The plate spacing is not to exceed the maximum for that grade.

GANGLAM Plate Maximum Spacing

Regular Duty GANGLAM Plate Spacing : 600mm one side only
Heavy Duty GANGLAM Plate Spacing : 300mm one side only
*Super Heavy Duty GANGLAM Plate Spacing : 300mm both sides, no stitch plate required

* Architectural GANGLAMS are only regular or heavy duty.

Plate Specification

GANGLAM connector plates are G300 steel, Z275 galvanised, 1.0 and 1.6mm thickness. Grade 316 stainless steel is also available.

Support Plate

These are pressed on both sides of each 45mm layer directly above every support location.

Stitch Plate

These are pressed on the opposite side of the GANGLAM plates, spaced at not more than 2.0m apart.

They are not required for super duty GANGLAM or architectural GANGLAM.

Splice Plate

Splice Plate Size

Timber components may be butt-jointed to required length with splice plates on both sides of each 45mm layer. Splice plates should be located around quarter spans.

GANGLAM Depth (mm)	290, 330	380, 430	480, 530, 580
Splice Plate Size (GN16)	9x43	14x33	14x43

