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SPAN TABLES FOR ALFRESCO BEAMS from "MAXbeam" Structural Laminated Veneer Lumber Report for INDEPENDENT TIMBER SUPPLIES October 2003

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SPAN TABLES FOR ALFRESCO BEAMS

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Report for INDEPENDENT TIMBER SUPPLIES

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1. BACKGROUND

Following the production of span tables for carport beams, Independent Timber Supplies received a number of queries from builders asking whether the same beams could be used for Alfresco areas. The product can be used for this purpose, but new span tables are required

The properties of MAXbeam materials had previously been agreed for the production of the Carport beams. The same properties were used for this work.

Alfrescos are under the main roof, and the beams required are:

- 'Alfresco beams' – exposed beams around the edge of the roof
- Ridge beams (if specified).

Independent Timber Supplies indicated that the table would only be required for a total roof and ceiling weight of:

- 40 kg/m² for sheet roofs and
- 90 kg/m² for tiled roofs

Span tables have been produced in accordance with AS1684.1 for N1/N2 houses. Conventions and nomenclature used in the report are shown in Figure 1.

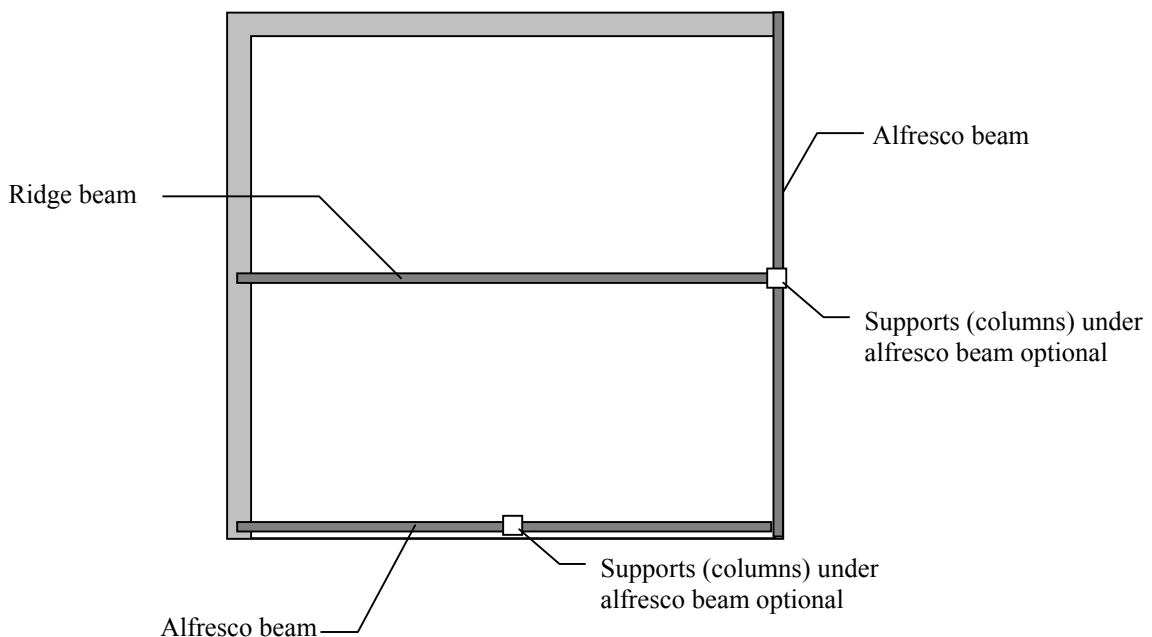


Figure 1 – Nomenclature used in Span Tables

2. PREPARATION OF SPAN TABLES

2.1 Properties

The following properties have been used in preparation of the span tables:

- $f'_b = 66.0 \text{ MPa}$
- $f'_s = 5.0 \text{ MPa}$
- $E = 18,500 \text{ MPa}$
- $\rho_b = 1.07$

These properties are consistent with the properties used in the preparation of carport beam span tables for the same material, and have been agreed with Jack Taylor report Monash University.

2.2 Basis of Span table preparation

The span tables were prepared using a spreadsheet that was created in accordance with the load cases, constraints and requirements for roof beams and lintels in AS1684.1:1999.

- Ridge Beam tables complied with requirements for Roof beams and Intermediate beams – and considered both roof loads and ceiling loads.
- Alfresco Beam tables were modelled extensively on the requirements for Roof beams and Intermediate beams, but included extra provisions drawn from strutting and hanging beams that can accommodate point loads.

All of the roof beam load cases given for roof and intermediate beams in AS1684.1:1999 were considered with the addition of the wind load cases given for lintels. (These included downward wind loads that were not listed for the roof and intermediate beams.)

The following additional assumptions were made:

- No overhangs were considered for the alfresco beams. (None of the plans provided included overhangs on the beams.)
- For continuous alfresco beams, maximum positive and negative bending moments may have been caused by different positions of the roof struts. The most adverse positions were chosen for each moment case.
- Exposed beams and ridge beams had both ceiling and roof attached to the upper side of the beam. This gives lateral restraint only to the upper edge. It is a conservative assumption, and will provide a safe solution for the case of beams within the ceiling space, with the ceiling attached to the bottom edge of the beam and the roof attached to the top edge.

2.3 Roof construction

The span tables can be used with a number of different types of roof construction. The different types mean that different load paths would result, and cause different loading patterns on the beams to be designed.

- All beams can be used for roofs with strutting from underpurlins or ridge beams to the alfresco beams.
- They can also be used with direct load transfer between rafters and the beams.

2.3.1 AS1684.1 Residential Timber Framed Construction – Design criteria

The design criteria for the preparation of the span tables was drawn from AS1684.1-1999.

The tables for the roof beams require designers to calculate the roof load width. This distance is defined in AS1684.2-1999.

Bending moment, shear force and deflection calculations were performed for both single spans and continuous spans based on the theory of elasticity. Appropriate duration of load factors are defined in AS1684.1 to account for inelastic behaviour of timber.

3. SPAN TABLES

Preliminary span tables were prepared based on the results of running software that matched performance against the criteria shown in the Design Criteria document AS1684.1. The ridge beam spans were compared against the tabulated values of spans for ridge beams with MGP10 properties. The spread sheet gave generally conservative results. Most spans were typically 100 mm or so less than the tabulated values.

Alfresco beams		Roof Load Width (mm)				
		1500	3000	4500	6000	7500
Size <i>d</i> x <i>b</i> (mm)	Total Ceiling & Roof mass (kg/m ²)	Max Beam Span (mm)				
		single span				
200x50	40	4500	3600	3200	2900	2600
	90	3600	2900	2500	2300	2100
200x65	10	4800	3900	3400	3100	2800
	60	3900	3100	2700	2500	2300
240x50	40	5300	4300	3800	3400	3100
	90	4300	3400	3000	2700	2500
240x65	40	5800	4700	4100	3700	3400
	90	4700	3700	3300	3000	2800
280x80	40	7000	5700	5100	4700	4300
	90	5800	4700	4100	3700	3500

Notes: Beams can be installed as exposed beams

Alfresco beams		Roof Load Width (mm)				
		1500	3000	4500	6000	7500
Size $d \times b$ (mm)	Total Ceiling & Roof mass (kg/m ²)	Max Beam Span (mm)				
		continuous span				
200x50	40	5600	4500	3900	3600	3300
	90	4200	3400	2900	2700	2500
200x65	10	6000	4900	4300	3900	3600
	60	4600	3700	3200	2900	2700
240x50	40	6700	5400	4700	4300	4000
	90	5100	4000	3500	3200	3000
240x65	40	7200	5800	5100	4700	4300
	90	5500	4400	3800	3500	3200
280x80	40	8900	7200	6400	5800	5400
	90	6800	5500	4800	4400	4100

Notes: Beams can be installed as exposed beams

Ridge beams		Roof Load Width (mm)				
		1500	3000	4500	6000	7500
Size $d \times b$ (mm)	Total Ceiling & Roof mass (kg/m ²)	Max Beam Span (mm)				
		single span				
200x50	40	4700	3700	3200	2900	2600
	90	3700	2900	2500	2300	2100
200x65	10	5100	4000	3500	3100	2800
	60	4000	3200	2800	2500	2300
240x50	40	5600	4500	3800	3400	3100
	90	4500	3500	3100	2700	2500
240x65	40	6100	4800	4200	3700	3400
	90	4800	3800	3300	3000	2800
280x80	40	7400	6000	5200	4700	4300
	90	6000	4800	4200	3800	3500

Notes: Beams can be installed as exposed beams

The span tables are valid provided the MaxBeam properties remain unchanged.



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