APPENDIX C – SPAN TABLES

C.1 Introduction

This Appendix has been taken from the **OneSteel** publication, *Design Note No. D3* (Nov 2005). It contains span tables covering various primary and secondary beam spans with common design floor loadings. It is intended that these tables will be used by engineers to assist in the preliminary design of a composite steel and concrete floor system. The solutions provided may be conservative but can be refined during the final design process.

C.2 Design Criteria

These tables were generated using COMPBEAM® version 2.0 software. This software assists in the design of simply supported beams in accordance with Australian Standard AS 2327.1 - 2003.

C.2.1 Design Variables

The following factors represent the variables in the design charts:

- **Design Loads**
    - Standard offices
    - Premium offices
    - Standard retail
    - Premium retail
    - Plant rooms
    - Compactus areas
    - Carparking
- **Secondary Beam Spans** from 8 to 17m
- **Primary Beam Spans** from 8 to 12m

C.2.2 Fixed Design Variables

The design variables that have been fixed in these tables are:

- **300PLUS®** Grade beams as these are widely recognised as being the most economical
- **Re-entrant profiled steel decking** as trapezoidal decks are not permitted by AS 2327.1 - 2003
- **1.0mm decking** as this is commonly available and generally results in more economical floor system than 0.75mm thick decking
- **2.8m secondary beam spacing** - common span for 1.0mm re-entrant decking
- **Slab thickness** - the slab thickness tabulated for each load condition is considered the most economical for that particular design load
- **Deflection criteria** - the criteria adopted are those commonly required in practice for the design loading. E.g; premium retail has incremental deflection criteria of span/500 while a standard retail has an incremental deflection criteria of span/300
- **Incremental deflection** - the sum of the creep and in-service shrinkage based on 300μ strain and the short-term live load (γs.Q)
- **Maximum camber of 50mm** - The camber is determined by summing the deflection due to self weight of the wet concrete, ponding and steel beam and rounding down to the nearest 5mm
- **No propping** to maximise speed of construction

These criteria will suit preliminary design for most applications. However, should the design variables be significantly different from those available in the tables, the preliminary design should be produced from first principles using AS 2327.1 and design tools such as CompPanel® and COMPBEAM®.

C.3 Design Charts

The design information provided by the charts in Table C.1 to Table C.4 includes the following:

- Secondary and primary beam sizes
- Number of 19mm diameter shear studs
- Beam camber
- Slab thickness
- Concrete strength
- Natural frequency of the beam

These values will enable a designer to develop a preliminary design suitable for costing typical bays.

C.4 Supporting Design Aids and Tools

Numerous design aids and tools are available to support these charts including CompPanel®, COMPBEAM® and CompSelector® which are available from OneSteel.

C.4.1 CompPanel® and COMPBEAM®

CompPanel® and COMPBEAM® are analysis software that have the capacity to check other design options not covered by these tables including edge beams, non-prismatic sections, varying slab widths, propped construction and load combinations.

C.4.2 CompSelector®

Covers spreadsheet software that reads these tables and selects beams for preliminary design.

C.4.3 Floor Vibrations

While these tables provide a value for natural frequency of the secondary beam and the secondary/primary beam combination, a check on acceptability is still required. Users of this technical note are directed to the ASI Publication *Floor Vibrations in Composite Steel Office Buildings* for guidance on how this may be done and software contained in CompPanel®.

		Standard Offices Q = 3 + 1.5				Premium Grade Offices Q = 4 + 1.5			
Span (m)	Spacing (m)	Beam 300PLUS	Camber (mm)	Nos studs per beam	Nat. Fn Hz	Beam 300PLUS	Camber (mm)	Nos studs per beam	Nat. Fn Hz
Secondary Beams									
8	2.8	310UB40.4	30	21	6.4	310UB40.4	30	21	6.4
9	2.8	360UB44.7	35	23	5.8	360UB44.7	35	23	5.8
10	2.8	360UB50.7	45	26	4.0	410UB53.7	30	26	5.6
11	2.8	410UB53.7	50	28	4.6	410UB53.7	50	28	4.6
12	2.8	460UB67.1	45	32	4.7	460UB67.1	45	32	4.7
13	2.8	460UB82.1	50	34	4.3	460UB82.1	50	34	4.3
14	2.8	530UB82.0	50	36	4.2	530UB82.0	50	36	4.2
15	2.8	610UB101	45	39	4.4	610UB101	45	39	4.4
16	2.8	610UB113	50	41	4.1	610UB113	50	41	4.1
17	2.8	700WB115	45	44	4.1	700WB115	45	44	4.1
Primary Beams									
8	8	460UB74.6	20	34	4.8	460UB82	20	38	4.9
8	9	530UB82.0	0	38	4.8	530UB82.0	0	38	4.8
8	10	530UB92.4	0	42	4.3	530UB92.4	0	42	4.7
8	11	530UB92.4	0	42	4.2	530UB92.4	0	42	4.2
8	12	530UB92.4	20	42	4.0	610UB101	0	46	4.2
8	13	610UB101	0	46	4.2	610UB101	0	46	4.2
8	14	610UB101	0	46	3.9	610UB101	0	46	3.9
8	15	610UB113	0	48	3.9	610UB125	0	54	3.0
8	16	610UB125	0	54	3.8	610UB125	0	54	3.8
8	17	610UB125	0	54	3.7	700WB115	0	52	3.7
8.4	8	460UB82.0	25	38	4.7	460UB82.1	25	38	4.7
8.4	9	530UB82.0	20	38	4.6	530UB82.0	20	38	4.6
8.4	10	530UB92.4	20	42	4.2	530UB92.4	20	42	4.5
8.4	11	530UB92.4	20	42	4.1	610UB101	0	46	4.2
8.4	12	610UB101	0	46	4.0	610UB101	0	46	4.0
8.4	13	610UB101	20	46	4.1	610UB113	0	48	4.2
8.4	14	610UB113	0	48	3.9	610UB125	0	54	3.9
8.4	15	610UB125	0	54	3.9	610UB125	0	54	3.9
8.4	16	610UB125	20	54	3.8	700WB115	0	52	3.8
8.4	17	700WB115	0	52	3.7	800WB122	0	52	3.7
9	8	530UB82.0	25	38	4.6	530UB82.0	25	38	4.6
9	9	530UB92.4	25	42	4.4	530UB92.4	25	42	4.4
9	10	610UB101	20	46	4.2	610UB101	20	46	4.4
9	11	610UB101	20	46	4.0	610UB101	20	46	4.0
9	12	610UB113	20	48	3.9	610UB125	0	54	3.0
9	13	610UB125	20	54	4.0	610UB125	20	54	4.0
9	14	610UB125	20	54	3.8	700WB115	0	52	3.8
9	15	700WB115	20	52	3.8	800WB122	0	52	3.9
9	16	800WB122	0	52	3.8	800WB122	0	52	3.8
9	17	800WB122	0	52	3.6	800WB122	0	52	3.6
10	8	610UB101	20	46	4.4	610UB101	20	46	4.4
10	9	610UB101	25	46	4.1	610UB101	25	46	4.1
10	10	610UB113	25	48	3.9	610UB125	20	54	4.2
10	11	610UB125	25	54	3.8	610UB125	25	54	3.8
10	12	700WB115	20	52	3.8	700WB115	20	52	3.8
10	13	800WB122	0	52	3.0	800WB122	0	52	3.0
10	14	800WB122	20	52	3.7	800WB122	20	52	3.7
10	15	800WB146	0	62	3.8	800WB146	0	62	3.8
10	16	800WB146	0	62	3.6	800WB146	0	62	3.6
10	17	800WB146	20	62	3.5	800WB146	20	62	3.5
11	8	610UB113	30	48	4.1	610UB125	25	54	4.2
11	9	610UB125	30	54	3.9	610UB125	30	54	3.9
11	10	700WB115	25	52	3.7	800WB122	20	52	4.1
11	11	800WB122	20	52	3.8	800WB122	20	52	3.8
11	12	800WB122	25	52	3.6	800WB146	20	62	3.8
11	13	800WB146	20	62	3.8	800WB146	20	62	3.8
11	14	800WB146	20	62	3.5	800WB146	20	62	3.5
11	15	800WB146	25	62	3.5	900WB175	0	66	3.7
11	16	900WB175	0	66	3.6	900WB175	0	66	3.6
11	17	800WB168	20	66	3.3	900WB175	20	66	3.5
12	8	610UB125	40	54	3.8	700WB115	30	52	3.0
12	9	800WB122	25	52	3.0	800WB122	25	52	3.0
12	10	800WB122	30	52	3.6	800WB146	20	62	4.0
12	11	800WB146	25	62	3.6	800WB146	25	62	3.6
12	12	800WB146	25	62	3.5	800WB146	25	62	3.5
12	13	800WB146	30	62	3.5	800WB168	25	66	3.6
12	14	800WB168	25	66	3.4	900WB175	20	66	3.5
12	15	900WB175	25	66	3.5	900WB175	25	66	3.5
12	16	900WB175	25	66	3.3	900WB175	25	66	3.3
12	17	800WB192	25	98	3.2	1000WB215	20	66	3.4

Assumptions: 120mm Slab, F'c =25 MPa, 2400 kg/m^2 on decking with pan width 200mm, Un-propped, 12.5mm ponding allowance
Incremental Defl limit < Span / 300, Total Defl limit < Span / 250

Table C.1 - Office floors.

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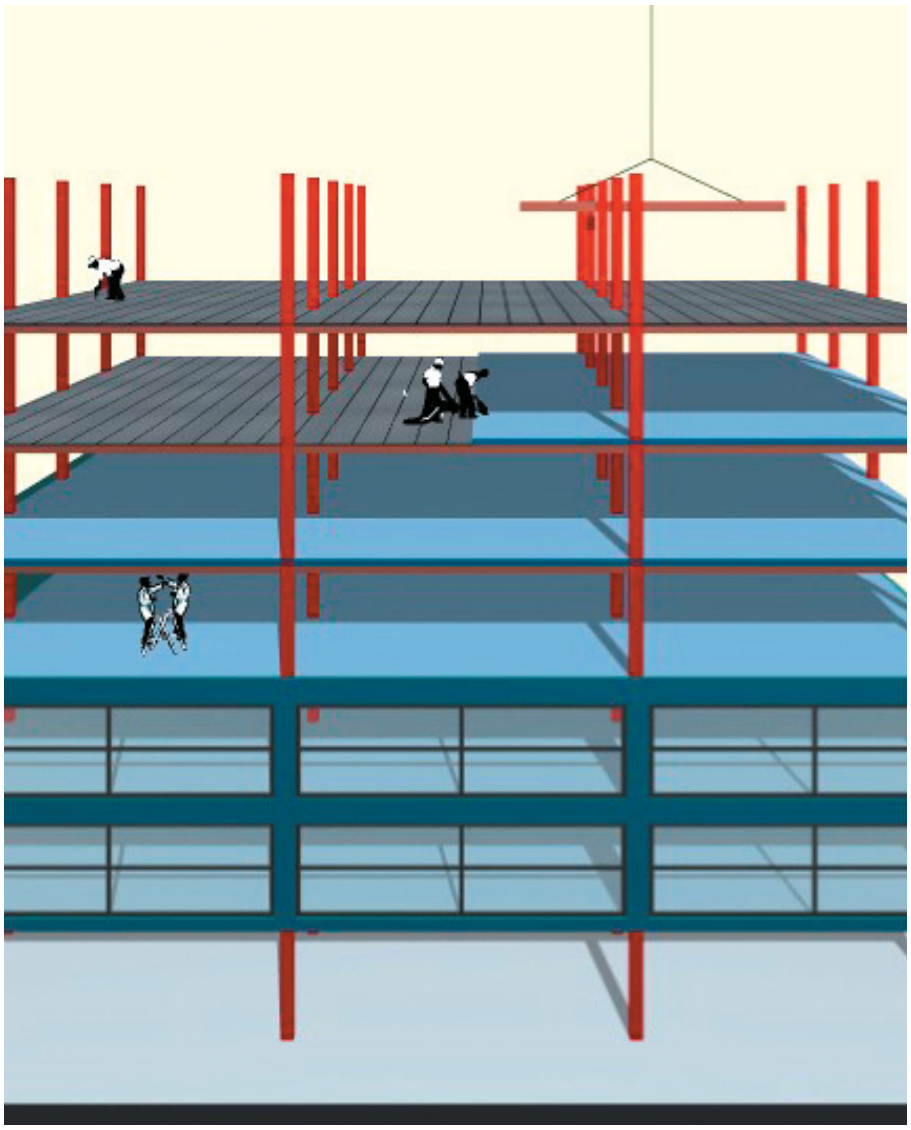
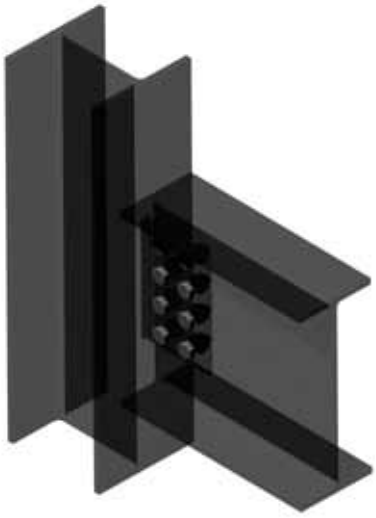
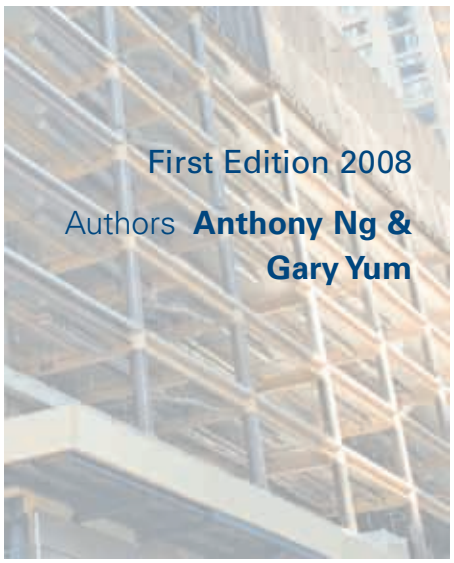
Design aspects for construction – Composite steel framed structures







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