

B2. Preliminary Slab Design

Before making a decision regarding which floor framing alternative to adopt, it is necessary to establish the maximum decking span corresponding to the spacing of the secondary beams.

Recall that a decision has been made to use the BlueScope Steel / Lysaght product Bondek for the purposes of this text, while acknowledging that on a real design project a decision could be made to use one of several similar alternative products from different suppliers.

A preliminary estimate of the maximum unpropped composite slab span has to be determined at this stage to enable finalisation of a floor framing plan including all beam centreline dimensions.

Refer to Appendix I for Theory and Discussion related to Composite Slabs.

As discussed in Appendix I, the design of composite slabs is complex and generally will be based primarily on reference to manufacturer's published recommendations or specialised proprietary design software. These recommendations may change from time to time due to changes in products and design requirements, and on the basis of ongoing research into product performance and design. For this reason it is essential to access the latest information concerning the product being used.

The current Lysaght Bondek User's Guide (June 2005) was accessed from <http://www.bluescopesteel.com.au>. This provides "formwork span tables" defining the maximum slab span with deflections limited to either Span / 240 or Span / 130 for single and multiple spans. To minimise the number of supporting beams the heaviest 1.0 mm Bondek is adopted. Referring to the floor framing alternatives, in both cases the Bondek will be continuous over at least 4 equal spans in all locations for both alternatives.

The formwork span tables are only intended for preliminary design and they do not consider the fire requirements or the superimposed loading on the floor. To achieve the required FRL of 120/120/120 a minimum 120 slab thickness is required (being the same as the minimum for conventional reinforced concrete). The superimposed loading will affect the detailed slab design including the amount of conventional reinforcement required. Generally it will not affect the maximum slab span, that is primarily dictated by the strength and stiffness of the Bondek at the time of the slab pour.

For this product the absolute maximum slab span for a 120 thick slab continuous over two spans and with deflections limited to Span / 130 is listed in the User's Guide as 3400. (For Span / 240 this reduces to 2850. For three span systems, perhaps unexpectedly and as a result of pattern loading, the maximum spans typically reduce by around 7%.)

It would generally be unwise to go right to the 3400 span limit without detailed checking. If a design were developed on this basis but subsequently it was found that the decking could not span this far then potentially time consuming design rework could be required. On the other hand, pushing the decking to its limit may allow the number of beams per floor to be significantly reduced. For the purposes of preliminary design a maximum span of 3000 will be adopted.

(A detailed check using the design software Bondek2003.xls gives a maximum span of just under 3100. As shown in the adopted floor framing system, the actual maximum span turns out to be 2800.)

ADOPT maximum composite slab span for preliminary design purposes of 3000 mm



Composite Design Example for Multistorey Steel Framed Buildings

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Table of contents

Table of contents	iii
Preface	v
Section A: INPUT INFORMATION	1
A1. Client and Architectural Requirements	2
A2. Site Characteristics	4
A3. Statutory Requirements	5
A4. Serviceability	8
A5. Design Loads	9
A6. Materials and Systems	10
A7. Design Aids and Codes	11
Section B: CONCEPTUAL AND PRELIMINARY DESIGN	12
B1. Conceptual and Preliminary Design	13
B1.1 Consideration of alternative floor framing systems– Scheme A	14
B1.2 Consideration of alternative floor framing systems– Scheme B	15
B1.3 Framing system for horizontal loading – initial distribution of load	16
B1.4 Alternatives for overall distribution of horizontal load to ground	17
B2. Preliminary Slab Design	21
B3. From Alternatives to Adopted Systems	22
B3.1 Adopted floor framing arrangement	22
B3.2 Adopted framing arrangement for horizontal loading	23
B4. Indicative Construction Sequence and Stages	24
B4.1 The importance of construction stages in composite design	24
B4.1 Indicative construction sequence and construction stages	25
B4.2 Adopted construction sequence for design of erection columns	27
B4.3 Core construction alternatives	27
B4.4 Adopted construction method for the core	27
B5. Preliminary Sizing of Primary and Secondary Beams	28
B6. Plenum Requirements and Floor to Floor Height	30
B7. Preliminary Column Sizes and Core Wall Thickness	33
Section C: DETAILED DESIGN	35
C1. Detailed Design - Introduction	36
C2. Design Stages and Construction Loading	37
C3. Detailed Load Estimation After Completion of Construction	38
C3.1 Vertical loading	38
C3.2 Wind loading	39
C3.3 Seismic loading Not considered	40
C4. Erection Column Design	41
C4.1 Load distribution for erection column design	42
C4.2 Side Column C5 (typical of C5 to C10)	43
C4.3 End column C2 (typical of C2, C3, C12 and C13)	44
C4.4 Corner column C1 (typical of columns C1, C4, C11 and C14)	44
C5. Floor Beams – Construction Stage 1	45
C5.1 Secondary beams Group S1(11 050, 2800) (Beams B22 – B41, B43 – 48)	45
C5.2 Primary beams Group P1(9800, 5725) (Beams B1, B7 to B12, B18,	46
B19 – 21, B49 – 51 and B42)	46
C5.3 Primary beams Group P2(9250, 6600) (B2, B6, B13 and B17)	47
C6. Floor Beams – Construction Stage 3	48
C6.1 Secondary beams Group S1(11 050, 2800) (Beams B22 – 41, B43 – 48)	48
C6.2 Primary beams Group P1(9800, 5725) (Beams B1, B7 - B12, B18 – 21,	49
B49 – 51 and B42)	49
C6.3 Primary beams Group P2(9250, 6600) (Beams B2, B6, B13, B17)	49
C7 Floor Beam Design for Occupancy Loading	50
C7.1 Secondary beams Group S1(11 050, 2800) (Beams B19, B21, B22 - B41,	51
B43 – B49 and B51)	51



C7.2	Primary beams Group P1(9800,5725) (Beams B1, B7 to B12, B18)	58
C7.3	Primary beams group P2(9050, 6600) (Beams B2, B6, B13, B17)	63
C8.	Assessment of Dynamic Performance of Floor System	69
C8.1	Definition of the dynamic assessment process	69
C8.2	Application of the dynamic assessment process	73
C9	Final Slab Design	79
C9.1	Slab design for the office areas	79
C9.2	Slab design for the compactus areas	80
C10.	Longitudinal Shear Reinforcement Design	81
C10.1	Introduction	81
C10.2	Proprietary longitudinal shear reinforcement products	83
C10.3	Secondary beams group S1, B22 typical – longitudinal shear design	84
C10.4	Internal primary beams group P2, (B2 typical) longitudinal shear design	85
C10.5	Primary beams P1, (B1 typical) – longitudinal shear design	87
C10.6	Perimeter beams B19 to 21 and B49 to 51	88
C11.	Floor System Design Review and Final Decisions	89
C11.1	Floor design review	89
C11.2	Final floor framing plan and deck reinforcement	90
C12.	Final Design of RC Columns	91
C13.	Detailed Design of the Core	91
C13.1	Preliminary discussion and statement of limitations of this section	91
C13.2	Basic modelling of the core using beam elements	92
C13.3	The Space Gass Analysis Model	96
C13.4	Model verification and static deflections for W_s	97
C13.5	Dynamic analysis for natural frequency of building	98
C13.6	Interpretation and application of stress resultants from Space Gass	100
C13.7	Further investigation of the core using a Strand7 finite element model	102
C13.8	Review of core investigations	105
C14.	Steel Connection Design	106
C14.1	Can it be built?	106
C14.2	Representative connections	108
C14.3	Web side plate connection design for $V^* = 142$ kN	108
C14.4	Flexible end plate connection for $V^* = 279$ kN	112
C14.5	B2 to core web side plate connection for $V^* = 308$ kN	113
C14.6	Column splice for a load of $N^* = 1770$ kN	114
C14.7	Column base plate for a load of $N^* = 1770$ kN	115
C15.	Web Penetrations	116
C16.	Some Final Thoughts and Disclaimers	117
Appendix I	Theory and discussion – composite slabs	119
Appendix II	Theory and discussion - composite beams	133
Appendix III	Dynamic assessment of the floor system	149
Appendix IV	Theory and discussion steel connections	163
Appendix V	Corrosion and fire protection	175

