

EXAMPLE LOAD/SPAN TABLES

SIMPLE BEAMS

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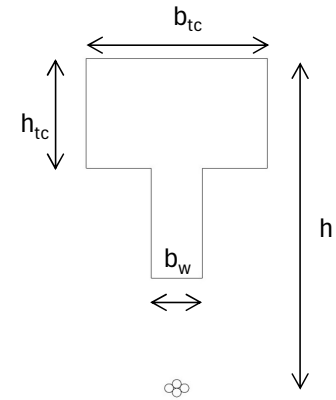
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NOT FOR CONSTRUCTION

LOAD TABLES ARE TO BE USED FOR PRELIMINARY DESIGN ONLY.
DETAILED DESIGN IS TO BE CARRIED OUT BY OR WITH INPUT FROM
minimass.

Assumptions and Notes:

- concrete strength, $f_{ck} = 40\text{MPa}$
 - grade Y1860 for prestressing steel
 - consequence class CC2
 - beams designed as simply supported
 - first stressing in the factory (note: alternative option available = mild steel bottom chord with no stressing)
 - second stressing on site to offset permanent load deflection (note: second stressing is not always required)
 - δ_{lev} is precamber introduced in the factory, incl. effect of first stressing
 - δ_{DL+SDL} is deflection after application of permanent loads and second stressing
 - δ_{DL+SDL} can be varied to suit specific project requirements
 - δ_{LTQP} is long term deflection at quasi-permanent load values, including creep
 - +ve displacement is downwards
 - dimensions indicated can be varied to suit specific project requirements
 - $\psi_2 = 0.6$ in all calculations
 - h_{tc} (minimum) = 250 mm, but can increase in multiples of 10 mm to any higher value
 - b_{tc} (minimum) = 210 mm, but can increase in multiples of 30 mm to any higher value
 - h (minimum) = 400 mm, but can increase in multiples of 10 mm to any higher value
 - b_w is typically set to equal b_{tc} but can be reduced to suit project specific requirements
- alternative cross-section geometries for the concrete top chord are possible, including inverted T (boot) and L sections, contact minimass for design input if required



			span, L	m	6	7	8	9	10	11	12	15	20	25	30
h_{tc}	250 mm	top chord thickness	qRd	kN/m	44,2	30,5	18,3	13,6							
b_{tc}	210 mm	top chord width	qDL+SDL	kN/m	18,6	13,0	8,1	6,2							
b_w	210 mm	thickness of concrete web	δ_{lev}	mm	-20	-24	-25	-30							
h	400 mm	full height of beam at midspan	δ_{DL+SDL}	mm	-23	-32	-24	-26							
Φ_p	15,7 mm	strand diameter	δ_{LTOP}	mm	3	0	12	13							
			CO2e	kg/m	44,8	44,4	43,0	43,3							
			mass	kg/m	173,5	171,6	168,9	170,4							
			# strands		3	3	2	2							

			span, L	m	6	7	8	9	10	11	12	15	20	25	30
h_{tc}	250 mm	top chord thickness	qRd	kN/m	108,4	50,3	34,4	23,9	18,6	13,8					
b_{tc}	300 mm	top chord width	qDL+SDL	kN/m	44,7	21,3	15,0	10,7	8,6	6,7					
b_w	300 mm	thickness of concrete web	δ_{lev}	mm	-20	-23	-27	-30	-33	-29					
h	500 mm	full height of beam at midspan	δ_{DL+SDL}	mm	-31	-31	-42	-36	-40	-37					
Φ_p	15,7 mm	strand diameter	δ_{LTOP}	mm	-4	-1	-8	4	4	6					
			CO2e	kg/m	66,9	62,8	62,3	62,0	61,5	62,1					
			mass	kg/m	261,8	253,5	250,1	253,5	250,7	254,1					
			# strands		7	4	4	3	3	3					

			span, L	m	6	7	8	9	10	11	12	15	20	25	30
h_{tc}	300 mm	top chord thickness	qRd	kN/m	156,5	117,4	87,8	61,4	40,3	29,7	19,2				
b_{tc}	300 mm	top chord width	qDL+SDL	kN/m	64,3	48,5	36,6	26,0	17,5	13,3	9,0				
b_w	300 mm	thickness of concrete web	δ_{lev}	mm	-22	-25	-27	-30	-33	-37	-40				
h	600 mm	full height of beam at midspan	δ_{DL+SDL}	mm	-28	-35	-37	-49	-43	-54	-26				
Φ_p	15,7 mm	strand diameter	δ_{LTOP}	mm	-5	-4	3	-7	5	-6	22				
			CO2e	kg/m	64,4	70,0	71,8	72,7	70,0	70,6	68,0				
			mass	kg/m	294,6	297,1	296,1	301,7	295,7	299,7	294,3				
			# strands		7	7	7	7	5	5	3				

			span, L	m	6	7	8	9	10	11	12	15	20	25	30
h_{tc}	350 mm	top chord thickness	qRd	kN/m		151,7	114,8	90,5	72,5	56,7	46,1	20,8			
b_{tc}	300 mm	top chord width	qDL+SDL	kN/m		62,6	47,7	37,9	30,7	24,3	20,1	9,9			
b_w	300 mm	thickness of concrete web	δ_{lev}	mm		-25	-27	-33	-33	-37	-40	-42			
h	750 mm	full height of beam at midspan	δ_{DL+SDL}	mm		-32	-33	-47	-44	-53	-60	-43			
Φ_p	15,7 mm	strand diameter	δ_{LTOP}	mm		-7	-2	-9	1	-4	-6	12			
			CO2e	kg/m		73,5	78,9	77,7	79,4	80,3	79,7	77,2			
			mass	kg/m		340,8	343,1	347,7	346,2	351,8	348,0	343,5			
			# strands			7	7	7	7	7	7	7	5		

			span, L	m	6	7	8	9	10	11	12	15	20	25	30
h_{tc}	400 mm	top chord thickness	qRd	kN/m			301,6	238,3	185,4	137,9	106,2	48,1	21,7		
b_{tc}	400 mm	top chord width	qDL+SDL	kN/m			123,7	98,2	77,0	57,8	45,1	21,7	11,1		
b_w	400 mm	thickness of concrete web	δ_{lev}	mm			-29	-34	-33	-42	-40	-50	-30		
h	1000 mm	full height of beam at midspan	δ_{DL+SDL}	mm			-44	-50	-51	-51	-63	-49	-43		
Φ_p	15,7 mm	strand diameter	δ_{LTOP}	mm			18	19	-14	-8	-16	11	3		
			CO2e	kg/m			125,7	124,9	121,9	121,9	119,2	113,2	119,4		
			mass	kg/m			545,8	555,4	544,7	554,2	544,8	535,0	542,4		
			# strands				15	15	15	12	12	7	7		

			span, L	m	6	7	8	9	10	11	12	15	20	25	30
h_{tc}	500 mm	top chord thickness	qRd	kN/m				377,0	303,1	255,6	208,0	113,0	31,7	20,0	
b_{tc}	400 mm	top chord width	qDL+SDL	kN/m				154,6	124,9	105,8	86,6	48,4	15,7	11,0	
b_w	400 mm	thickness of concrete web	δ_{lev}	mm				-33	-33	-37	-46	-58	-38	6	
h	1200 mm	full height of beam at midspan	δ_{DL+SDL}	mm				-45	-44	-50	-64	-74	-36	-10	
Φ_p	15,7 mm	strand diameter	δ_{LTOP}	mm				-19	-13	-13	-22	-22	-6	-3	
			CO2e	kg/m				139,2	143,7	145,8	141,9	147,5	130,4	133,7	
			mass	kg/m				666,0	663,4	676,7	664,9	668,7	648,1	636,8	
			# strands					19	19	19	19	19	7	7	

			span, L	m	6	7	8	9	10	11	12	15	20	25	30
h_{tc}	700 mm	top chord thickness	qRd	kN/m					398,4	329,8	282,2	181,9	97,4	55,1	34,0
b_{tc}	500 mm	top chord width	qDL+SDL	kN/m					165,4	137,8	118,7	78,3	44,3	27,3	18,8
b_w	500 mm	thickness of concrete web	δ_{lev}	mm					-52	-52	-52	-52	-62	-45	-4
h	1500 mm	full height of beam at midspan	δ_{DL+SDL}	mm					-56	-58	-55	-63	-75	-37	-17
Φ_p	15,7 mm	strand diameter	δ_{LTQP}	mm					-38	-36	-30	-28	-31	2	-37
			CO2e	kg/m					214,0	210,4	216,1	219,4	218,7	210,1	210,1
			mass	kg/m					1187,4	1165,3	1157,2	1127,7	1092,6	1061,5	1047,6
			# strands						19	19	19	19	19	15	15

