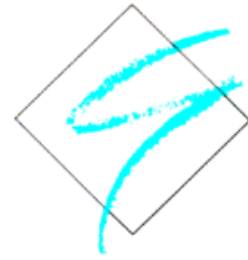


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**STRUCTURAL CALCULATIONS**

CLIENT: MAXISPAN

JOB ADDRESS: 6 DAPHNE STREET KURRALTA PARK SA

JOB NUMBER: 32408

DATE: JUL'18

ENGINEER: SS

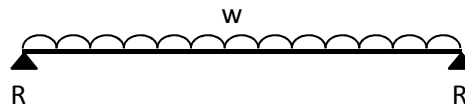
Notes:

1. Dead and live loads and load combinations to AS1170.0 and AS1170.1
2. Wind Loads to AS/NZS1170.2
3. Steelwork to AS4100
4. Concrete to AS3600
5. Masonry to AS3700
6. Timber to AS1720.1



Floor Joist

L = 4.6 m



Loads

			<u>DL (kN/m)</u>		<u>LL (kN/m)</u>
S/W	-	-	0.10		
Wall (HB)	0.0 m	1.00 kPa	0.00		
Roof (S)	0.0 m	0.40 kPa	0.00	0.25 kPa	0.00
Floor	0.6 m	0.70 kPa	0.42	1.50 kPa	0.90

Load combinations

w = DL =	0.5 kN/m	-->	R =	1.2 kN
w = LL =	0.9 kN/m	-->	R =	2.1 kN
w* = 1.2DL + 1.5LL =	2.0 kN/m	-->	R* =	4.5 kN

TRY: WB4510 (FLR)

Check Strength

M* = 5.22 kNm
M_{oa} =
α_s =
α_m =
φM_{sx} = 24.47 kNm :: OK

$M = 0.125wL^2$
AS4100 - C5.6.1
AS4100 - C5.6.1
AS4100 - T5.6.1

Check deflection

I_x = 13.9 x 10⁶ mm⁴
Δ_{dl} = 1.1 mm (~L / 4218)
Δ_{total} = 3.0 mm (~L / 1545)

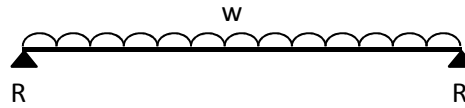
$$\Delta = \frac{5wL^4}{384EI}$$

USE: WB4510



Floor Joist (Wet Area)

L = 3.5 m



Loads

			<u>DL (kN/m)</u>		<u>LL (kN/m)</u>
S/W	-	-	0.10		
Wall (HB)	0.0 m	1.00 kPa	0.00		
Roof (S)	0.0 m	0.40 kPa	0.00	0.25 kPa	0.00
Floor	0.5 m	1.20 kPa	0.54	1.50 kPa	0.68

Load combinations

w = DL =	0.6 kN/m	-->	R =	1.1 kN
w = LL =	0.7 kN/m	-->	R =	1.2 kN
w* = 1.2DL + 1.5LL =	1.8 kN/m	-->	R* =	3.1 kN

TRY: WB3510 (FLR)

Check Strength

M* =	2.73 kNm
M _{oa} =	
α _s =	
α _m =	
φM _{sx} =	18.53 kNm :: OK

$$M = 0.125wL^2$$

AS4100 - C5.6.1
AS4100 - C5.6.1
AS4100 - T5.6.1

Check deflection

I _x =	8.19 x 10 ⁶ mm ⁴
Δ _{dl} =	0.8 mm (~L / 4584)
Δ _{total} =	1.6 mm (~L / 2231)

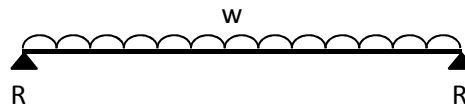
$$\Delta = \frac{5wL^4}{384EI}$$

USE: WB3510



BEAM B1

L = 3.2 m



Loads

			<u>DL (kN/m)</u>		<u>LL (kN/m)</u>
S/W	-	-	0.10		
Wall (HB)	2.7 m	1.00 kPa	2.70		(Ballastrade)
Roof (S)	2.0 m	0.40 kPa	0.80	0.25 kPa	0.50
Floor	0.6 m	1.20 kPa	0.72	1.50 kPa	0.90

Load combinations

w = DL =	4.3 kN/m	-->	R =	6.9 kN
w = LL =	1.4 kN/m	-->	R =	2.2 kN
w* = 1.2DL + 1.5LL =	7.3 kN/m	-->	R* =	11.7 kN

TRY: WB4510 (FLR)

Check Strength

M* =	9.32 kNm
M _{oa} =	
α _s =	
α _m =	
φM _{sx} =	24.47 kNm :: OK

$$M = 0.125wL^2$$

AS4100 - C5.6.1
AS4100 - C5.6.1
AS4100 - T5.6.1

Check deflection

I _x =	13.9 x 10 ⁶ mm ⁴
Δ _{dl} =	2.1 mm (~L / 1508)
Δ _{total} =	2.8 mm (~L / 1139)

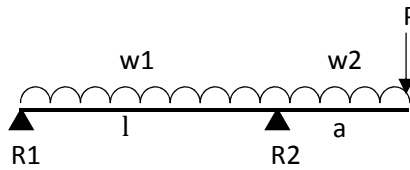
$$\Delta = \frac{5wL^4}{384EI}$$

USE: WB4510



BEAM B2

l = 4.5 m
a = 1.0 m
L = 5.5 m



Loads

UDL - w1			DL (kN/m)		LL (kN/m)
S/W	-	-	0.10		
Wall (HB)	2.7 m	1.00 kPa	2.70		
Roof (S)	1.8 m	0.40 kPa	0.72	0.25 kPa	0.45
Floor	1.8 m	1.00 kPa	1.80	1.50 kPa	2.70

UDL - w2			DL (kN/m)		LL (kN/m)
Wall (HB)	2.7 m	1.00 kPa	2.70		
Roof (S)	1.8 m	0.40 kPa	0.72	0.25 kPa	0.45
Floor	1.8 m	1.00 kPa	1.80	1.50 kPa	2.70

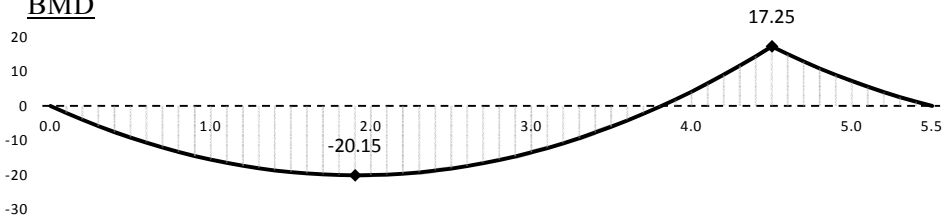
Load Combinations

	w1 (kN/m)		w2 (kN/m)		P (kN)		R1 (kN)	R2 (kN)
Working	DL	5.32	DL	5.32	6.9	-->	9.8	26.3
Ultimate	1.2DL+1.5LL	11.11	1.2DL+1.5LL	11.11	11.7	-->	21.2	51.6

TRY: WB4510 (FLR)

Check Strength

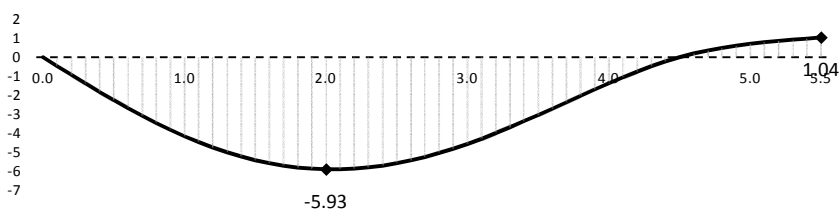
BMD



M* = 20.15 kNm
-M* = -17.25 kNm
Mo a =
 α_s =
 α_m =
 ϕM_{sx} = 24.47 kNm :: OK

AS4100 - C5.6.1
AS4100 - C5.6.1
AS4100 - T5.6.1

Check Deflection



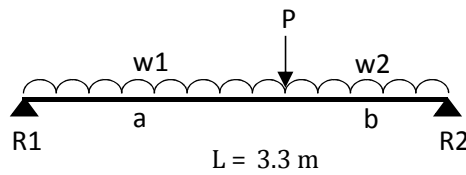
(~l / 759)
(~a / 962)

USE: WB4510



BEAM B3

a = 1.7 m
b = 1.6 m



Loads

UDL - w1			DL (kN/m)		LL (kN/m)
S/W	-	-	0.35		
Wall (HB)	0.0 m	1.00 kPa	0.00		
Roof (S)	0.0 m	0.40 kPa	0.00	0.25 kPa	0.00
Floor	0.0 m	0.70 kPa	0.00	1.50 kPa	0.00

UDL - w2			DL (kN/m)		LL (kN/m)
Wall (HB)	0.0 m	1.00 kPa	0.00		
Roof (S)	0.0 m	0.40 kPa	0.00	0.25 kPa	0.00
Floor	0.0 m	0.70 kPa	0.00	1.50 kPa	0.00

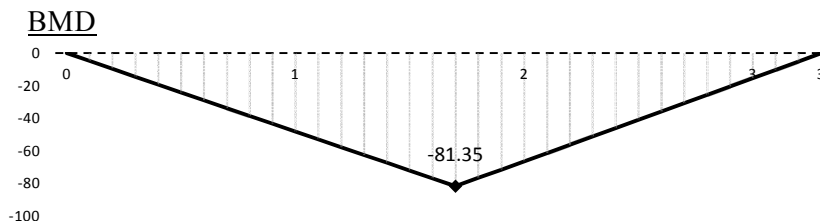
Load combinations

	w1	w2	P		R1	R2
(W) DL	0.35	0.35	37.0	-->	18.5	19.6
(W) LL	0.00	0.00	36.0	-->	17.5	18.5
(U) 1.2DL+1.5LL	0.42	0.42	98.0	-->	48.2	51.2

0

TRY: 250PFC Le = 1.7 m

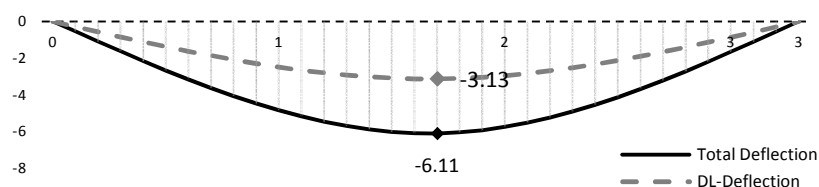
Check Strength



M* = 81.35 kNm
Moa = 328.83 kNm
 α_s = 0.83
 α_m = 1.00
 ϕM_{bx} = 95.02 kNm :: OK

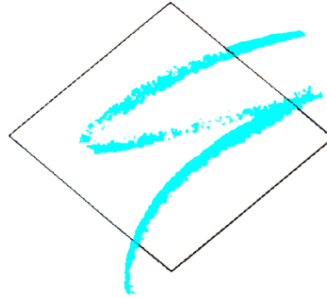
AS4100 - C5.6.1
AS4100 - C5.6.1
AS4100 - T5.6.1

Check Deflection



(~L / 540)
(~L / 1054)

USE: 250PFC



WIND BEAM (WB2)

$$\text{Contributing Width (c/w)} = 3.5 \text{ m}$$

$$\text{Beam Span (L)} = 3.3 \text{ m}$$

$$\text{Wind Speed (Ws)} = 26 \text{ m/s}$$

$$\begin{aligned} q &= [(Ws^2) \times 0.6] / 1000 \\ &= 0.41 \text{ kPa} \end{aligned}$$

$$\begin{aligned} F_R &= (0.7 + 0.5) \times q \times c/w \\ &= 1.70 \text{ kN/m} \end{aligned}$$

$$\begin{aligned} M_{(\text{working})} &= (F_R \times L^2) / 8 \\ &= 2.32 \text{ kNm} \end{aligned}$$

$$I_{\text{req}} = 994815$$

$$= 0.995 \times 10^6 \text{ mm}^4$$

$$\text{Deflection Limit} = \frac{L}{250}$$

USE: 102 X 76 X 3.5 RHS Grade C450L0

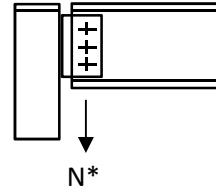


COLUMN C1

Max height = 3.0 m

Loads

$$\begin{aligned} N^* &= 52.00 \text{ kN} \\ N_e^* &= 52.00 \text{ kN} \\ M_e^* &= 7.51 \text{ kNm} \quad (e = 0.145 \text{ m}) \end{aligned}$$



TRY: 89x89x3.5 SHS

Properties

$$\begin{aligned} \phi N_s &= 364.0 \text{ kN} \quad (\text{for } l_e = 3.0 \text{ m}) \\ \phi N_c &= 211.0 \text{ kN} \\ \phi M_{sx} &= 11.5 \text{ kNm} \\ \phi M_{bx} &= 11.5 \text{ kNm} \end{aligned}$$

Check section capacity

$$\frac{M_e^*}{\phi M_s} + \frac{N^*}{\phi N_s} = 0.80 < 1.0, \text{ therefore OK}$$

Check member capacity

$$\frac{M_e^*}{\phi M_b} + \frac{N^*}{\phi N_c} = 0.90 < 1.0, \text{ therefore OK}$$

USE: 89x89x3.5 SHS

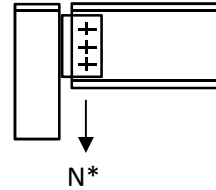


COLUMN C1

Max height = 3.0 m

Loads

$$\begin{aligned} N^* &= 80.00 \text{ kN} \\ N_e^* &= 80.00 \text{ kN} \\ M_e^* &= 11.56 \text{ kNm} \quad (e = 0.145 \text{ m}) \end{aligned}$$



TRY: 89x89x6.0 SHS

Properties

$$\begin{aligned} \phi N_s &= 589.0 \text{ kN} \quad (\text{for } l_e = 3.0 \text{ m}) \\ \phi N_c &= 324.0 \text{ kN} \\ \phi M_{sx} &= 17.9 \text{ kNm} \\ \phi M_{bx} &= 17.9 \text{ kNm} \end{aligned}$$

Check section capacity

$$\frac{M_e^*}{\phi M_s} + \frac{N^*}{\phi N_s} = 0.78 < 1.0, \text{ therefore OK}$$

Check member capacity

$$\frac{M_e^*}{\phi M_b} + \frac{N^*}{\phi N_c} = 0.89 < 1.0, \text{ therefore OK}$$

USE: 89x89x6.0 SHS