GINOS ENGINEERING PTY LTD
Consulting Engineers
ABN 22 621 716 121

2nd Floor 185 Victoria Square
ADELAIDE SA 5000
Phone (08) 8212 4900
email@ginosengineers.com.au
www.ginosengineers.com.au

STRUCTURAL CALCULATIONS

CLIENT: MAXISPAN

JOB ADDRESS: 6 DAPHNE STREET KURRALTA PARK SA

JOB NUMBER: 32408-1

DATE: JUL'18

ENGINEER: SS

Notes:

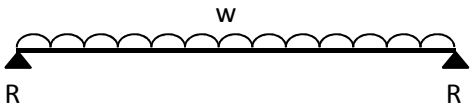
1. Dead and live loads and load combinations to AS1170.0 and AS1170.1
2. Wind Loads to AS/NZS1170.2
3. Steelwork to AS4100
4. Concrete to AS3600
5. Masonry to AS3700
6. Timber to AS1720.1

GINOS ENGINEERING PTY LTD
Consulting Engineers

Job: 32408-1
Design: SS
Date: Jul-18
Page: 1

Floor Joist

L = 4.6 m



Loads

			DL (kN/m)		LL (kN/m)
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 $M = 0.125wL^2$
Moa = AS4100 - C5.6.1
α_s = AS4100 - C5.6.1
α_m = AS4100 - T5.6.1
φMsx = 24.47 kNm :: OK

Check deflection

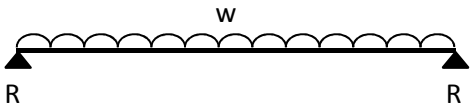
Ix = 13.9 x 10^6 mm^4
Δ_dl = 1.1 mm (~L / 4218)
Δ_total = 3.0 mm (~L / 1545)

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

USE: WB4510

Floor Joist (Wet Area)

L = 4.6 m



Loads

			DL (kN/m)		LL (kN/m)
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 =	1.5 kN
w = LL =	0.7 kN/m	-->	R =	1.6 kN
w* = 1.2DL + 1.5LL =	1.8 kN/m	-->	R* =	4.1 kN

TRY: WB3510 (FLR)

Check Strength

M* = 4.71 kNm $M = 0.125wL^2$
Moa = AS4100 - C5.6.1
α_s = AS4100 - C5.6.1
α_m = AS4100 - T5.6.1
φMsx = 18.53 kNm :: OK

Check deflection

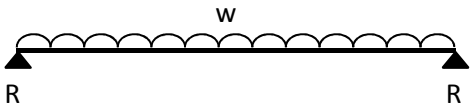
Ix = 8.19 x 10^6 mm^4
Δ_dl = 2.3 mm (~L / 2019)
Δ_total = 4.7 mm (~L / 983)

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

USE: WB3510

BEAM B1

L = 3.2 m



Loads

			DL (kN/m)		LL (kN/m)	
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		$M = 0.125wL^2$
Moa =			AS4100 - C5.6.1
α_s =			AS4100 - C5.6.1
α_m =			AS4100 - T5.6.1
φMsx =	24.47 kNm :: OK		

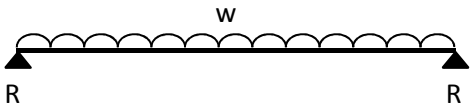
Check deflection

Ix =	13.9 x 10^6 mm^4		
Δ_dl =	2.1 mm	(~L / 1508)	$\Delta = \frac{5wL^4}{384EI}$
Δ_total =	2.8 mm	(~L / 1139)	

USE: WB4510

BEAM B1

L = 5.0 m



Loads

			DL (kN/m)		LL (kN/m)	
S/W	-	-	0.10			
Wall (HB)	0.0 m	1.00 kPa	0.00			(Ballastrade)
Roof (S)	0.0 m	0.40 kPa	0.00	0.25 kPa	0.00	
Floor	1.0 m	1.20 kPa	1.20	1.50 kPa	1.50	

Load combinations

w = DL =	1.3 kN/m	-->	R =	3.3 kN
w = LL =	1.5 kN/m	-->	R =	3.8 kN
w* = 1.2DL + 1.5LL =	3.8 kN/m	-->	R* =	9.5 kN

TRY: WB4510 (FLR)

Check Strength

M* =	11.91	kNm	$M = 0.125wL^2$
Moa =			AS4100 - C5.6.1
α_s =			AS4100 - C5.6.1
α_m =			AS4100 - T5.6.1
φMsx =	24.47	kNm :: OK	

Check deflection

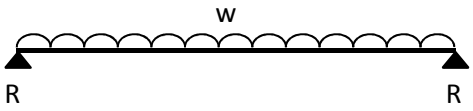
Ix =	13.9 x 10^6	mm^4	
Δ_dl =	3.8	mm	(~L / 1314)
Δ_total =	8.2	mm	(~L / 610)

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

USE: WB4510

BEAM B2

L = 4.6 m



Loads

			DL (kN/m)		LL (kN/m)
S/W	-	-	0.20		
Wall (HB)	2.7 m	1.00 kPa	2.70		
Roof (S)	2.0 m	0.40 kPa	0.80	0.25 kPa	0.50
Floor	0.3 m	0.70 kPa	0.21	1.50 kPa	0.45

Load combinations

w = DL =	3.9 kN/m	-->	R =	9.0 kN
w = LL =	1.0 kN/m	-->	R =	2.2 kN
w* = 1.2DL + 1.5LL =	6.1 kN/m	-->	R* =	14.1 kN

TRY: 2/WB4510 (FLR)

Check Strength

M* =	16.18	kNm	$M = 0.125wL^2$
Moa =			AS4100 - C5.6.1
α_s =			AS4100 - C5.6.1
α_m =			AS4100 - T5.6.1
φMsx =	48.94	kNm :: OK	

Check deflection

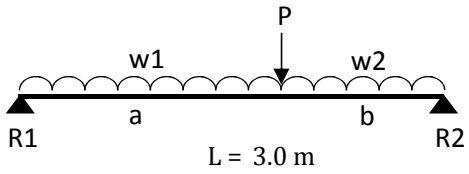
Ix =	27.8 x 10^6	mm^4	
Δ_dl =	4.1	mm	(~L / 1122)
Δ_total =	5.1	mm	(~L / 903)

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

USE: 2/WB4510

BEAM B3

a = 2.4 m
b = 0.6 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

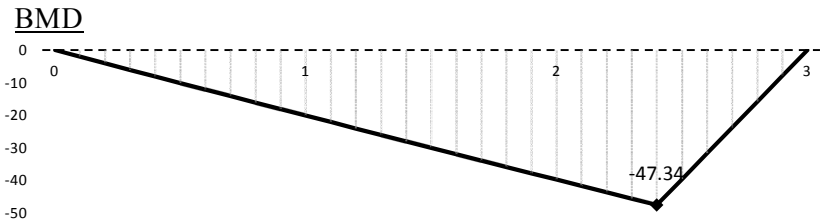
Load combinations

	w1	w2	P		R1	R2
(W) DL	0.35	0.35	37.0	-->	7.9	30.1
(W) LL	0.00	0.00	36.0	-->	7.2	28.8
(U) 1.2DL+1.5LL	0.42	0.42	98.0	-->	20.2	79.0

0

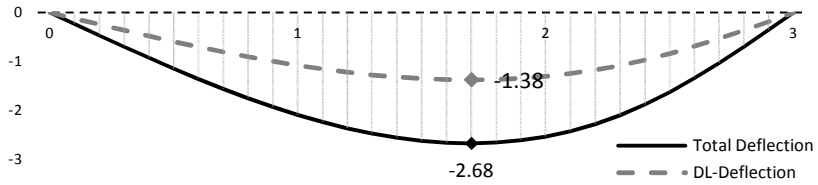
TRY: 250PFC Le = 2.4 m

Check Strength



M* = 47.34 kNm
Moa = 197.62 kNm AS4100 - C5.6.1
α_s = 0.72 AS4100 - C5.6.1
α_m = 1.00 AS4100 - T5.6.1
φMbx = 82.48 kNm :: OK

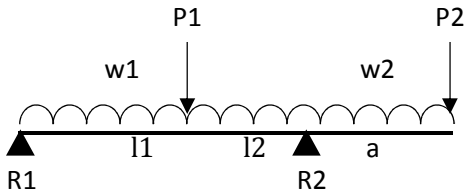
Check Deflection



(~L / 1119)
(~L / 2174)

USE: 250PFC

BEAM B4



l1 =	4.6 m
l2 =	1.5 m
a =	1.2 m
L =	7.3 m

Loads

UDL - w1			DL (kN/m)		LL (kN/m)
S/W	-	-	0.40		
Wall (HB)	2.7 m	1.00 kPa	2.70		
Roof (S)	2.0 m	0.40 kPa	0.80	0.25 kPa	0.50
Floor	2.0 m	1.00 kPa	2.00	3.00 kPa	6.00

UDL - w2			DL (kN/m)		LL (kN/m)
Wall (HB)	2.7 m	1.00 kPa	2.70		
Roof (S)	2.0 m	0.40 kPa	0.80	0.25 kPa	0.50
Floor	2.0 m	1.00 kPa	2.00	3.00 kPa	6.00

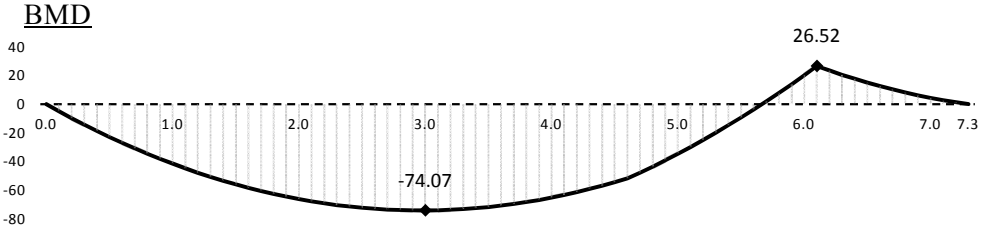
Load Combinations

	w1 (kN/m)		w2 (kN/m)		P1 (kN)	P2 (kN)		R1 (kN)	R2 (kN)
Working	DL	5.90	DL	5.90	5.0	6.0	-->	17.3	36.7
Ultimate	1.2DL+1.5LL	16.83	1.2DL+1.5LL	16.83	12.0	12.0	-->	49.9	96.9

TRY: 310UB40 Le = 4.6 m

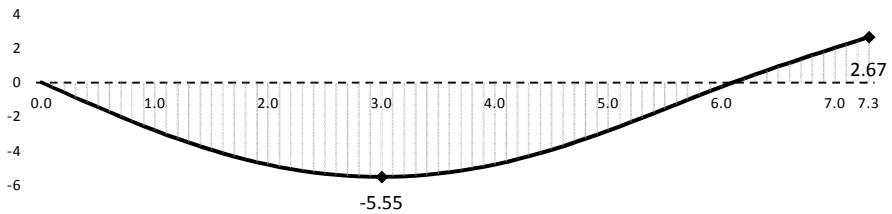
Check Strength

BMD



M* =	74.07	kNm	
-M* =	-26.52	kNm	
Moa =	141.24	kNm	AS4100 - C5.6.1
α_s =	0.49		AS4100 - C5.6.1
α_m =	1.00		AS4100 - T5.6.1
φMbx =	89.04	kNm :: OK	

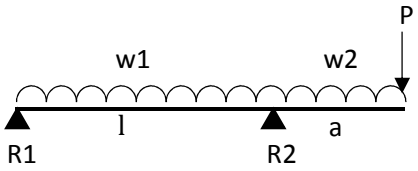
Check Deflection



(~l / 1099)
(~a / 449)

USE: 310UB40

BEAM B5



l =	2.3 m
a =	0.5 m
L =	2.8 m

Loads

UDL - w1			DL (kN/m)		LL (kN/m)
S/W	-	-	0.10		
Wall (Br.Vr)	0.0 m	2.40 kPa	0.00		
Roof (T)	0.0 m	1.00 kPa	0.00	0.25 kPa	0.00
Floor	2.0 m	1.00 kPa	2.00	1.50 kPa	3.00

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	2.0 m	1.00 kPa	2.00	1.50 kPa	3.00

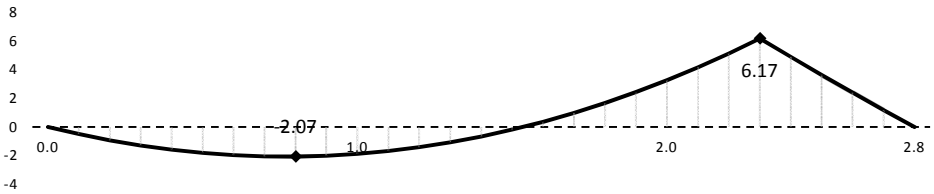
Load Combinations

	w1 (kN/m)		w2 (kN/m)		P (kN)		R1 (kN)	R2 (kN)
Working	DL	2.10	DL+LL	5.10	6.9	-->	0.6	13.6
Ultimate	1.2DL+1.5LL	7.02	1.2DL	2.52	11.7	-->	5.4	23.7

TRY: 150x50x4.0 RHS Le = 2.0 m

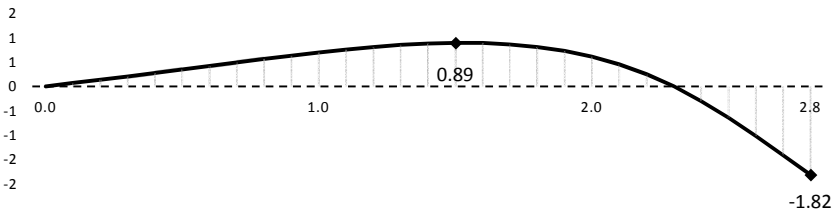
Check Strength

BMD



M* =	2.07	kNm	
-M* =	-6.17	kNm	
Moa =	223.06	kNm	AS4100 - C5.6.1
α_s =	0.98		AS4100 - C5.6.1
α_m =	1.00		AS4100 - T5.6.1
φMbx =	20.18	kNm :: OK	

Check Deflection

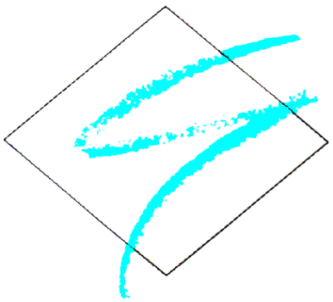


(~l / 2584)
(~a / 275)

USE: 150x50x4.0 RHS

GINOS ENGINEERS PTY LTD
Consulting Engineers
A.B.N. 82 082 586 178

2nd Floor
185 Victoria Square
Adelaide SA 5000
Telephone:(08) 8212 4900
Facsimile:(08) 8212 3829



WIND BEAM (WB1)

Contributing Width (c/w)	=	3.5	m
Beam Span (L)	=	4.3	m
Wind Speed (Ws)	=	26	m/s
q	=	[(Ws^2)x0.6]/1000	
	=	0.41	kPa
F_R	=	(0.7+0.5)x q x c/w	
	=	1.70	kN/m
$M_{(working)}$	=	(F_R x L^2)/8	
	=	3.94	kNm

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

I_{req} = 2200929

= **2.2×10^6 mm^4**

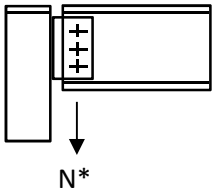
USE: **125PFC** **GRADE 300**

COLUMN C1

Max height = 3.0 m

Loads

N* = 52.00 kN
N^*_e = 52.00 kN
M^*_e = 7.51 kNm (e = 0.145 m)



TRY: 89x89x3.5 SHS

Properties

Ns = 364.0 kN (for le = 3.0m)
Nc = 211.0 kN
Msx = 11.5 kNm
Mbx = 11.5 kNm

Check section capacity

$$\frac{M_e^*}{\phi M_S} + \frac{N^*}{\phi N_S} = 0.80 \quad < 1.0, \text{ therefore OK}$$

Check member capacity

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

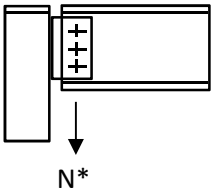
USE: 89x89x3.5 SHS

COLUMN C2

Max height = 3.0 m

Loads

N* = 80.00 kN
N^*_e = 80.00 kN
M^*_e = 11.56 kNm (e = 0.145 m)



TRY: 89x89x6.0 SHS

Properties

Ns = 589.0 kN (for le = 3.0m)
Nc = 324.0 kN
Msx = 17.9 kNm
Mbx = 17.9 kNm

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