



## STRUCTURAL COMPUTATIONS

**DATE:** 12.03.2019

**JOB NUMBER:** 119605

**PROPOSED:** Residence

**SITE ADDRESS:** Lot. 322, No. 40, Samphire  
Drive ,Connewarre

**CLIENT:** Desbo Industries Pty Ltd

**SHEETS:** 64

**DESIGNED BY:** Jiao Wang  
B.E. CIVIL

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## Document Template

Template v released 11.02.2016

## Document Revision History

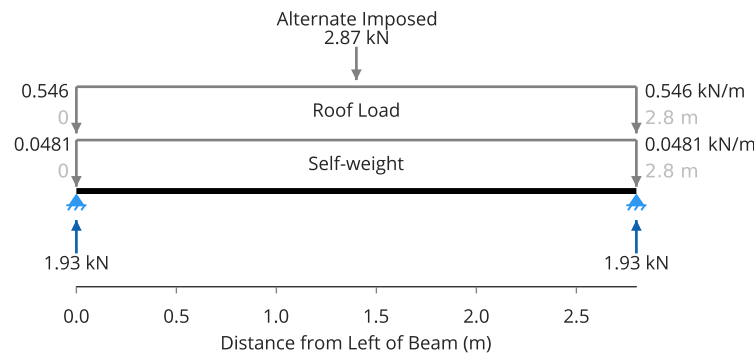
Date	Version	Author	Comments
12.03.2019	Vv:0	Jiao Wang	First Edition



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	GL1

### Summary

	Moment Demand	$M^* = 2.22 \text{ kNm}$
30%	Moment Capacity	$M_d = 7.5 \text{ kNm}$
	Shear Demand	$V^* = 1.82 \text{ kN}$
12%	Shear Capacity	$V_d = 15.8 \text{ kN}$
	Bearing Demand	$N^* = 1.82 \text{ kN}$
8%	Governing Bearing Capacity	$N_{d,gov} = 22.5 \text{ kN}$
24%	Long Term Serviceability Deflection	$\delta_l = 2.43 \text{ mm}$
57%	Short Term Serviceability Deflection	$\delta_s = 5.71 \text{ mm}$
	Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
	Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	150 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 1$
Member Orientation	Major Axis
Total Span Length	$L = 2800 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 2800 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	23.9	1.93
Pinned	2800	50	1	23.9	1.93

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	600	0.4	0.25	0	2800

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	2800
Uplift Wind	Wu,up	-0.311	-0.311	0	2800
Service Wind	Ws	-0.185	-0.185	0	2800

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	1400

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 7.98 \text{ kNm} \quad \phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 16.8 \text{ kN} \quad \phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 23.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	1.84	-0.921	0.645	0.921
<b>1.2G, 1.5Q</b>	0.94	3.86	1.93	2.36	1.93
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	1.64	-0.818	0.573	0.818
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	1.48	-0.74	0.518	0.74
<b>0.9G, W<sub>u</sub>up</b>	1	-0.17	0.0848	-0.0594	-0.0848
<b>G, E<sub>u</sub>, Q<sub>E</sub></b>	1	0.778	-0.389	0.272	0.389
<b>1.2G, S<sub>u</sub>, Q<sub>comb</sub></b>	0.8	1.17	-0.583	0.408	0.583

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	0.261	0.407
<b>G, Q<sub>st</sub></b>	2.58	5.71
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	1.29	2.02
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	0.778	1.21
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	0.778	1.21

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	0.778	2.43
<b>G, Q<sub>lt</sub></b>	0.778	2.43
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	0.778	2.43

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	0.778	-0.389	0.272	0.389	1.21
<i>Q</i> (Imposed)	0.42	-0.21	0.147	0.21	0.656
<i>W<sub>u</sub>down</i> (Ultimate Downward Wind)	0.548	-0.274	0.192	0.274	0.855
<i>W<sub>u</sub>up</i> (Ultimate Upward Wind)	-0.869	0.435	-0.304	-0.435	-1.36
<i>W<sub>s</sub></i> (Service Wind)	-0.517	0.258	-0.181	-0.258	-0.806
<i>Eu</i> (Ultimate Earthquake)	0	0	0	0	0
<i>Es</i> (Service Earthquake)	0	0	0	0	0
<i>Su</i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>Ss</i> (Service Snow/Liquid)	0	0	0	0	0

## Comments

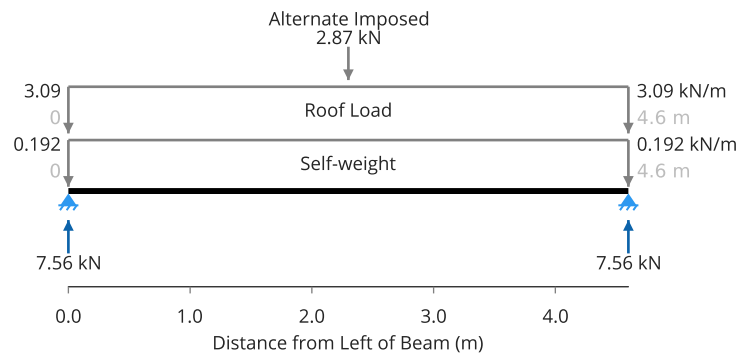
### Comments



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<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	GL2

### Summary

Moment Demand	$M^* = 5.39 \text{ kNm}$
17% Moment Capacity	$M_d = 31.8 \text{ kNm}$
Shear Demand	$V^* = 4.69 \text{ kN}$
12% Shear Capacity	$V_d = 38.2 \text{ kN}$
Bearing Demand	$N^* = 4.69 \text{ kN}$
17% Governing Bearing Capacity	$N_{d,gov} = 27.3 \text{ kN}$
60% Long Term Serviceability Deflection	$\delta_l = 6.01 \text{ mm}$
43% Short Term Serviceability Deflection	$\delta_s = 4.25 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	300 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 2$
Member Orientation	Major Axis
Total Span Length	$L = 4600 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 4600 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	47.9	8.23
Pinned	4600	50	1	47.9	8.23

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	3400	0.4	0.25	0	4600

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	4600
Uplift Wind	Wu,up	-0.311	-0.311	0	4600
Service Wind	Ws	-0.185	-0.185	0	4600

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	2300

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$



## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 55.7 \text{ kNm} \quad \phi \cdot k_{4,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 67 \text{ kN} \quad \phi \cdot k_{4,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 47.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	16.5	-8.23	9.46	8.23
<b>1.2G, 1.5Q</b>	0.94	15.1	-7.56	8.69	7.56
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	14.6	-7.32	8.41	7.32
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	9.24	-4.62	5.31	4.62
<b>0.9G, W<sub>u</sub>up</b>	1	4.83	-2.41	2.78	2.41
<b>G, Eu, Q<sub>E</sub></b>	1	6.95	-3.47	4	3.47
<b>1.2G, Su, Q<sub>comb</sub></b>	0.8	10.4	-5.21	5.99	5.21

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	6.1	2.64
<b>G, Q<sub>st</sub></b>	9.69	4.25
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	7.8	3.37
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	6.95	3.01
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	6.95	3.01

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	6.95	6.01
<b>G, Q<sub>lt</sub></b>	6.95	6.01
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	6.95	6.01

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	6.95	-3.47	4	3.47	3.01
<i>Q</i> (Imposed)	3.91	-1.96	2.25	1.96	1.69
<i>W</i> <sub>u<sub>down</sub></sub> (Ultimate Downward Wind)	0.9	-0.45	0.517	0.45	0.389
<i>W</i> <sub>u<sub>up</sub></sub> (Ultimate Upward Wind)	-1.43	-0.714	-0.821	-0.714	-0.618
<i>W</i> <sub>s</sub> (Service Wind)	-0.849	0.424	-0.488	-0.424	-0.367
<i>E</i> <sub>u</sub> (Ultimate Earthquake)	0	0	0	0	0
<i>E</i> <sub>s</sub> (Service Earthquake)	0	0	0	0	0
<i>S</i> <sub>u</sub> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>S</i> <sub>s</sub> (Service Snow/Liquid)	0	0	0	0	0

## Comments

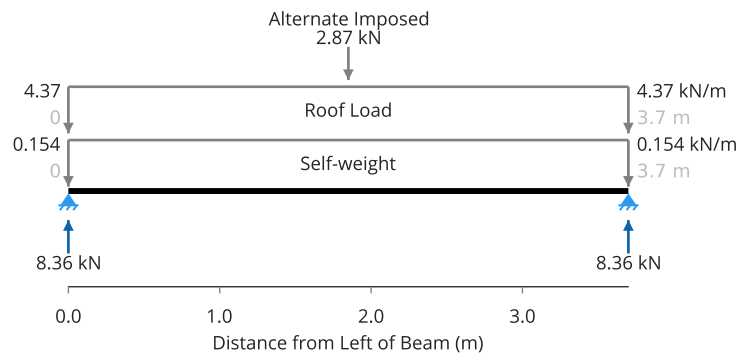
### Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RL1

### Summary

Moment Demand	$M^* = 4.71 \text{ kNm}$
22% Moment Capacity	$M_d = 21.2 \text{ kNm}$
Shear Demand	$V^* = 5.1 \text{ kN}$
17% Shear Capacity	$V_d = 30.6 \text{ kN}$
Bearing Demand	$N^* = 5.1 \text{ kN}$
19% Governing Bearing Capacity	$N_{d,gov} = 27.3 \text{ kN}$
66% Long Term Serviceability Deflection	$\delta_l = 6.64 \text{ mm}$
47% Short Term Serviceability Deflection	$\delta_s = 4.69 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	240 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 2$
Member Orientation	Major Axis
Total Span Length	$L = 3700 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 3700 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	47.9	8.94
Pinned	3700	50	1	47.9	8.94

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	4800	0.4	0.25	0	3700

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	3700
Uplift Wind	Wu,up	-0.311	-0.311	0	3700
Service Wind	Ws	-0.185	-0.185	0	3700

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	1850

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 37.3 \text{ kNm} \quad \phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 53.6 \text{ kN} \quad \phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 47.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	17.9	-8.94	8.27	8.94
<b>1.2G, 1.5Q</b>	0.94	16.7	-8.36	7.73	8.36
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	15.9	-7.95	7.35	7.95
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	9.78	-4.89	4.53	4.89
<b>0.9G, W<sub>u</sub>up</b>	1	5.65	-2.82	2.61	2.82
<b>G, Eu, Q<sub>E</sub></b>	1	7.55	-3.78	3.49	3.78
<b>1.2G, Su, Q<sub>comb</sub></b>	0.8	11.3	-5.66	5.24	5.66

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	6.87	3.02
<b>G, Q<sub>st</sub></b>	10.7	4.69
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	8.23	3.62
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	7.55	3.32
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	7.55	3.32

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	7.55	6.64
<b>G, Q<sub>lt</sub></b>	7.55	6.64
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	7.55	6.64

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load $E_d$ (kN)	Shear $V^*$ (kN)	Moment $M^*$ (kNm)	Max Reaction $R^*$ (kN)	Deflection $\Delta$ (mm)
$G$ (Permanent)	7.55	-3.78	3.49	3.78	3.32
$Q$ (Imposed)	4.44	-2.22	2.05	2.22	1.95
$W_{u_{down}}$ (Ultimate Downward Wind)	0.724	-0.362	0.335	0.362	0.318
$W_{u_{up}}$ (Ultimate Upward Wind)	-1.15	-0.574	-0.531	-0.574	-0.505
$W_s$ (Service Wind)	-0.683	-0.341	-0.316	-0.341	-0.3
$E_u$ (Ultimate Earthquake)	0	0	0	0	0
$E_s$ (Service Earthquake)	0	0	0	0	0
$S_u$ (Ultimate Snow/Liquid)	0	0	0	0	0
$S_s$ (Service Snow/Liquid)	0	0	0	0	0

## Comments

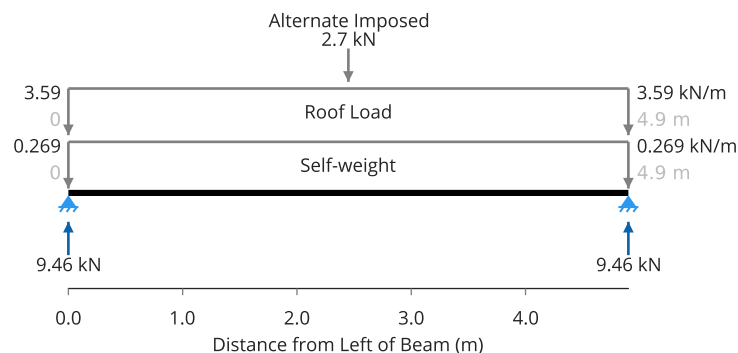
### Comments



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<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RL2

### Summary

	Moment Demand about X-Axis	$M_x^* = 11.6 \text{ kNm}$
22%	Moment Capacity about X-Axis	$\phi M_x = 53.8 \text{ kNm} \quad \phi \cdot M_{u,int}$
	Shear Demand	$V_* = 9.46 \text{ kN}$
5%	Shear Capacity	$\phi V_v = 182 \text{ kN} \quad \phi \cdot V_v$
5%	Shear Capacity Given Moment Interaction	$\phi V_{vm} = 182 \text{ kN} \quad \phi \cdot V_{vm}$
	Bearing Demand	$R_* = 9.46 \text{ kN}$
6%	Governing Bearing Capacity	$\phi R_{gov} = 154 \text{ kN}$
0%	Bending and Bearing Interaction	$int_{MR} = 0$
52%	Short Term Deflection	$\delta_s = 5.19 \text{ mm}$
37%	Long Term Deflection	$\delta_l = 3.74 \text{ mm}$
	Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
	Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	200 PFC 200 - Gr.300PLUS
Beam Orientation / Loading Direction	Major Axis / Loaded from Top
Total Span Length	$L = 4900 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 300$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Lateral/Torsional and Rotational  
Restraint at Supports

Partially Restrained Only

Maximum Spacing of Lateral Restraints

$$L_L = 600 \text{ mm}$$

Position of Supports from Left

$$r =$$

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Yield Capacity $R_{by}$ (kN)	Bearing Buckling Capacity $R_{bb}$ (kN)	Governing Reactions $R^*$ (kN)
Pinned	0	50	238	154	9.46
Pinned	4900	50	238	154	9.46

### Permanent & Imposed Loads (AS1170.1)

Distributed Loads

$$w =$$

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	4200	0.4	0.25	0	4900

Height of Loads Application

Top Flange

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

### Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

$$C_{pt,down\downarrow} = 0.63$$

Net Uplift Pressure Coefficient

$$C_{pt,up\uparrow} = -1$$

Wind Tributary/Load Width

$$LW_{wind} = 450 \text{ mm}$$

Other Distributed Loads

$$w_{other} =$$

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	4900
Uplift Wind	Wu,up	-0.311	-0.311	0	4900
Service Wind	Ws	-0.185	-0.185	0	4900

Other Point Loads

$$P_{other} =$$

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	2450

### Load Case Analysis (AS1170.0)

Strength Load Cases

Load Case	Total Load $E_d$ (kN)	Shear $V^*$ (kN)	Moment $M^*$ (kNm)	Max Reaction $R^*$ (kN)
$1.35G$	12.6	-6.3	7.72	6.3
$1.2G, 1.5Q$	18.9	-9.46	11.6	9.46
$1.2G, 1.5Q_{lt}$	11.2	-5.6	6.86	5.6
$1.2G, W_{u_{down}}, Q_{comb}$	12.2	-6.08	7.45	6.08
$0.9G, W_{u_{up}}$	6.88	-3.44	4.21	3.44
$G, E_u, Q_E$	9.33	-4.67	5.72	4.67
$1.2G, S_u, Q_{comb}$	11.2	-5.6	6.86	5.6



### Short-term Service Load Cases

Load Case	Total Load E <sub>d</sub> (kN)	Deflection Δ <sub>s</sub> (mm)
$G, W_s$	8.43	3.38
$G, Q_{st}$	12.9	5.19
$G, W_s, Q_{lt}$	10.2	4.1
$G, E_s, Q_{lt}$	9.33	3.74
$G, S_s, Q_{lt}$	9.33	3.74

### Long-term Service Load Cases

Load Case	Total Load E <sub>d</sub> (kN)	Deflection Δ <sub>l</sub> (mm)
$G$	9.33	3.74
$G, Q_{lt}$	9.33	3.74
$G, S_s, Q_{lt}$	9.33	3.74

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
$G$ (Permanent)	9.33	-4.67	5.72	4.67	3.74
$Q$ (Imposed)	5.15	-2.57	3.15	2.57	2.06
$W_{u_{down}}$ (Ultimate Downward Wind)	0.959	-0.479	0.587	0.479	0.384
$W_{u_{up}}$ (Ultimate Upward Wind)	-1.52	-0.761	-0.932	-0.761	-0.61
$W_s$ (Service Wind)	-0.904	0.452	-0.554	-0.452	-0.363
$E_u$ (Ultimate Earthquake)	0	0	0	0	0
$E_s$ (Service Earthquake)	0	0	0	0	0
$S_u$ (Ultimate Snow/Liquid)	0	0	0	0	0
$S_s$ (Service Snow/Liquid)	0	0	0	0	0

## Shear Capacity (AS4100-1998, Section 5.11)

Shear Capacity Factor	$\phi = 0.9$
Nominal Shear Yield Capacity	$V_w = 203 \text{ kN}$ $0.6 \cdot f_{yw} \cdot n_w \cdot d_l \cdot t_w \cdot 10^{(-3)}$
Nominal Shear Buckling Capacity	$V_b = 203 \text{ kN}$ $\min(\alpha_v \cdot V_w, V_w)$
Nominal Shear Capacity in Uniform Stress Distribution	$V_u = 203 \text{ kN}$ $V_w$
Nominal Shear Capacity	$V_v = 203 \text{ kN}$ $V_u$

## Moment Section Capacity (AS4100-1998, Cl 5.3)

Capacity Factor	$\phi = 0.9$
Section Moment Capacity	$M_s = 66.3 \text{ kNm}$ $f_{y,f} \cdot Z_e \cdot 10^{(-6)}$

## Moment Capacity for Interior Spans (AS4100-1998, Cl 5.1 & 5.6.1)

Nominal Capacity	$M_{u,int} = 59.7 \text{ kNm}$ $\min(M_s, M_{b,int})$
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## Moment Capacity for Cantilever Spans (if applicable) (AS4100-1998, CI 5.1 & 5.6.2)

Nominal Capacity  $M_{u,cant} = 0 \text{ kNm}$   $\min(M_s, M_{b,cant})$

## Shear - Bending Moment Interaction (AS4100, CI 5.12)

Moment Capacity of Flanges Alone  $M_f = 50.8 \text{ kNm}$   $A_{fm} \cdot d_f \cdot f_{y,f} \cdot 10^{(-6)}$

Negative Moment Demand about X-Axis  $M_x^{*-} = -0.0000000000000033 \text{ kNm}$

Effective Shear Capacity Given Moment Interaction  $V_{vm} = 203 \text{ kN}$   $V_v$

## Bearing Capacity (AS4100, CI 5.13)

Capacity Factor  $\phi = 0.9$

Flange Lateral Restraint One Flange Only

## Comments

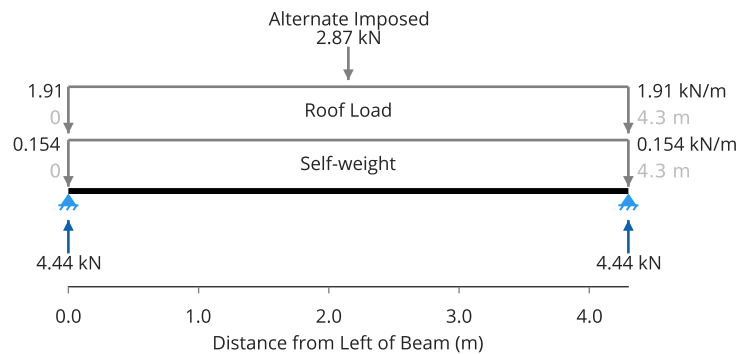
Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RL3(below)

### Summary

	Moment Demand	$M^* = 5.57 \text{ kNm}$
16%	Moment Capacity	$M_d = 35 \text{ kNm}$
	Shear Demand	$V^* = 2.79 \text{ kN}$
9%	Shear Capacity	$V_d = 30.6 \text{ kN}$
	Bearing Demand	$N^* = 2.79 \text{ kN}$
10%	Governing Bearing Capacity	$N_{d,gov} = 27.3 \text{ kN}$
57%	Long Term Serviceability Deflection	$\delta_l = 5.7 \text{ mm}$
48%	Short Term Serviceability Deflection	$\delta_s = 4.84 \text{ mm}$
	Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
	Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	240 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 2$
Member Orientation	Major Axis
Total Span Length	$L = 4300 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 4300 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	47.9	4.89
Pinned	4300	50	1	47.9	4.89

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	2100	0.4	0.25	0	4300

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	4300
Uplift Wind	Wu,up	-0.311	-0.311	0	4300
Service Wind	Ws	-0.185	-0.185	0	4300

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	2150

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison  $M_d/k_1 = 37.3 \text{ kNm}$   $\phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$

Shear Capacity for Comparison  $V_d/k_1 = 53.6 \text{ kN}$   $\phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$

Governing Bearing Capacity for Comparison  $N_{d,gov}/k_1 = 47.9 \text{ kN}$

### Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	9.78	-4.89	5.26	4.89
<b>1.2G, 1.5Q</b>	0.94	8.88	-4.44	5.92	4.44
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	8.7	-4.35	4.67	4.35
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	5.8	-2.9	3.12	2.9
<b>0.9G, W<sub>u</sub>up</b>	1	2.38	1.19	1.28	1.19
<b>G, E<sub>u</sub>, Q<sub>E</sub></b>	1	4.13	-2.07	2.22	2.07
<b>1.2G, S<sub>u</sub>, Q<sub>comb</sub></b>	0.8	6.2	-3.1	3.33	3.1

### Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	3.34	2.3
<b>G, Q<sub>st</sub></b>	5.93	4.84
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	4.92	3.4
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	4.13	2.85
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	4.13	2.85

### Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	4.13	5.7
<b>G, Q<sub>lt</sub></b>	4.13	5.7
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	4.13	5.7

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	4.13	-2.07	2.22	2.07	2.85
<i>Q</i> (Imposed)	2.26	-1.13	1.21	1.13	1.56
<i>W<sub>u</sub>down</i> (Ultimate Downward Wind)	0.841	-0.421	0.452	0.421	0.581
<i>W<sub>u</sub>up</i> (Ultimate Upward Wind)	-1.34	0.668	-0.718	-0.668	-0.922
<i>W<sub>s</sub></i> (Service Wind)	-0.793	0.397	-0.426	-0.397	-0.548
<i>Eu</i> (Ultimate Earthquake)	0	0	0	0	0
<i>Es</i> (Service Earthquake)	0	0	0	0	0
<i>Su</i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>Ss</i> (Service Snow/Liquid)	0	0	0	0	0

## Comments

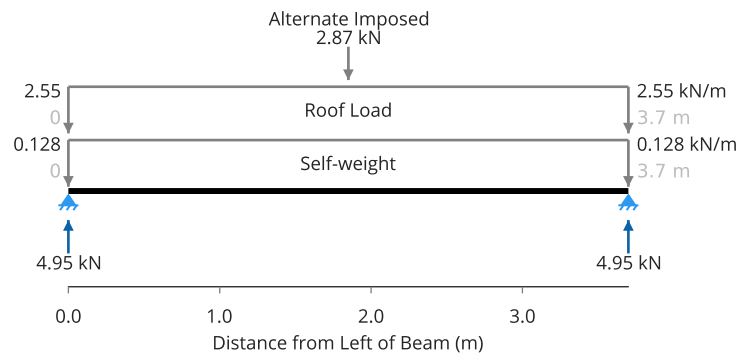
### Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RL4

### Summary

	Moment Demand	$M^* = 5 \text{ kNm}$
20%	Moment Capacity	$M_d = 25.2 \text{ kNm}$
	Shear Demand	$V^* = 3.05 \text{ kN}$
12%	Shear Capacity	$V_d = 25.5 \text{ kN}$
	Bearing Demand	$N^* = 3.05 \text{ kN}$
11%	Governing Bearing Capacity	$N_{d,gov} = 27.3 \text{ kN}$
69%	Long Term Serviceability Deflection	$\delta_l = 6.86 \text{ mm}$
56%	Short Term Serviceability Deflection	$\delta_s = 5.62 \text{ mm}$
	Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
	Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	200 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 2$
Member Orientation	Major Axis
Total Span Length	$L = 3700 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 3700 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	47.9	5.35
Pinned	3700	50	1	47.9	5.35

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	2800	0.4	0.25	0	3700

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	3700
Uplift Wind	Wu,up	-0.311	-0.311	0	3700
Service Wind	Ws	-0.185	-0.185	0	3700

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	1850

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$



## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 26.8 \text{ kNm} \quad \phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 44.7 \text{ kN} \quad \phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 47.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
$1.35G$	0.57	10.7	5.35	4.95	5.35
$1.2G, 1.5Q$	0.94	9.9	-4.95	5.32	4.95
$1.2G, 1.5Q_{lt}$	0.57	9.51	4.75	4.4	4.75
$1.2G, W_{u_{down}}, Q_{comb}$	1	6.14	-3.07	2.84	3.07
$0.9G, W_{u_{up}}$	1	2.92	-1.46	1.35	1.46
$G, Eu, Q_E$	1	4.52	2.26	2.09	2.26
$1.2G, Su, Q_{comb}$	0.8	6.77	3.39	3.13	3.39

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
$G, W_s$	3.83	2.91
$G, Q_{st}$	6.33	5.62
$G, W_s, Q_{lt}$	5.2	3.95
$G, Es, Q_{lt}$	4.52	3.43
$G, Ss, Q_{lt}$	4.52	3.43

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
$G$	4.52	6.86
$G, Q_{lt}$	4.52	6.86
$G, Ss, Q_{lt}$	4.52	6.86

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load $E_d$ (kN)	Shear $V^*$ (kN)	Moment $M^*$ (kNm)	Max Reaction $R^*$ (kN)	Deflection $\Delta$ (mm)
$G$ (Permanent)	4.52	2.26	2.09	2.26	3.43
$Q$ (Imposed)	2.59	-1.3	1.2	1.3	1.97
$W_{u_{down}}$ (Ultimate Downward Wind)	0.724	-0.362	0.335	0.362	0.55
$W_{u_{up}}$ (Ultimate Upward Wind)	-1.15	-0.574	-0.531	-0.574	-0.873
$W_s$ (Service Wind)	-0.683	-0.341	-0.316	-0.341	-0.519
$E_u$ (Ultimate Earthquake)	0	0	0	0	0
$E_s$ (Service Earthquake)	0	0	0	0	0
$S_u$ (Ultimate Snow/Liquid)	0	0	0	0	0
$S_s$ (Service Snow/Liquid)	0	0	0	0	0

## Comments

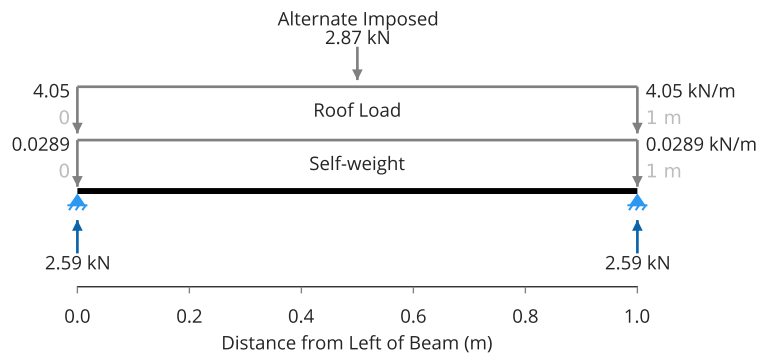
### Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RL5

### Summary

Moment Demand	$M^* = 0.945 \text{ kNm}$
<b>32%</b> Moment Capacity	$M_d = 2.99 \text{ kNm}$
Shear Demand	$V^* = 2.43 \text{ kN}$
<b>26%</b> Shear Capacity	$V_d = 9.45 \text{ kN}$
Bearing Demand	$N^* = 2.43 \text{ kN}$
<b>11%</b> Governing Bearing Capacity	$N_{d,gov} = 22.5 \text{ kN}$
<b>30%</b> Long Term Serviceability Deflection	$\delta_l = 1.19 \text{ mm}$
<b>39%</b> Short Term Serviceability Deflection	$\delta_s = 1.54 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 4 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	90 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 1$
Member Orientation	Major Axis
Total Span Length	$L = 1000 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 1000 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	23.9	2.59
Pinned	1000	50	1	23.9	2.59

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	4450	0.4	0.25	0	1000

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	1000
Uplift Wind	Wu,up	-0.311	-0.311	0	1000
Service Wind	Ws	-0.185	-0.185	0	1000

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	500

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 3.18 \text{ kNm} \quad \phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 10.1 \text{ kN} \quad \phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 23.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	4.27	-2.13	0.534	2.13
<b>1.2G, 1.5Q</b>	0.94	5.17	-2.59	1.01	2.59
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	3.79	-1.9	0.474	1.9
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	2.36	-1.18	0.295	1.18
<b>0.9G, W<sub>u</sub>up</b>	1	1.31	-0.656	0.164	0.656
<b>G, E<sub>u</sub>, Q<sub>E</sub></b>	1	1.8	-0.901	0.225	0.901
<b>1.2G, S<sub>u</sub>, Q<sub>comb</sub></b>	0.8	2.7	-1.35	0.338	1.35

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	1.62	0.533
<b>G, Q<sub>st</sub></b>	3.6	1.54
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	1.99	0.654
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	1.8	0.593
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	1.8	0.593

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	1.8	1.19
<b>G, Q<sub>lt</sub></b>	1.8	1.19
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	1.8	1.19

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E_d (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	1.8	-0.901	0.225	0.901	0.593
<i>Q</i> (Imposed)	1.11	-0.556	0.139	0.556	0.366
<i>W<sub>u</sub>down</i> (Ultimate Downward Wind)	0.196	-0.0978	0.0245	0.0978	0.0644
<i>W<sub>u</sub>up</i> (Ultimate Upward Wind)	-0.311	0.155	-0.0388	-0.155	-0.102
<i>W<sub>s</sub></i> (Service Wind)	-0.185	0.0923	-0.0231	-0.0923	-0.0607
<i>Eu</i> (Ultimate Earthquake)	0	0	0	0	0
<i>Es</i> (Service Earthquake)	0	0	0	0	0
<i>Su</i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>Ss</i> (Service Snow/Liquid)	0	0	0	0	0

## Comments

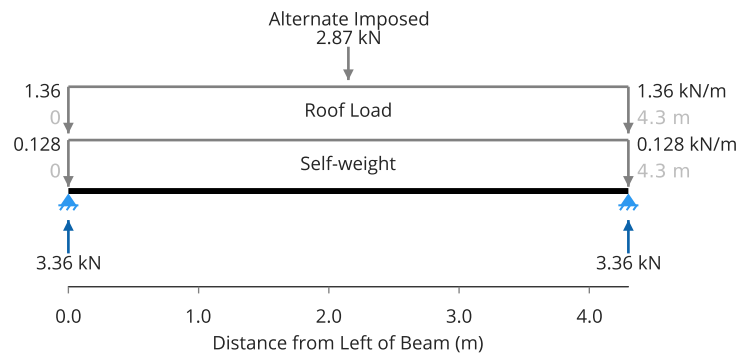
### Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RL6(ABOVE)

### Summary

Moment Demand	$M^* = 4.85 \text{ kNm}$
<b>19%</b> Moment Capacity	$M_d = 25.2 \text{ kNm}$
Shear Demand	$V^* = 2.03 \text{ kN}$
<b>8%</b> Shear Capacity	$V_d = 25.5 \text{ kN}$
Bearing Demand	$N^* = 2.03 \text{ kN}$
<b>7%</b> Governing Bearing Capacity	$N_{d,gov} = 27.3 \text{ kN}$
<b>72%</b> Long Term Serviceability Deflection	$\delta_l = 7.19 \text{ mm}$
<b>70%</b> Short Term Serviceability Deflection	$\delta_s = 7.03 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	200 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 2$
Member Orientation	Major Axis
Total Span Length	$L = 4300 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 4300 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	47.9	3.57
Pinned	4300	50	1	47.9	3.57

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	1500	0.4	0.25	0	4300

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	4300
Uplift Wind	Wu,up	-0.311	-0.311	0	4300
Service Wind	Ws	-0.185	-0.185	0	4300

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	2150

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$



## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 26.8 \text{ kNm} \quad \phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 44.7 \text{ kN} \quad \phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 47.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	7.13	-3.57	3.83	3.57
<b>1.2G, 1.5Q</b>	0.94	6.72	-3.36	5.15	3.36
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	6.34	-3.17	3.41	3.17
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	4.46	-2.23	2.39	2.23
<b>0.9G, W<sub>u</sub>up</b>	1	1.38	-0.688	0.739	0.688
<b>G, E<sub>u</sub>, Q<sub>E</sub></b>	1	3.01	-1.51	1.62	1.51
<b>1.2G, S<sub>u</sub>, Q<sub>comb</sub></b>	0.8	4.52	-2.26	2.43	2.26

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	2.22	2.65
<b>G, Q<sub>st</sub></b>	4.81	7.03
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	3.81	4.54
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	3.01	3.59
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	3.01	3.59

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	3.01	7.19
<b>G, Q<sub>lt</sub></b>	3.01	7.19
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	3.01	7.19

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E_d (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	3.01	-1.51	1.62	1.51	3.59
<i>Q</i> (Imposed)	1.61	-0.806	0.867	0.806	1.92
<i>W<sub>u</sub>down</i> (Ultimate Downward Wind)	0.841	-0.421	0.452	0.421	1
<i>W<sub>u</sub>up</i> (Ultimate Upward Wind)	-1.34	0.668	-0.718	-0.668	-1.59
<i>W<sub>s</sub></i> (Service Wind)	-0.793	0.397	-0.426	-0.397	-0.946
<i>Eu</i> (Ultimate Earthquake)	0	0	0	0	0
<i>Es</i> (Service Earthquake)	0	0	0	0	0
<i>Su</i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>Ss</i> (Service Snow/Liquid)	0	0	0	0	0

## Comments

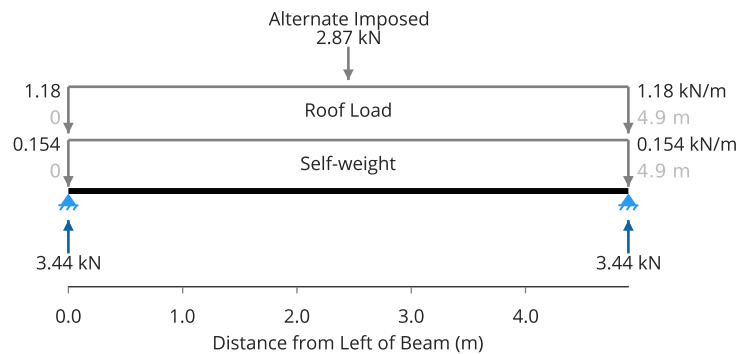
### Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RB1

### Summary

Moment Demand	$M^* = 5.61 \text{ kNm}$
16% Moment Capacity	$M_d = 35 \text{ kNm}$
Shear Demand	$V^* = 2.12 \text{ kN}$
7% Shear Capacity	$V_d = 30.6 \text{ kN}$
Bearing Demand	$N^* = 2.12 \text{ kN}$
8% Governing Bearing Capacity	$N_{d,gov} = 27.3 \text{ kN}$
64% Long Term Serviceability Deflection	$\delta_l = 6.41 \text{ mm}$
61% Short Term Serviceability Deflection	$\delta_s = 6.15 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	240 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 2$
Member Orientation	Major Axis
Total Span Length	$L = 4900 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 4900 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	47.9	3.72
Pinned	4900	50	1	47.9	3.72

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	1300	0.4	0.25	0	4900

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	4900
Uplift Wind	Wu,up	-0.311	-0.311	0	4900
Service Wind	Ws	-0.185	-0.185	0	4900

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	2450

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison  $M_d/k_1 = 37.3 \text{ kNm}$   $\phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$

Shear Capacity for Comparison  $V_d/k_1 = 53.6 \text{ kN}$   $\phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$

Governing Bearing Capacity for Comparison  $N_{d,gov}/k_1 = 47.9 \text{ kN}$

### Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	7.43	-3.72	4.55	3.72
<b>1.2G, 1.5Q</b>	0.94	6.88	-3.44	5.97	3.44
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	6.61	-3.3	4.05	3.3
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	4.73	-2.36	2.89	2.36
<b>0.9G, W<sub>u</sub>up</b>	1	1.3	-0.652	0.798	0.652
<b>G, E<sub>u</sub>, Q<sub>E</sub></b>	1	3.14	-1.57	1.92	1.57
<b>1.2G, S<sub>u</sub>, Q<sub>comb</sub></b>	0.8	4.71	-2.35	2.88	2.35

### Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	2.23	2.28
<b>G, Q<sub>st</sub></b>	4.94	6.15
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	4.04	4.13
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	3.14	3.21
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	3.14	3.21

### Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	3.14	6.41
<b>G, Q<sub>lt</sub></b>	3.14	6.41
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	3.14	6.41

## Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	3.14	-1.57	1.92	1.57	3.21
<i>Q</i> (Imposed)	1.59	-0.796	0.975	0.796	1.63
<i>W<sub>u</sub></i> <sub>down</sub> (Ultimate Downward Wind)	0.959	-0.479	0.587	0.479	0.979
<i>W<sub>u</sub></i> <sub>up</sub> (Ultimate Upward Wind)	-1.52	-0.761	-0.932	-0.761	-1.55
<i>W<sub>s</sub></i> (Service Wind)	-0.904	0.452	-0.554	-0.452	-0.923
<i>E<sub>u</sub></i> (Ultimate Earthquake)	0	0	0	0	0
<i>E<sub>s</sub></i> (Service Earthquake)	0	0	0	0	0
<i>S<sub>u</sub></i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>S<sub>s</sub></i> (Service Snow/Liquid)	0	0	0	0	0

## Comments

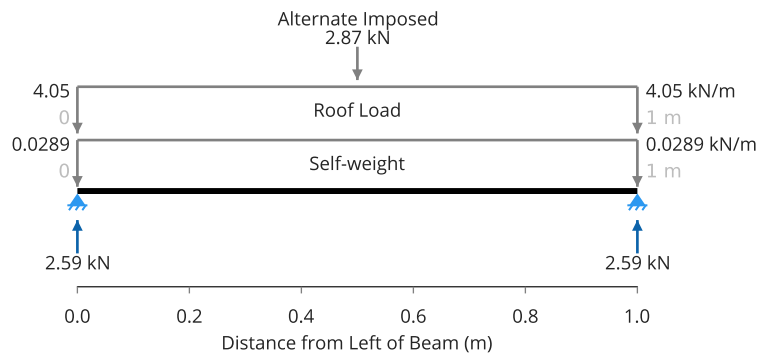
Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RB2

### Summary

Moment Demand	$M^* = 0.945 \text{ kNm}$
<b>32%</b> Moment Capacity	$M_d = 2.99 \text{ kNm}$
Shear Demand	$V^* = 2.43 \text{ kN}$
<b>26%</b> Shear Capacity	$V_d = 9.45 \text{ kN}$
Bearing Demand	$N^* = 2.43 \text{ kN}$
<b>11%</b> Governing Bearing Capacity	$N_{d,gov} = 22.5 \text{ kN}$
<b>30%</b> Long Term Serviceability Deflection	$\delta_l = 1.19 \text{ mm}$
<b>39%</b> Short Term Serviceability Deflection	$\delta_s = 1.54 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 4 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	90 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 1$
Member Orientation	Major Axis
Total Span Length	$L = 1000 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 1000 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	23.9	2.59
Pinned	1000	50	1	23.9	2.59

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	4450	0.4	0.25	0	1000

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	1000
Uplift Wind	Wu,up	-0.311	-0.311	0	1000
Service Wind	Ws	-0.185	-0.185	0	1000

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	500

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$



## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 3.18 \text{ kNm} \quad \phi \cdot k_{d,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 10.1 \text{ kN} \quad \phi \cdot k_{d,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 23.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	4.27	-2.13	0.534	2.13
<b>1.2G, 1.5Q</b>	0.94	5.17	-2.59	1.01	2.59
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	3.79	-1.9	0.474	1.9
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	2.36	-1.18	0.295	1.18
<b>0.9G, W<sub>u</sub>up</b>	1	1.31	-0.656	0.164	0.656
<b>G, E<sub>u</sub>, Q<sub>E</sub></b>	1	1.8	-0.901	0.225	0.901
<b>1.2G, S<sub>u</sub>, Q<sub>comb</sub></b>	0.8	2.7	-1.35	0.338	1.35

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	1.62	0.533
<b>G, Q<sub>st</sub></b>	3.6	1.54
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	1.99	0.654
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	1.8	0.593
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	1.8	0.593

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	1.8	1.19
<b>G, Q<sub>lt</sub></b>	1.8	1.19
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	1.8	1.19

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E_d (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	1.8	-0.901	0.225	0.901	0.593
<i>Q</i> (Imposed)	1.11	-0.556	0.139	0.556	0.366
<i>W<sub>u</sub>down</i> (Ultimate Downward Wind)	0.196	-0.0978	0.0245	0.0978	0.0644
<i>W<sub>u</sub>up</i> (Ultimate Upward Wind)	-0.311	0.155	-0.0388	-0.155	-0.102
<i>W<sub>s</sub></i> (Service Wind)	-0.185	0.0923	-0.0231	-0.0923	-0.0607
<i>Eu</i> (Ultimate Earthquake)	0	0	0	0	0
<i>Es</i> (Service Earthquake)	0	0	0	0	0
<i>Su</i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>Ss</i> (Service Snow/Liquid)	0	0	0	0	0

## Comments

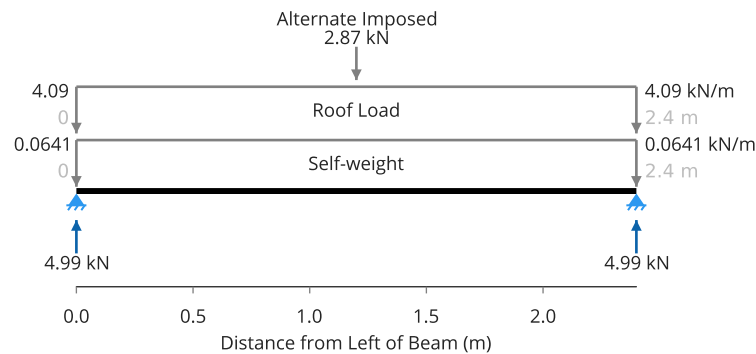
### Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RB3

### Summary

Moment Demand	$M^* = 3.22 \text{ kNm}$
<b>26%</b> Moment Capacity	$M_d = 12.3 \text{ kNm}$
Shear Demand	$V^* = 3 \text{ kN}$
<b>24%</b> Shear Capacity	$V_d = 12.7 \text{ kN}$
Bearing Demand	$N^* = 3 \text{ kN}$
<b>22%</b> Governing Bearing Capacity	$N_{d,gov} = 13.6 \text{ kN}$
<b>38%</b> Long Term Serviceability Deflection	$\delta_l = 3.68 \text{ mm}$
<b>32%</b> Short Term Serviceability Deflection	$\delta_s = 3.04 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 9.6 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	200 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 1$
Member Orientation	Major Axis
Total Span Length	$L = 2400 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 2400 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	23.9	5.26
Pinned	2400	50	1	23.9	5.26

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	4500	0.4	0.25	0	2400

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	2400
Uplift Wind	Wu,up	-0.311	-0.311	0	2400
Service Wind	Ws	-0.185	-0.185	0	2400

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	1200

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 0.972$   $1.5 - 0.05 \cdot \rho_b \cdot S_1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 13 \text{ kNm} \quad \phi \cdot k_{4,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 22.3 \text{ kN} \quad \phi \cdot k_{4,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 23.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	10.5	-5.26	3.16	5.26
<b>1.2G, 1.5Q</b>	0.94	9.98	-4.99	3.42	4.99
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	9.35	-4.67	2.8	4.67
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	5.8	-2.9	1.74	2.9
<b>0.9G, W<sub>u</sub>up</b>	1	3.25	-1.63	0.975	1.63
<b>G, E<sub>u</sub>, Q<sub>E</sub></b>	1	4.44	-2.22	1.33	2.22
<b>1.2G, S<sub>u</sub>, Q<sub>comb</sub></b>	0.8	6.66	-3.33	2	3.33

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	4	1.66
<b>G, Q<sub>st</sub></b>	6.33	3.04
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	4.88	2.03
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	4.44	1.84
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	4.44	1.84

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	4.44	3.68
<b>G, Q<sub>lt</sub></b>	4.44	3.68
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	4.44	3.68

## Unfactored Load

Load Case	Total Load $E_d$ (kN)	Shear $V^*$ (kN)	Moment $M^*$ (kNm)	Max Reaction $R^*$ (kN)	Deflection $\Delta$ (mm)
$G$ (Permanent)	4.44	-2.22	1.33	2.22	1.84
$Q$ (Imposed)	2.7	-1.35	0.81	1.35	1.12
$W_{u_{down}}$ (Ultimate Downward Wind)	0.469	-0.235	0.141	0.235	0.195
$W_{u_{up}}$ (Ultimate Upward Wind)	-0.745	0.373	-0.224	-0.373	-0.309
$W_s$ (Service Wind)	-0.443	0.221	-0.133	-0.221	-0.184
$E_u$ (Ultimate Earthquake)	0	0	0	0	0
$E_s$ (Service Earthquake)	0	0	0	0	0
$S_u$ (Ultimate Snow/Liquid)	0	0	0	0	0
$S_s$ (Service Snow/Liquid)	0	0	0	0	0

## Comments

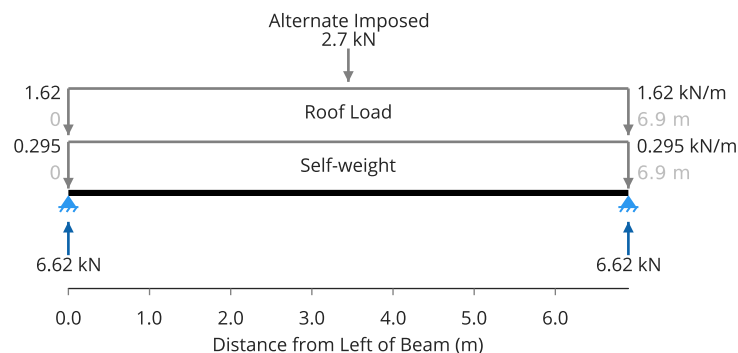
Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RB4

### Summary

	Moment Demand about X-Axis	$M_x^* = 11.8 \text{ kNm}$
18%	Moment Capacity about X-Axis	$\phi M_x = 65.9 \text{ kNm} \quad \phi \cdot M_{u,int}$
	Shear Demand	$V_* = 6.62 \text{ kN}$
3%	Shear Capacity	$\phi V_v = 231 \text{ kN} \quad \phi \cdot V_v$
3%	Shear Capacity Given Moment Interaction	$\phi V_{vm} = 231 \text{ kN} \quad \phi \cdot V_{vm}$
	Bearing Demand	$R_* = 6.62 \text{ kN}$
4%	Governing Bearing Capacity	$\phi R_{gov} = 163 \text{ kN}$
0%	Bending and Bearing Interaction	$int_{MR} = 0$
78%	Short Term Deflection	$\delta_s = 7.84 \text{ mm}$
55%	Long Term Deflection	$\delta_l = 5.54 \text{ mm}$
	Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
	Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	230 PFC 230 - Gr.300PLUS
Beam Orientation / Loading Direction	Major Axis / Loaded from Top
Total Span Length	$L = 6900 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 300$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Lateral/Torsional and Rotational  
Restraint at Supports

Partially Restrained Only

Maximum Spacing of Lateral Restraints

$$L_L = 600 \text{ mm}$$

Position of Supports from Left

$$r =$$

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Yield Capacity $R_{by}$ (kN)	Bearing Buckling Capacity $R_{bb}$ (kN)	Governing Reactions $R^*$ (kN)
Pinned	0	50	257	163	6.62
Pinned	6900	50	257	163	6.62

### Permanent & Imposed Loads (AS1170.1)

Distributed Loads

$$w =$$

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	1900	0.4	0.25	0	6900

Height of Loads Application

Top Flange

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

### Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

$$C_{pt,down\downarrow} = 0.63$$

Net Uplift Pressure Coefficient

$$C_{pt,up\uparrow} = -1$$

Wind Tributary/Load Width

$$LW_{wind} = 450 \text{ mm}$$

Other Distributed Loads

$$w_{other} =$$

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	6900
Uplift Wind	Wu,up	-0.311	-0.311	0	6900
Service Wind	Ws	-0.185	-0.185	0	6900

Other Point Loads

$$P_{other} =$$

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	3450

### Load Case Analysis (AS1170.0)

Strength Load Cases

Load Case	Total Load $E_d$ (kN)	Shear $V^*$ (kN)	Moment $M^*$ (kNm)	Max Reaction $R^*$ (kN)
$1.35G$	9.37	-4.69	8.08	4.69
$1.2G, 1.5Q$	13.2	-6.62	11.8	6.62
$1.2G, 1.5Q_{lt}$	8.33	-4.17	7.19	4.17
$1.2G, W_{u_{down}}, Q_{comb}$	9.68	-4.84	8.35	4.84
$0.9G, W_{u_{up}}$	4.11	-2.05	3.54	2.05
$G, E_u, Q_E$	6.94	-3.47	5.99	3.47
$1.2G, S_u, Q_{comb}$	8.33	-4.17	7.19	4.17



### Short-term Service Load Cases

Load Case	Total Load E <sub>d</sub> (kN)	Deflection Δ <sub>s</sub> (mm)
$G, W_s$	5.67	4.52
$G, Q_{st}$	9.24	7.84
$G, W_s, Q_{lt}$	8.22	6.56
$G, E_s, Q_{lt}$	6.94	5.54
$G, S_s, Q_{lt}$	6.94	5.54

### Long-term Service Load Cases

Load Case	Total Load E <sub>d</sub> (kN)	Deflection Δ <sub>l</sub> (mm)
$G$	6.94	5.54
$G, Q_{lt}$	6.94	5.54
$G, S_s, Q_{lt}$	6.94	5.54

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
$G$ (Permanent)	6.94	-3.47	5.99	3.47	5.54
$Q$ (Imposed)	3.28	-1.64	2.83	1.64	2.62
$W_{u_{down}}$ (Ultimate Downward Wind)	1.35	-0.675	1.16	0.675	1.08
$W_{u_{up}}$ (Ultimate Upward Wind)	-2.14	1.07	-1.85	-1.07	-1.71
$W_s$ (Service Wind)	-1.27	0.637	-1.1	-0.637	-1.02
$E_u$ (Ultimate Earthquake)	0	0	0	0	0
$E_s$ (Service Earthquake)	0	0	0	0	0
$S_u$ (Ultimate Snow/Liquid)	0	0	0	0	0
$S_s$ (Service Snow/Liquid)	0	0	0	0	0

## Shear Capacity (AS4100-1998, Section 5.11)

Shear Capacity Factor	$\phi = 0.9$
Nominal Shear Yield Capacity	$V_w = 257 \text{ kN}$ $0.6 \cdot f_{yw} \cdot n_w \cdot d_l \cdot t_w \cdot 10^{(-3)}$
Nominal Shear Buckling Capacity	$V_b = 257 \text{ kN}$ $\min(\alpha_v \cdot V_w, V_w)$
Nominal Shear Capacity in Uniform Stress Distribution	$V_u = 257 \text{ kN}$ $V_w$
Nominal Shear Capacity	$V_v = 257 \text{ kN}$ $V_u$

## Moment Section Capacity (AS4100-1998, Cl 5.3)

Capacity Factor	$\phi = 0.9$
Section Moment Capacity	$M_s = 81.3 \text{ kNm}$ $f_{yf} \cdot Z_e \cdot 10^{(-6)}$

## Moment Capacity for Interior Spans (AS4100-1998, Cl 5.1 & 5.6.1)

Nominal Capacity	$M_{u,int} = 73.2 \text{ kNm}$ $\min(M_s, M_{b,int})$
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Moment Capacity for Cantilever Spans (if applicable) (AS4100-1998, CI 5.1 & 5.6.2)

Nominal Capacity  $M_{u,cant} = 0 \text{ kNm}$   $\min(M_s, M_{b,cant})$

Shear - Bending Moment Interaction (AS4100, CI 5.12)

Moment Capacity of Flanges Alone  $M_f = 58.9 \text{ kNm}$   $A_{fm} \cdot d_f \cdot f_{y,f} \cdot 10^{(-6)}$

Negative Moment Demand about X-Axis  $M_x^{*-} = -0.000000000000000622 \text{ kNm}$

Effective Shear Capacity Given Moment Interaction  $V_{vm} = 257 \text{ kN}$   $V_v$

Bearing Capacity (AS4100, CI 5.13)

Capacity Factor  $\phi = 0.9$

Flange Lateral Restraint One Flange Only

Comments

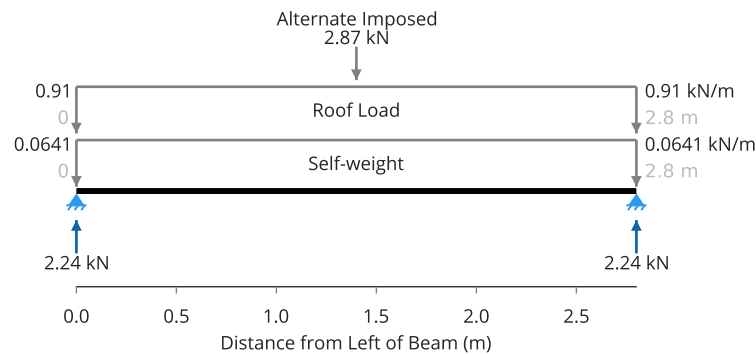
Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RB5

### Summary

Moment Demand	$M^* = 2.42 \text{ kNm}$
<b>20%</b> Moment Capacity	$M_d = 12.3 \text{ kNm}$
Shear Demand	$V^* = 2.11 \text{ kN}$
<b>10%</b> Shear Capacity	$V_d = 21 \text{ kN}$
Bearing Demand	$N^* = 2.11 \text{ kN}$
<b>9%</b> Governing Bearing Capacity	$N_{d,gov} = 22.5 \text{ kN}$
<b>17%</b> Long Term Serviceability Deflection	$\delta_l = 1.66 \text{ mm}$
<b>27%</b> Short Term Serviceability Deflection	$\delta_s = 2.73 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	200 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 1$
Member Orientation	Major Axis
Total Span Length	$L = 2800 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 2800 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	23.9	2.24
Pinned	2800	50	1	23.9	2.24

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	1000	0.4	0.25	0	2800

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	2800
Uplift Wind	Wu,up	-0.311	-0.311	0	2800
Service Wind	Ws	-0.185	-0.185	0	2800

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	1400

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 0.972$   $1.5 - 0.05 \cdot \rho_b \cdot S_1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 13 \text{ kNm} \quad \phi \cdot k_{4,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 22.3 \text{ kN} \quad \phi \cdot k_{4,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 23.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	2.99	-1.49	1.05	1.49
<b>1.2G, 1.5Q</b>	0.94	4.48	2.24	2.57	2.24
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	2.65	-1.33	0.929	1.33
<b>1.2G, <math>Wu_{down}</math>, <math>Q_{comb}</math></b>	1	2.06	-1.03	0.721	1.03
<b>0.9G, <math>Wu_{up}</math></b>	1	0.265	-0.133	0.0928	0.133
<b>G, <math>Eu</math>, <math>Q_E</math></b>	1	1.26	-0.63	0.441	0.63
<b>1.2G, <math>Su</math>, <math>Q_{comb}</math></b>	0.8	1.89	-0.946	0.662	0.946

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, <math>Ws</math></b>	0.744	0.49
<b>G, <math>Q_{st}</math></b>	3.06	2.73
<b>G, <math>Ws</math>, <math>Q_{lt}</math></b>	1.78	1.17
<b>G, <math>Es</math>, <math>Q_{lt}</math></b>	1.26	0.83
<b>G, <math>Ss</math>, <math>Q_{lt}</math></b>	1.26	0.83

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	1.26	1.66
<b>G, <math>Q_{lt}</math></b>	1.26	1.66
<b>G, <math>Ss</math>, <math>Q_{lt}</math></b>	1.26	1.66

## Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	1.26	-0.63	0.441	0.63	0.83
<i>Q</i> (Imposed)	0.7	0.35	0.245	0.35	0.461
<i>W<sub>u</sub></i> <sub>down</sub> (Ultimate Downward Wind)	0.548	-0.274	0.192	0.274	0.361
<i>W<sub>u</sub></i> <sub>up</sub> (Ultimate Upward Wind)	-0.869	0.435	-0.304	-0.435	-0.573
<i>W<sub>s</sub></i> (Service Wind)	-0.517	0.258	-0.181	-0.258	-0.34
<i>E<sub>u</sub></i> (Ultimate Earthquake)	0	0	0	0	0
<i>E<sub>s</sub></i> (Service Earthquake)	0	0	0	0	0
<i>S<sub>u</sub></i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>S<sub>s</sub></i> (Service Snow/Liquid)	0	0	0	0	0

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Comments

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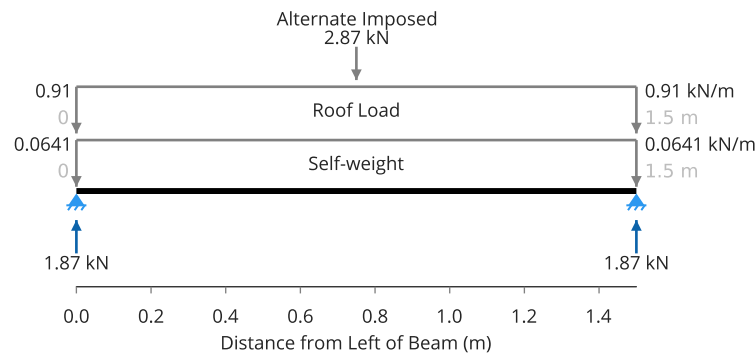
Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	RB6

### Summary

	Moment Demand	$M^* = 1.16 \text{ kNm}$
10%	Moment Capacity	$M_d = 12.3 \text{ kNm}$
	Shear Demand	$V^* = 1.76 \text{ kN}$
8%	Shear Capacity	$V_d = 21 \text{ kN}$
	Bearing Demand	$N^* = 1.76 \text{ kN}$
8%	Governing Bearing Capacity	$N_{d,gov} = 22.5 \text{ kN}$
2%	Long Term Serviceability Deflection	$\delta_l = 0.137 \text{ mm}$
6%	Short Term Serviceability Deflection	$\delta_s = 0.36 \text{ mm}$
	Governing Deflection Limit	$\Delta_{allow,gov} = 6 \text{ mm}$
	Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	200 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 1$
Member Orientation	Major Axis
Total Span Length	$L = 1500 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 1500 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	23.9	1.87
Pinned	1500	50	1	23.9	1.87

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	1000	0.4	0.25	0	1500

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	1500
Uplift Wind	Wu,up	-0.311	-0.311	0	1500
Service Wind	Ws	-0.185	-0.185	0	1500

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	750

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 0.972$   $1.5 - 0.05 \cdot \rho_b \cdot S_1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$



## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 13 \text{ kNm} \quad \phi \cdot k_{4,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 22.3 \text{ kN} \quad \phi \cdot k_{4,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 23.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	1.6	0.8	0.3	0.8
<b>1.2G, 1.5Q</b>	0.94	3.73	1.87	1.24	1.87
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	1.42	0.711	0.267	0.711
<b>1.2G, W<sub>u</sub>down, Q<sub>comb</sub></b>	1	1.1	0.552	0.207	0.552
<b>0.9G, W<sub>u</sub>up</b>	1	0.142	0.071	0.0266	0.071
<b>G, Eu, Q<sub>E</sub></b>	1	0.675	0.338	0.127	0.338
<b>1.2G, Su, Q<sub>comb</sub></b>	0.8	1.01	0.507	0.19	0.507

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, W<sub>s</sub></b>	0.399	0.0404
<b>G, Q<sub>st</sub></b>	2.48	0.36
<b>G, W<sub>s</sub>, Q<sub>lt</sub></b>	0.952	0.0964
<b>G, E<sub>s</sub>, Q<sub>lt</sub></b>	0.675	0.0684
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	0.675	0.0684

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	0.675	0.137
<b>G, Q<sub>lt</sub></b>	0.675	0.137
<b>G, S<sub>s</sub>, Q<sub>lt</sub></b>	0.675	0.137

## Unfactored Load

Load Case	Total Load E <sub>d</sub> (kN)	Shear V* (kN)	Moment M* (kNm)	Max Reaction R* (kN)	Deflection Δ (mm)
<i>G</i> (Permanent)	0.675	0.338	0.127	0.338	0.0684
<i>Q</i> (Imposed)	0.375	0.188	0.0703	0.188	0.038
<i>W<sub>u</sub></i> <sub>down</sub> (Ultimate Downward Wind)	0.293	-0.147	0.055	0.147	0.0297
<i>W<sub>u</sub></i> <sub>up</sub> (Ultimate Upward Wind)	-0.466	0.233	-0.0873	-0.233	-0.0472
<i>W<sub>s</sub></i> (Service Wind)	-0.277	0.138	-0.0519	-0.138	-0.028
<i>E<sub>u</sub></i> (Ultimate Earthquake)	0	0	0	0	0
<i>E<sub>s</sub></i> (Service Earthquake)	0	0	0	0	0
<i>S<sub>u</sub></i> (Ultimate Snow/Liquid)	0	0	0	0	0
<i>S<sub>s</sub></i> (Service Snow/Liquid)	0	0	0	0	0

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Comments

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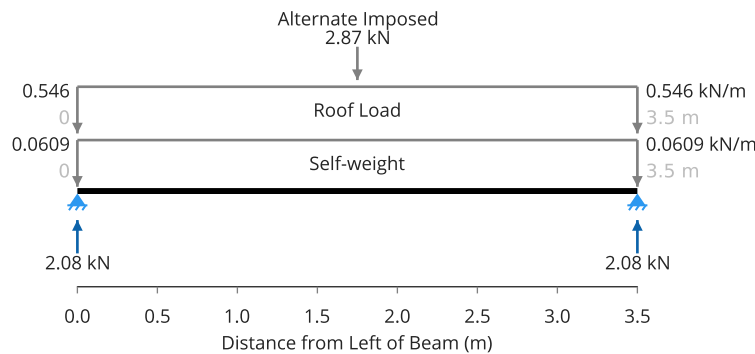
Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	R1

### Summary

Moment Demand	$M^* = 2.89 \text{ kNm}$
<b>26%</b> Moment Capacity	$M_d = 11.3 \text{ kNm}$
Shear Demand	$V^* = 1.95 \text{ kN}$
<b>10%</b> Shear Capacity	$V_d = 20 \text{ kN}$
Bearing Demand	$N^* = 1.95 \text{ kN}$
<b>9%</b> Governing Bearing Capacity	$N_{d,gov} = 22.5 \text{ kN}$
<b>30%</b> Long Term Serviceability Deflection	$\delta_l = 3.02 \text{ mm}$
<b>58%</b> Short Term Serviceability Deflection	$\delta_s = 5.83 \text{ mm}$
Governing Deflection Limit	$\Delta_{allow,gov} = 10 \text{ mm}$
Graphed Load Case	Strength: (1.2G, 1.5Q)



### Key Properties

Member Type	190 x 42 SmartLVL15
Number of Members in Group/Laminate	$n_{com} = 1$
Member Orientation	Major Axis
Total Span Length	$L = 3500 \text{ mm}$
Centre-to-Centre Spacing	$s = 450 \text{ mm}$
Lateral Restraint Type	Discrete Restraints at Compression Edge
Minor Axis Effective Length for Buckling	$L_{ay} = 600 \text{ mm}$
Torsional Effective Length for Buckling	$L_{a\phi} = 3500 \text{ mm}$
Deflection Limit Span Criteria	$L/ = 250$
Deflection Limit Absolute Criteria	$\Delta_{max} = 10 \text{ mm}$

Structure Category

1 - House

Position of Supports from Left

 $r =$ 

Support Type	Position (mm)	Length of Bearing (mm)	Bearing Factor $k_7$	Bearing Capacity $N_d/k_1$	Governing Reactions $R^*$ (kN)
Pinned	0	50	1	23.9	2.08
Pinned	3500	50	1	23.9	2.08

## Permanent and Imposed Loads (AS1170.1)

Distributed Loads

 $w =$ 

Label	Load Width (mm)	Permanent Load (kPa)	Imposed Load (kPa)	Start Location (mm)	End Location (mm)
Roof Load	600	0.4	0.25	0	3500

Include Self Weight

Yes

Character of Imposed Load

Roofs: All Other

## Wind and Other Loads (AS1170.x)

Wind Class

N1

Net Downward Pressure Coefficient

 $C_{pt,down\downarrow} = 0.63$ 

Net Uplift Pressure Coefficient

 $C_{pt,up\uparrow} = -1$ 

Wind Tributary/Load Width

 $LW_{wind} = 450$ 

Other Distributed Loads

 $w_{other} =$ 

Label	Load Type	Start Magnitude (kN/m)	End Magnitude (kN/m)	Start Location (mm)	End Location (mm)
Downward Wind	Wu,dn	0.196	0.196	0	3500
Uplift Wind	Wu,up	-0.311	-0.311	0	3500
Service Wind	Ws	-0.185	-0.185	0	3500

Other Point Loads

 $P_{other} =$ 

Label	Load Type	Magnitude (kN)	Location (mm)
Alternate Imposed	Q2	1.8	1750

## Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

 $\phi = 0.95$ 

Initial Moisture Content

 $mc = 15\%$ 

Moisture Content when Fully Loaded

&lt; 25%

Equilibrium Moisture Content (Annual Average)

 $EMC = 15\%$ 

Partial Seasoning Factor for Bending

 $k_{4,M} = 1$ 

Partial Seasoning Factor for Shear

 $k_{4,V} = 1$   $k_{4,M}$ 

Temperature Factor

 $k_6 = 1$ 

Number of Discrete Parallel Members

1 or 2

Strength Sharing Factor

 $k_9 = 1$ 

Stability Factor

 $k_{12} = 0.983$   $1.5 - 0.05 \cdot \rho_b \cdot S_1$ 

Creep Factor for Long-Term Deflections

 $j_2 = 2$

## Load Case Analysis (AS1170.0)

Moment Capacity for Comparison

$$M_d/k_1 = 12 \text{ kNm} \quad \phi \cdot k_{4,M} \cdot k_0 \cdot k_9 \cdot k_{12} \cdot f'_b \cdot Z$$

Shear Capacity for Comparison

$$V_d/k_1 = 21.2 \text{ kN} \quad \phi \cdot k_{4,V} \cdot k_0 \cdot f'_s \cdot A_s \cdot 10^{(-3)}$$

Governing Bearing Capacity for Comparison

$$N_{d,gov}/k_1 = 23.9 \text{ kN}$$

Strength Load Cases

Load Case	Load Duration Factor $k_1$	Total Load $E_d$ (kN)	Shear $V^*/k_1$ (kN)	Moment $M^*/k_1$ (kNm)	Max Reaction $R^*/k_1$ (kN)
<b>1.35G</b>	0.57	2.39	-1.19	1.04	1.19
<b>1.2G, 1.5Q</b>	0.94	4.16	-2.08	3.08	2.08
<b>1.2G, 1.5Q<sub>lt</sub></b>	0.57	2.12	-1.06	0.928	1.06
<b>1.2G, <math>Wu_{down}</math>, <math>Q_{comb}</math></b>	1	1.89	-0.947	0.828	0.947
<b>0.9G, <math>Wu_{up}</math></b>	1	-0.18	-0.0902	-0.0789	-0.0902
<b>G, <math>Eu</math>, <math>Q_E</math></b>	1	1.01	-0.504	0.441	0.504
<b>1.2G, <math>Su</math>, <math>Q_{comb}</math></b>	0.8	1.51	-0.755	0.661	0.755

Short-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_s$ (mm)
<b>G, <math>Ws</math></b>	0.361	0.542
<b>G, <math>Q_{st}</math></b>	2.81	5.83
<b>G, <math>Ws</math>, <math>Q_{lt}</math></b>	1.65	2.48
<b>G, <math>Es</math>, <math>Q_{lt}</math></b>	1.01	1.51
<b>G, <math>Ss</math>, <math>Q_{lt}</math></b>	1.01	1.51

Long-term Service Load Cases

Load Case	Total Load $E_d$ (kN)	Deflection $\Delta_l$ (mm)
<b>G</b>	1.01	3.02
<b>G, <math>Q_{lt}</math></b>	1.01	3.02
<b>G, <math>Ss</math>, <math>Q_{lt}</math></b>	1.01	3.02

## Unfactored Load Analysis (AS1170.0)

### Unfactored Load

Load Case	Total Load $E_d$ (kN)	Shear $V^*$ (kN)	Moment $M^*$ (kNm)	Max Reaction $R^*$ (kN)	Deflection $\Delta$ (mm)
$G$ (Permanent)	1.01	-0.504	0.441	0.504	1.51
$Q$ (Imposed)	0.525	-0.263	0.23	0.262	0.788
$W_{u_{down}}$ (Ultimate Downward Wind)	0.685	-0.342	0.3	0.342	1.03
$W_{u_{up}}$ (Ultimate Upward Wind)	-1.09	-0.543	-0.475	-0.543	-1.63
$W_s$ (Service Wind)	-0.646	-0.323	-0.283	-0.323	-0.969
$E_u$ (Ultimate Earthquake)	0	0	0	0	0
$E_s$ (Service Earthquake)	0	0	0	0	0
$S_u$ (Ultimate Snow/Liquid)	0	0	0	0	0
$S_s$ (Service Snow/Liquid)	0	0	0	0	0

## Comments

### Comments



<b>Client:</b>	Desbo Industries Pty Ltd	<b>Date:</b>	Mar 4, 2019
<b>Engineer:</b>	Jiao Wang	<b>Job #:</b>	#119605
<b>Project:</b>	Lot. 322, No. 40, Samphire Drive, Connewarre, Vic, 3227	<b>Subject:</b>	C1

## Summary

	Design Axial Load	$N_c^* = 8.34 \text{ kN}$	$E_d$
27%	Axial Compressive Capacity about X-Axis	$N_{d,cx} = 30.7 \text{ kN}$	$\phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot k_{12,cx} \cdot f_c' \cdot A_c \cdot 10^{(-3)}$
27%	Axial Compressive Capacity about Y-Axis	$N_{d,cy} = 30.7 \text{ kN}$	$\phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot k_{12,cy} \cdot f_c' \cdot A_c \cdot 10^{(-3)}$
	Minor Axis Design Moment	$M_y^* = 0.375 \text{ kNm}$	$\max(1.35 \cdot w_{y,dcr} \cdot e_y, (\psi_{dl} \cdot w_{y,cr1} + \psi_{cl} \cdot w_{y,cr2}) \cdot e_y)$
20%	Minor Axis Bending Moment Capacity	$M_{d,y} = 1.85 \text{ kNm}$	$\phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot f_b' \cdot Z_y \cdot 10^{(-6)}$
	Major Axis Design Moment	$M_x^* = 0 \text{ kNm}$	$\max(1.35 \cdot w_{x,dcr} \cdot e_x, (\psi_{dl} \cdot w_{x,cr1} + \psi_{cl} \cdot w_{x,cr2}) \cdot e_x)$
0%	Major Axis Moment Capacity	$M_{d,x} = 1.85 \text{ kNm}$	$\phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot k_{12,bx} \cdot f_b' \cdot Z_x \cdot 10^{(-6)}$
47%	Minor Axis Combined Capacity Check	$D_{com,y} = 0.475$	$\left(\frac{M_x^*}{M_{d,x}}\right)^2 + \frac{M_y^*}{M_{d,y}} + \frac{N_c^*}{N_{d,cy}}$
31%	Major Axis Combined Capacity Check	$D_{com,x} = 0.313$	$\frac{M_x^*}{M_{d,x}} + \left(\frac{M_y^*}{M_{d,y}}\right)^2 + \frac{N_c^*}{N_{d,cx}}$
7%	Axial Deformation	$\delta_y = 0.352 \text{ mm}$	$\left(\frac{E_d \cdot L}{A_c \cdot E}\right) \cdot 10^3$
0%	Tensile Capacity Parallel to Grain	$N_{d,t} = 61 \text{ kN}$	$\phi \cdot k_1 \cdot k_4 \cdot k_6 \cdot f_t' \cdot A_t \cdot 10^{(-3)}$

## Dimensions and Member Section Properties

Member Type	90 x 90 F7 Seasoned SW
Number of Members in Group/Laminate	$n_{com} = 1$
Span Length	$L = 2700 \text{ mm}$
Strong Axis Effective Length	$L_{ax} = 2700 \text{ mm}$
Weak Axis Effective Length	$L_{ay} = 2700 \text{ mm}$
Weak Axis Effective Length in Bending	$L_{ay,b} = 2700 \text{ mm}$
Strong Axis Effective Length in Bending	$L_{ax,b} = 2700 \text{ mm}$
Structure Category	1 - House
Column End Restraint Conditions	Studs in Light Framing
Restraint Edge	Discrete Restraints at Compression Edge

## Loads and Load Factors

## Column Loads

$$w =$$

Label	Dead Load Magnitude (kN)	Live Load Magnitude (kN)
Minor Axis Bending Load 1	4.2	2.2
Minor Axis Bending Load 2	0	0
Major Axis Bending Load 1	0	0
Major Axis Bending Load 2	0	0

## Wind Load

$$W = 0 \text{ kN}$$

## Total Design Action

$$E_d = 8.34 \text{ kN} \quad \psi_{dl} \cdot G + \psi_{cl} \cdot Q$$

Limit State	Strength: Permanent and Imposed Action (1.2dl, 1.5dll)
Character of Imposed Action	All Other Roofs

### Modification Factors for Compressive and Tensile Capacity

Capacity Factor	$\phi = 0.9$
Effective Peak Load Duration	5 Days (0.94)
Partial Seasoning Factor	$k_4 = 1$
Temperature Factor	$k_6 = 1$
Stability Factor in Compression, X-Axis Buckling	$k_{12,cx} = 0.344 \frac{200}{(\rho_c \cdot S_3)^2}$
Stability Factor in Compression, Y-Axis Buckling	$k_{12,cy} = 0.344 \frac{200}{(\rho_c \cdot S_4)^2}$

### Moment Capacity

Connection Type	Capped
Stability Factor in Bending, X-Axis	$k_{12,bx} = 1$

### Deformation

Allowable Axial Deformation	$\Delta_{allow,y} = 5.4 \text{ mm} \frac{L}{k_{ay}}$
Axial Deformation Factor	$k_{ay} = 500$
Comments	