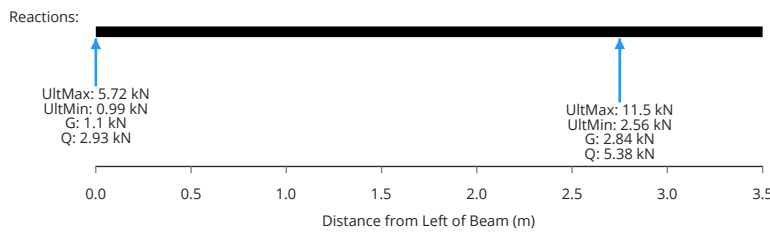




Client:	My Client	Date:	Oct 8, 2020
Author:	Brooks Smith	Job #:	12345
Project:	Example House Project	Subject:	B1
References:	AS 1720.1:2010 (Amdt 3)		

Summary

Moment Demand	$M^* = 3.74 \text{ kN} \cdot \text{m}$	
82% Moment Capacity	$M_d = 4.54 \text{ kN} \cdot \text{m}$	AS 1720.1:2010, Cl 3.2.1.1
Shear Demand	$V^* = -7.37 \text{ kN}$	
51% Shear Capacity	$V_d = 14.5 \text{ kN}$	AS 1720.1:2010, Cl 3.2.5
Bearing Demand	$N_{gov}^* = 11.5 \text{ kN}$	AS 1720.1:2010, Cl 3.2.6
23% Bearing Capacity	$N_{d,gov} = 49.9 \text{ kN}$	AS 1720.1:2010, Cl 3.2.6
54% Governing Short-Term Deflection	$\delta_s = 2.71 \text{ mm}$	
77% Governing Long-Term Deflection	$\delta_l = 3.87 \text{ mm}$	
52% Governing Imposed Load Deflection	$\delta_Q = 2.58 \text{ mm}$	



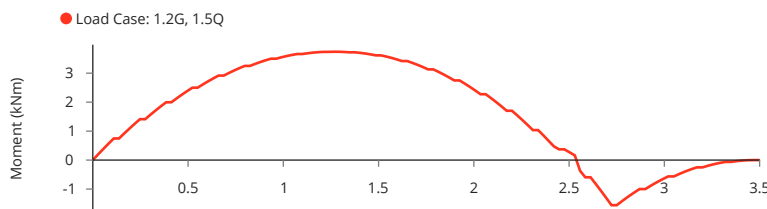
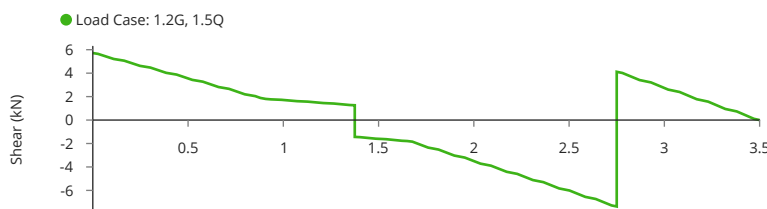
Show Plots Including Load Duration Factor k1?

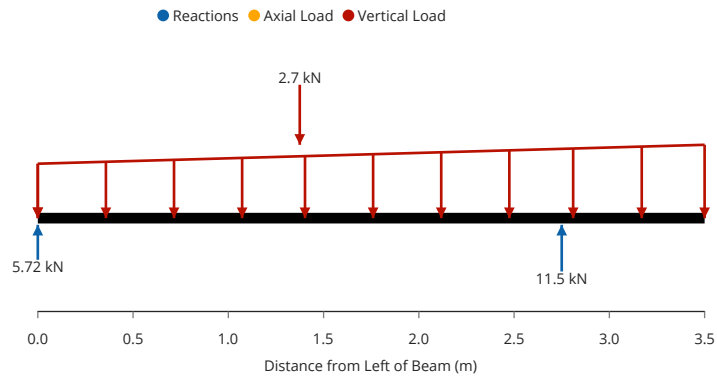
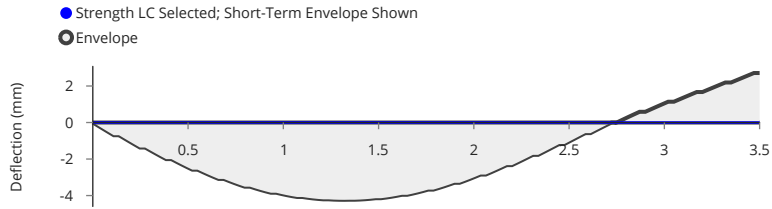
Yes - Show Final Demands for Individual Load Cases

Graphed Load Case

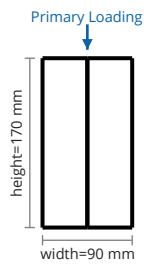
Strength: (1.2G, 1.5Q)

AS1170 Cl 4.2.2





Key Properties



Use Custom Member?	No	
Member Type	170 x 45 MGP10	
Number of Members in Group/Laminate	$n_{com} = 2$	AS 1720.1:2010, Cl 2.4.5.2
Total Beam Length	$L = 3\,500$ mm	
Lateral Restraint Type	Discrete Restraints at Compression Edge	AS 1720.1:2010, Cl 3.2.3.2
Minor Axis Effective Length for Buckling	$L_{ay} = 450$ mm	AS 1720.1:2010, Cl 3.2.3
Position of Supports from Left	$r =$	

Support Type	Position x (mm)	Length of Bearing l_b (mm)
Pinned	0	90
Pinned	2 750	90

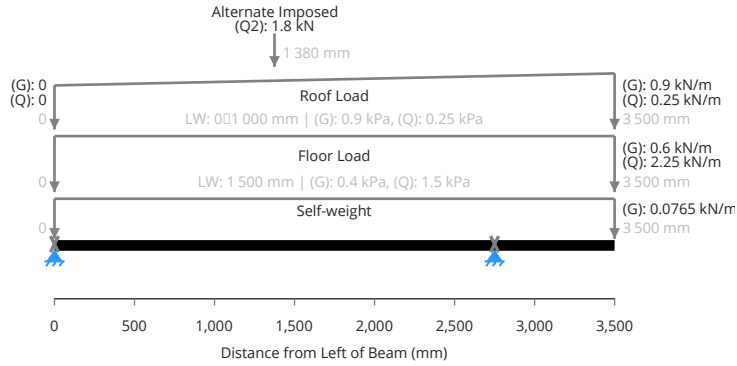
Design Criteria

Deflection Limit Absolute Criterion	$\Delta_{max} = 10$ mm
Deflection Limit Span Criterion	$D_{lim} =$

Span Type (Interior or Cantilever)	Short-Term Service $\Delta_{s,lim}$ (L/)	Long-Term Service $\Delta_{l,lim}$ (L/)	Imposed Load $Q \delta_{Q,lim}$ (L/)
Interior Spans	300	300	300
Cantilevers	150	150	150

Structure Category 2 - Primary Structural Member

Loads (AS1170.x)



Distributed Loads

$$w =$$

Label	Start Location x_s (mm)	End Location x_e (mm)	Start Load Width LW_s (mm)	End Load Width LW_e (mm)	Load Magnitudes w
Floor Load	0	3 500	1 500	1 500	G, Q
Roof Load	0	3 500	0	1 000	G, Q

Point & Moment Loads

$$P, M =$$

Label	Location x (mm)	Load Magnitudes P, M
Alternate Imposed	1 380	Q2

Member Orientation

Major Axis

Include Self Weight

Yes

Character of Imposed Load

Floors: Residential and Domestic AS1170.1, Cl 4.2.2

Wind Loads

Wind Class

N1

AS 4055:2012, Cl 2.1

Net Downward Pressure Coefficient

$$C_{pt,down} = 0$$

AS 1170.2:2011, Table 5.1

Net Uplift Pressure Coefficient

$$C_{pt,up} = 0$$

AS 1170.2:2011, Table 5.1

Wind Tributary/Load Width

$$LW_{wind} = 1\,000 \text{ mm}$$

Member Properties

Maximum Beam Depth

$$d_{max} = 300 \text{ mm}$$

Minimum Beam Depth

$$d_{min} = 0 \text{ mm}$$

Overall Depth

$$d_{total} = 170 \text{ mm}$$

Modification Factors (AS1720.1, Cl 2.4)

Capacity Factor

$$\phi = 0.7$$

AS 1720.1:2010, Cl 2.3 Table 2.1

Initial Moisture Content

$$mc = \text{Seasoned}$$

Equilibrium Moisture Content (Annual Average)

$$EMC = 15 \%$$

AS1720.1, Cl 2.4.2.3

Partial Seasoning Factor for Bending

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

AS 1720.1:2010, Cl 2.4.2, & 8.4.3

Partial Seasoning Factor for Shear

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

AS 1720.1:2010, Cl 2.4.2, & 8.4.3

Temperature Factor

$$k_6 = 1$$

AS 1720.1:2010, Cl 2.4.3

Number of Discrete Parallel Members

1 or 2

AS 1720.1:2010, Cl 2.4.5.2

Strength Sharing Factor

$$k_9 = 1.14$$

AS 1720.1:2010, Cl 2.4.5, 7.4.3, & 8.4.6

Stability Factor

$$k_{12} = 1$$

AS 1720.1:2010, Cl 2.4.6 & 3.2.4

Creep Factor for Permanent and Long-Term Imposed Loads

$$j_{2,max} = 2$$

AS 1720.1:2010, Cl 2.4.1.2

Load Case Analysis (AS1170.0)

Strength Load Cases

$$LC_{str} =$$

Load Case	Load Duration Factor k_1	Total Load $\Sigma w + \Sigma P$ (kN)	Shear V^* (kN)	Moment M^* (kN · m)	Max Reaction N^* (kN)
1.35G	0.57	5.32	-2.34	1.03	3.84
1.2G, 1.5Q	0.8	17.2	-7.37	3.74	11.5
1.2G, 1.5Q_It	0.57	9.72	-4.2	2.05	6.64
1.2G, Wu_dn, Q_comb	1	8.06	-3.49	1.67	5.56
0.9G, Wu_up	1	3.55	-1.56	0.688	2.56
G, Eu, Q_E	1	6.44	-2.79	1.33	4.46
1.2G, Su, Q_comb	0.8	8.06	-3.49	1.67	5.56

Short-term Service Load Cases

$$LC_{sserv} =$$

Load Case	Total Load $\Sigma w + \Sigma P$ (kN)	Deflection δ_s (mm)
G, Ws_up	3.94	-1.54
G, Q_st	9.76	-4.23
G, Ws_dn, Q_It	7.27	-3.08
G, Es, Q_It	7.27	-3.08
G, Ss, Q_It	7.27	-3.08

Long-term Service Load Cases

$$LC_{lserv} =$$

Load Case	Total Load $\Sigma w + \Sigma P$ (kN)	Deflection δ_l (mm)
G	7.89	-3.07
G, Q_It	14.5	-6.16
G, Ss, Q_It	14.5	-6.16

Strength Load Case Analysis with Constant Capacity

Moment Capacity Excluding Load Duration Factor

$$M_d/k_1 = 5.67 \text{ kN} \cdot \text{m}$$

AS 1720.1:2010, Cl 3.2.1.1

Shear Capacity Excluding Load Duration Factor

$$V_d/k_1 = 18.1 \text{ kN}$$

AS 1720.1:2010, Cl 3.2.5

Governing Bearing Capacity Excluding Load Duration Factor

$$N_{d,gov}/k_1 = 62.4 \text{ kN}$$

AS 1720.1:2010, Cl 3.2.6

Strength Load Cases: Demands Divided by Load Duration Factor

$$LC_{str}/k_1 =$$

Load Case	Load Duration Factor k_1	Total Load $(\Sigma w + \Sigma P)/k_1$ (kN)	Shear V^*/k_1 (kN)	Moment M^*/k_1 (kN · m)	Max Reaction N^*/k_1 (kN)
1.35G	0.57	9.34	-4.1	1.81	6.73
1.2G, 1.5Q	0.8	21.5	-9.21	4.67	14.4
1.2G, 1.5Q_It	0.57	17.1	-7.36	3.59	11.7
1.2G, Wu_dn, Q_comb	1	8.06	-3.49	1.67	5.56
0.9G, Wu_up	1	3.55	-1.56	0.688	2.56
G, Eu, Q_E	1	6.44	-2.79	1.33	4.46
1.2G, Su, Q_comb	0.8	10.1	-4.36	2.09	6.96

Unfactored Load Analysis (AS1170.0)

Unfactored Load

Load Type	Total Load $\Sigma w + \Sigma P$ (kN)	Shear V^* (kN)	Moment M^* (kN · m)	Max Reaction R^* (kN)	Short-Term Deflection δ_s (mm)
G	3.94	-1.73	0.764	2.84	-1.54
Q	8.31	-3.53	1.88	5.38	-3.85

Bearing Capacity (AS 1720.1:2010, Cl 3.2.6)

Bearing Utilisation

$$N_{d,table} =$$

AS 1720.1:2010, Cl 2.4.4

Support Location l (mm)	Bearing Demand N^*/k_1 (kN)	Bearing Factor k_7	Bearing Capacity N_d/k_1 (kN)	Bearing Utilisation N^*/N_d
0	7.14	1	56.7	0.126
2 750	14.4	1.1	62.4	0.23

| Deflection Analysis |

Short-Term Deflection Per Span

$$D_{ST} =$$

Span Length L (mm)	Span Type	Short-Term Deflection δ_s (mm)	Short-term Deflection Limit $\Delta_{s,lim}$ (mm)	Deflection Utilisation $\Delta_s/\Delta_{s,lim}$
2 750	Int	-4.23	9.17	0.462
750	Cant	2.71	5	0.542

Long-Term Deflection Per Span

$$D_{LT} =$$

Span Length L (mm)	Span Type	Long-Term Deflection δ_l (mm)	Long-term Deflection Limit $\Delta_{l,lim}$ (mm)	Deflection Utilisation $\Delta_l/\Delta_{l,lim}$
2 750	Int	-6.16	9.17	0.671
750	Cant	3.87	5	0.774

Imposed Load Deflection Per Span

$$D_Q =$$

Span Length L (mm)	Span Type	Imposed Load Deflection δ_Q (mm)	Imposed Load Deflection Limit $\Delta_{Q,lim}$ (mm)	Deflection Utilisation $\Delta_Q/\Delta_{Q,lim}$
2 750	Int	-3.85	9.17	0.42
750	Cant	2.58	5	0.517

| Comments |