

Member Size	686x254	170	
D =	692.9	mm	
T =	23.7	mm	
t =	14.5	mm	
b/T =	4.45		
d/t =	42.4		
ry (Radius of Gyration) =	28		
Sx (Plastic Modulus) =	6630	cm ³	
Ix (Second Moment of Area) =	170000		6630 cm ⁴
Beam Length	14.5	m	
Continuous Load	14.5	kN/m	
Each Point Load	37	kN	
Total Load on Beam	358.25	kN	

Maximum Shear at Ra & Rb			
Continuous load =	105.125	kNm	
Point Load =	74.00	kNm	No. of Point load = 4
Total Shear = Ra = Rb =	179.13	kNm	

Maximum Bending Moment at Mid Point			
Bending Moment for Continuous Load =	381.078125	kN	
Bending Moment for Point Load =	984.15625	kN	
Total Bending Moment =	1365.234375	kN	
			SUPPORT TO FIRST POINT LOAD a = 2
			DISTANCE TO NEXT POINT LOAD b = 2

From Table 11, BS5950 = $\varepsilon = \sqrt{\text{Grade}/P_y}$			
	T = <16MM	P _y = 275	T = 16 - 40MM P _y = 265
ε =	1.02		
b/T < 9 ε =	4.45	<	9.17
d/t < 80 ε =	42.4	<	81.50
			Flange is plastic
			Flange is plastic

Shear Strength			
d/t < 70 ε =	23.7	<	71.31
			Shear Buckling is not considered

Shear capacity of Section (P _v)			
P _v = 0.6 P _y t D	1597.48	kN	
Check F _v < 0.6 P _v			
F _v =	179.13	kN	
0.6 P _v =	958.49	kN	
Shear Utilisation =	18.69%		
			Low Shear Load

Effective Length From Table 13, BS5950 - Both Flanges free to rotate on plan			
LE = 1.0 L _T	14.5	m	
M _{sw} =	62.55	kNm	
M _x =	1427.78	kNm	

Mb = pb Sx		For Plastic Section	
pb obtained from Table 20, BS 5950:-		It is Given by:-	
$\sqrt{\beta_w}$ (LE/ry)	=	51.79	
D/T	=	29.24	
From Table 20, BS5950 (1)			
Pb =	320.00	N/mm ²	Interpolate if needed See Next Tab "Table 20, BS 5950"

Mb = pb Sx	=	2121.60 kNm	
Check Mx < Mb			
Mx	=	1427.78	Section Suitable
Mb	=	2121.60	
Bending Utilisation =		67.30%	

Deflection Check		
E =	205	
Δ_{max} =	0.00041 m	
Δ_{max} =	0.41 mm	
Deflection Check = SPAN/360 < Δ_{max}		
SPAN/360 =	40.28 mm	SELECTION SUITABLE
Δ_{max} =	0.41 mm	
Deflection Utilisation =	1.01%	