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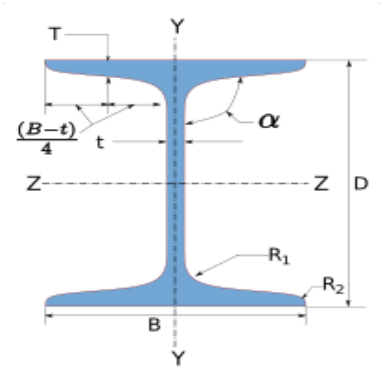
1 Input Parameters

Module			Beam Coverplate Weld Connection	
MainModule			Moment Connection	
Moment(kNm)*			10.0	
Shear(kN)*			10.0	
Axial (kN) *			10.0	
Section				
	Beam Section *		MB 450	
	Material *		E 250 (Fe 410 W)A	
	Ultimate strength, fu (MPa)		410	
	Yield Strength , fy (MPa)		250	
	Mass	72.4	Iz(mm4)	303580000.0
	Area(mm2) - A	9220.0	Iy(mm4)	8070000.0
	D(mm)	450.0	rz(mm)	181.0
	B(mm)	150.0	ry(mm)	30.0
	t(mm)	9.4	Zz(mm3)	1349300.0
	T(mm)	17.4	Zy(mm3)	108000.0
	FlangeSlope	98	Zpz(mm3)	1551600.0
	R1(mm)	15.0	Zpy(mm3)	108000.0
	R2(mm)	7.5		
Weld Details				
Weld Type			Fillet	
Type of weld fabrication			Shop Weld	
Material grade overwrite (MPa) Fu			410.0	

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2 Design Checks

2.1 Member Capacity

Check	Required	Provided	Remarks
Axial Capacity Ac (kN)		$Ac = \frac{A * f_y}{\gamma_{m0} * 1000}$ $= \frac{9220.0 * 250}{1.1 * 1000}$ $= 2095.45$	
Shear Capacity Sc (kN)		$S_c = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo} * 1000}$ $= \frac{415.2 * 9.4 * 250}{\sqrt{3} * 1.1 * 1000}$ $= 512.12019$	
Plastic Moment Capacity Pmc (kNm)		$Pmc = \frac{\beta_b * Z_p * fy}{\gamma_{mo} * 1000000}$ $= \frac{1 * 405119 * 250}{1.1 * 1000000}$ $= 92.07$	
Moment Deformation Criteria Mdc (kNm)		$Mdc = \frac{1.5 * Z_e * fy}{1.1}$ $= \frac{1.5 * 1349300.0 * 250}{1.1}$ $= 459.99$	
Moment Capacity Mc (kNm)		$M_c = min(Pmc, Mdc)$ $= min(92.07, 459.99)$ $= 92.07$	

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2.2 Load Consideration

Check	Required	Provided	Remarks
Axial Load Au (kN)	$Ac_{min} = 0.3 * A_c$ $= 0.3 * 2095.45$ $= 628.64$	$Au = max(A, Ac_{min})$ $= max(10.0, 628.64)$ $= 628.64$	Pass
Shear Load Vu (kN)	$Sc_{min} = 0.6 * A_c$ $= 0.6 * 512.12$ $= 307.27$	$Vu = max(V, Vc_{min})$ $= max(10.0, 307.27)$ $= 307.27$	Pass
Moment Load Mu (kNm)	$Mc_{min} = 0.5 * M_c$ $= 0.5 * 92.07$ $= 46.04$	$Mu = max(M, Mc_{min})$ $= max(10.0, 46.04)$ $= 46.04$	Pass
Forces Carried by Web		$A_w = Axial\ force\ in\ web$ $= \frac{(D - 2 * T) * t * Au}{A}$ $= \frac{(450.0 - 2 * 17.4) * 9.4 * 628.64}{9220.0}$ $= 266.11$ $M_w = Moment\ in\ web$ $= \frac{Z_w * Mu}{Z}$ $= \frac{405119 * 46.04}{1551600.0}$ $= 12.02$	
Forces Carried by Flange		$A_f = Axial\ force\ in\ flange$ $= \frac{Au * B * T}{A}$ $= \frac{628.64 * 150.0 * 17.4}{9220.0}$ $= 177.95$ $M_f = Moment\ in\ flange$ $= Mu - M_w$ $= 46.04 - 12.02$ $= 34.02$ $F_f = flange\ force$ $= \frac{M_f * 1000}{D - T} + A_f$ $= \frac{34.02}{450.0 - 17.4} + 177.95$ $= 256.59$	

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2.3 Weld Design Checks

Check	Required	Provided	Remarks
Min Weld Size (mm)	$Thickness\ of\ Thicker\ part$ $= max(17.4, 26.0)$ $= 26.0$ $IS800:2007\ cl.10.5.2.3\ Table21,$ $t_{w_{min}} = 6$	15	Pass
Max Weld Size (mm)	$Thickness\ of\ Thinner\ part$ $= Min(17.4, 26.0) = 17.4$ $t_{w_{max}} = 17.4$	15	Pass
Flange Weld Strength (N/mm)	$Stress = \frac{F_f * 1000}{F_{rl}}$ $= \frac{256.59 * 1000}{370}$ $= 693.4777339312893$	1988.39	Pass

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2.4 Flange Plate Check

Check	Required	Provided	Remarks
Min. Plate Height (mm)	50	$b_{fp} = B - 2 * sp$ $= 150.0 - 2 * 20$ $= 110$	Pass
Max. Plate Height (mm)	$b_{fp} = B - 2 * sp$ $= 150.0 - 2 * 20$ $= 110$	110	Pass
Min. Plate Length (mm)	110	$l_{fp} = [2 * (l_w + 2 * s) + g]$ $= [2 * (1452 * 15) + 10.0]$ $= 360$	Pass

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3 3D View

Figure 1: 3D View