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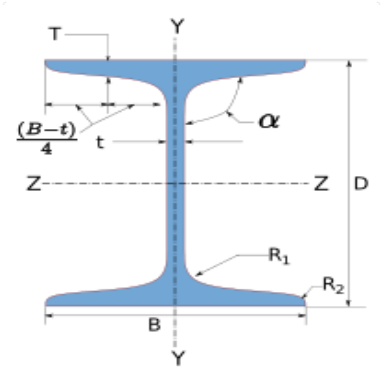
1 Input Parameters

Module	Beam Coverplate Connection
MainModule	Moment Connection
Moment(kNm)*	5.0
Shear (kN)*	42.0
Axial (kN) *	100.0

Section



Beam Section *		JB 225	
Preferences		Outside + Inside	
Material *		E 250 (Fe 410 W)A	
Ultimate strength, fu (MPa)		410	
Yield Strength , fy (MPa)	250	R1(mm)	6.5
Mass	12.8	R2(mm)	1.5
Area(mm2) - A	1630.0	Iz(mm4)	13100000.0
D(mm)	225.0	Iy(mm4)	405000.0
B(mm)	80.0	rz(mm)	89.7
t(mm)	3.7	ry(mm)	15.8
T(mm)	5.0	Zz(mm3)	116000.0
FlangeSlope	91.5	Zy(mm3)	10100.0

Bolt Details

Diameter (mm)*	[12.0, 16.0, 20.0, 24.0, 30.0, 36.0]
Grade *	[3.6, 4.6, 4.8, 5.6, 5.8, 6.8, 8.8, 9.8, 10.9, 12.9]
Type *	Friction Grip Bolt
Bolt hole type	Standard
Slip factor (μ_f)	0.3
Type of edges	a - Sheared or hand flame cut
Gap between beam and support (mm)	10.0
Are the members exposed to corrosive influences	False

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2 Design Checks

2.1 Member Capacity

Check	Required	Provided	Remarks
Axial Capacity Member Ac (kN)		$A_c = \frac{A * f_y}{\gamma_{m0} * 10^3}$ $= \frac{1630.0 * 250}{1.1 * 10^3}$ $= 370.45$	
Shear Capacity Member Sc (kN)		$S_c = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo} * 10^3}$ $= \frac{215.0 * 3.7 * 250}{\sqrt{3} * 1.1 * 10^3}$ $= 104.38$	
Plastic Moment Capacity Pmc (kNm)		$Pmc = \frac{\beta_b * Z_p * fy}{\gamma_{mo} * 10^6}$ $= \frac{1 * 42758.12 * 250}{1.1 * 10^6}$ $= 9.72$	
Moment Deformation Criteria Mdc (kNm)		$Mdc = \frac{1.5 * Z_e * fy}{1.1 * 10^6}$ $= \frac{1.5 * 116000.0 * 250}{1.1 * 10^6}$ $= 39.55$	
Moment Capacity Member Mc (kNm)		$M_c = min(Pmc, Mdc)$ $= min(9.72, 39.55)$ $= 9.72$	

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2.2 Load Consideration

Check	Required	Provided	Remarks
Applied Axial Load Au (kN)	$Ac_{min} = 0.3 * A_c$ $= 0.3 * 370.45$ $= 111.14$ $Ac_{max} = Ac$ $= 370.45$	$A_u = 111.14$	Pass
Applied Shear Load Vu (kN)	$Vc_{min} = 0.6 * S_c$ $= 0.6 * 104.38$ $= 62.63$ $Vc_{max} = Sc$ $= 104.38$	$V_u = 62.63$	Pass
Applied Moment Load Mu (kNm)	$Mc_{min} = 0.5 * M_c$ $= 0.5 * 9.72$ $= 4.86$ $Mc_{max} = Mc$ $= 9.72$	$M_u = 5.0$	Pass
Forces Carried by Web		$A_w = Axial\ force\ in\ web$ $= \frac{(D - 2 * T) * t * Au}{A}$ $= \frac{(225.0 - 2 * 5.0) * 3.7 * 111.14}{1630.0}$ $= 54.24\ kN$ $M_w = Moment\ in\ web$ $= \frac{Z_w * Mu}{Z}$ $= \frac{42758.12 * 5.0}{129300.0}$ $= 1.65\ kNm$	
Forces Carried by Flange		$A_f = Axial\ force\ in\ flange$ $= \frac{Au * B * T}{A}$ $= \frac{111.14 * 80.0 * 5.0}{1630.0}$ $= 27.27\ kN$ $M_f = Moment\ in\ flange$ $= Mu - M_w$ $= 5.0 - 1.65$ $= 3.35\ kNm$ $F_f = flange\ force$ $= \frac{M_f * 10^3}{D - T} + A_f$ $= \frac{3.35 * 10^3}{225.0 - 5.0} + 27.27$ $= 42.48\ kN$	

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2.3 Initial Member Check

Check	Required	Provided	Remarks
Flange Tension Yielding Capacity (kN)	$F_f = 42.48$	$T_{dg} = \frac{l * t * f_y}{\gamma_{mo}}$ $= \frac{1 * 80.0 * 5.0 * 250}{1.1}$ $= 90.91$	Pass
Web Tension Yielding Capacity (kN)	$A_w = 54.24$	$T_{dg} = \frac{l * t * f_y}{\gamma_{mo}}$ $= \frac{1 * 215.0 * 3.7 * 250}{1.1}$ $= 181$	Pass

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2.4 Initial flange plate height check

Check	Required	Provided	Remarks
flange_plate.Height	Outer.b >= 50	$Outer.b = 80.0$	Pass
flange_plate.InnerHeight	Inner.b >= 50	$inner.b = \frac{B - t - (2 * r_1)}{2}$ $= \frac{80.0 - 3.7 - (2 * 6.5)}{2}$ $= 31.65$	Fail

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2.5 Flange plate thickness

Check	Required	Provided	Remarks
Thickness (mm)*	$T = 2.5$	$t_f = 80.0$	Pass

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2.6 Web plate thickness

Check	Required	Provided	Remarks
Thickness (mm)*	$t = 1.85$	$t_w = 20.0$	Pass
Plate Area check (mm2)	$pt.area >= connected\ member\ area * 1.05 = 707.07$	$web\ b = D - (2 * T) - (2 * r_1) = 225.0 - (2 * 5.0) - (2 * 6.5) = 182.0$ $pt.area = 20.0 * 2 * 182.0 = 7280.0$	Pass

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3 3D View

Figure 1: 3D View