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| **Company Name** | **mukund** | **Project Title** | **WORKSHOP** |
| **Group/Team Name** | **mukund** | **Subtitle** | |
| **Designer** | **mukund** | **Job Number** | **PROBLEM 4** |
| **Date** | **05 /06 /2016** | **Method** | **Limit State Design (No Earthquake Load)** |

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| **Design Conclusion** | |
| **Finplate** | **Pass** |
| **Finplate** | |
| **Connection Properties** | |
| **Connection** | |
| Connection Title | Single Finplate |
| Connection Type | Shear Connection |
| **Connection Category** | |
| Connectivity | Column flange-Beam web |
| Beam Connection | Bolted |
| Column Connection | Welded |
| **Loading (Factored Load)** | |
| Shear Force (kN) | 200 |
| **Components** | |
| **Column Section** | ISSC 200 |
| Material | Fe 410 |
| **Beam Section** | ISMB 400 |
| Material | Fe 410 |
| Hole | STD |
| **Plate Section** | 250X120X16 |
| Thickness (mm) | 16 |
| Width (mm) | 120 |
| Depth (mm) | 250 |
| Hole | STD |
| **Weld** | |
| Type | Double Fillet |
| Size (mm) | 13 |
| **Bolts** | |
| Type | Black Bolt |
| Grade | 4.8 |
| Diameter (mm) | 16 |
| Bolt Numbers | 7 |
| Columns (Vertical Lines) | 2 |
| Bolts Per Column | 4 |
| Gauge (mm) | 40 |
| Pitch (mm) | 63 |
| End Distance (mm) | 30 |
| Edge Distance (mm) | 30 |
| **Assembly** | |
| **Column-Beam Clearance (mm)** | 20 |

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| Design Check | | | |
|---|---|---|---|
| **Check** | **Required** | **Provided** | **Remark** |
| **Bolt shear capacity (kN)** | | $V_{dsb}$ = (400*0.6126*16*16)/(√3*1.25*1000) = 29.006 [cl. 10.3.3] | |
| **Bolt bearing capacity (kN)** | | $V_{dpb}$ = (2.5*0.491*16*8.9*410)/(1.25*1000) = 57.333 [cl. 10.3.4] | |
| **Bolt capacity (kN)** | | Min (29.006, 57.333) = 29.006 | |
| **No. of bolts** | 200/29.006 = 6.9 | 7 | **Pass** |
| **No.of column(s)** | ≤ 2 | 2 | |
| **No. of bolts per column** | | 4 | |
| **Bolt pitch (mm)** | ≥ 2.5* 16 = 40, ≤ Min(32*8.9, 300) = 285 [cl. 10.2.2] | 63 | **Pass** |
| **Bolt gauge (mm)** | ≥ 2.5*16 = 40, ≤ Min(32*8.9, 300) = 285 [cl. 10.2.2] | 40 | |
| **End distance (mm)** | ≥ 1.7*18 = 30.6, ≤ 12*8.9 = 106.8 [cl. 10.2.4] | 30 | **Pass** |
| **Edge distance (mm)** | ≥ 1.7*18 = 30.6, ≤ 12*8.9 = 106.8 [cl. 10.2.4] | 30 | **Pass** |
| **Block shear capacity (kN)** | ≥ 200 | $V_{db}$ = 679 | **Pass** |
| **Plate thickness (mm)** | (5*200*1000)/(250*250) = 16.0 [Owens and Cheal, 1989] | 16 | **Pass** |
| **Plate height (mm)** | ≥ 0.6*400=240.0, ≤ 400-16-14-10=330.0 [cl. 10.2.4, Insdag Detailing Manual, 2002] | 250 | **Pass** |
| **Plate width (mm)** | | 100 | |
| **Plate moment capacity (kNm)** | $(2*29.006*63^2)/(63*1000)$ = 15.642 | $M_d$ = (1.2*250*$Z$)/(1000*1.1) = 45.45 [cl. 8.2.1.2] | **Pass** |
| **Effective weld length (mm)** | | 250-2*16 = 218 | |
| **Weld strength (kN/mm)** | $\sqrt{[(15642*6)/(2*218^2)]^2 + [200/(2*218)]^2}$ = 1.089 | $f_v$= (0.7*13*410)/(√3*1.25) = 2.121 [cl. 10.5.7] | **Pass** |
| **Weld thickness (mm)** | Max((1.089*1000*√3* 1.25)/(0.7 * 410),16* 0.8) = 12.8 [cl. 10.5.7, Insdag Detailing Manual, | 13 | **Pass** |

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| | 2002] | | |

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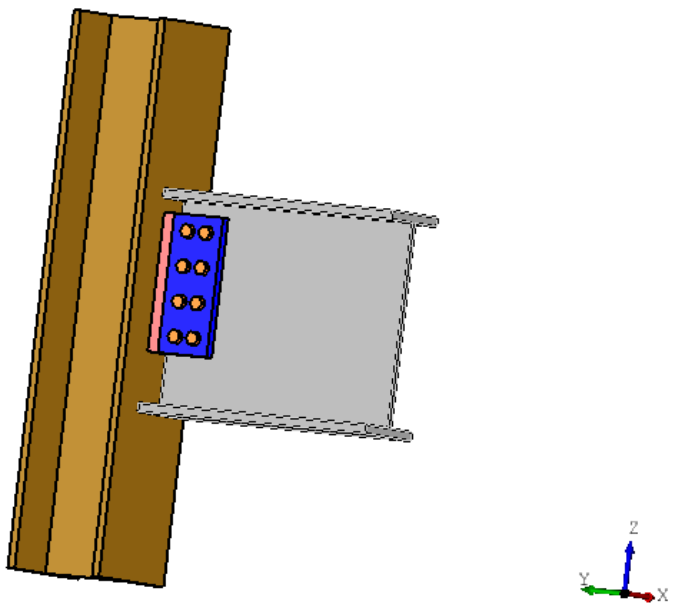
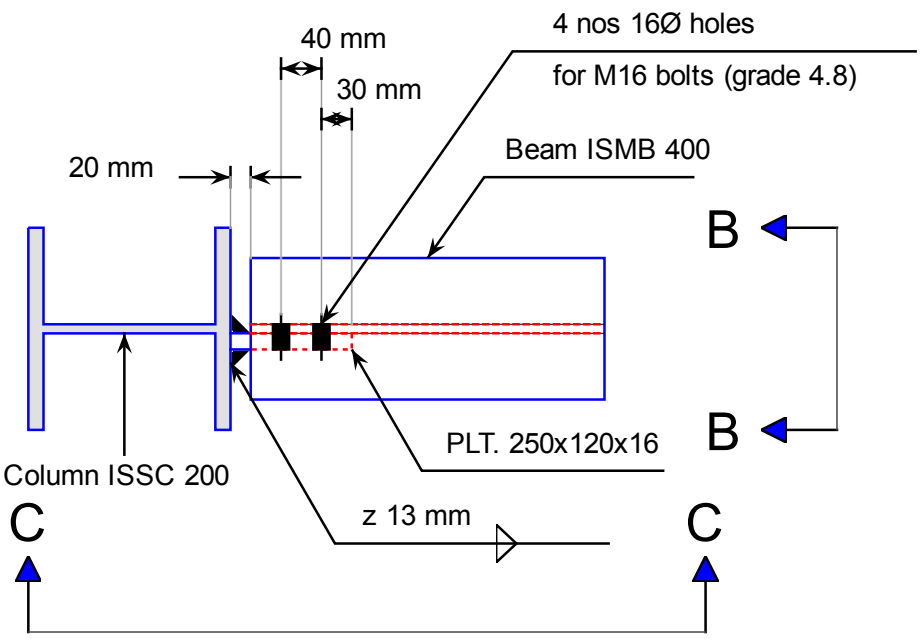
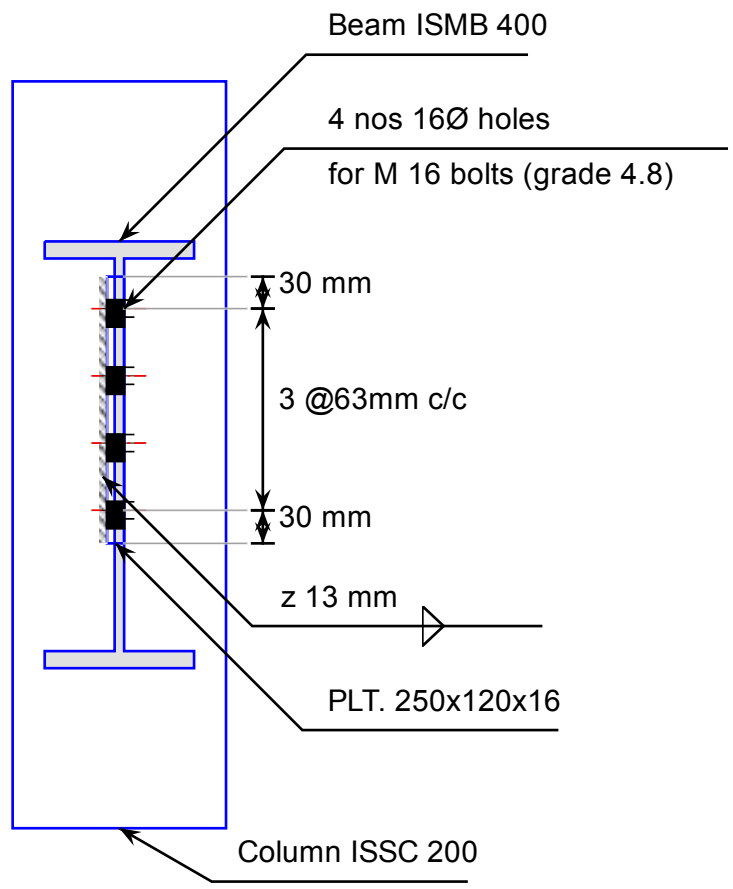
| **Designer** | **mukund** | **Job Number** | **PROBLEM 4** |
| **Date** | **05 /06 /2016** | **Method** | **Limit State Design (No Earthquake Load)** |

## Views

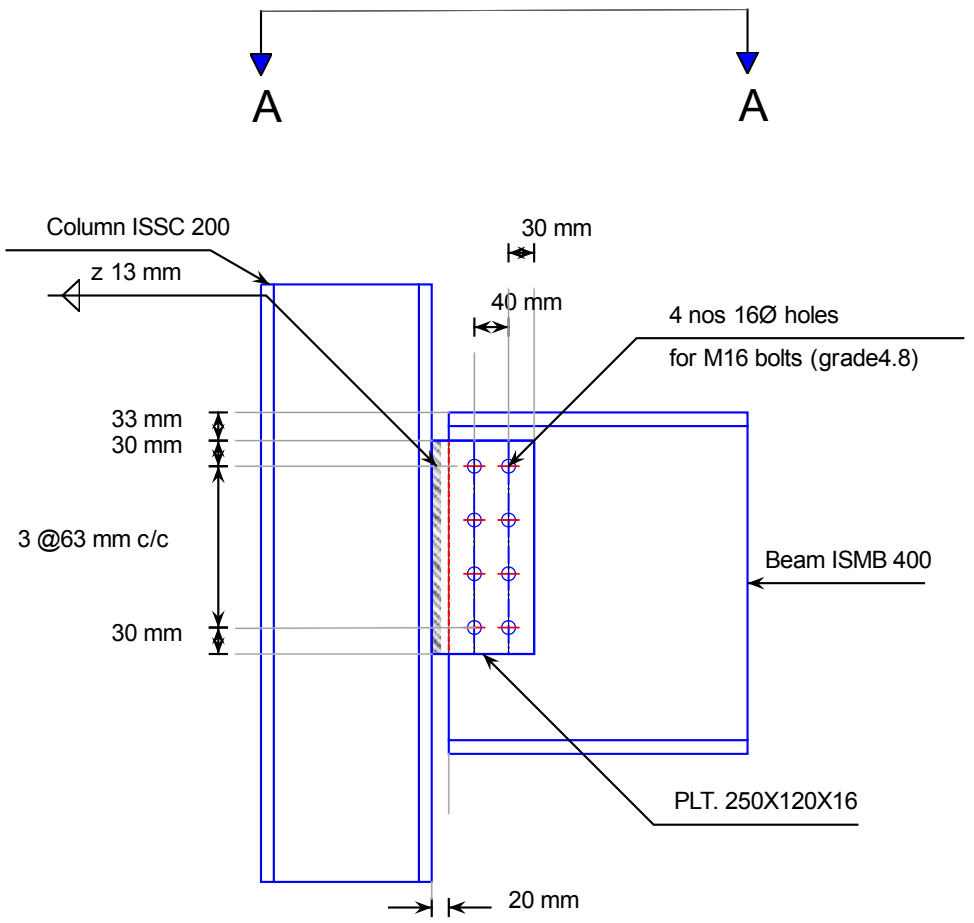





Top view (Sec A-A)




Side view (Sec B-B)




Front view (Sec C-C)

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| **Additional Comments** | |