Deadline: **Final Exam**

**Question 1.**

In Figure 1, a bolted unstiffened end-plate connection specimen is given. Column of the specimen is formed by HEA profile with 3m height, cantilever beam of that by IPE profile with Lbeam length. End-plate with tep thick is connected to the column flange by 8 pretensioned bolts; connected to the beam by fillet welds. S355 steel grade and E80XX weld material are used. Determine maximum PD load which the fillet welds of the connecion can bear safely.



Figure 1. A bolted unstiffened end-plate connection specimen

Parameters:

Lfl=bbeam Lweb=hbeam

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| G (Stu.No. Par.) | 0,1 | 2,3 | 4,5 | 6,7 | 8,9 |
| Column | HE160A | HE180A | HE200A | HE220A | HE240A |
| Beam | IPE240 | IPE270 | IPE300 | IPE330 | IPE360 |
| tep (mm) | 20 | 25 | 30 | 35 | 40 |

PL=(1+0.01F+0.02H)PD  Lbeam=1.2+0.1F+0.2G+0.1H (m)

**Question 2.**

A tension member spliced using welded connection is shown in figure 2. Same splice connection is formed using a bolt group in figure 3. Please determine the strength ratio for both connection for 1.2PD + 1.6PL design combination, considering the weld material is E80XX and structural steel is S355. Use maximum available weld thickness for welded connection and 8.8 bolt quality for bolted connection..



Figure 2 Welded Splice



Figure 3 Bolted Splice

Parameters:

|  |  |  |  |
| --- | --- | --- | --- |
| **H** | **Tension Member** | **Splice Plate** | **Bolt Size** |
| **0-2** | IPE200 | 2□150.10 | M16 |
| **3-6** | IPE220 | 2□170.12 | M16 |
| **7-9** | IPE240 | 2□170.14 | M20 |

PD (kN) : 100 + 20 G + 10 B

PL (kN) : 150 + 10 ( E + B )

Lw (mm) : 100 + 100A + 10B

Lb (mm): 40 + 5B