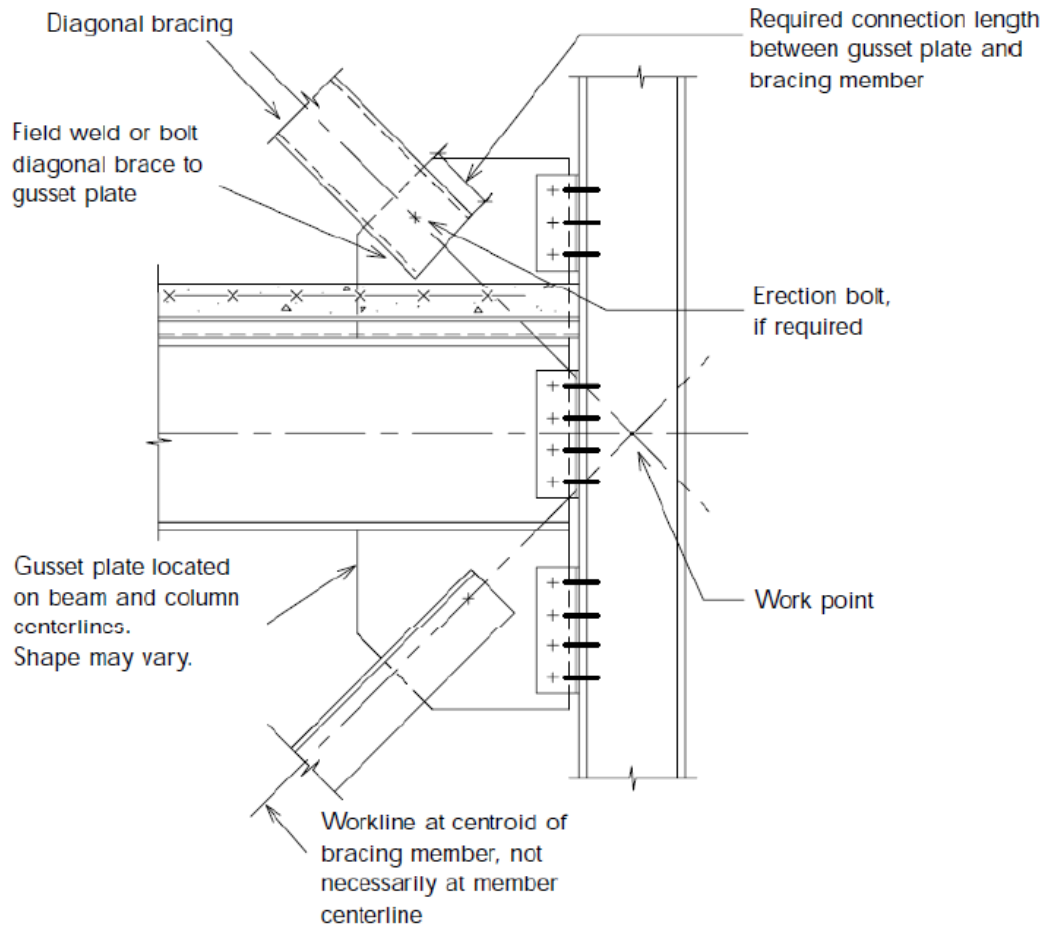


HW 8 Soln

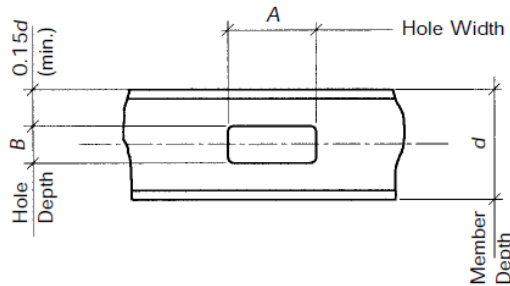
Problem 1

Draw a braced frame connection of an HSS diagonal going to a WF beam to WF column joint in section.



Problem 2

For a mechanical web opening through a wide flange beam, what is the maximum hole depth if we reinforce the beam web? What is the max ratio of length of hole to depth of hole?



CONCENTRIC WEB PENETRATION

The ratio of hole length to depth should be limited to 2.5.

The hole depth must be limited to a maximum of 70 percent of the member depth.

Problem 3

For a 150ft long steel building exposed to the weather undergoing a 100 degree temperature change, what is the change in steel length measured in inches?

$$\text{Change in steel length} = (0.000065) \times (\text{Length of steel}) \times (\text{Temperature differential})$$

$$0.000065 \times 150\text{ft} \times 12\text{in per foot} \times 100 = 1.17''$$

Problem 4

What are the 4 principle parts of paints/coatings?

It is not always necessary to paint or coat structural steel

- when the structure is hidden and protected from moisture
- when it is protected with spray-applied fire protection or
- when aesthetics do not require it.

There are many times, however, when the steel structure must be protected against corrosion

- when it is architecturally exposed.
- When environment / weather requires it

Properly specified and applied coating systems can be expected to give 20 to 25 years of initial service life that can be extended almost indefinitely and with subsequent maintenance painting.

Most coatings are made up of four principal parts:

- Pigments
- Non-volatile vehicles (resins or binders)
- Volatile vehicles (organic solvents and/or water)
- Additives (specialty chemicals which make the coating function).

What is the name of a special type of paint that can be used for fireproofing in exposed steel?

Intumescent paints are examples of special purpose coating systems.

They can provide fire ratings for exposed steel for up to three hours.

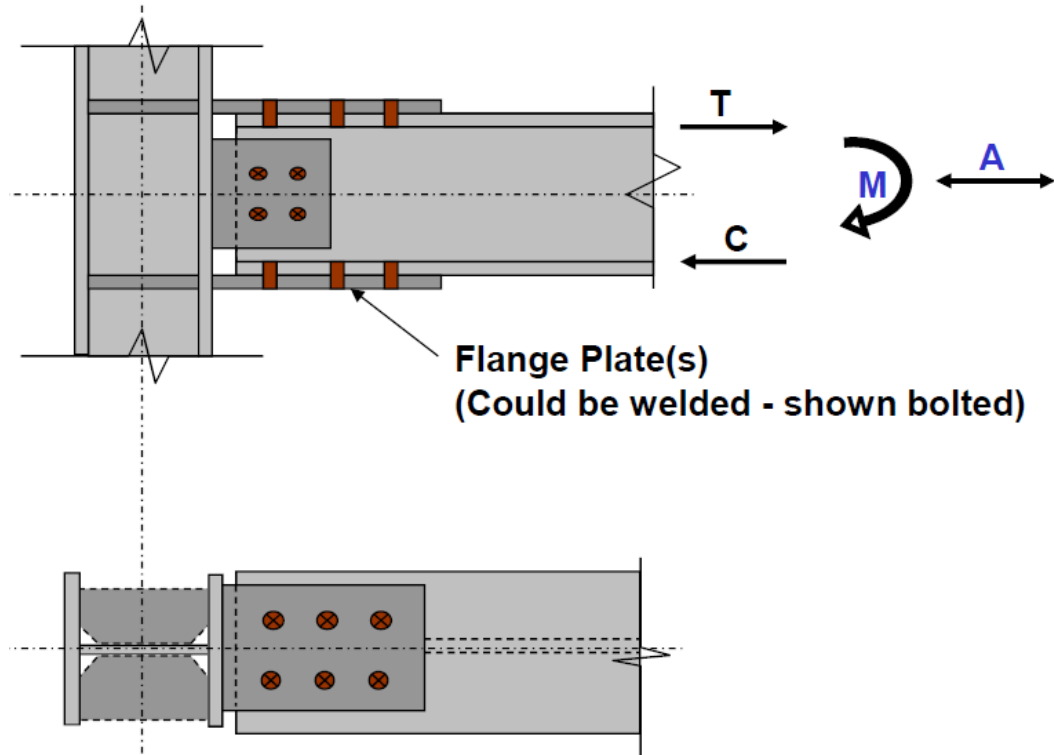
Problem 5

What is the main lesson learned on Ronan Point from the reading?

See reading

Problem 6

Draw a moment connection of a wide flange beam to a wide flange column in section using bolted flange plates. What are the names of the 10 +/- limit states (ways in can fail).



- Holes in flange using Reduced Beam Section for Moment
- Bolt Bearing and tearout on flange
- Bolt Shear
- Bolt Bearing and tearout on Plates
- Plate Tension yielding
- Plate Tension Rupture
- Plate Block shear Type 1 and 2
- Weld at Column
- Check Stiffeners / Doubler within Column

Problem 7

Describe everything you see in this image...



Root, Weld Access hole, Bevel, Backing Bar

Access holes are required for some welds, such as the welded flange connections
The top access hole allows for a continuous backing bar to be placed under the top flange
The bottom access hole allows for complete access to weld the entire width of the bottom flange