What is Connection Detailing?

Worksheet

Connection detailing specifies how members are joined (bolted, welded, or pinned) and sized so the connection can safely carry the force between members; for bolted joints, the number of bolts needed is n = P / Vb.

Questions

1. An applied force of 150 kN acts on a connection with bolts rated at 25 kN shear capacity each. How many bolts are needed?

A) 4
B) 5
C) 6
D) 7

2. What is the main practical difference between bolted and welded connections?

A) Bolted connections allow disassembly, welded ones are permanent
B) Welded connections are always cheaper
C) Bolted connections need no inspection
D) Welded connections are always faster to erect on site

3. A moment connection transfers

A) Only axial force
B) Only shear force
C) Shear and moment (often plus axial)
D) Only torsion

4. What is one of the most common causes of structural connection failure?

A) Wrong paint color
B) Poor detailing
C) Buildings being too tall
D) Using too many bolts

5. A bracket connection carries an applied force of 120 kN; each bolt has a shear capacity of 30 kN. How many bolts are required?

6. A beam-to-column connection must transfer 250 kN using bolts rated at 50 kN shear capacity each, with a 20% safety margin on bolt count.

7. A welded connection must develop 180 kN with a weld capacity of 1.2 kN per mm of weld length. Find the required weld length.

8. Define: What is connection detailing?

9. Define: What are the two main connection types?

10. Define: What is a moment connection?

Answer Key

1. C) 6 - 150 / 25 = 6 bolts.

2. A) Bolted connections allow disassembly, welded ones are permanent - Bolts can be removed and adjusted; welds form a permanent, continuous joint.

3. C) Shear and moment (often plus axial) - Moment connections resist bending in addition to shear and axial forces.

4. B) Poor detailing - Even adequately sized members fail if their connections aren't properly detailed.

5. n = P / Vb = 120 / 30 = 4 bolts

6. Base count = 250 / 50 = 5 bolts With margin = 5 1.2 = 6 bolts

7. L = P / capacity per mm = 180 / 1.2 = 150 mm

8. The engineering design of how structural members join - via bolts, welds, or plates - to safely transfer forces.

9. Bolted and welded (connections are also classified by behavior as pinned or moment connections).

10. A connection that transfers bending moment in addition to shear and axial force between members.