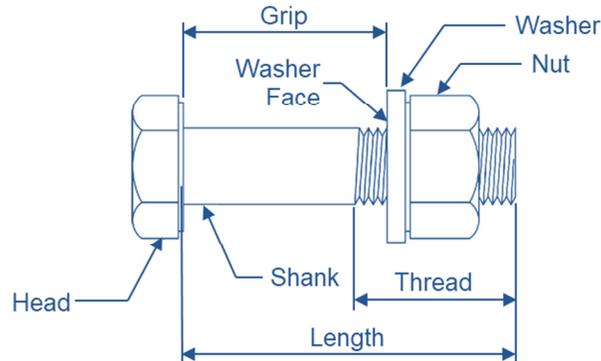


HW7 - SOLN

- 1 What are the two common types of high strength steel bolts?
A325 and A490
- 2 Draw a bolt and label the head/grip/washer/nut.



- 3 Why is 0.707 used in the strength calculation of a fillet weld?
That is the shortest distance and the failure plane at 45degrees and $\cos 45 = 0.707$

- 4 What is the ASD shear capacity of a single 3/4 A325N bolt (bolt shear only)?
 $F_{nv} = 54 \text{ksi}$
 $A = 0.44 \text{in}^2$

$$R_n = F_n A_b \quad (J3-1)$$

$$\phi = 0.75 \text{ (LRFD)} \quad \Omega = 2.00 \text{ (ASD)}$$

$$R_n / \Omega = 54 \text{ksi} \times 0.44 / 2 = 11.88 \text{k}$$

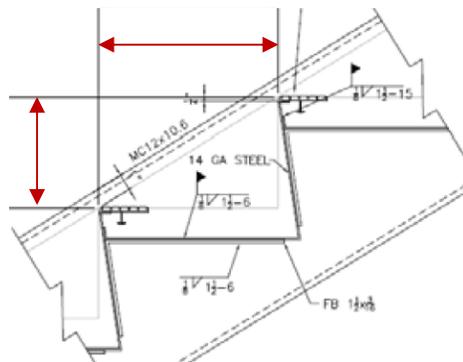
- 5 What are the required tread and riser dimensions for the IBC and IRC?

11" T / 7" R for IBC and 10.75" T / 7.75" R

Why is it important to have a tread of this dimension – that is, what is the safety issue, going up the stair, down, toe or heel etc?

The issue is only descending the stair and the heel gets caught and trip forward

HW7 - SOLN



6 What is the minimum width of a landing? What is the vertical clearance to the ceiling from stairs?

The min width is 44" but there are other requirements that are complicated. Vert dist is 80".

7 When is a guardrail required? Does the guardrail need to have a continuous member at the top?

Guardrail required in IBC, and no guardrail does not need a continuous member.

8 For a guard railing main post that is spaced at 4ft on center, does a 1.25" Square Bar (A36) work in bending for the loading requirements? Assume 42" high similar to bar rail below.



Load = 200# or 50plf x 4ft which is the same thing as 200#

Moment = 0.2k x 42" = 8.4k-in

Z = 1.25³/4 = 0.488

Mn/Ω = Fy Z / Ω = 36ksi x 0.488/1.67 = 10.5k-in > 8.4k-in - OK