

Concept quiz

Circle one

Concrete performs better than steel in (**compression**/tension).

Steel performs better than concrete in (compression/**tension**).

You have a simply supported beam with a distributed load. Compression occurs on the (**top**/bottom) of the beam.

Which of the following beams will require more steel to hold the same amount of load?

d=30in

d=40in

Fill in the blank

If you are given a specific effective beam depth (d), within what range is the width of the beam (b)? Write as b in relation to d.

$$b \leq \frac{d}{2} \text{ and } b \geq \frac{d}{3}$$

If you have a 40 ft span estimate the effective depth of beam.

$$d = \mathbf{40in}$$

What distance from the end of a concrete beam does shear failure occur in concrete?

effective depth d

What angle does shear failure occurs from the end of the concrete?

45 degrees

To protect against shear failure you can install **stirrups**.

Shear reinforcement is installed in a concrete beam until the point when shear strength provided by the concrete is **2** times the critical shear stress.

Use an effective depth of 40in and fill in a dimension for the following:

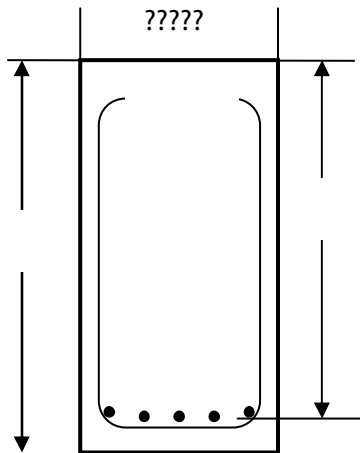
Width of section: $b = 13-20\text{in}$

Height of section: $h = 13-20\text{in plus the concrete cap of } 1.5 + \text{diameter of rebar}$

Concrete cap = 1.5in

Minimum space between bars = 1in

Minimum concrete space from bars to side of section = 1.5in



Draw the following diagram for shear reinforcement and label spacing:

5 #5 bars at 15in spacing

Note that the first spacing occurs at $s/2$ or in this case $15/2$. Also keep in mind that reinforcement is installed from both sides of the beam.

