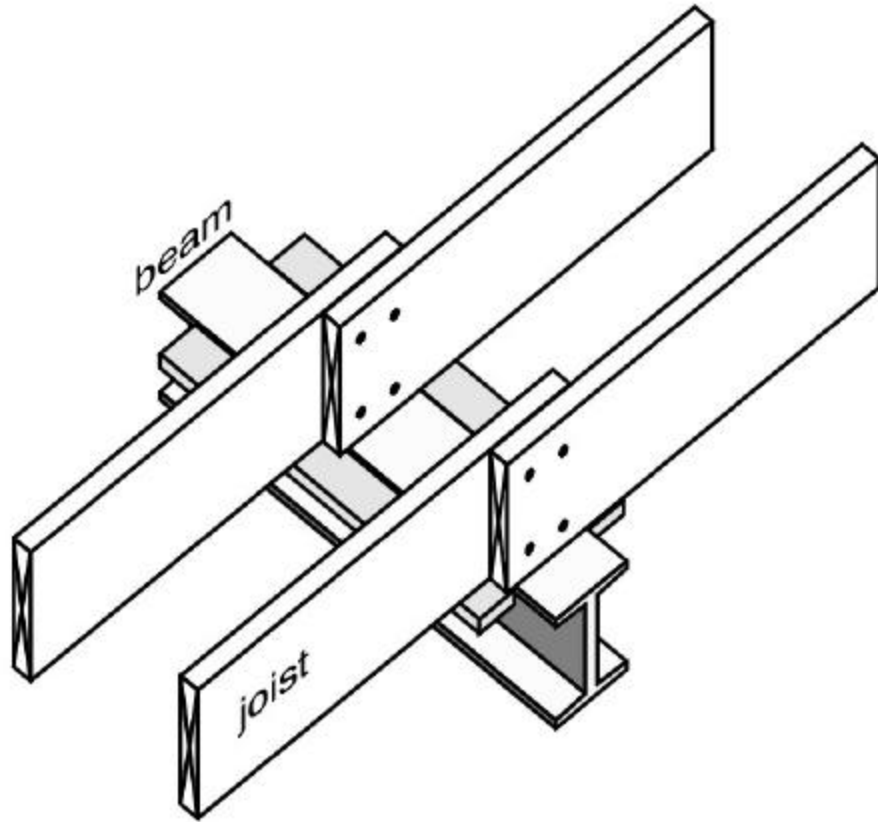


STUDY SESSION 1

Structural Component Definitions and Descriptions

1. This section introduces terminology and definitions necessary for understanding commercial structures and what goes wrong with them. While you may already know many of the terms, there will likely be some you are not completely familiar with.
2. By the end of this Study Session, you should be able to –
 - explain the purpose and function of a footing.
 - explain the purpose and function of piles.
 - describe the two functions of the foundation walls.
 - describe the loads that are handled by beams and girders.
 - describe the loads on a joist.
 - describe the function of a column.
 - explain what reinforced concrete is and why it is a desirable material.
 - describe the characteristics of pre-cast concrete panels.
 - define deflection.
 - give an example of a cantilever.
3. This Study Session should take you about 40 minutes to complete.
4. Quick Quiz 1 is included at the end.

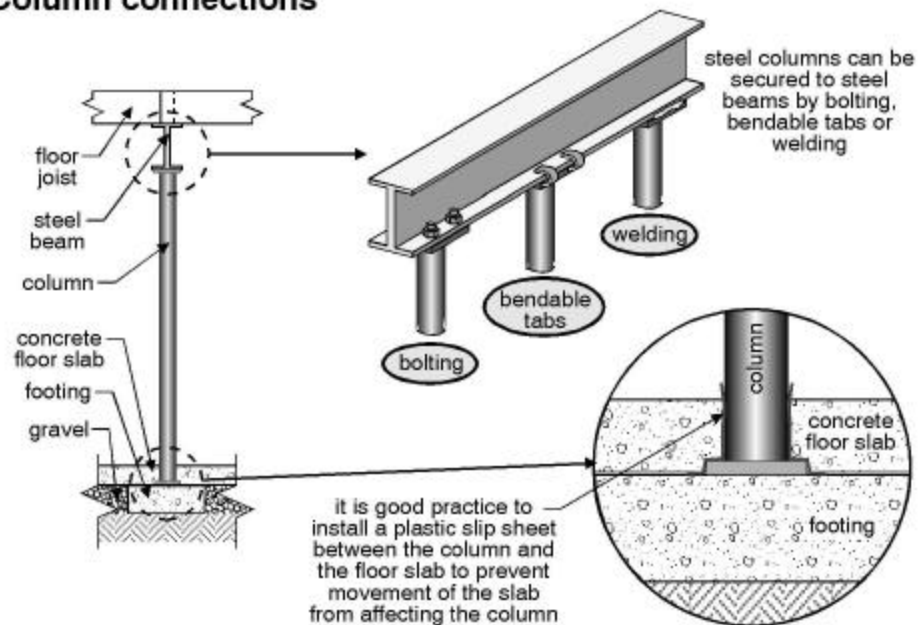


COLUMN

Columns
Transfer Loads
to Footings

Columns transfer loads vertically from beams to footings or to other beams. The illustration below (left) shows floor joists resting on a beam and a beam resting on a column. The column sits on a footing beneath the concrete floor slab (inset on bottom right)

Column connections



SUBSTRUCTURE AND SUPERSTRUCTURE

The *substructure* includes the portion of the building extending below the ground. It includes the footings and foundations.

The *superstructure* is the portion of the building structure starting above grade and up. In general, this is everything from the top of the foundation and up.

REINFORCED CONCRETE AND RE-BAR

Reinforced concrete is a composite material usually consisting of concrete and steel bars (re-bar). The structural properties of the resulting composite are superior to either of the two materials alone.

DEFLECTION

Deflection Is the Amount of Sag or Bending under a Load

For our purposes, deflection is the amount of sag in a joist, beam when a load is applied. For example, if you stand on the end of a diving board it bends under your weight. This bending is '*deflection.*'

Structural components don't bend or *deflect* as much as a diving board but they do bend and sag under the loads applied, even if we don't see it. For example, if you and a few friends walk into a room in your home, the floor may sag 1/16 of an inch or more.

Deflection Is Normal

Deflection is normal. Floor structures are designed to deflect a little. The illustration below shows the normal maximum allowable deflection for a floor structure with a drywall ceiling below

