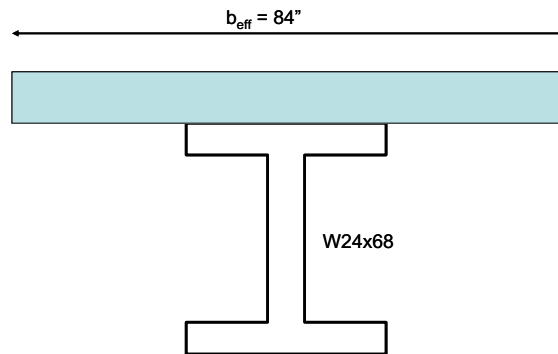


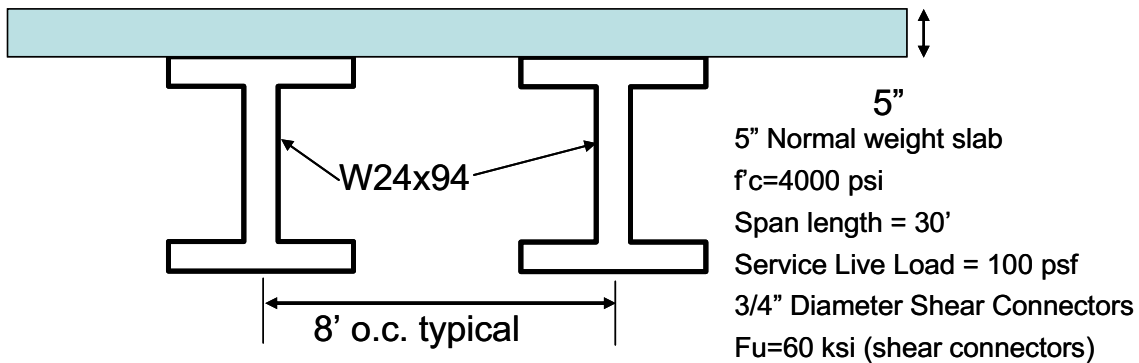
CENG 4315 PS#1

Composite Design

1. **Given:** A fully composite slab is connected to a W24x68 made with the manufacturer preferred material. Concrete is specified to be 3.5 ksi concrete and the slab is 4 inches thick. The effective width of this portion of the slab is 84 inches. **Find:** The nominal and design strength of the section for the fully plastic condition.



2. Determine if the composite beam pictured below is adequate for this application (this includes bending, shear, deflection and shear stud limit states). The dead load for this beam is 10 psf plus the weight of the deck, which is made from normal weight concrete.



3. **Given:** The sketch and details below (which is identical to the information provided in Problem #1). The span of the beam is 35 feet, the beams are spaced 7 feet apart and the beam supports a live load of 100 psf in addition to the dead load of the slab which is comprised of light weight (density = 125 pcf) concrete. **Find:** The number of required shear connectors for fully composite action of a typical interior beam. Your stud design should comply with AISC I8-1. In addition to

finding the number of studs, *design* them: determine diameter, height, longitudinal spacing (ensuring that maximum and minimum spacing requirements are met), and transverse spacing. This design should meet the requirements outlined in the AISC Code Section I8. Provide a plan view and cross section sketch showing your final design. We will not cover many of these requirements in class. This is an opportunity to show me that you are capable of going beyond class notes to teach yourself something new. As always, I am available to answer questions.

