

TO: Students, ME 421  
FROM: Dr. K. Lulay  
DATE: November 13, 2012  
SUBJECT: West Virginia Bridge Design

Congratulations, based on your superior performance on recent projects, you have been promoted to Lead Engineer on the West Virginia suspension bridge project. You are responsible for overseeing the work of other engineers. Your current task is to review the design of the joint connecting the eye-bars.

The bridge has a 1750 foot total span. It is for a 2-lane highway. The basic concept is described:

- Modified suspension bridge design.

- Truss system supports the road deck.

- Solid steel suspension eye-bars and vertical eye-bars are bolted together.

- Eye-bars are forged from a high strength steel.

- The bolts are Grade 8 (high strength steel).

- Vertical eye-bars transfer the load from the road deck trussing to the suspension eye-bar system.

- There are two identical sets of eye-bars - one on each side of the bridge.

- There are two towers supporting the eye-bar suspension.

- Figure 1 shows the basic overview.

- Figure 2 is a sketch of how the eye-bars support the trussing.

- Figure 3 shows details of the joint.

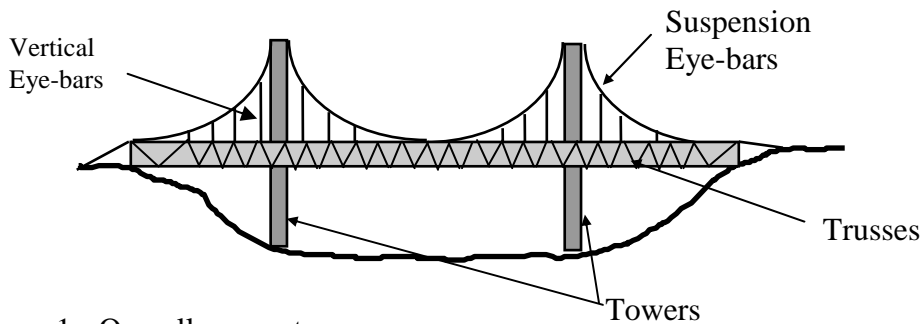


Figure 1 - Overall concept

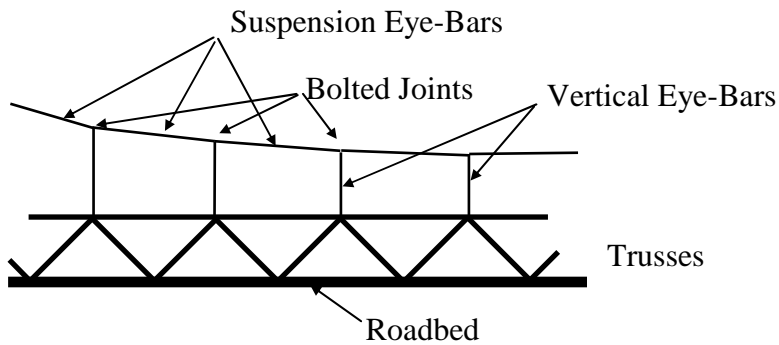


Figure 2 - Suspension details

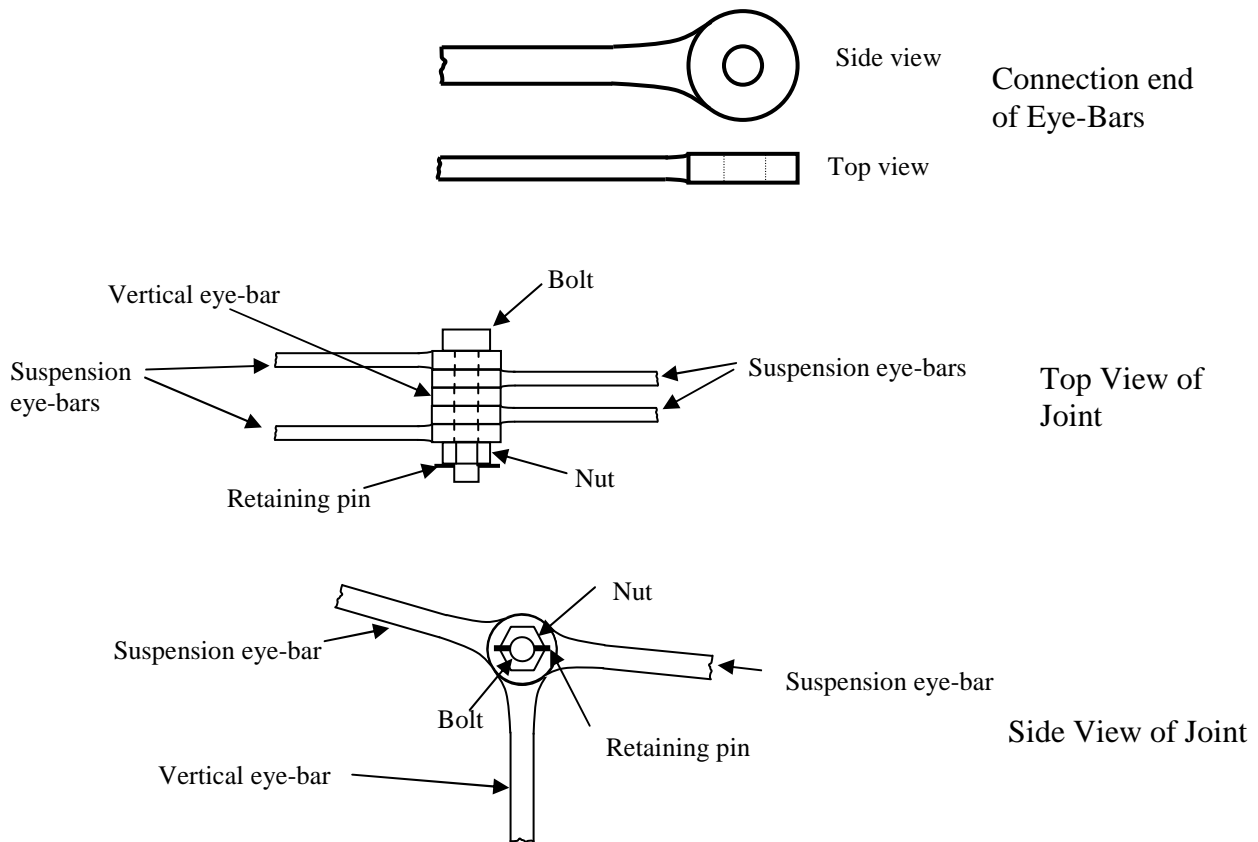


Figure 3 - Details of Bolted Joint.

Your job is to review the joint design (eye-bars, bolts, nuts, and retaining pin). Do not comment on other aspects such as connections to the trussing, etc. Please identify your top concern regarding this design. Include questions or requests for data that you would have for the designer regarding the design. For example (obviously, fatigue is not an option for you since I've already picked it for my example):

Example... *Concerns: Fatigue - have the bolts and eye-bars been properly analyzed to withstand anticipated fatigue loading? I need to see the assumptions regarding loading, and what they are based on. I would also like to see the calculations.* (Instructor note, the above is an example of what I'm looking for from you. Do NOT do stress calculations, etc.)