

560.206

Homework 2

External Reactions

1. Hibbeler #2-31
2. Hibbeler #5-20 – EXTERNAL REACTIONS ONLY!

Truss Analysis

3. Hibbeler #3-6
4. Hibbeler #3-7

Group Work – Truss Analysis Case Study

5. Morgan Bridge Case Study Truss Analysis

(supplemental h/o in class gives dimensions and additional details)

- (a) IDEALIZATION
 - a. Assume pin-roller statically determinant boundary conditions for the truss. Solve for the external reactions under the given dead load.
 - b. Prove the truss is internally statically determinant
- (b) DEAD LOAD ANALYSIS: Find the truss member forces under dead load, you may use any method but you must show the following.
 - a. Show a completed FBD of one joint with at least three members – draw the member forces as vectors AND draw them to scale!
 - b. Show FBD for at least one cut section through the truss
 - c. Show a final drawing of the truss with all member forces indicated and use T or C to denote if the bar is in tension or compression
- (c) LIVE LOAD ANALYSIS: Select a location for the van at either approximately the $\frac{1}{4}$ or $\frac{1}{2}$ length of the bridge. Distribute the van load to the joints (panel points) of the truss. Provide a drawing of the truss with your assumed live load clearly shown.
 - a. Find the member forces for your assumed live load
 - b. show a final drawing of the truss with the member forces and external reactions due to live load clearly shown.
- (d) COMBINED LOAD: Use “superposition” to combine your member forces and report the final dead+live load member forces for the Morgan Bridge.
- (e) DISCUSSION
 - a. What idealizations are required to make your analysis – how do they compare with the bridge itself?
 - b. What are the critical members in the truss, how can you decide this from the analysis alone?
 - c. Where did you place the live load, why?