

Design Project
Submittal DP4
Design Analysis

Team: _____
Members: _____

Attach a neatly hand drawn concept sketch (3D isometric) of your design. Identify all of the components on the sketch with a unique name or number. Include preliminary layout dimensions. Also show preliminary sketches of connections.

Submit the complete design analysis including assumptions, warnings, FBDs, and calculations for both strength and servicability. Show that the maximum stress values are below the allowable stress (strength divided by safety factor). Calculations can either be done by hand or with the aid of a computer program. If a spreadsheet program is used, show sample hand computations that demonstrate what the program is doing. There is no need to use a word processor for reporting the calculations. If you develop design equations from standard analysis formulas, show this development one time. Calculations lead the team to decisions regarding member sizing, adequacy, material choice, safety, etc. Both the task leader and the assistant need to approve each decision with their signature.

An outline of the design analysis is:

1. identify the component (name or number), show it in situ (on concept sketch)
2. sketch the model with loads and label it for each loading scenario, show support conditions symbolically
3. draw the FBD
4. analyze each cross section (there may be more than one), give materials and allowables, assumptions and warnings, and references; report new data to team; develop design equations from standard formulas; use and update data tables (materials, loads, etc.)
5. make decision; specify sizes being careful about nominal and actual dimensions; any other conclusions; report to team
6. leader and assistant sign off on each decision
7. repeat steps 3-6 for each loading condition