Lucerne Bridge

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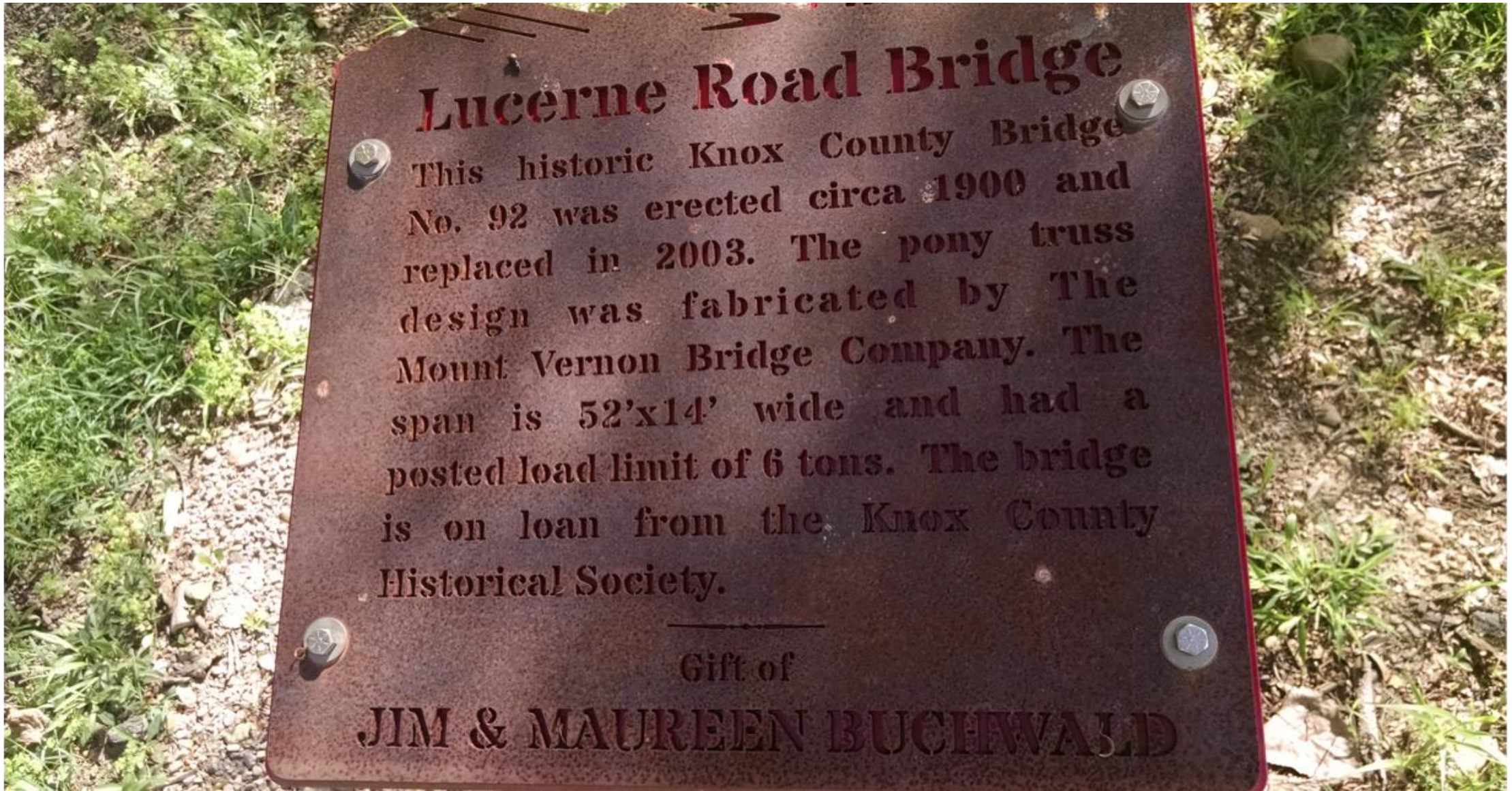
Description

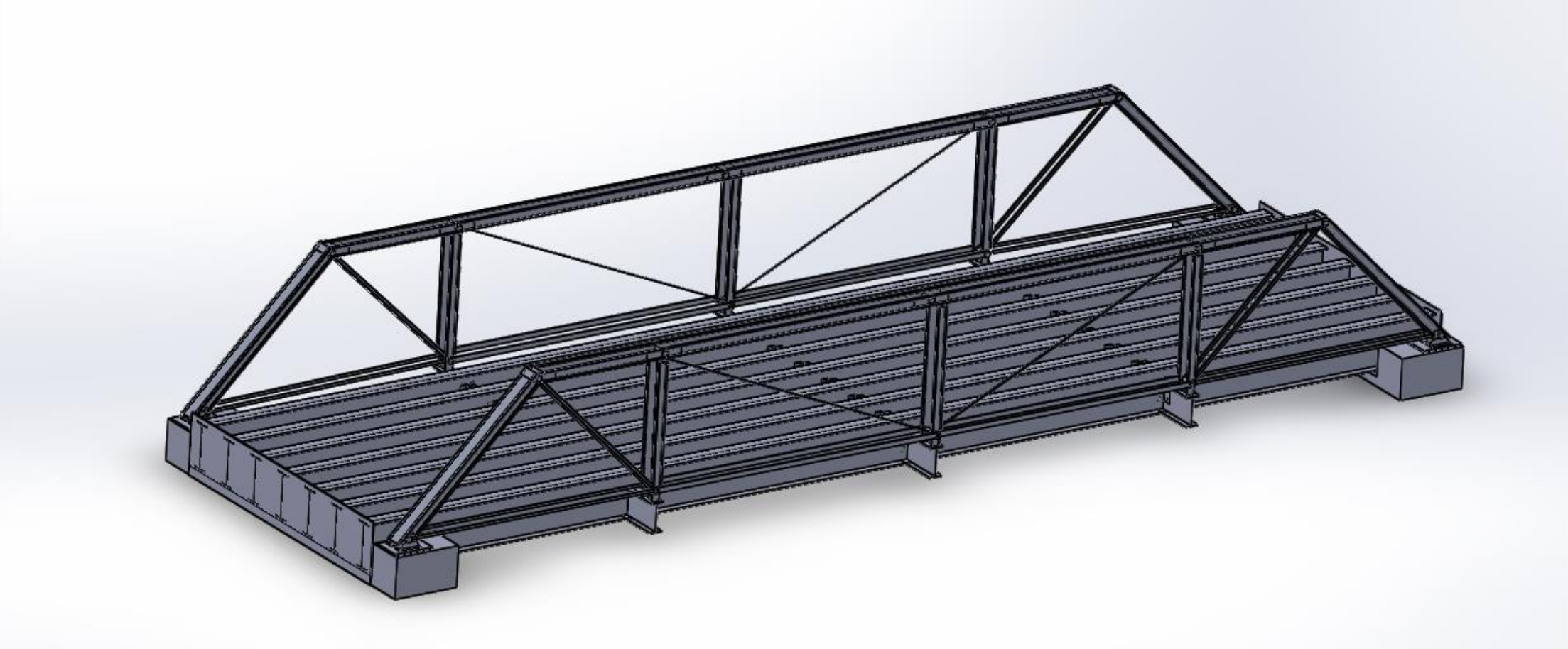


The Lucerne Bridge

Objective

- To perform stress analysis utilizing ANSYS software on the Lucerne Bridge
  - Going on site to perform measurements
  - Developing a script to input into ANSYS
  - Constructing 3-Dimensional models to aid in more accurate measurements
  - Running various analyses on the ANSYS model in order to determine maximum theoretical stresses
  - Comparing stress analysis with the posted load limit of the Lucerne Bridge

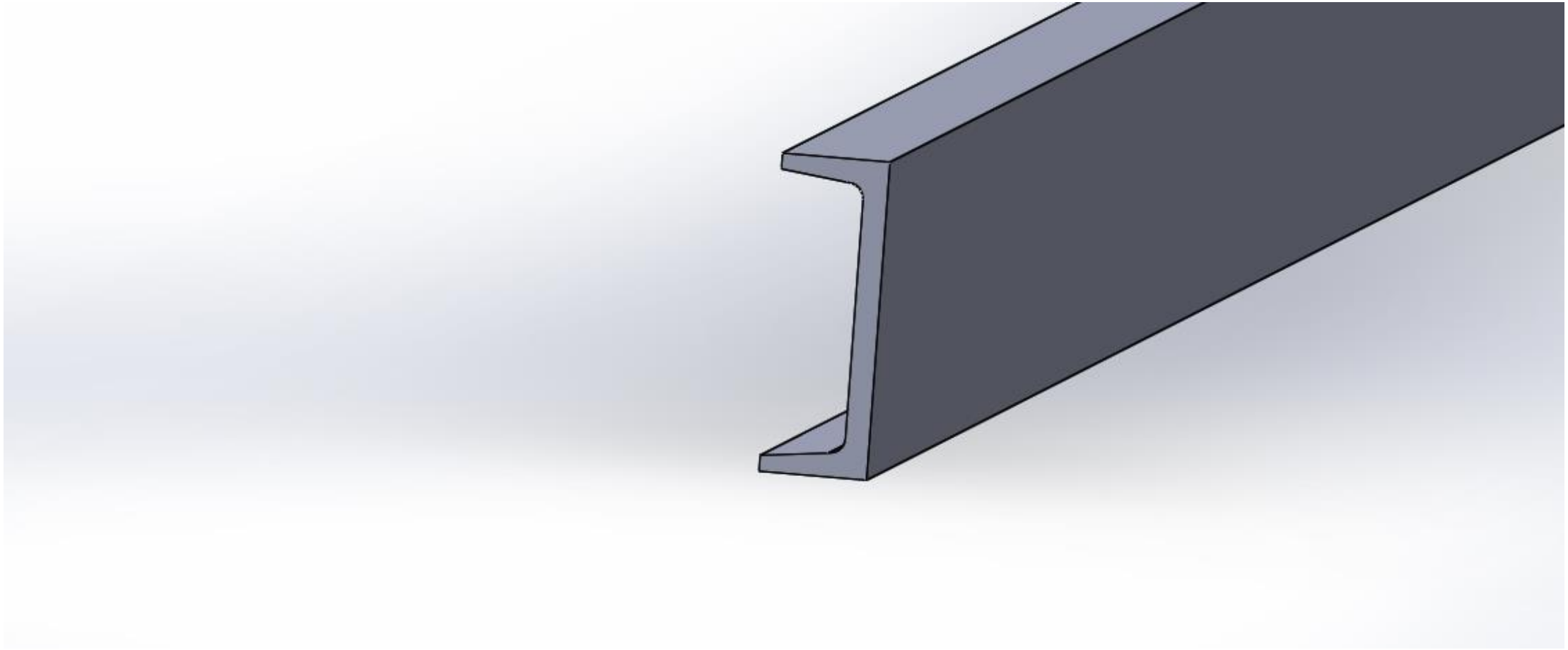
Modeling



Pros and Cons of Modeling

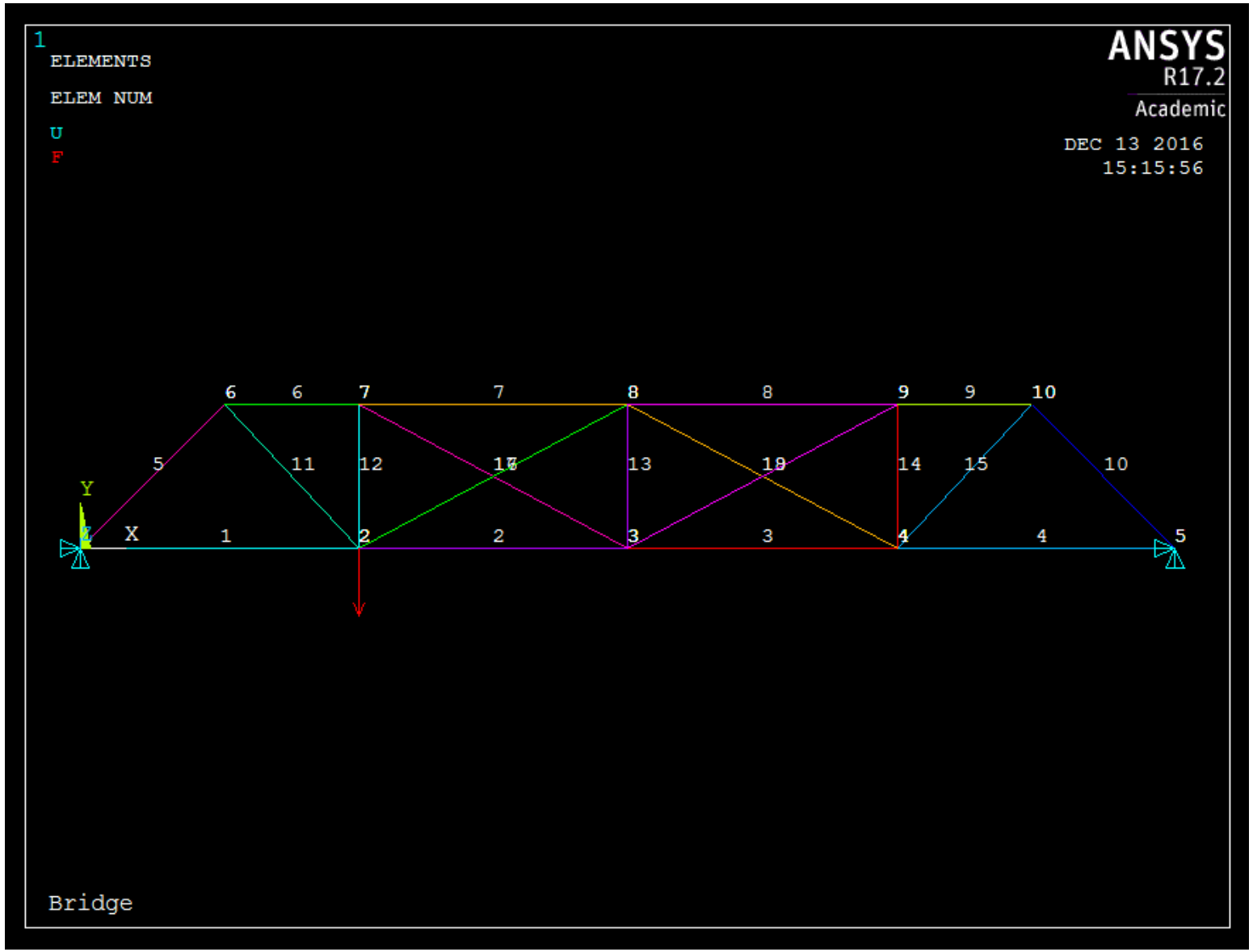
- Unfortunately, the 3D model did not live up to expectations
  - Too detailed for 3D printing
  - Too large for ANSYS to analyze
  - Could have been constructed differently to be properly used
- However, it did aid ANSYS
  - The model was able to define very specific areas
  - The model served as a quick reference for measurement needed during the script process

Modeling (continued)



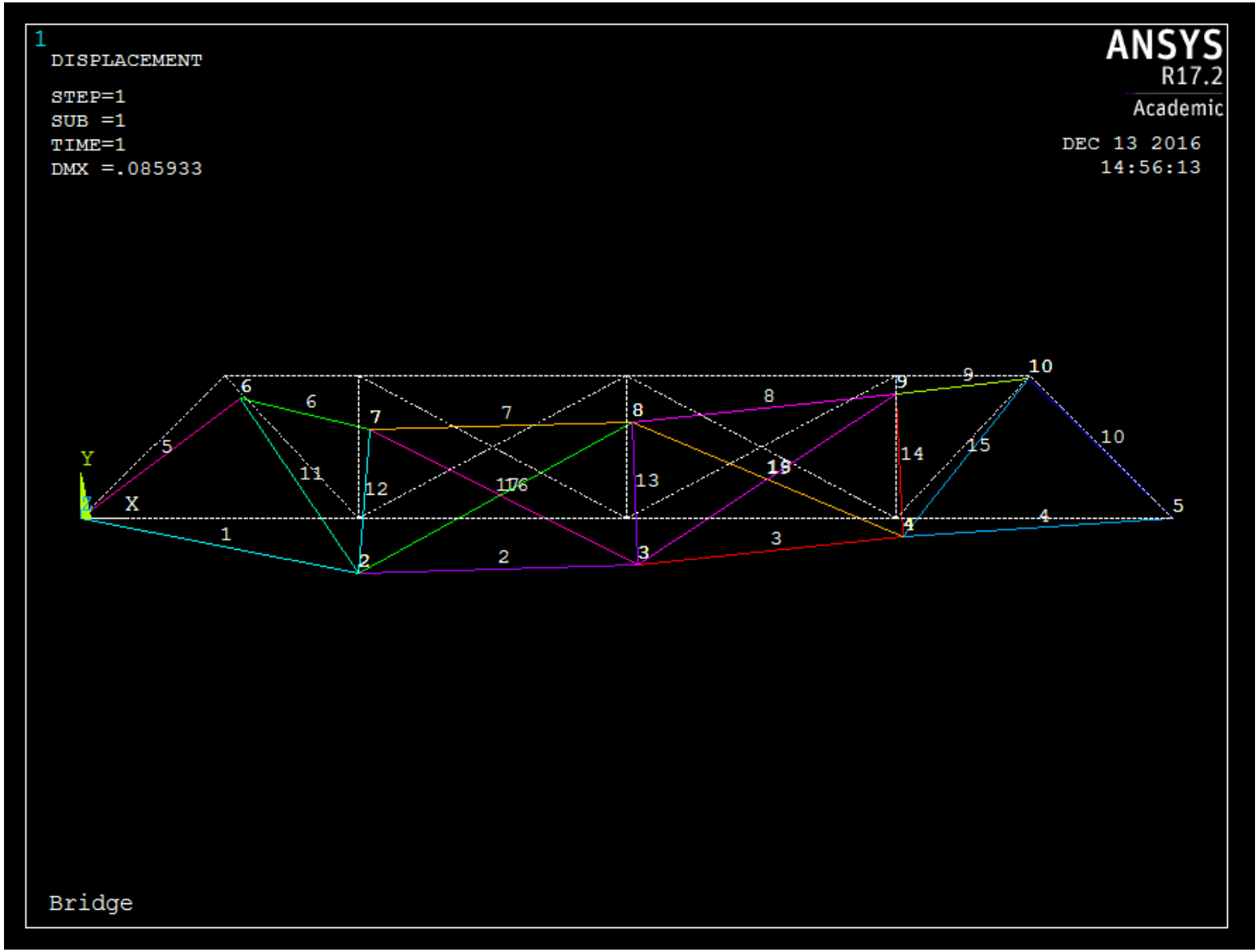
Pre-Loading

- Lucerne Bridge in ANSYS before we applied the load of 10,000lbs to the bridge at node 2 in the downward direction.
- By applying forces at multiple different points, we determined the maximum stress was experienced at node 2



Post-Loading

- Lucerne Bridge in ANSYS after applying the load of 5000lbs in the downward direction at node two.
- Max Stress: at element 11.) 6,134.6 psi
- Yield Strength (A36 Steel): 36,000 psi
- Ultimate Strength (A36 Steel): 58,000 psi



Conclusion

- Theoretically, the bridge can support its posted load of 6 tons
  - The members of the bridge do not exceed the Yield Strength of A36 structural steel
  - The F.O.S of the posted load is 5.87