# 1.101 Introduction to Civil and Environmental Engineering Design I

Structure Design Task

Your task is to design, fabricate and test a simply-supported truss, which will support a prescribed load without failure. Also, the vertical deflection of any node is not to exceed a prescribed value. The figure is meant only to introduce overall geometry of the structure. More detailed specifications are given below.
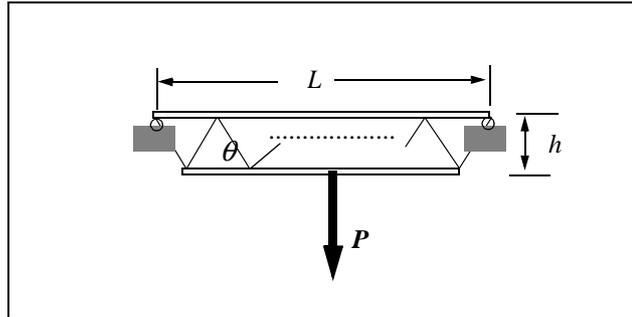
- The length of span is prescribed as L =3 ft.+/- 0.5inches
- The structure is required to support, at mid span, a static load of 40 pounds.
- Maximum deflection at any node is not to exceed 0.1 inches.

Other constraints include:

- Your choice of bar stock, out of which you are to fabricate members, is limited to three steel sections: one with a rectangular cross-section of 1/8 in. by 1/16 in., a second with cross-section of 1/4 in. by 1/16 in and third with cross-section measuring 1/4 in. by 1/8 in.
- All joints are to be spot welded.
- Material and fabrication costs are to be kept to a minimum. The cost of the steel stock per unit of length is proportional to the cross-sectional area. The unit cost of a spot welded joint is one tenth (1/10) the cost of a length L (the span length) of the heaviest stock.

A dial gage indicator will be used to measure joint displacement and you will be supplied with the necessary equipment to support and load the structure.

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