# 1.101 Structural Design Task
Fall 2006

Here are the requirements: Revised, 1 November

- The contributions to the torsional stiffness of the entire structure due to bending of the rods is to be approximately the same as the contribution due to torsion of the rods. **Better to have the contribution due to torsion greater than that due to bending so the difference in structure stiffness will be more dramatic.**

- The torsional stiffness should be such that the rotation can be measured with a dial gage. **The structure should show a rotation of 5 - 10° for the case when the resistance to torsion is due to bending alone.**

- Loading is to be accomplished using the 1/2 and 6 pound weights available in the lab.

- The apparatus should not fail, yield or break during experiment.

- Your structure should fit within a rectangular parallelepiped of dimensions 10in. by 10 in. by 24 in. (See figure at right).

- The *free end*, plate C, should interface with the loading beam (DD' in the figure previous page) as shown.

- The *fixed end*, plate B, should be bolted rigidly to the open grill, table surface as shown in the figure on the previous page.
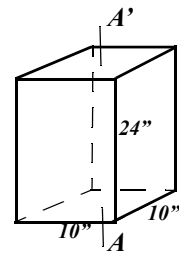
Your task includes i) sizing the circular shafts (length, diameter, wall thickness if hollow), choosing n, their number, and the material out of which they are to be made ii) fabricating the elements of the structure paying special attention to how to fasten the ends of the rods to plate C in both modes of testing   iii) assembly and testing of the structure. Available materials and rod stock sizes will be given in a table.

A detail: The figure below shows the table base. The axis of your structure should fall on the intersection of the of the grid. Note too that the lever arm on top will be 16inches, not 12.