1. The arm ABC of the robot shown is to be made from a steel tube having an outside diameter of 4 inches. A maximum 30 pound load can be lifted at point C. Determine the minimum wall thickness for the tube so that the deflection of point C is limited to 0.005 inches. Find the maximum bending stress in the arm for that thickness. (HINT: This is an excellent Excel Solver problem!)

2. A wide-flange beam is needed to support the two 10,000-pound crane loads shown. The load can move from X = 0 ft to X = 35 ft. Determine the worst-case location for the loads and select a suitable wide-flange beam. Use A992 steel and a design factor of 3.0 on bending stress. Do NOT neglect the weight of the beam.

3. For the flat plate in tension, compute the stress at the holes considering the stress concentrations. Assume the holes are sufficiently far apart that their effects do not interact.

4. Determine the maximum stress in the bar considering stress concentrations.

5. Determine the maximum stress in the bar considering stress concentrations.