MECH-308 Finite Element Analysis Spring 2009

PS #3 **Due: 2/16/09 Tue Lab**
Due: 2/19/09 Fri Lab

Objectives

1. To determine the forces and displacements of a simple statically indeterminate problem.

2. To deal with rigid portions of a model with finite element analysis.

The Problem

P5.42 A hollow steel [$E = 30{,}000$ ksi] tube (1) with an outside diameter of 3.50 in. and a wall thickness of 0.216 in. is fastened to a solid 2-in.-diameter aluminum [$E = 10{,}000$ ksi] rod. The assembly is attached to unyielding supports at the left and right ends and is loaded as shown in Fig. P5.42. Determine:

(a) the stresses in all parts of the axial structure.

(b) the deflections of joints B and C relative to support A.

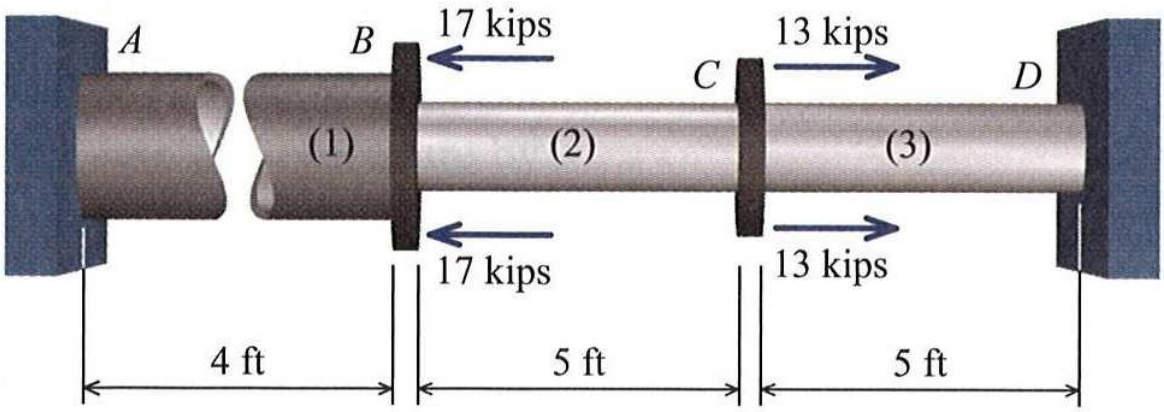

FIGURE P5.42

Model the above axial problem and model the connecting plates as ¾-inch thick by 6-inches in diameter, as is, as a rigid element and by eliminating the plate from the model entirely. Provide a discussion of the stress results.