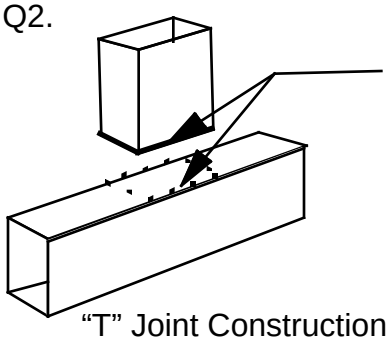
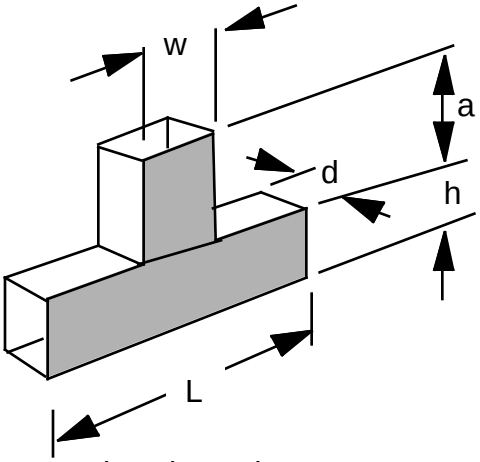
Homework 4

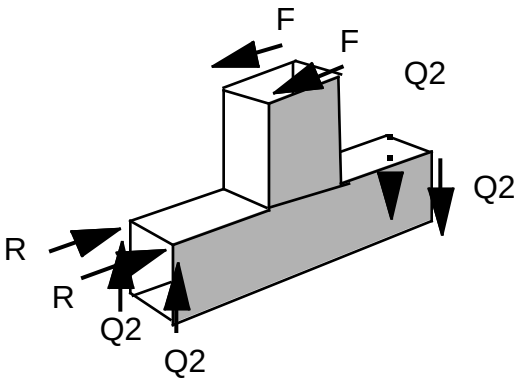
The thin-walled “T” Joint shown below is loaded by a force F along side edges. The reactions to ground are limited to R and Q2.




“T” Joint Construction




“T” Joint Dimensions



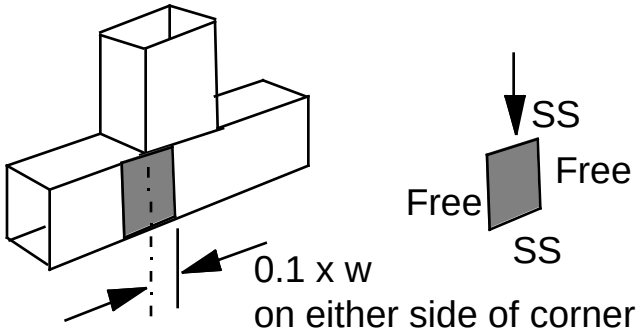

Applied Load: F
Reaction Loads to Ground: R, Q2

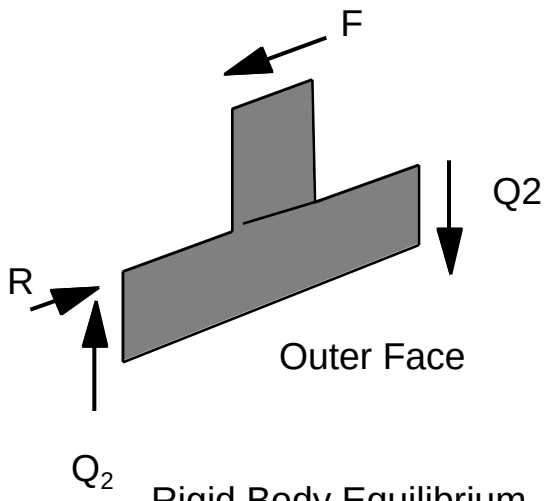
A) Compute all the internal forces for the first order shear panel/spar model shown on the next page. (Note: shear panels, representing panels, can only react in-plane shear forces and spars, representing corners, can only react axial forces.)

B) For w=4 in. a=8 in. h=4 in. d=3 in. L= 20 in.
thickness of panel D is .042 in., thickness of panels A, B, C is .035 in.
Material:Steel $E=30x10^6$psi, $\sigma_y$=30000psi, $\tau_y$=15000psi

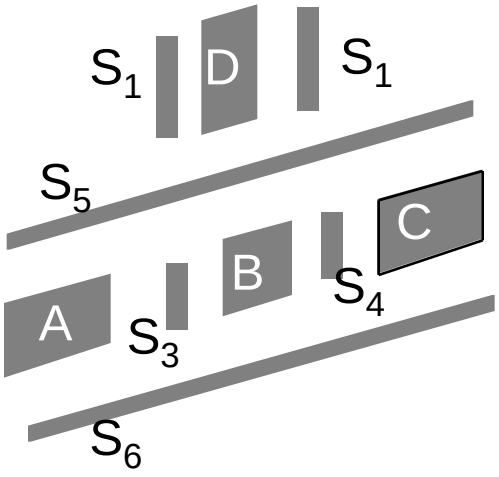
compute the loads, F, at which shear buckling occures in panels A, B, C, D (use K=5 in the buckling equation)

C) Assume the load in Spar $S_3$ is reacted by a portion of panels A and B as shown below. What is load, F, at which buckling of this panel will occur? How could this buckling load be increased?

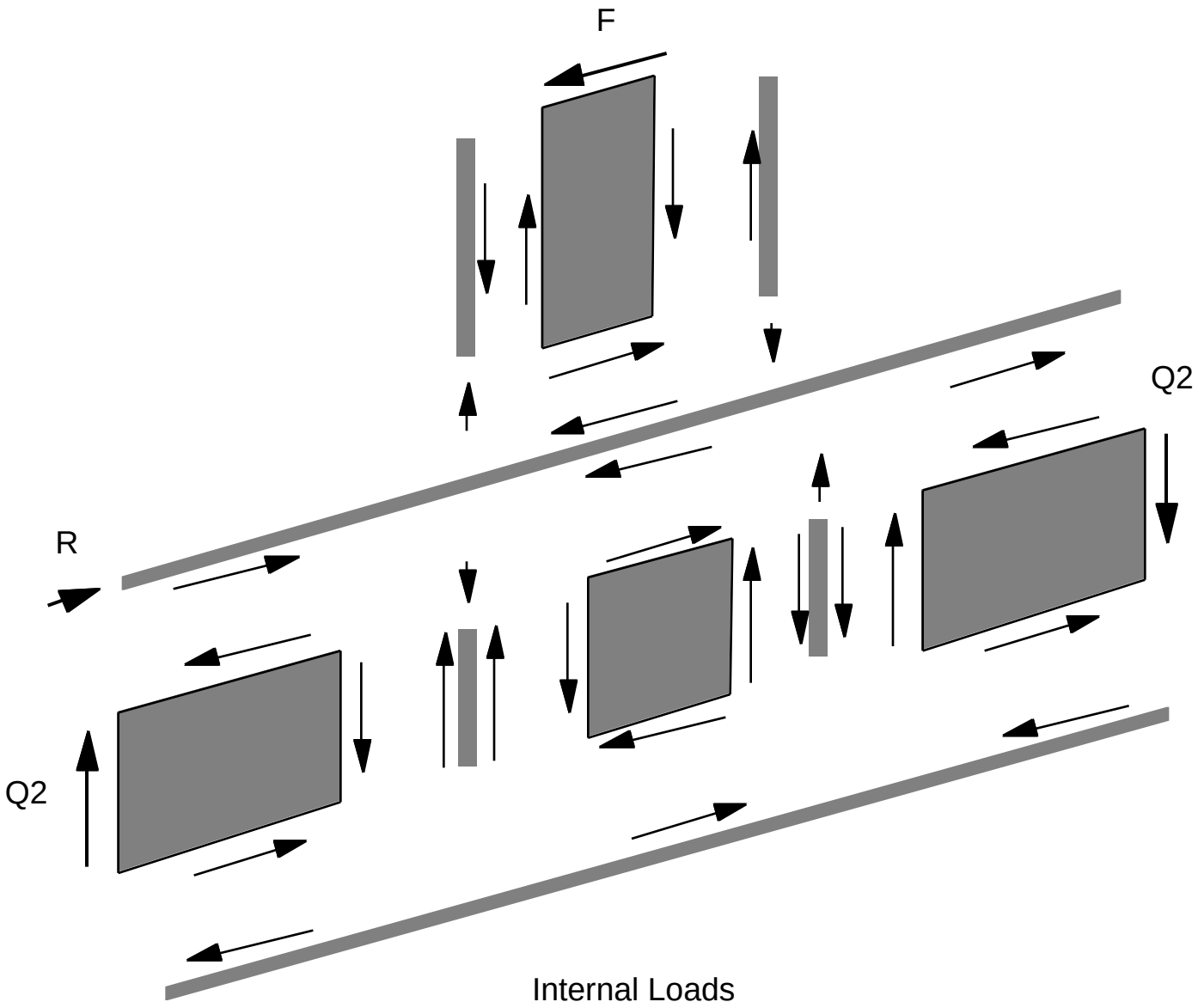





Rigid Body Equilibrium




Panel and Spar Labeling




Internal Loads