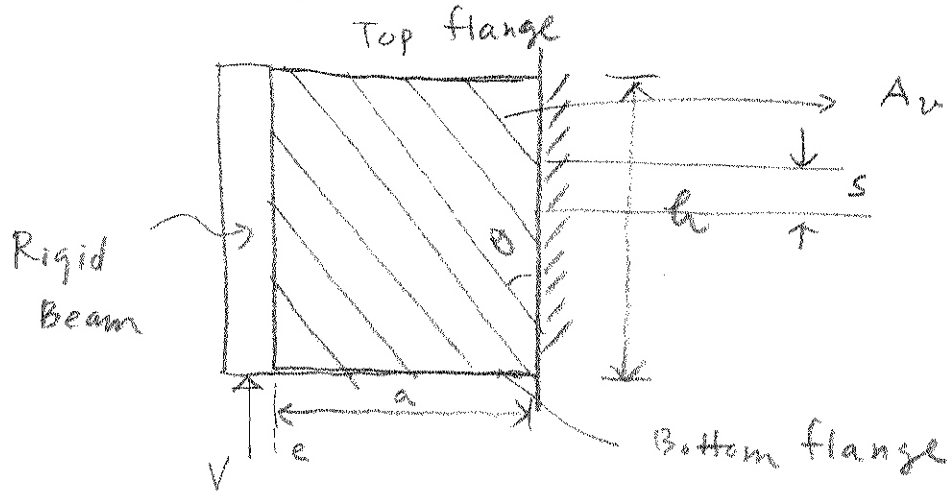


**Final exam of Plasticity in Concrete 2007-12-18**

1. Even we have discussed yield condition of concrete in plane stress and plane strain, only a uni-axial strength of concrete is applied to describe web crushing failure of beams in shear. Propose where Mohr-Coulomb material can be applied to and explain why
2. Derive shear strength of shear wall with the following inclined web reinforcement using lower bound and upper bound solutions.



3. For the shear wall on Figure 4.9.1 derive shear strength by upper bound solution. You should derive Equations (4.9.25) and (4.9.27).
4. Derive shear strengths of the structures shown on page 353 in the text book by upper bound solutions.

$$P = \frac{(0.5 \cdot \sigma_c \cdot b \cdot h) \cdot (1 + c)}{2 \cdot \phi \cdot f_c}$$

$$P = \frac{\sigma_c \cdot b \cdot h}{(1 + c)} \cdot \frac{(1 + c)}{2 \cdot \phi \cdot f_c}$$

$$P = \frac{\sigma_c \cdot b \cdot h}{(1 + c)} \cdot \frac{(1 + c)}{2 \cdot \phi \cdot f_c}$$

$$P = \frac{\sigma_c \cdot b \cdot h}{(1 + c)} \cdot \frac{(1 + c)}{2 \cdot \phi \cdot f_c}$$

5. Using circular fan in Figure 4.8.15 derive the ultimate load due to the bond failure of tensile stringer.