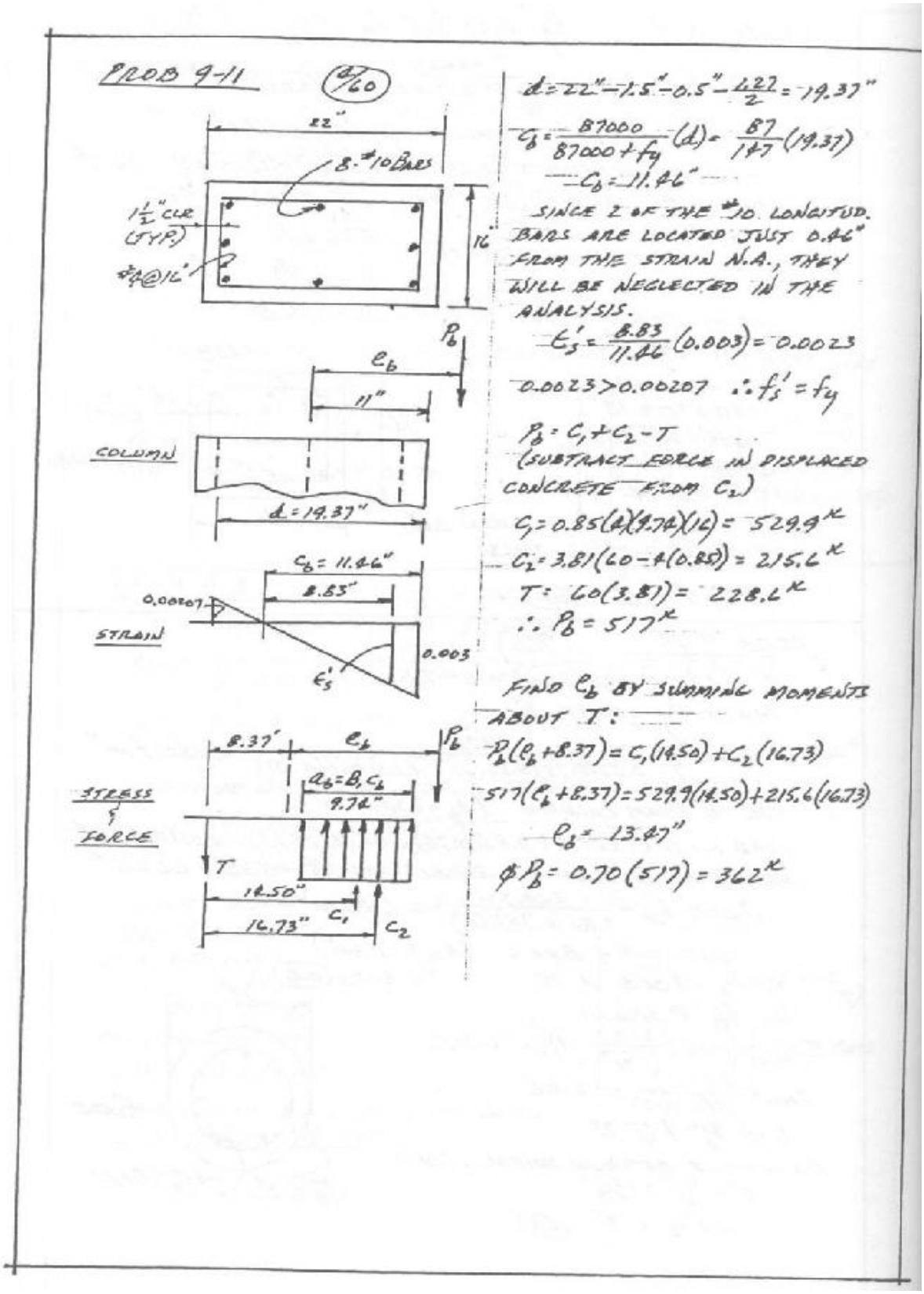
ENCE 355 – Introduction to Structural Design
SOLUTIONS to Homework Set No. 8
Fall 2002



$d = 22" - 1.5" - 0.5" - \frac{4.27}{2} = 19.37"$

$c_b = \frac{87000}{87000 + f_y}(d) = \frac{87}{147}(19.37)$

$c_b = 11.46"$

SINCE 2 OF THE #10 LONGITUD. BARS ARE LOCATED JUST 0.46" FROM THE STRAIN N.A., THEY WILL BE NEGLECTED IN THE ANALYSIS.

$\epsilon_s' = \frac{8.83}{11.46}(0.003) = 0.0023$

$0.0023 > 0.00207 \quad \therefore f_s' = f_y$

$P_b = C_1 + C_2 - T$

(SUBTRACT FORCE IN DISPLACED CONCRETE FROM C_2)

$C_1 = 0.85(4)(9.74)(16) = 529.9^K$

$C_2 = 3.81(60 - 4(0.85)) = 215.6^K$

$T = 60(3.81) = 228.6^K$

$\therefore P_b = 517^K$

FIND e_b BY SUMMING MOMENTS ABOUT T:

$P_b(e_b + 8.37) = C_1(14.50) + C_2(16.73)$

$517(e_b + 8.37) = 529.9(14.50) + 215.6(16.73)$

$e_b = 13.47"$

$\phi P_b = 0.70(517) = 362^K$

PROB #2-1

1. $u = (1.4)(1200) = 1680$ lbs/ft

2. $u = (1.2)(1200) + (1.6)(720) = 2592$ lbs/ft ←

3. $u = (1.2)(1200) + (0.5)(720) = 1800$ lbs/ft

4. $u = (1.2)(1200) + (0.5)(720) = 1800$ lbs/ft

5. $u = (1.2)(1200) + (0.5)(720) = 1800$ lbs/ft

6. $u = (0.9)(1200) = 1080$ lbs/ft

7. $u = (0.9)(1200) = 1080$ lbs/ft

$\boxed{u = 2592 \text{ lbs/ft}}$ ✓ gcm