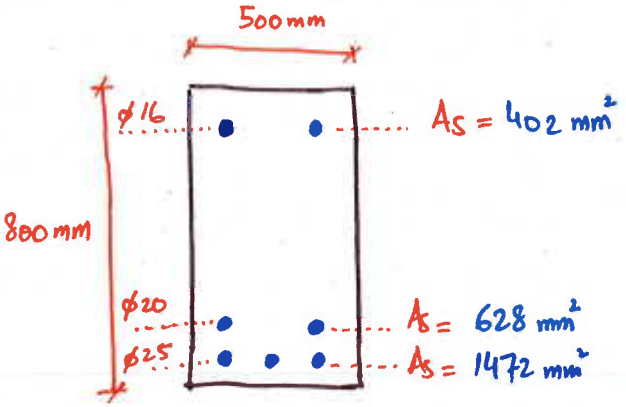
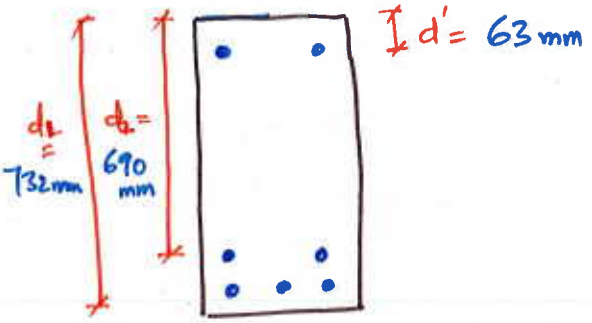




STRAIN LIMITS

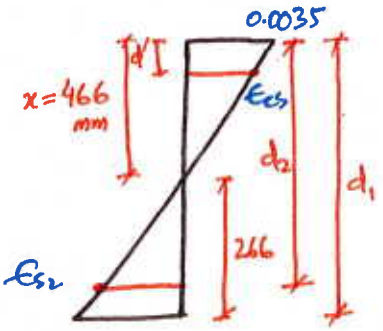
$f_{ck} = 40\ N/mm^2$; $\gamma_{mc} = 1.5$; $\epsilon_c = 0.0035$

$f_{yk} = 500\ N/mm^2$; $\gamma_{ms} = 1.15$; $\epsilon_s = 0.002$

External Axial Load

$P = 300\ kN$

STRAIN DIAGRAM



$\epsilon_{s1} = 0.002$

$\epsilon_c = 0.0035$

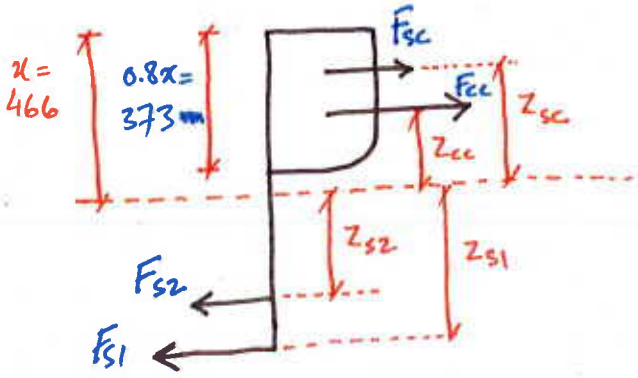
$\epsilon_{s1} = 0.002$

$\epsilon_{s2} = \frac{0.002}{266} \times 244 = 0.0018$

$\epsilon_{cs} = \frac{0.0035}{466} \times 403 = 0.003 > 0.002$

Hence 0.002

STRESS DIAGRAM



161 kN ⇑

$F_{sc} = 0.002 \times 200 \times 10^3 \times 402\ mm^2 = 400\ N/mm^2$; $Z_{sc} = 403\ mm$

$F_{cc} = \eta \cdot \frac{f_{ck}}{\gamma_{mc}} \times b \times 0.8x = 0.9 \times \frac{40}{1.5} \times 1000 \times 373$

$F_{cc} = 8952\ kN$ $\quad Z_{cc} = 466 - \frac{377}{2} = 277\ mm$

$F_{s2} = 0.0018 \times 200 \times 10^3 \times 628 = 226\ kN$ $\quad Z_{s2} = 224\ mm$

$F_{s1} = 0.002 \times 200 \times 10^3 \times 1472 = 589\ kN$ $\quad Z_{s1} = 266\ mm$

$F_{sc} + F_{cc} \neq F_{s2} - F_{s1} \neq P$ Therefore Revise "x"

MOMENT OF RESISTANCE

$M = F_{sc} \times Z_{sc} + F_{cc} \times Z_{cc} + F_{s2} \times Z_{s2} + F_{s1} \times Z_{s1}$

$= 161 \times 0.403 + 8952 \times 0.277 + 226 \times 0.224 + 589 \times 0.266$

$= 2752\ kN.m$