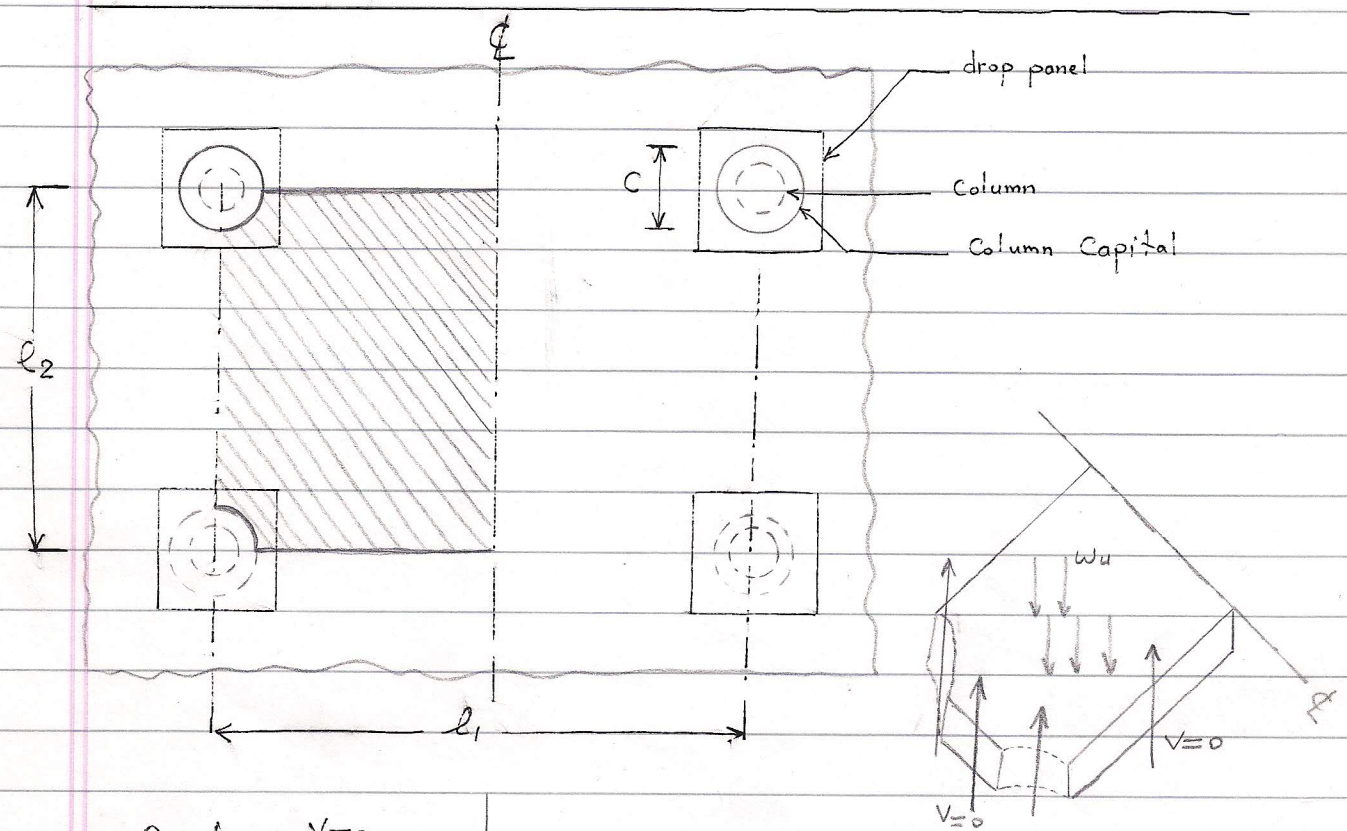
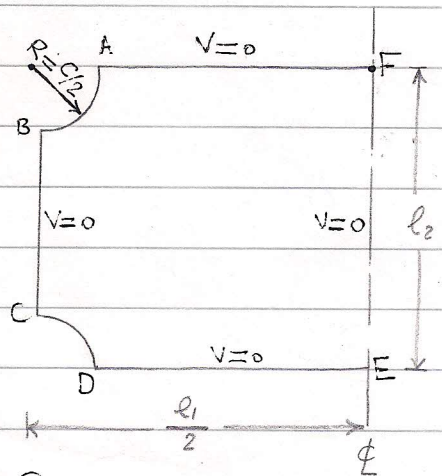
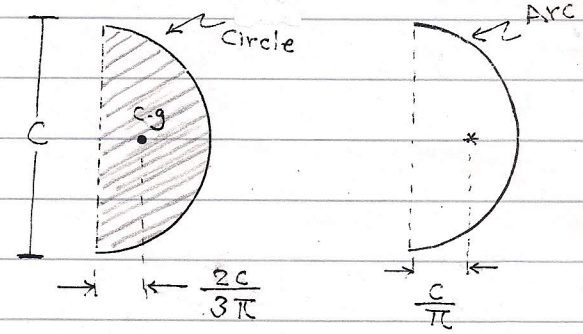
* Total Factored Moment (M_o) in flat slab with column Capital



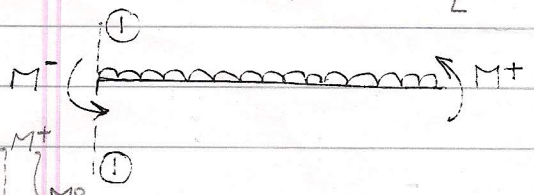


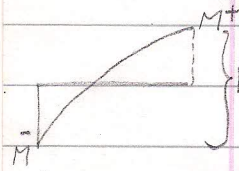


ربع دائرة

فدائتين (ربعين)

$2 * \frac{1}{4} * \frac{\pi}{4} C^2 = \frac{\pi}{8} C^2$





Let C = diameter of column Capital

$\sum$ reactions on arcs AB & CD $= w_u \left(\frac{\ell_2 \cdot \ell_1}{2} - \frac{\pi}{8} C^2 \right)$

$\sum M_{1-1} = 0$ ↻

$\left(\frac{\ell_1}{2} * \frac{1}{2}\right)$ — ab ℓ_1 arc — center arc — rect from on arc

$$M^+ + M^- - \left(w_u \frac{\ell_2 \ell_1}{2}\right)\left(\frac{\ell_1}{4}\right) + \left(w_u \frac{\pi}{8} C^2\right)\left(\frac{2C}{3\pi}\right) + w_u\left(\frac{\ell_1 \ell_2}{2} - \frac{\pi}{8} C^2\right) * \frac{C}{\pi} = 0$$

$$M_o - \frac{w_u \ell_2 \ell_1^2}{8} + \frac{w_u C^2}{12} + \frac{w_u \ell_1 \ell_2 C}{2\pi} - \frac{w_u C^3}{8} = 0$$

$$M_o = \frac{w_u \ell_2 \ell_1^2}{8} + \frac{w_u C^3}{24} - \frac{w_u \ell_1 \ell_2 C}{2\pi}$$

$$M_o = \frac{w_u \ell_2 \ell_1^2}{8}\left(1 + \frac{C^3}{3\ell_2 \ell_1^2} - \frac{4C}{\pi \ell_1}\right)$$

$$\boxed{M_o \simeq \frac{w_u \ell_2 \ell_1^2}{8}\left(1 - \frac{2C}{3\ell_1}\right)^2} \geqslant M_o' = \frac{w_u \ell_2 \ell_n^2}{8}$$

Note/