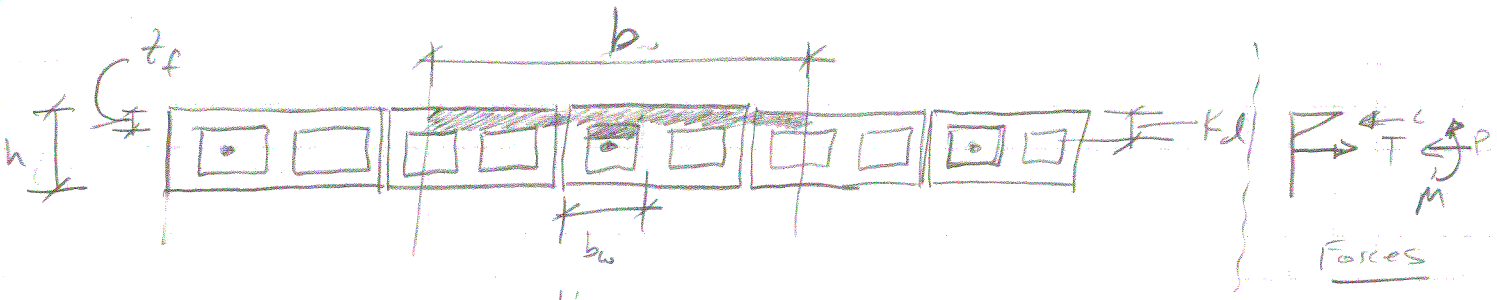
JOB: Partial Grout Out-of-Plane

SHEET NO.: 1 OF

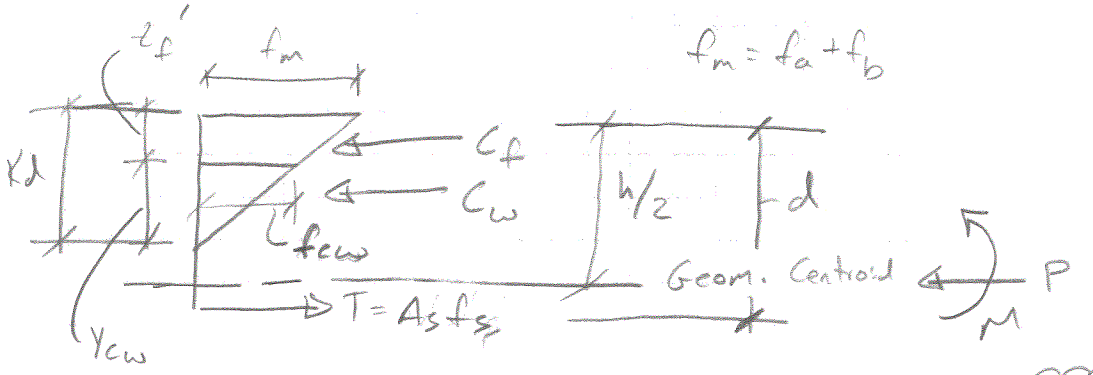
CALCULATED BY: RSIF DATE:

CHECKED BY: DATE:

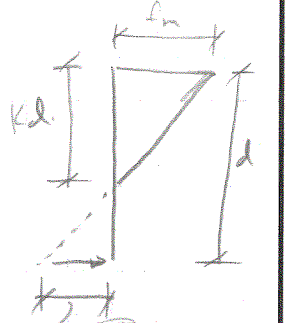
SCALE: Masonry Wall



Section



$f_m = f_a + f_b$



$t_f' = \min(t_f, Kd)$

$f_{cw} = f_m \frac{(Kd - t_f')}{Kd}$

$Y_{cw} = \max(0, Kd - t_f')$

$C_f = \frac{1}{2}\{f_m + f_{cw}\} \times t_f' \times b$

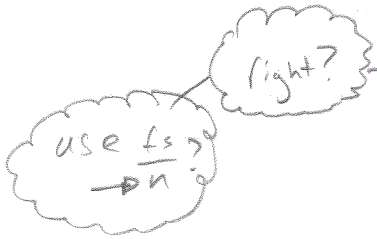
$C_w = \frac{1}{2} Y_{cw} \times f_{cw} \times b_w$

$f_s' = n \frac{f_m}{Kd} \times (d - Kd)$

$f_s = \min(F_s, f_s')$

$F_s = 24^{ksi} \times 4/3$ if applicable.

$T = A_s f_s$



$\frac{f_m}{Kd} = \frac{f_s/n}{d - Kd}$

$f_s' = n \frac{f_m}{Kd} \times (d - Kd)$

JOB Partial Grout out-of-Plane

SHEET NO. 2 OF

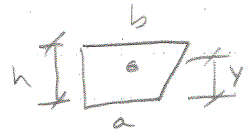
CALCULATED BY RSF DATE

CHECKED BY DATE

SCALE Masonry Wall

$\Sigma F = C_f + C_w + P - T = 0$

ΣM @ Geom. Centroid.



$y = \frac{h(2a+b)}{3(a+b)}$

Moment Arms

Flange $\Rightarrow$ $x_{cf} = \frac{h}{2} - \frac{t'_f(2f_{cw} + f_m)}{3(f_{cw} + f_m)}$

web $\Rightarrow$ $x_{cw} = \frac{h}{2} - \left(t'_f + \frac{y_{cw}}{3}\right)$

steel $\Rightarrow$ $x_{s1} = h/2 - d$

use "+" This will determine if neg.

$\Sigma M = x_{cf} \times C_f + x_{cw} \times C_w + T x_{s1} + M = 0$

→ For given P, M, & Geometry,
→ Assume Kd and $f_m = F_m$, where $F_m = \frac{f'_m}{3} \times 4/3$
→ Perform iteration until $\Sigma F = 0$ & $\Sigma M = 0$

or

$e_{req'd} = \frac{M_a}{P_a} = \frac{M_n}{P_n}$ — (Find M_n, P_n From Above ΣF & ΣM solving for M & P respectively)

$f_a = \frac{P}{A_{net}}$ $\Rightarrow$ A_{net} = Flange + Web + grouted cell

Shear — ⊥ to wall

→ use Area in Compression only?

Checks

$F_a = 0.25 f'_m R$ $\Rightarrow$ $\begin{cases} R = 1 - \left(\frac{h}{140r}\right)^2 & \frac{h}{r} \le 99 \\ R = \left(\frac{70r}{h}\right)^2 & \frac{h}{r} > 99 \end{cases}$

$f_a \le F_a$

$f_m \le F_m$