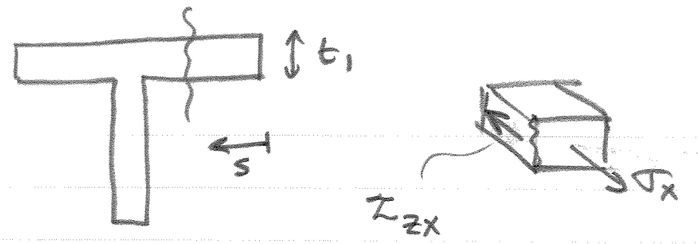
(3)

At junction shear flow in = $2\tau_{xz}t_1 = \dfrac{V\omega h^2 t_1 t_2}{2I(\omega t_1 + h t_2)}$

At junction shear flow out = $\tau_{xy}t_2 = \dfrac{V\omega h^2 t_1 t_2}{2I(\omega t_1 + h t_2)}$

$\Rightarrow$ shear flow in = shear flow out

(2)



$$\tau_{xz}t_1\,dx = -\int \sigma_x \Big|_{\text{front-back}} dA = -\int \frac{y}{I} dM\, dA$$

$$\Rightarrow \tau_{xz} = -\frac{1}{t_1}\int \frac{y}{I}\underbrace{\frac{dM}{dx}}_{-V} dA = \frac{V}{It_1}\underbrace{\int y\,dA}_{Q} = \frac{VQ}{It_1}$$

$Q = \bar{y}A^*$

$A^* = st_1 = \left(\frac{\omega}{2} - z\right)t_1$

$\bar{y} = \dfrac{h^2 t_2}{2(\omega t_1 + h t_2)} - \dfrac{t_1}{2} \approx \dfrac{h^2 t_2}{2(\omega t_1 + h t_2)}$

$\Rightarrow \tau_{xz} = \dfrac{V}{I}\left(\dfrac{\omega}{2} - z\right)\dfrac{h^2 t_2}{2(\omega t_1 + h t_2)}$

At end $z = \frac{\omega}{2} \Rightarrow \tau_{xz} = 0$

At center $z = 0 \Rightarrow \tau_{xz} = \dfrac{V\omega h^2 t_2}{4I(\omega t_1 + h t_2)}$

