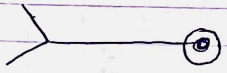
Chapter 9: Welding

Symbols:



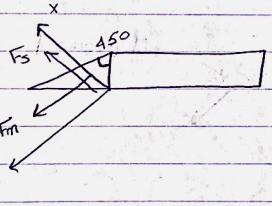
Welded point → Stress concentration → K_{fs} → Table 9-5

In a Butt joint: $\sigma = \frac{F}{hl}$, Tensile

throat → $\tau = \frac{F}{hl}$

I care about shear in Welding → It's stress is more important

Example:
fillet weld



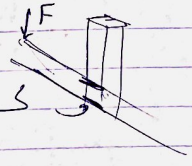
$\tau_{max} = \frac{F}{0.707hl}$

minimum Area at 45°

9.3: Stresses in welded Joints in torsion

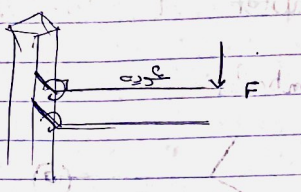
Torsion = الفتوة

الفتوة موازية



الفتوة الفتوة

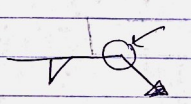
Stresses in Bending

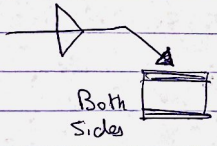


How to solve:

- obtain G . Table 9-1 (T_u unit kg/cm^2)
- find $\tau' = \frac{V}{A}$ $J = 0.707 h J_u$
- find $\tau'' = \frac{M_n}{J}$ =
- find Resultant = τ_{max}

Symbol





9.5 Strength of welded strength

Table 9-1 → Permissible Stress

Table 9-5 → Stress Concentration

Table 9-6 → Allowable load

- Conventional method for weld metal

Use Table 9-3

obtain $\tau' = \frac{F}{A}$

$\tau'' = \frac{M_r}{I} \sim$ if Bending

$\sim$ if Torsion

Stress

Bending

$n = \frac{S_y}{\sigma}$

Bending formula

Shear (Torsion)

$n = \frac{S_{sy}}{\tau} = \frac{0.577\, S_{sy}}{\tau}$

Torsion formula

- Example 9-1 :-
  at Beam (Bending) so $\sigma = \frac{Mc}{I}$.

  a is not important X

Fatigue loading

- Example 9-6
  Table 6-2 → row (4) always

  use Goerber → for welding always

→ welded always shear, only primary shear

$S_{ut} = 0.6 f S_{ut}$

I assume worst case and take less yield strength
I find $S_e = K_a K_b K_c$ ——

K_a → As forged

K_f → 1

K_c → 0.59 (torsional) → (always 0.59)

$K_{fs} = 2$ → I beam