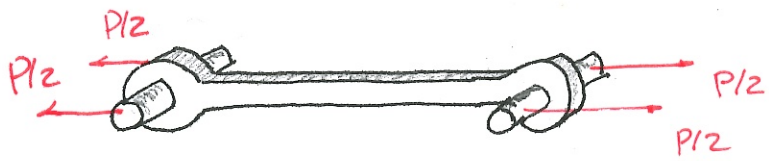
LET'S DESIGN A LINK

DOUBLE SHEAR



WHAT THINGS AFFECT WHETHER OR NOT THE LINK FAILS?

- ULTIMATE TENSILE STRENGTH (UTS)
- THICKNESS
- LENGTH (MANUFACTURING TOLERANCES)
- HOW PINS ARE LOADED
  - PINS BEND 1ST?
  - PINS STRAIGHT?
- HOW LONG IN SERVICE? (CORROSION, DEGRADATION)
- LOADING?
  - TENSION / COMPRESSION?
  - CYCLIC? STEADY?
- CRACKS AROUND HOLES?
- EXTRA MATERIAL NEEDED TO REINFORCE

HOW PREDICTABLE WOULD YOU SAY MANY OF THESE THINGS ARE? NOT VERY

KEY IDEA: FOS MAKES THINGS SAFER !

LET'S ASSUME OUR LINK WILL FAIL BY FRACTURE @ AN ULTIMATE TENSILE STRENGTH of 90 ksi

FOR A FOS = 3, WHAT STRESS SHOULD THE LINK BE DESIGNED FOR?

a. 90 ksi
b. 30 ksi
c. 270 ksi
d. SCHIFTY-FIVE

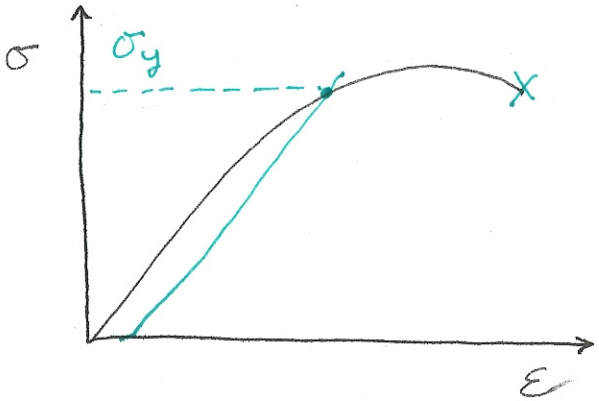
¿ WHAT FOS TO USE? (TYPICAL VALUES) WHY? WEIGHT.

STRUCTURAL STUFF → 2-5
AIRCRAFT → 1.25-2

¿ WHY NOT MAKE FOS = 10 ? - WEIGHT - COST

¿ WHERE DO YOU GET GUIDELINES FOR FOS?

- DESIGN STANDARDS
- INDUSTRY EXPERIENCE
- HIGH WHEN YOU DONT KNOW MUCH



σ_y : YIELD STRENGTH

σ_u : U I S.

- FAILS BY YIELDING → USE σ_y IN FOS
- FAILS BY FRACTURE → USE σ_u IN FOS.