

# Manufacturing Processes

## Homework #2

1. What is the reason that yield strength is generally defined as a 0.2% offset strength?
2. A paper clip is made of wire 0.7 mm in diameter. If the original material from which the wire is made is a rod 25 mm in diameter, calculate the longitudinal engineering and true strains that the wire has undergone during processing.
3. You are given the K and n values of two different metals. Is this information sufficient to determine which metal is tougher? If not, what additional information do you need?
4. A cable is made of two strands of different materials, A and B, and cross sections as follows:  
For material A,  $K = 415 \text{ MPa}$ ,  $n = 0.5$ ,  $A_o = 380 \text{ mm}^2$ .  
For material B,  $K = 210 \text{ MPa}$ ,  $n = 0.5$ ,  $A_o = 190 \text{ mm}^2$ .  
Calculate the maximum tensile force that this cable can withstand prior to necking.
5. A metal has a strength coefficient  $K = 700 \text{ MPa}$  and  $n = 0.2$ . Assuming that a tensile-test specimen made from this metal begins to neck at a true strain of 0.2, show that the ultimate tensile strength is 415 MPa.
- 6- What is the physical meaning of Von Mises distortion energy theory?

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