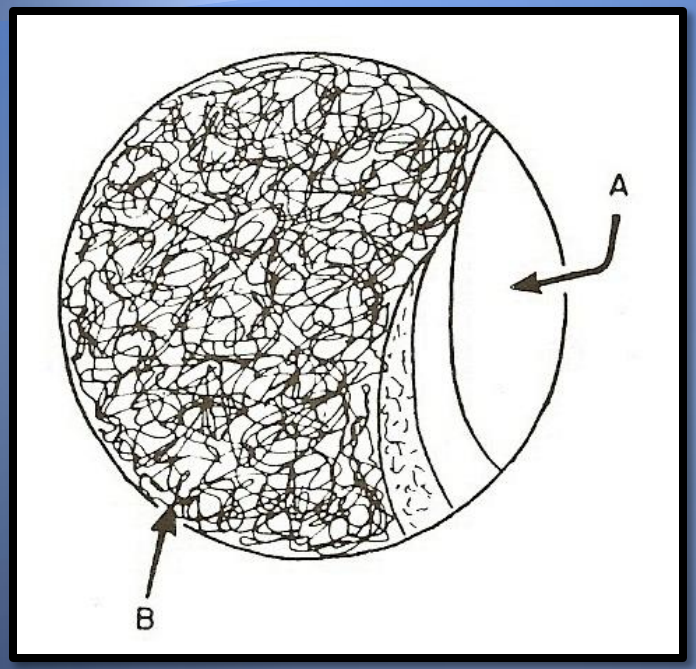
UNDERSTANDING HIGH STRENGTH FASTENERS AND APPLICATIONS

A Presentation by Kerr Lakeside

Clamping Force and Applied Torque

- **Torque Formula** $T_{in} = K \times D \times P$
  - Tightening torque in pounds/feet
    D = Diameter of bolt or stud
    P = Clamp load objective = 75% of specified yield
    (why choose this number?)
  - K = Nut Factor – 250 contributing factors
  - K is derived by measuring torque and tension over a large group of similar fasteners

The Fatigue Fracture Site



A – Surface is smooth and shiny where the bolt failed during crack initiation

B – Surface is rough in regions which failed rapidly

Drawing from An Introduction to the Design and Behavior of Bolted Joints, 3rd Edition, revised and expanded by John H. Bickford

Formed vs. Machined Heads

- ASTM standards require that heads on SHCS be forged to help prevent fatigue failure

- Some studies have shown that forged heads have 3 times the fatigue life of a machined head