

WEAR

* = Progressive loss of bearing material from bearing surface

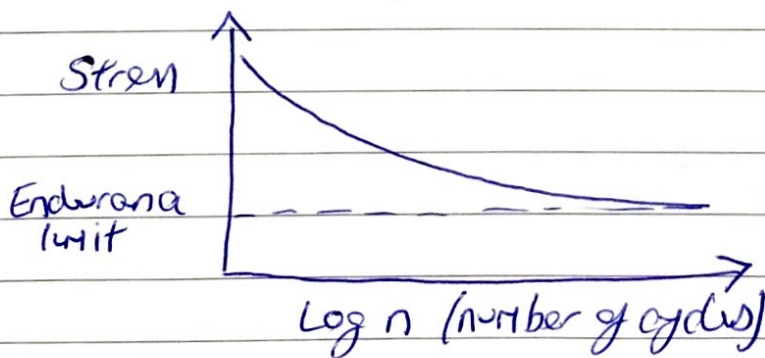
- MODES
- ① 2 intended bearing surfaces eg. jet head on acetabulum shell
 - ② One intended & one unintended bearing surface
 - ③ 2 intended bearing surfaces with interposed 3rd body
 - ④ 2 unintended bearing surfaces eg. backside wear

MECHANISMS

* Mechanical ① Abrasive Poly soft material vs Metal hard material

* ② Adhesive Junction formed between 2 opposing surfaces by intermolecular bonds

* ③ Fatigue (dilatation) - Endurance limit = stress level below which specimen will withstand cyclical stresses indefinitely (10 million)



* Chemical Corrosion = unwanted dissolution of a metal in a solution

Generalised Galvanic = 2 dissimilar metals electrically coupled

Localised Pitting = Breaks in protective surface of metal

Anode small area active metal
Cathode large passive surface

Crevice = Exchange in material with surrounding bulk solution limited

Fretting = Combination of wear & crevice corrosion
Inclusion corrosion = Impurities

Stress (fatigue) = Accelerates corrosion

Intergranular & intragranular = electrochemical differences between & within grains of alloy

Eg Stainless steel wire in contact with CoCr or Ti stem

Stainless steel head Ti stem

Ti screw stainless steel plate

* Passivation = Oxidised layer on surface of metal
Serves as a protective barrier to corrosion

Volumes of wear

Linear (mm/yr)

volumetric (mm³/yr)