



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

Failure Analysis and Prevention

General Procedure of Failure Analysis: Selection, Preservation, Cleaning & Sectioning

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Purpose

- Sectioning: thermal and mechanical cutting (sawing cut off wheels)
- Cleaning
 - dry cleaning, inorganic solvents, acid/base/ultrasonic, plastic replica
- Possible damages & protection of fracture surfaces
 - Mechanical
 - chemical

Mechanical damage

- Striking surface with other object (during fracture, transporting, handling)
- Protection during transport: cover with cloth / cotton
- No touching
- No fitting of fractured ends

Chemical damage

- Corrosion from moist air, foreign matter on surface
- Best is to dry fracture surface with compressed air jet and place it in desiccator
- If possible then wash in water be avoided
- If necessary to remove sea water, fire extinguishing fluid then rising water followed by acetone/ alcohol



Cleaning

- Avoid it if possible
- It may be necessary for SEM
- Uses air, inorganic solution, acid/base, ultrasonic cleaning with water/ aetone
- Application and stripping o plastic replica
- Cellulose acetate replica sheet 1mm

Sectioning

- For accommodating small size sample for hardness, microscopy other testing
- Record of location of sample with photo/schematic
- Protect fracture surface to avoid damage from heat, force, molten metal, cutting fluid
- Large sections use thermal cutting at greater distance
- Coolant may cause corrosion , wash for debris
- Coolant may be needed if cut can not be made at distance

