



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

Failure Analysis and Prevention

General Procedure of Failure Analysis: Preliminary Examination & NDT

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Scope

- Visual examination
- Photography of failed component



Purpose

- Research of clues, evidence
- Failure mechanisms prevailing form colour, texture and their gradient
- Establishing relationship of fragments with main component
- General idea about design and workmanship



Visual examination

- Thorough examination of parts before cleaning
- Presence of soil, debris, paint, oil etc. can suggest failure sequence
- Observation using unaided eye
 - Exceptional depth of focus
 - Ability to examine a) large area and b) detect change in texture and colour
 - Look for path cracks on the fracture surfaces



Visual examination

- Look for evidences at the breakdown site which may be lost if not vigilant
- These observations can indicate
 - Abnormal condition or abuse in service
 - General assessment of basic design and workmanship
 - Dimensions of all parts with photographs and sketches

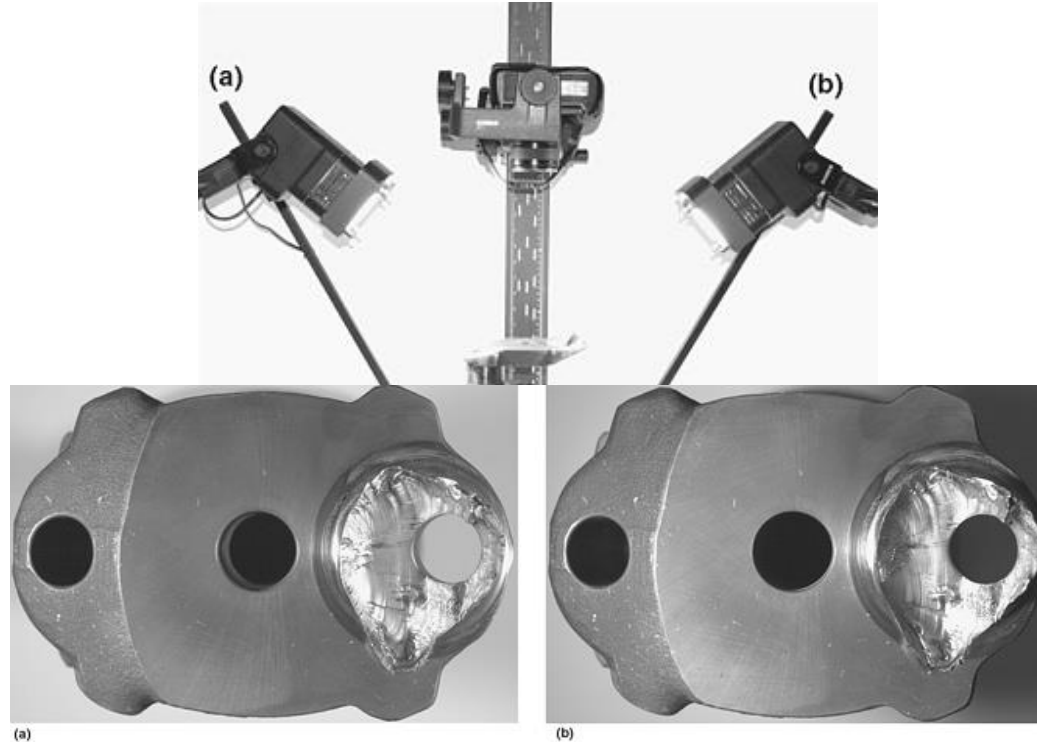


Photographing fractures

- To show fractured part including pieces & their size, location and how were they related with assembly
- Examine the fracture surfaces using direct light from different angles to reveal fracture characteristics
- Identifying the areas of interest on fracture surface and ones which need to be focused
- Mentioning photographs and their magnification

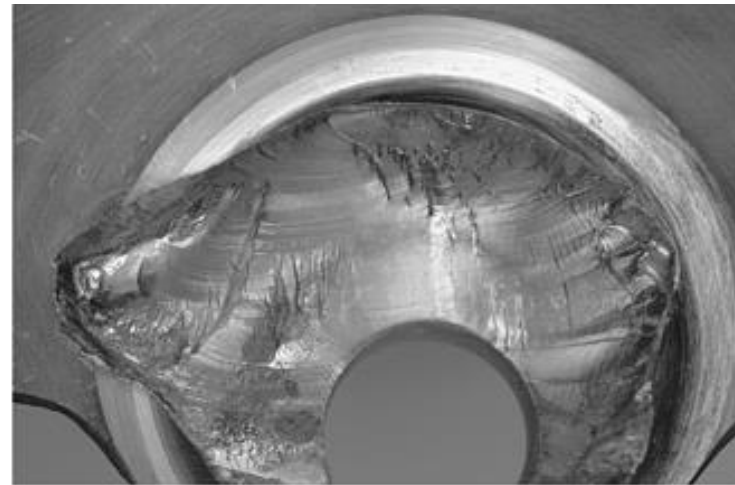


Dual incandescent lighting





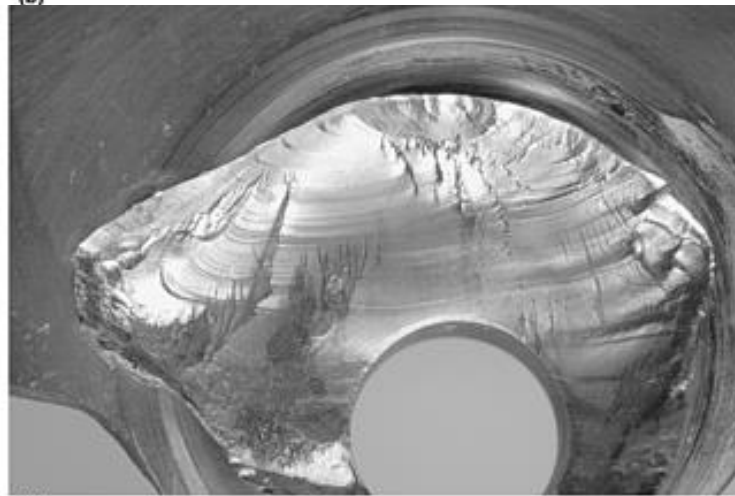
(a)



(b)



(a)



(b)