

Project Assignment: Failure Analysis
Proposal Due: 5 p.m. Friday, Sept. 25
Report Due: 5 p.m. Tuesday, Nov. 24
Oral Presentations: in class following Thanksgiving break

Obtain a failed part that either stood alone or was part of a larger engineering system. The part may be provided by any source, but you must be able to obtain adequate, pertinent information about the failure (history, loading, abuse, environment, etc.). In a few exceptions, case studies *may* also be acceptable when the part could not be obtained, pending the instructor's approval. The proposal is intended to allow an opportunity for feedback before its too late!

The proposal should be less than one page (single-spaced 12 pt font), briefly describing the failed part, circumstances surrounding the failure, and proposed methods to analyze the failure. Discussion of various case studies in class and in supplementary reading assignments will provide a good starting point for your approach.

The final report should not be more than ten pages (single-spaced 12 pt font) including references, tables and figures. The report should include the following sections:

1. Description of the Failure
2. Crack Initiation/Propagation Mechanisms
3. Engineering Calculations
4. Redesign or Failure Prevention Strategy
5. References

An abstract should summarize the entire paper. In section one, sketches, drawings, photographs, micrographs, service history, environmental conditions and/or material data could be very useful. The overall paper should emphasize the effects of the material *structure* on the *properties/performance* using a *fracture mechanics* approach. Your analysis should be original; however, references should be used to support your analysis. Literature citations should primarily include peer-reviewed journals articles, conference proceedings, and books. If you are not familiar with search engines such as *Google Scholar*, *Compendex* or the *Web of Science*, (see <http://www.library.nd.edu/ddw/public/subject-all-dbs.cgi>) please contact me. References should be cited in the text numerically [1], and listed at the end in a references section. Formatting guidelines are flexible given consistency and clarity. Finally, think like a detective; you are Sherlock Holmes!

The oral presentation will include a short summary of the report (approx. 15 min) followed by discussion (5 min). Times and dates for presentations will be determined at a later date.