

# Failure Analysis Do's and Don'ts

## Always Do This:

1. Follow the steps of conducting a failure investigation/analysis.
  - First identify the purpose of the investigation!
  - The level of detail and effort will depend on the nature of the failure (not all failures require well developed fault trees, FMEA tables, etc.).
  - Obtain data about the service conditions (process data is preferred).
  - Get a working component that has not failed for comparison and contrast (even better—one that has not been in service).
  - Create a timeline of events.
2. Probe for understanding by asking “how” questions (e.g., how did events happen, how did the damage manifest).
3. Ask others what they think happened, and how.
4. Generate a problem statement.
  - Follow a problem analysis process (e.g., problem analysis worksheet).
5. Generate decision statements.
6. Perform the act of observation independently from the act of interpretation:
  - *Observation*: the act of viewing or noting a fact or occurrence for some scientific or other special purpose; to regard with attention, especially so as to see or learn something;
  - *Interpretation*: the process executed to provide the meaning of facts and/or data; meaning making; to explain something.
7. Create a list of observations and questions that will allow you to make the decisions you have identified.
8. Generate arguments that are based on the evidence:
  - Best to have more than one piece of evidence for your claim(s) (at least two pieces);
  - Your argument should include serious counterarguments;
  - There should be no contradictions to your argument in the body of evidence (i.e., your argument must address all the evidence)

## Don't Do This:

1. Put fracture surfaces back together (unless you have completed all other surface and testing/analyses).
2. Ask “why” events happened.
3. Believe the first plausible theory you come up with.
4. Only look for evidence that supports your favourite theory.
5. Make judgements when you are supposed to be observing.
6. Start doing research before knowing what questions you have or how they relate to decisions to be made.