



## Failure Mode Effect Analysis (FMEA)

### Why

FMEA is a good idea whenever changes to the design or process are planned.

- At the beginning of a project, FMEA can help a team better scope the opportunity by defining the types of failures and narrowing the focus to a specific type of problem.
- In the Improve phase, FMEA can help uncover potential problems (especially unintended consequences) with suggested solutions, thereby allowing timely adjustments.
- In the Control phase, FMEA helps identify what measures need to be in place to make sure that failures will not happen in the future.

FMEAs are however most effective when they are part of the way that a company operates rather than one-off exercises as part of a project. They retain corporate knowledge to prevent potential failures. A generic FMEA for each process and asset should be owned by the process or asset owner. By constantly updating the generic FMEA and using this as the basis for new process specific and design specific FMEAs, every release of a new asset or process should be an improvement on the last.

### What

Failure Mode and Effects Analysis (FMEA) is a comprehensive technique that can be used to improve the quality, reliability and safety of products and processes. The methodology provides a systematic approach for examining all the ways in which a device or process can fail to function as required. In particular, FMEA identifies, defines and eliminates known and potential failures, problems and errors from products, designs, systems and services before they reach the customer.

| Failure                               |      | Ratings |       |                         | RISK                  | ACTION                  |       |
|---------------------------------------|------|---------|-------|-------------------------|-----------------------|-------------------------|-------|
| Function/<br>Item/<br>Process<br>Step | Mode | Effect  | Cause | Occurrence<br>O         | Severity<br>S         | Detectable<br>D         | O*S*D |
|                                       |      |         |       | 1= never<br>10= certain | 1= none<br>10= hazard | 1= certain<br>10= never |       |

### How

FMEA it can be used at various stages of your project. FMEA works best when drawing upon knowledge and expertise of a multi-disciplinary team. Will need to draw up a scale in advance for each rating to help people consistently interpret what warrants a score of 1,2,3....10.

1. Document the components and items that make up the device or process being analyzed.
2. Define the function of each item.
3. Identify all potential failure modes.
4. Assign a rating for severity.
5. Determine the causes of each failure mode.
6. Assign an occurrence rating.
7. Determine how each cause or failure mode would be detected.
8. Assign a detection rating in terms of easy it is to spot the failure arising.
9. Determine the most appropriate corrective/preventive actions based on the 3 ratings mentioned above.
10. Identify tasks that may be performed by operations maintenance personnel.
11. Carry out the recommended actions.