

Knowledge article

Basic introduction of FMEA - Failure Mode Effect Analysis

Created 1 year ago Active 1 year ago Viewed 52 times 1 min read





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What it means **o**





FMEA can be described as a systemized group of activities intended to

- 1. Recognize and evaluate the potential failure of a product/process and its effects
- 2. Identify actions which could eliminate or reduce the chance of the potential failure occurring
- 3. Document the process.
 - It is complementary to the design process of defining positively what a design must do to satisfy the customer.

Why FMEA **S**

- Failure Modes and Effects Analysis (FMEA) helps you to understand your processes in detail.
- It highlights the risks and develops the counter-measures.
- Furthermore, FMEA enables knowledge transfer and develops a multi-disciplined team in one step.
- FMEA procedure is a highly effective way to evaluate processes, services or products.
- It is as valuable for revealing areas needing improvement as it is for guiding the development of new processes.

"The optimist and the pessimist both contribute to society. The optimist invents the airplane, the pessimist invents the parachute."

When to do it **o**



- 1. One of the most important factors for the successful implementation of an FMEA program is timeliness.
- 2. It is meant to be a "before-the-event" action, not an "after-the-fact' exercise.
- 3. FMEA must be done before a design or process failure mode has been unknowingly designed into the product.
- 4. Up front time spent in doing a comprehensive FMEA will alleviate late change crises due to sudden failure.
- 5. Properly applied, it is an interactive process which is never ending.

Who owns it S

- 1. Although responsibility for the "preparation" of the FMEA has to be assigned to an individual.
- 2. FMEA input should be a team effort.
- 3. A team of knowledgeable individuals should be assembled to do this.

It vital that everybody in team contributes to FMEA and if not detail knowledge of product or process they should atleast know what is a feature and what is a bug :-)



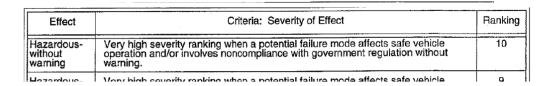
Terms used in FMEA **S**

- 1. Functional: List the function under analysis
- 2. Potential Failure Mode
- 3. Potential Failure Effect
- 4. Potential Failure CauseCurrent Controls
- 5. Actions Taken

Metrics ©

- 1. Severity S
- 2. Occurrence O
- 3. Detectability D
- Risk Priority Number RPN = S X O X D

Severity - S S



Occurrence - O 🔊

Probability of Failure	Possible Failure Rates	Ranking
Very High: Failure is almost inevitable	≥ 1 in 2	10
	1 in 3	9
High: Repeated failures	1 in 8	8
	1 in 20	7
Moderate: Occasional failures	1 in 80	6

Criteria: Likelihood of Detection by Design Control	Ranking
Design Control will not and/or can not detect a potential cause/mechanism and subsequent failure mode; or there is no Design Control.	10
Very remote chance the Design Control will detect a potential cause/mechanism and subsequent failure mode	9
	Design Control will not and/or can not detect a potential cause/mechanism and subsequent failure mode; or there is no Design Control. Very remote chance the Design Control will detect a potential cause/mechanism

References ©

FMEA-GUIDE FMEDA-FMEA



As part of the product development process a Safety FMEA must be created by the team.

Additional training (standard work, templates, guidelines) can be provided at the following website. insight.carrier.com/engineering/SitePages/FMEA/... – jcalinski Jan 24, 2022 at 13:03

Thanks Joseph – mahesh-gaikwad Jan 24, 2022 at 13:07