

Course ID

FMEA

Course Duration

2 days

Course Title

Failure Modes and Effects Analysis: A Comprehensive Workshop

Related Courses

- Industrial Statistics: A Tutorial (INDSTAT, 2 days)
- Design of Experiments: An Overview (1 day, DOE1)
- Design of Experiments: A Comprehensive Course and Workshop (2+ days, DOE2)
- Root Cause Analysis of Systems Failure: A Tutorial (RCFA2D, 2 days)
- Root Cause Analysis of Component Failure: Understanding Human and Engineering Factors for Improved Product Performance (RCFA-ME, 2-4 days)
- Quality Management (QUALMGT, 3 days)

Aimed At

This course is aimed at engineers, project engineers, design engineers, process engineers, program managers and others responsible for identifying and preventing product or process failure modes.

Group Size

5-25

Prerequisites

While there are no formal prerequisites, the course does assume a process, industrial, manufacturing, or engineering background.

Course in a Nutshell

Failure Modes and Effects Analysis (FMEA) is a tool that can identify product and process failures before they occur, identify appropriate risk mitigation measures to prevent or otherwise control the failure, and improve product and process design.

All product and process failures (and the actions required to control these failures) are predictable and preventable; however, organizations frequently experience predictable and preventable failures with costly consequences. These failures can lead to product recalls, death or injury, poor quality, and unanticipated cost.

The aerospace and defense industries have used FMEA for decades. FMEA has made significant inroads into automotive, biomedical device, and many other industries. Your organization can benefit greatly from this analysis tool.

This course utilizes real-life case studies to help you apply this toolkit effectively to your job.

The Eogogics *Failure Modes and Effects Analysis* program is an intense 16-hour course that will teach your staff how to prepare FMEAs for your products and processes.

Customize It!

Whatever the nature of your system and objective, whether failure prevention or cause determination, we will customize the course to meet your specific needs and concerns. Here are some of the ways in which we can tailor the course to help you get more out of it:

- Add a “workshop day” to the course to allow the participants to work together to prepare an FMEA specific to your organization. The workshop day can be scheduled a few weeks after the course to allow time for applying the technologies presented in class under an experienced FMEA practitioner’s guidance.
- Schedule post-class follow-up consultation for continuing in-house product and process FMEAs.

Learn How To

- Work together to prepare complex FMEAs.
- Proactively eliminate potential failure modes before they occur.

Course Outline

Day 1: Introduction, Elements, and Preparation.

- Introductory concepts.
 - FMEA and FMECA definitions.
 - FMEA objectives.
 - Process versus product FMEA.
 - Pre-design, design, and post-design effectiveness.
 - Prediction versus detection.
 - The predictive nature of FMEAs.
 - Soliciting and including appropriate expertise.
 - Applicable standards.
 - Tabular analysis organization.
 - **Class exercise.**
- FMEA Elements.
 - Mechanical component failure modes.
 - Electronic component failure modes.
 - Electrical equipment failure modes.
 - Hydraulic equipment failure modes.
 - Assessing failure effects at component, subassembly, next assembly, and system levels.
 - Criticality definitions and determinations.
- Product FMEA Preparation.
 - Tabular formats.
 - Using Word and Excel when preparing FMEAs and FMECAs.
 - **Class FMEA/FMECA preparation exercise.**
 - Critical, major, minor, and negligible definitions.

- Corrective and preventive action.
- Corrective action order of precedence.

Day 2: Quantification, Report Preparation, and Course Wrap-Up.

- Process FMEAs.
 - Process versus Product FMEAs.
 - Assessing production, operational, quality assessment, and administrative processes.
 - Assessing redundancy defeaters.
 - Tapping outside resources.
 - Developing improvement recommendations.
 - *Class exercise.*
- FMEA Quantification.
 - Failure rates, MTBF, and probability of failure.
 - Failure rate sources.
 - Human error failure rates.
 - Failure rate versus environment.
 - MIL-HDBK-217F, NPRD-95, and MIL-STD-1629.
 - Dormant versus active failure rates.
 - Assessing storage failure mechanisms.
 - *Class exercise.*
- The Failure Mode Effects Summary (FMES).
 - FMES purposes.
 - Using Excel's sorting features to streamline FMES preparation.
 - Quantifying failure mode effects.
- The FMEA Report.
 - System descriptions.
 - Citing data sources.
 - Using the FMEA to streamline reliability predictions.
 - Embedding Excel and *.pdf files to accelerate preparation.
- FMEA Cost Estimation.
 - Related reliability and system safety analyses.
 - Other information sources.
 - Estimating FMEA preparation costs.
- Course Summary, Review, and Critique.
 - Recap, Q/A, and evaluations

**How You Will
Learn**

- A seasoned consulting engineer-instructor will present this course in interactive lecture/workshop format.
- Along with the lecture, we will use exercises, puzzles, case studies, and interesting group activities to enrich the instruction and drive home the essential points.
- You will receive a printed Participant Handbook that includes all materials presented in class, which will help you remember and retain what you learned and apply it on your job.
- You will learn FMEA key concepts from a theoretical, practical, and organizational perspective.

2010 Nov 29f