

# Failure Mode Effects Criticality Analysis Training Course

## Overview

This one day Failure Mode Effects Criticality Analysis (FMECA) training course introduces the topics of design and process FMECA to your team by teaching the theory using practical examples from your own business. Delegates are provided with basic fundamentals and are led through the techniques for producing a FMECA. FMECA is an important technique in the field of reliability assessment; it can provide valuable information to feed into both design as well maintenance strategies. It provides a comprehensive identification and evaluation of the unwanted failure modes of components or sub-systems within a system, and the effects these failures have on the system. Criticality analysis enables the seriousness of these failures to be assessed.

## Why FMECA

The need for asset integrity is a key driver for any industry. Improving maintenance and reliability ensures the optimum performance of assets against a backdrop of regulatory, safety and cost pressures. Maintenance needs to improve the integrity and availability of assets while minimising costs.

FMECA is a methodology for predicting potential failures and the consequences of those failures. The output of the analysis is used to direct effort appropriately into preventing failures, with the overall aim of reducing the risk of failure to an acceptable level.

Criticality analysis is a key technique for understanding which items of equipment, or systems, are most important to operations. Knowing which items are most critical allows engineers to prioritise maintenance effort into the most beneficial and necessary areas for the business. When applied effectively criticality analysis and FMECA both result in optimising equipment maintenance policies that save money and increase reliability.

## Basic Idea of FMECA

- Running Document - Updated by each Design Review
- Finds and Records all the Failure Modes
- Assesses the Effects of each Mode
- Estimates Modes' Frequencies
- Assesses Seriousness of Effects
- Analyses Causes of Failures
- Suggests Redesign, PM or Other Actions
- Known Modes from Preceding Product
- Effect of Changed Stress Levels

## Who should attend

Those needing methods for:

- Prioritising reliability improvement work.
- Identifying potential failures and appropriate preventive activities

## What you will learn

At the conclusion of the course each delegate will gain:-

- Basic principles and the methodology of FMECA
- Criticality analysis methodology and its application in prioritising equipment & reliability improvement work.
- How to play an active part in an equipment criticality analysis as well as how to select the appropriate criteria to apply.
- FMECA as a method for analysing, prioritising and avoiding potential equipment failures
- How to use FMECA to develop effective equipment maintenance policies and the practical application of these techniques to real-life examples

## The training method

These courses consist of lectures, case studies and group exercises. Based on practical situations; the sessions are highly interactive.

## Course Agenda

FMECA:

- Introduction and Basic principles
- Essential definitions and terms
- Top Down Or Bottom Up
- Structure and application
- Defining the scope & worksheet

Functions:

- Functional analysis
- Role of CMMS systems

Failure modes:

- Potential modes of failure
- Potential causes and effects
- Failure Mode I/D #
- Assembly, Sub-assembly, Parts Involved
- Description of failure
- Symptoms/ Warning signs
- (All possible) Effect(s) on Assembly and on Complete Product
- How Failure is Detected
- Proposed Actions (Operational restrictions, Preventive Maintenance or Design Change)
- Failure modes exercise

Criticality Analysis:

- How to engage in critical analysis
- How to select appropriate criticality criteria

- Severity classification
- Frequency analysis
- Criticality calculation
- How to use the results of a criticality analysis
- What the priorities mean

Putting in together:

- Use a Spreadsheet Program or A3 Paper
- Give Yourself Lots of Room
- Design the Headings for the Job; do NOT use same format for all FMECA's
- Words are More Important than Numbers, which are always inaccurate.
- Column to Record Decisions and Actions
- Reference No for each Failure Mode
- Consult MIL-STD 1629 and BS5760 Part1
- Draw Reliability Block Diagrams to Help Analysis
- Practice Exercises
- Translating the results to develop effective maintenance policies
- Target Reliability improvement opportunities

This course is designed for delegates who are involved in the design or assessment of systems required to demonstrate a high level of reliability. It delivers basic knowledge of one of the key techniques for assessing system reliability.