Software FMEA Training

This course is intended to provide everything you need for practical application of software failure modes effects analysis on real world projects.

Target audience

Software engineers, firmware engineers, systems engineers, software test engineers, software management, reliability engineers.

What this course has that other courses do not have

- The class is taught by a world expert in software FMEA
- The class uses the Common Defect Enumeration which our company invented and published on the DAU R&M CoP website
- The class has real world examples
- The methods presented in this course are recommended as per the IEEE 1633 Recommended Practices for Software Reliability, 2016.
- The software failure modes and root causes presented in this course are NOT AVAILABLE in any other software FMEA course.
- This course is presented by a leading industry practitioner for practitioners while other courses are more suitable for academia.

Each course attendee is able to

- Determine the best approach to analyzing software failure modes
- Understand the basic failure modes that effect every software system
- Understand how to identify the most appropriate failure modes for each software requirement, design, use case, etc.
- Understand how to apply the SFMEA to the use cases, software requirements, software design, interface design, detailed design, code, corrective actions, user's manuals and user interface, installation scripts.

Pricing

- Online self guided training
- Open session online courses with and without instructor are announced throughout the year at missionreadysoftware.com
- On site or instructor led online - Call 321-514-4659 or email sales@softrel.com for quotation
- DVD

Table of contents

- The two day option covers the first 2 days of class material as shown below.
- A popular and highly recommended option is to add one day of hands on application specific to your software.

Day and Topic	Estimated duration
Introduction - statement of goals for class and schedule	15 minutes
1. Preparing the SFMEA. • Identify what can go wrong • Identify the riskiest features • Identify the most likely failure modes • Identify the most effective coverage of depth (most failure modes) and breadth (most features) based on time and budget • Identify what you want to get from the SFMEA • Identify which artifacts to analyze - use cases, software requirements, interface design, detailed design, code, corrective actions, user interface and manual, or installation scripts • Identify the people and artifacts needed to do the SFMEA • Identify the ground rules for the SFMEA. • Identify the failure definition and scoring criteria to be used for the SFMEA	3 hours
2. Brainstorm past failure modes such as faulty functionality, faulty timing, faulty sequencing, faulty error handling, faulty data, faulty processing, etc. Employ a defect root cause analysis or software fault tree analysis.	30 minutes
Lunch Break	
3. Identify failure modes for the functional use case SFMEA viewpoint • What can go wrong with every use case? • What can go wrong with a specific use case? • What can go wrong within the steps of a specific use case?	Remainder of day
Day 2	
4. Identify consequences • What is the effect on the software? Subsystem? System? User? Safety? • What is the severity? Likelihood of first occurrence? Detectability of the failure mode during testing? Preventive measure? Compensating provisions?	30 minutes
5. Mitigate What needs to be changed to mitigate this failure mode? Software requirements? Interface design? Detailed design? Code? Test procedure? User manual? Service manual? Installation package? What is the post mitigation risk?	30 minutes
6. Generate the Critical Items List	15 minutes
Class example - The class will see a real example of a use case functional SFMEA	45 minutes
Identify failure modes for the software requirements functional viewpoint. Analyze what can go wrong with the statements.	1.5 hours
Lunch	
Class example of the software requirements functional SFMEA	1 hour

Day and Topic	Estimated duration
Identify failure modes for the interface SFMEA viewpoint. Interface FMEAs analyze failure modes between software, firmware and hardware. Class example - The class will see a real example of an interface SFMEA	Remainder of afternoon
Day 3	
Identify failure modes for the detailed SFMEA viewpoint. A detailed design FMEA is performed on the design or code. Class example of a detailed SFMEA.	2 hours
Identify failure modes for the maintenance SFMEA viewpoint. A maintenance process FMEA analyzes the failure modes related to how people support the software once it is deployed. The focus is on failure modes that would cause previously functional software to stop functioning. Class example of a maintenance SFMEA.	1.5 hour
How to perform a vulnerability SFMEA. This is a detailed SFMEA that focuses on the design and coding failure modes that are also related to vulnerabilities	1 hour
How to perform a production process FMEA. A production process FMEA analyzes the failure modes related to how people produce the software product. It's possible for the requirements, design and code to be working, but for the software to be unusable because there is no source control.	1.5 hours
How to perform an installation process FMEA. An installation process FMEA analyzes the failure modes related to an end user's or system installation. For example, the software could be working properly but the installation of it might fail. Or the end user may have an incorrect user's manual and be unable to use the software. Class exercise - The entire FMEA process will be executed from analyzing resources to improving the product.	1 hour
How to NOT do a SFMEA – The black box methods is not recommended. Mixing product and process SFMEA is not recommended.	15 minutes
Closing, Q & A	15 minutes
Optional extra day for onsite courses. The last day is spent doing FMEAs on your product and process with the guidance of the instructor.	

Related products and services

People who have purchased the Software FMEA training have also purchased these products and services.

Related products	Related services
Regus AI Predict	Software failure modes effects analyses Software defect root cause analysis Software fault tree analysis

The below table shows topics in the IEEE 1633 Recommended Practices that are covered by this class.

Section of IEEE 1633	IEEE Software reliability	Integrating software and hardware reliability	Software FMEA	Software FTA	Reliability driven software	SRE for DoD Acquisitions	SRE planning
4.0 Roles, Approach, Concepts						X	x
5.1 Planning							
5.1.1 Characterize the software system	X					**	
5.1.2 Defines failures and criticality	X		X				
5.1.3 Perform a reliability risk assessment	X						
5.1.4 Assess the data collection system		X					
5.1.6 Develop a software reliability plan							x
5.2 Develop failure modes model							
5.2.1 Perform a defect root cause analysis			X			**	
5.2.2 Perform a software FMEA			X				
5.2.3 Perform a software FTA				X			
5.3 Apply software reliability during development							
5.3.1 Identify/Obtain the initial system reliability objective		X				**	
5.3.2 Perform a software reliability assessment and prediction	X						
5.3.3 Sanity check the prediction	X						
5.3.4 Merge the software reliability predictions into the overall system reliability		X					
5.3.5 Determine an appropriate overall software reliability requirements		X					
5.3.6 Plan the reliability growth	X						
5.3.7 Perform a sensitivity analysis	X						
5.3.8 Allocate the required reliability to the software LRUs		X					
5.4 Apply software reliability during testing							
5.4.1 Develop a reliability test suite					X	**	
5.4.2 Increase test effectiveness through fault insertion			X		X		
5.4.3 Measure test coverage					X		
5.4.4 Collect fault and failure data		X					
5.4.5 Select Reliability growth models		X					
5.4.6 Apply software reliability metrics		X					
5.4.7 Determine accuracy of the predictive and reliability growth models	X	X					
5.5 Support release decision							
5.5.1 Determine release stability		X				**	
5.5.2 Forecast additional test duration		X					
5.5.3 Forecast remaining defects and effort required to correct them		X					

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6.0 Software reliability models	X	X					
Annex A templates for SFMEA			X				
Annex B Additional methods for predicting software reliability during development	X						

** These topics are briefly discussed from the viewpoint of DoD acquisitions