Failure Modes, Effects, and Criticality Analysis

Operational Sustainability, LLC® (OS) developed the OESuite™ Failure Modes and Effects Analysis (FMEA) and Failure Modes, Effects, and Criticality Analysis (FMECA) functionalities to streamline these proven analysis methods and automatically integrate findings, tasks, and information into our Process Risk and Corrective And Preventive Actions modules. Failure to address potential failures to mitigate risk can lead to severe malfunctions, product or process problems, and incidents. The results can be expensive repairs, warranty costs, production delays, catastrophic failures, or even loss of life. FMEA / FMECA analyses can be employed to support design, development, manufacturing, service and other activities to improve reliability and increase efficiency.

FMEA / FMECA are flexible processes designed to identify potential failure modes for a product or process and to assess the risk associated with those failure modes. Different industries utilize industry-specific templates to address their needs.

Standards we follow include

- U.S. Department of Defense’s MIL-STD-1629A
- SAE International’s J1739 and ARP5580 documents (for automotive and non-automotive applications, respectively)
- IEC 61508
- ISO 9000 / QS 9000
- ISO 26262 BS5670 Part 5
- Automotive Industry Action Group’s (AIAG) FMEA-4

During an FMECA procedure, identifying the failure modes and their effects is often only the beginning. The Criticality Analysis portion of the process is where the failure modes are ranked according to a combination of the severity of the consequences of failure and the probability of that failure mode actually occurring. Another way of determining the priority of an identified issue is to use Risk Priority Numbers. Our FMECA Module also provides a phrase library containing commonly used descriptions of component parts, failure modes, and effects to speed data entry. An apportionment library, derived from MIL-HDBK-338 is also included.

Risk Priority Numbers (RPN): The risk priority number system is a relative rating system that assigns a numerical value to the issue for each of three different categories: Severity (S), Occurrence (O) and Detection (D). The three ratings are multiplied to determine the overall RPN.

Criticality Analysis: Criticality Analysis takes into account the probability of failure for the item, the severity of the consequences of failure, and the portion of the failure probability that can be attributed to a particular failure mode. These factors determine the Criticality Value.
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As with the RPN method, this criticality value can be compared with the criticalities for other failure modes to help rank the issues that must be addressed.

The following features are included in FMEA:
- Track completion of recommended actions
- Record and manage data for current FMEAs
- Find and reuse relevant information from existing FMEAs
- Evaluate risk via RPN or Criticality Analysis
- Access ad hoc and template reports, queries, and dashboards
- Integrates with Reliability Centered Maintenance (RCM) module
- Adjust maintenance intervals as FMEA analysis changes
- Integrates with CAPA module

The following features are included in FMECA:
- Automatically assigned severity values
- User-definable severity category and matrix
- Assignment of RPN as needed
- Effects may be defined on any higher-level sub-system
- User-definable data fields and sort facilities
- Failure effects and severities traced through to system hierarchy
- Integrates with CAPA Module
- Multiple failure effects permitted for a single failure mode
- Libraries of components with pre-defined modes and apportionment
- Optimization of design to meet acceptable failure modes and severity

For more information email us at info@DrivingOE.com or call (713) 355-2900.