Teamcenter Quality – Failure Mode and Effects Analysis

Evaluating issues early in development to improve product reliability and reduce warranty claims and costs

Benefits

- Allows access to all available engineering data through native integration with Teamcenter
- Eliminates need for local installations to reduce maintenance
- Supports customer-specific configurations and customizations
- Improves user experience with modern and innovative user interface
- Supports closed-loop quality with product lifecycle management (PLM) integration

Features

- Creates failure mode and effects analysis (FMEA) following the seven-step approach
- Supports design and process FMEA
- Supports harmonized AIAG and VDA standards with action priority (AP)
- Viewing of FMEA form sheets with configuration options

Summary

Failure mode and effects analysis (FMEA) is a methodology that enables companies to assess risks associated with possible product failure. The damage caused by potential defects can often be linked to increased warranty costs, impaired product functionality and safety and an inability to meet required industry standards, among other potential consequences. Teamcenter® Quality - Failure Modes and Effects Analysis (FMEA) software helps you realize preventive defect avoidance by evaluating potential defects and risks early in the planning phase. With Teamcenter Quality - FMEA you can create an intuitive FMEA analysis and take appropriate actions to efficiently manage potential defects in real time.

FMEA planning in accordance with industry standards

An advanced FMEA solution is one of the most important tools a company can use to avoid product defects and process errors. Using Teamcenter Quality - FMEA enables you to support FMEA planning in accordance with the specification of the new harmonized AIAG and VDA standards. The solution helps you manage FMEA throughout the product lifecycle. You can organize people and tasks around FMEA in a project, assess and reduce identified risks using an action tracking and alert mechanism and validate the process with customer field data.

Applying failure mode and effects analysis

Teamcenter Quality - FMEA helps you to easily organize complex designs and processes in a tree structure, supported by net diagrams for sorting of data at all hierarchies and levels. This process helps you to quickly and efficiently navigate complex structures. The software clearly lists the products, components, and parts and displays connections between the functions and failures. You can create a systematic view of the correlation between different components, as well as a picture of the entire manufacturing process; from tools and machines to the finishing process.

With Teamcenter Quality - FMEA you can perform a risk assessment in accordance with the latest aligned AIAG and VDA standard. The action priority (AP) evaluation is available for analyzing improvement capabilities in accordance with the supported standard. An integrated quality action management capability assists you in coordinating and controlling corrective and improvement actions.

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Features *continued*

- Viewing of FMEA nets (system element, function and failure)
- Creates FMEAs based on item and process revision structures (BOMs and BOPs)
- Uses control and inspection plan characteristics, problem solving defects
- Quality master data concept (specifications and representations)
- Release and versioning of FMEA
- Enables printing of FMEA form sheets for offline use
- PLM integration

Supporting new harmonized AIAG and VDA FMEA approach

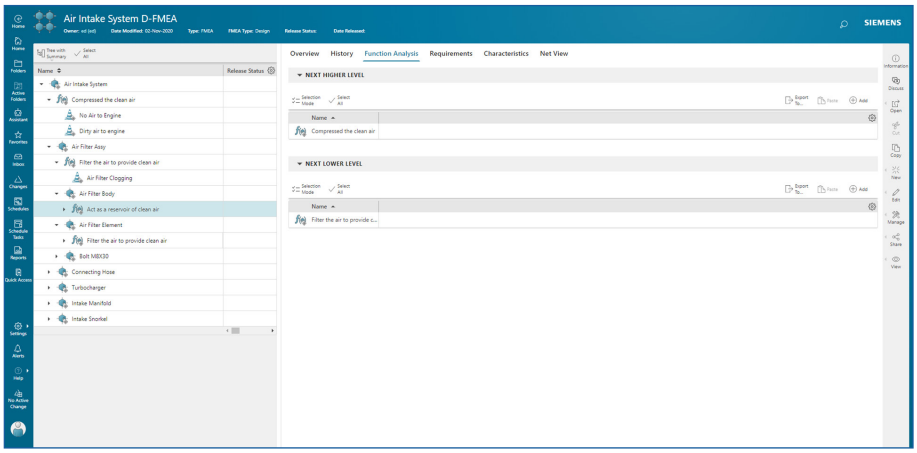
Teamcenter Quality – FMEA supports the seven-step approach prescribed by the harmonized AIAG and VDA FMEA Handbook. Previous recommendations described a five-step approach; the planning and preparation step and results documentation step have been added.

1. Planning and preparation
2. Structure analysis
3. Function analysis
4. Failure analysis
5. Risk analysis
6. Optimization
7. Results documentation

Source: *AIAG & VDA FMEA Handbook 2019.*

- Supports both design and process FMEA. The FMEA is a cross-functional methodology touching the entire product realization process.

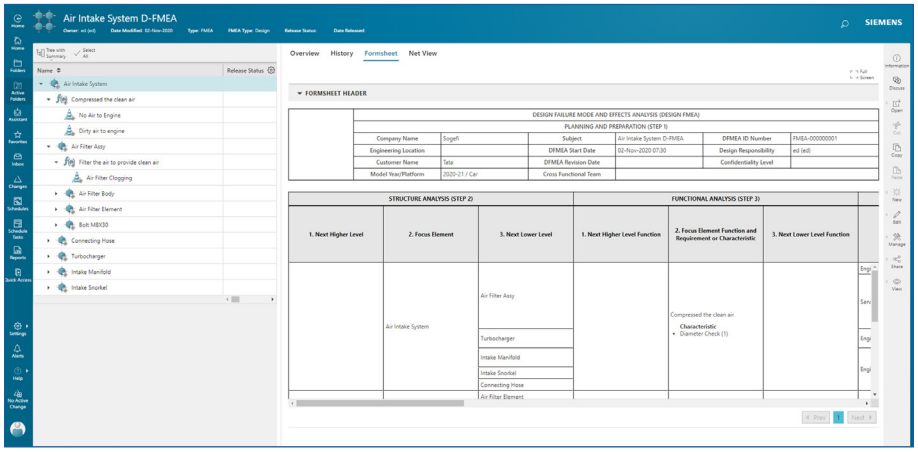
Teamcenter Quality supports design FMEA (D-FMEA) and process FMEA (P-FMEA) definition and realization.



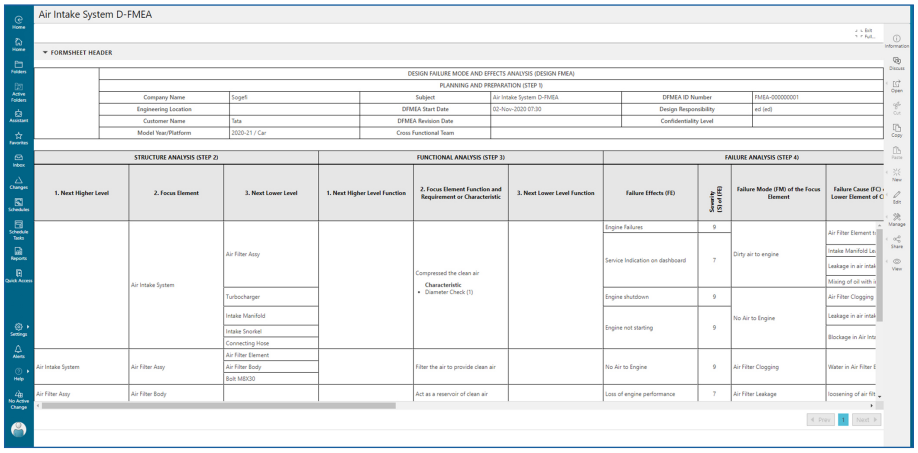
Example of function analysis in D-FMEA.

- Supports harmonized AIAG and VDA standard with action priority (AP) methodology, which replaces the risk priority number (RPN). The new method accounts for all 1,000 possible combinations of severity, occurrence and detection (S, O and D). Action priority was created to give more emphasis on severity first, then occurrence and then detection. The RPN alone is not an adequate method to determine the need for more actions because the RPN assigns equal weight to S, O and D.
- Viewing of FMEA form sheets with configuration possibilities. Teamcenter Quality - FMEA customers can configure the form sheet layout and styling according to their needs (for example, adding or deleting columns; changing colors for system elements, functions, failures; adding content to specific fields like system element names for failure causes; aligning text left, right or center).

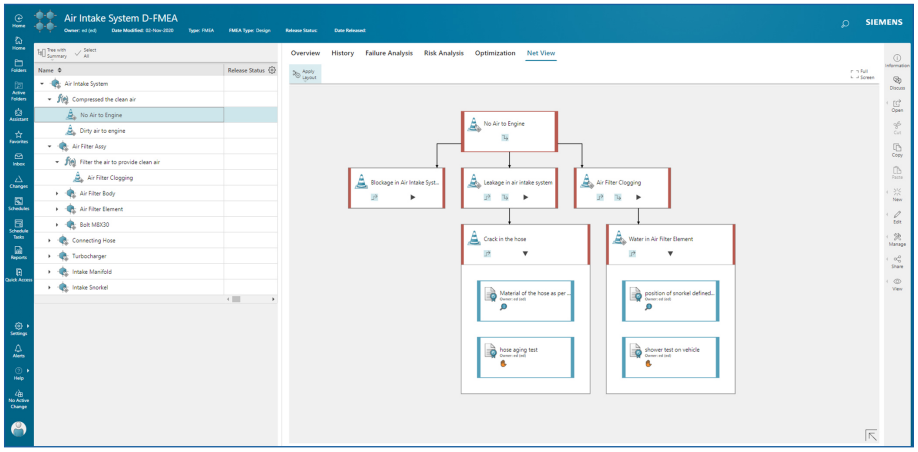
- Viewing of FMEA nets (system element, function and failure). The system, function and failure analyses are visualized in addition to the form sheet – the FMEA net views. This visualization of complex facts makes the FMEA process more efficient.
- Creation of FMEAs based on item and process revision structures. The structure of the FMEA (system analysis) can be created and aligned based on bill of materials (BOM) and bill of process (BOP).
- Re-use of control and inspection plan characteristics. Characteristics are shared and used between Teamcenter Quality - FMEA and Control and Inspection Planning to support closed-loop quality. Characteristics can only be attached to Inspection Definitions. Inspection Definitions can be attached to Functions.
- Quality master data concept (specifications and representations). With this concept Teamcenter Quality can be used to create a knowledge database for system elements, functions, failures and characteristics. With quality master data, users can create specification objects that can be re-used in the FMEA and other quality modules as representations. The objects are independent but referenced with each other.
- Release and versioning of FMEAs. Customers can release an FMEA root node object to secure working states and protect them against changes and to have a fixed status to share with partners.With versioning, users can create a new version from a released FMEA. This capability is needed to validate the risk assessment over time and to comply with audit requirements.
- Use of problem-solving defects helps transfer lessons learned back to the FMEA via failure specifications in the quality master data, supporting closed-loop quality in Teamcenter.



Combined tree view and form sheet



Form sheet view



FMEA failure net view with actions

Realize the change management process with fully integrated Teamcenter modules

The Teamcenter Quality - FMEA solution is natively integrated with Teamcenter, yielding multiple advantages of access to all engineering data like BOMs, BOPs, drawings and 3D models and boundary diagrams.

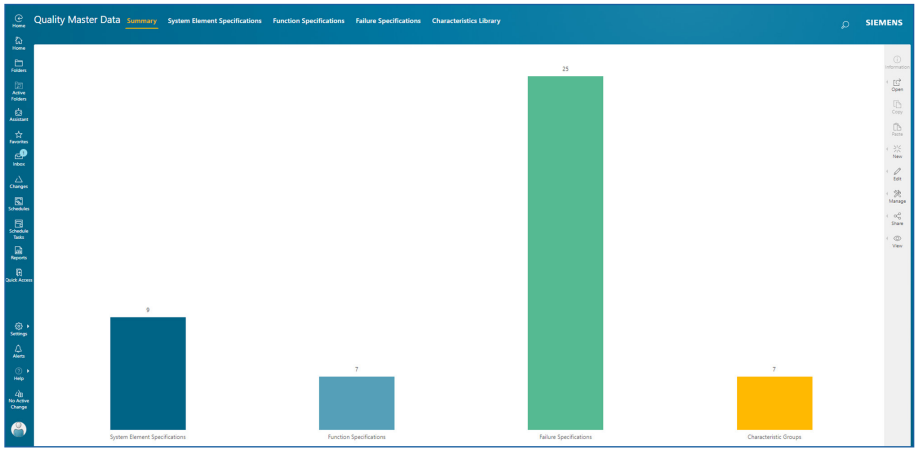
Information you generate in one area can be accessed and leveraged to prevent defects in process or products throughout the entire application. This integration allows you to provide optimal exchange of data and promote the use of a company knowledge database.

Furthermore, Teamcenter Quality - FMEA enables you to fully integrate your FMEA activities with other Teamcenter Quality modules, including:

- Advanced Product Quality Planning (APQP) for organizing people and tasks
- Problem Solving
- Control and Inspection Planning
- Systems Engineering
- Manufacturing Process Planner
- Structure Manager
- Report Builder
- Schedule Manager

Additional features in Teamcenter Quality - FMEA will allow you to:

- Escalate actions to management
- Allocate function-specific inspection characteristics
- Allocate function-specific requirements
- Integrate language toggling for masks and data
- Visualize links to individual defects
- Obtain graphical network representation of system, function and defect structures
- Support system process and product FMEA
- Create structure, function and defect analyses



Printing of FMEA form sheets for offline use

Realizing the benefits of Teamcenter Quality - FMEA

Using Teamcenter Quality - FMEA enables you to detect and avoid product defects prior to production, resulting in improved product reliability. You can collect data in a relational, comprehensive knowledge database that can be accessed from any of your company's locations, allowing you to secure company standards with maximum user flexibility and save time by eliminating multiple user access. Project experience can be applied to new tasks, which can help you shorten the development process cycle while adhering to quality output and project deadlines. And by reducing the number of defects at the beginning of the production cycle, you can expect reduced warranty and goodwill costs.

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