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Integration of ReliaSoft products into Navistar's Reliability Functional Excellence

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- Navistar
 - Founded in 1831 as the McCormick Reaper Company
 - Headquartered in Lisle, Illinois
 - Major manufacturer of commercial trucks, buses and defense vehicles
 - 13,200 active employees
- Advanced Reliability
 - Part of Reliability & Quality organization, focused on New Product Development
 - Set reliability targets for components/systems/vehicle
 - Creation of R&Q Strategy to deliver program targets
 - Early failure mode identification, mitigation and correction in all program phases
 - Independent review of product programs to ensure a quality product at program launch

Navistar processes inconsistent and siloed

- Connect design and manufacturing risks
- Develop test plans from risk
- Location to location, program to program variation

Opportunities with retention and execution strategy

- DFMEAs were stored in an online repository, shared / personal drives
- Limited searchability
- Weak Link to previous DFMEAs
- No formalized approval or configuration control
- Ineffective tracking of DFMEA completion
- Inconsistent Transfer of Controls from DFMEA to DVP

Reliability
Functional
Excellence

GOALS

- Develop more robust and sustainable Corporate DFMEA strategy
- Develop new guidelines and templates where applicable
- Develop and incorporate corporate wide training strategy
- Develop a corporate wide retention and execution strategy

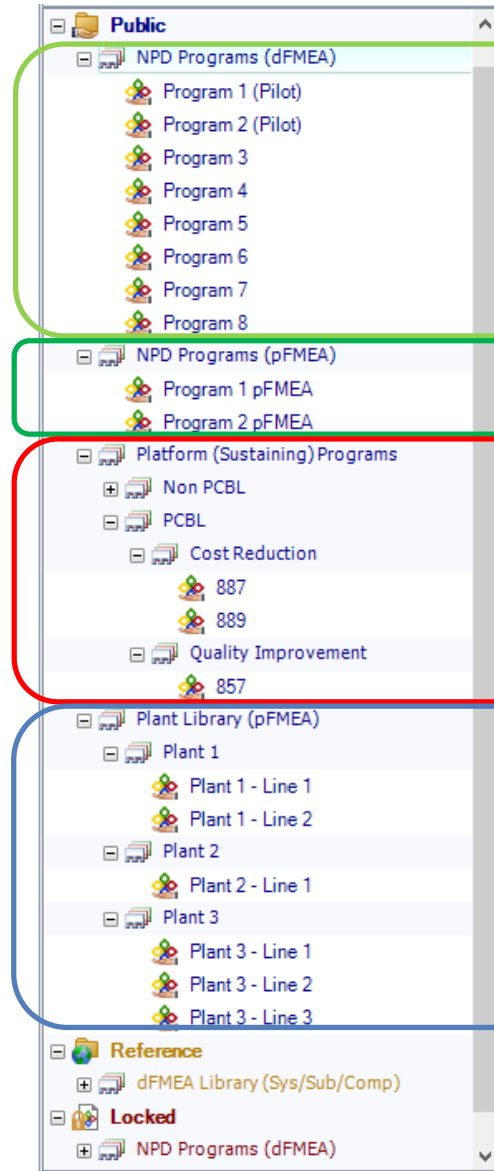
- Generated VOC
 - Met with Engineering, Reliability & Quality and Manufacturing leadership
 - Storage structure and attribute identification
 - Sections for new development programs and libraries for both DFMEA and PFMEAs
- Two major vehicle development programs piloted
- IT
 - Creation of corporate database utilizing SQL server
 - Licensing issues for two separate populations (XFMEA and ReliaSoft)
- Approvals
 - Incorporation of formalized approvals from appropriate functions electronically
- Security
 - 37 different security groups (Engineering, validation, approvers, IT admins)
 - Beneficial if Item Permissions could be assigned at a security group level
- Reporting
 - Canned reports based on attributes (need to tie Analysis Plan, FMEA and Change Log)
- Implementation
 - XFMEA approved as official Navistar DFMEA tool – Jan 2019

Gated NPD Program (DFMEA)

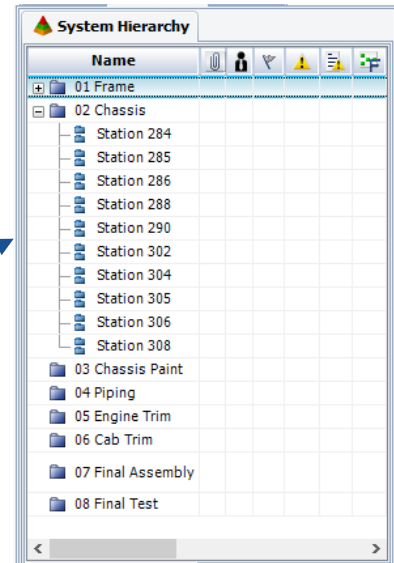
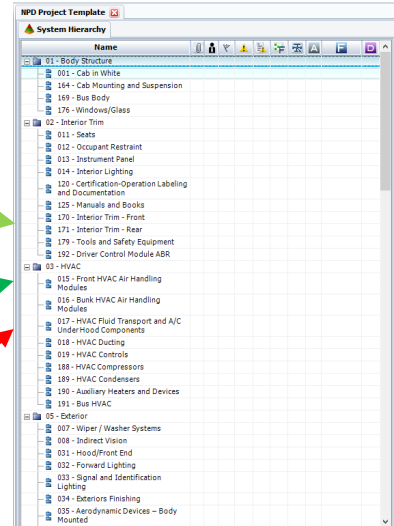
Gated NPD Program (PFMEA)

Non-Gated Improvements (DFMEA)

Assembly Plant PFMEA Library

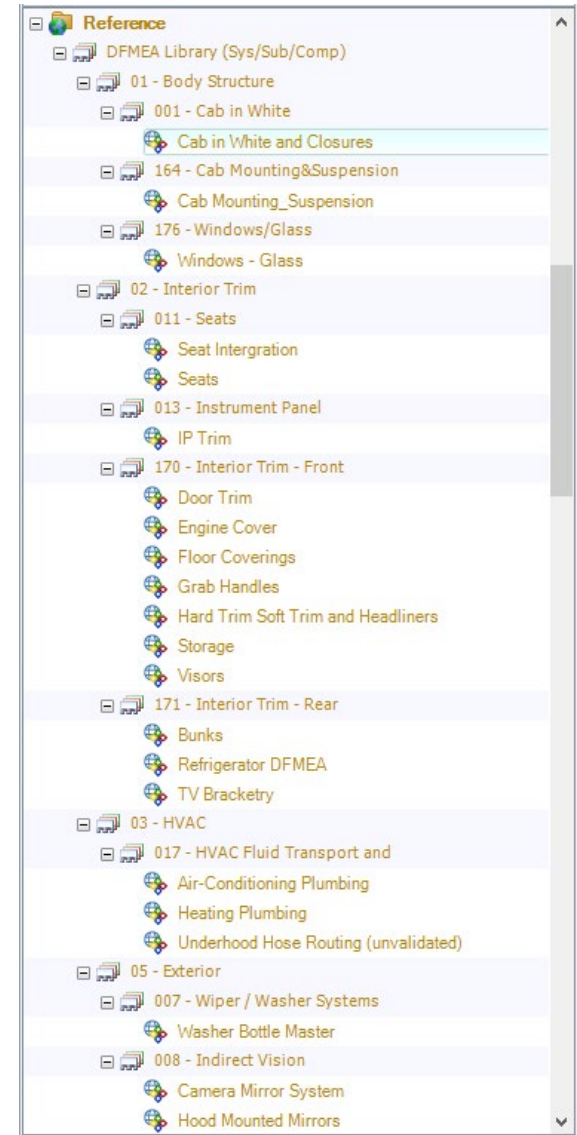


Product Structure



Process Structure

- Basic structure set by Engineering System / Subsystem
 - 14 systems and 101 subsystems
- Next level set by Engineering owners
 - Edit access only for Chief Engineers and Technical Specialists
 - View access for all
 - DFMEA structure set within Project Manager or under System Hierarchy for each item
- Implemented approval process by Engineering owners
- Improved standardization on DFMEA items
 - Utilize Project filter for common lists
 - Link Navistar test identification number to DVP/Auros
 - Appended numbers on imported Controls
- One location allows quantification of DFMEA state
 - Identify gaps in knowledge
 - Accessible to all
- Retiring legacy DFMEA database



Identify Risk

- Faster, more thorough reviews via DFMEA reuse
- Consistent format led to consistent reviews
- Prioritize program risks
- Instructor led training of 60 engineers
- Development of web-based XFMEA class
- No negative impact on project timeline

Manage Risk

- Ability to tie Controls tied from the DFMEA to DVP
- Program risk roll up verifying controls/actions in place
- Tracking supplier DFMEA progress and providing traceability
- Test for noises from DFMEA

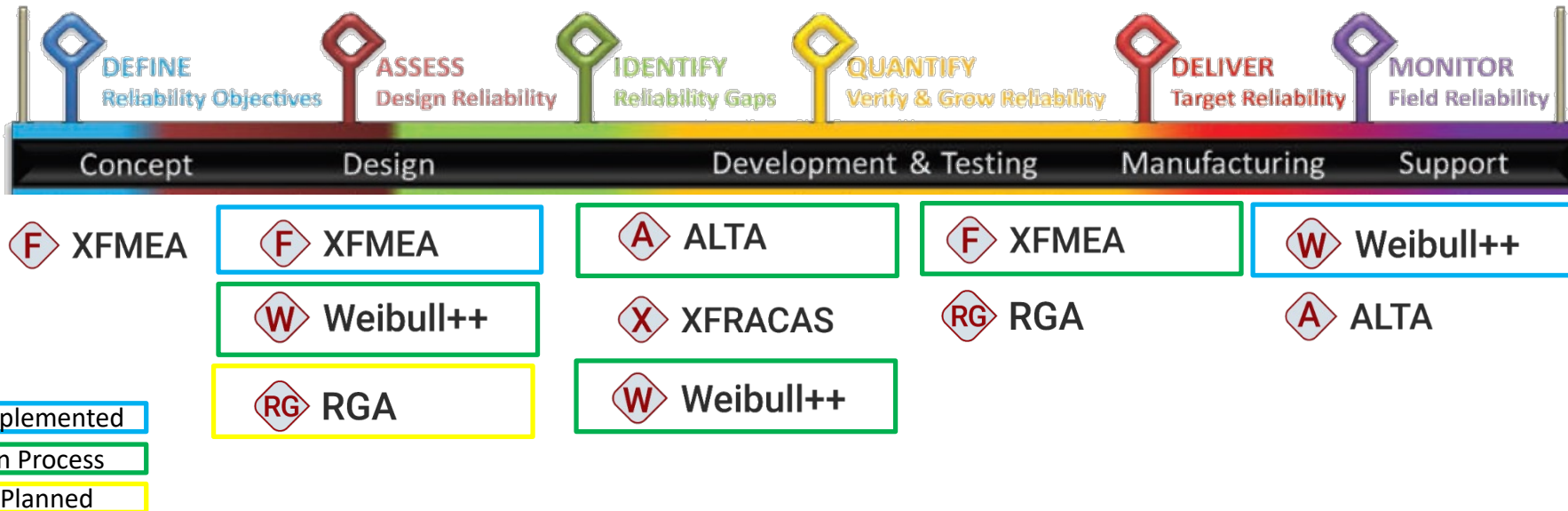
Robust Product



NPD Navistar Product Development Process



ReliaSoft Synthesis Platform
Update, Manage and Leverage Knowledge throughout Product Life Cycle to reduce risk



- Implemented
- In Process
- Planned

Challenge

- Inconsistent and siloed DFMEA process.
- DFMEAs were stored in multiple locations.
- Little reuse of previous DFMEAs
- Stored DFMEAs typically unverified and unapproved.
- Weak connection between DFMEAs and the DVPs and pFMEAs.
- Ineffective tracking of program DFMEAs, resulting in last minute reviews of varying quality.

Solution

- XFMEA was chosen as Navistar's tool for creating and storing FMEAs.
- Storage structure and attributes were created for both new program and library FMEAs as a result of extensive VOC.
- Initiated electronic approval process.
- XFMEA was used to track and report on DFMEA progress.
- Improved DVP cross-functional reviews by using XFMEA results to validate DFMEA controls were identified and used.

Results

- Successfully implemented XFMEA into Navistar's DFMEA process, completing the first step in integrating ReliaSoft into our Reliability Functional Excellence process.
- Created standard processes/structure that will increase DFMEA speed and improve quality.
- Completed and approved 129 DFMEAs on the two pilot programs.
- Created a searchable library structure and stored over 100 DFMEAs.
- Completed all cross-functional DFMEA reviews on time and prior to Program Approval phase.
- Over 140 people have worked in XFMEA as part of the pilot.
- 60 people formally trained in DFMEA and a Navistar online XFMEA training class was created.

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