Developing an Efficient Design FMEA

① Planning For FMEA

Planning
- Team Selection

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Create Boundary Diagram

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Create Interface Matrix

↓

Create P Diagram

Gather:

- Data/Warranty Information (TGW)
- Team :
  - ✓ Design Owner
  - ✓ Process Representative
  - ✓ PVT-Problem Data Person
  - ✓ Supplier as appropriate
  - ✓ Design Contrarian
  - ✓ Process Representative

② FMEA Development

Review Specification For Applicable Item

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Enter Functions Into Columns

↓

Enter all Failure Modes one after Another
- Error Status

↓

Enter Effects of Failure and Select Severity
- Effect and Error States

↓

B

Note:
- If on paper leave plenty of space for further analysis

Types of Failures:
Error States
- Full Failure
- Partial
- Intermittent
- Unintended

- List up to 5 in the same box (grouped) per each failure mode
- Place severity # beside each effect in parenthesis ex: (4)
- Place largest severity of the group into severity column

- *Refer to Severity Chart for Scale*

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B

3

Severity is 9 or 10?

IF

No → Review Severity, start at highest and go to lowest

Yes →

Failure Mode be eliminated?

IF

No ↓

Yes → Add to Action Column
-Responsible Person
-Date of Completion
Take Action to Reduce Severity / Occurrence

4

Consider Design Controls

Detection/Prevention (example)
D – Test Item
P - Mistake Proofing Feature
D - Evaluation Design Review

List Design Controls:
- •Multiple Controls are likely
- •Determine Detection value for each item record it in parenthesis ex: (5)
- •Move the smallest item into Detect. column

Determine:
What are the causes for the Failure Mode?

Fault Tree Analysis Cause & FM

F. M

Root Causes
For 9/10 SEV

Enter the Causes
Into FMEA Form

Refer to Occurrence Chart for Scale

Types of Causes:
- •Man
- •Material
- •Machine
- •Method
- •Environment
- •Noises (Robustness)

Note: Typically there are numerous Causes, be sure to allow for space if Completing FMEA on paper.

SEV is 5 - 8 & OCC $\geq$ 4 ?

Yes ↑

IF

No ↓

Determine:
How probable is each cause as it contributes to the failure mode?
- •Enter into Occur. Column

SEV is 9/10 & OCC > 1, DET > 1 ?

IF

Yes → Determine Action to Reduce Occur. or Improve Controls

No ↓

Calculate RPN
Risk Priority Number
SEV x OCC x DET
Pareto RPN

Top 20% of Failure Modes by RPN

R
P
N

Failure Modes

- •Ensure all YC/YS have actions
- •All actions must have names / dates
- •All team members must sign-in
- •Header info must be complete

Warning!
Do not select arbitrary RPN to be below
Based on 80/20 Rule