

In addition to this summary, this report includes the following forms:

- 1 RATING CRITERIA AND CLASSIFICATIONS
- 2 PROJECT PROPERTIES AND ANALYSIS PROPERTIES SUMMARY
- 3 FMEA SPREADSHEET REPORT
- 4 RECOMMENDED ACTIONS (Summary Report)
- 5 CURRENT CONTROLS

## Xfmea Report Sample – Design FMEA

This report was generated with ReliaSoft's Xfmea software in Microsoft Word. Similar reports can also be generated in Microsoft Excel. You can easily replace the Xfmea logo graphic with your own company logo. Within Word and Excel, reports can be edited/annotated, if necessary, and generated in PDF and/or HTML format for easy distribution.

This report includes:

- A summary of the rating criteria (Severity Scale, Occurrence Scale, Detection Scale) and classifications that were used in the analysis.
- A summary of the project and analysis properties that were defined for the analysis.
- The Design FMEA (DFMEA) spreadsheet report in the SAE J1739 reporting format.
- A summary list of the recommended actions identified during the analysis.
- A summary list of the current controls identified during the analysis.
- Some graphical charts that were generated in Xfmea's Plot Viewer and copy/pasted into the report document, along with chart legend information. These include:
  - Pareto (bar) chart of the cause RPNs, ranked by initial RPN.
  - Pie chart demonstrating the number of causes assigned to each available Occurrence rating.
  - Pie chart demonstrating the number of causes assigned to each available Detection rating.

*The report is based on the sample analysis provided in the SAE J1739 guidelines, on page 37.*



## RATING CRITERIA AND CLASSIFICATIONS

Date: 3/26/2003

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**RPN Calculation Method:** Cause RPN = Severity x Occurrence x Detection    **Failure RPN** = Sum of Cause RPNs    **Item RPN** = Sum of Mode RPNs plus Sub-Item RPNs

### Severity Rating Scale

#	Description	Criteria
1	None	No discernible effect.
2	Very Minor	Fit and finish/Squeak and rattle item does not conform. Defect noticed by discriminating customers (less than 25%).
3	Minor	Fit and finish/Squeak and rattle item does not conform. Defect noticed by 50% of customers.
4	Very Low	Fit and finish/Squeak and rattle item does not conform. Defect noticed by most customers (greater than 75%).
5	Low	Vehicle/Item operable but Comfort/Convenience item(s) inoperable. Customer somewhat dissatisfied.
6	Moderate	Vehicle/Item operable but Comfort/Convenience item(s) inoperable. Customer dissatisfied.
7	High	Vehicle/Item operable but at a reduced level of performance. Customer very dissatisfied.
8	Very High	Vehicle/Item inoperable (loss of primary function).
9	Hazardous with warning	Very high severity ranking when a potential failure mode affects safe vehicle operation and/or involves noncompliance with government regulation with warning.
10	Hazardous without warning	Very high severity ranking when a potential failure mode affects safe vehicle operation and/or involves noncompliance with government regulation without warning.

### Occurrence Rating Scale

#	Description	Criteria
1	Remote: Failure is unlikely	<= 0.01 per thousand vehicles/items
2	Low: Relatively few failures	0.1 per thousand vehicles/items
3	Low: Relatively few failures	0.5 per thousand vehicles/items
4	Moderate: Occasional failures	1 per thousand vehicles/items
5	Moderate: Occasional failures	2 per thousand vehicles/items
6	Moderate: Occasional failures	5 per thousand vehicles/items
7	High: Frequent failures	10 per thousand vehicles/items
8	High: Frequent failures	20 per thousand vehicles/items
9	Very High: Persistent failures	50 per thousand vehicles/items
10	Very High: Persistent failures	=> 100 per thousand vehicles/items

### Detection Rating Scale

#	Description	Criteria
1	Almost Certain	Design Control will almost certainly detect a potential cause/mechanism and subsequent failure mode.
2	Very High	Very High chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
3	High	High chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
4	Moderately High	Moderately High chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
5	Moderate	Moderate chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
6	Low	Low chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
7	Very Low	Very Low chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
8	Remote	Remote chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
9	Very Remote	Very Remote chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.
10	Absolute Uncertainty	Design Control will not and/or cannot detect a potential cause/mechanism and subsequent failure mode; or there is no Design Control.

### Classification Options

Abbreviation	Description
C	Critical
KI	Key Intermediate
KLd	Key Leading
KLg	Key Lagging
S	Significant



**PROJECT PROPERTIES AND ANALYSIS PROPERTIES**

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**Project Properties**

<b>Project Name</b>	<b>Based on Profile</b>
Design FMEA	J1739 DFMEA
<b>Project Description</b>	
This sample project was prepared based on the Design FMEA (DFMEA) on page 37 of the SAE J1739 guidelines.	
<b>Remarks</b>	
The information in this project could also be used to prepare a sample DFMEA like the one on page 64 of the AIAG FMEA-3 guidelines. To do this, the AIAG DFMEA profile must be applied to the project.	

**Analysis Properties**

<b>ITEM</b>	3 - Front Door L.H.					
<b>FMEA Number</b>	<b>Prepared By</b>	<b>Key Date</b>	<b>FMEA Date (Orig.)</b>	<b>FMEA Date (Rev.)</b>	<b>Primary Approval</b>	<b>Approval Date</b>
1234	A. Tate - X6412 - Body Engr	3/3/2003	2/28/2003	3/3/2003		
<b>Product</b>		<b>Model Year(s)/Program(s)</b>		<b>Mission</b>		
		199X/Lion 4dr/Wagon				
<b>Design Responsibility</b>	<b>Release Date</b>	<b>Core Team</b>		<b>Others Affected</b>		
Body Engineering		T. Fender - Car Product Dev., C. Childers - Manufacturing, J. Ford - Assy Ops (Dalton, Fraser, Henley Assembly Plants)				

**POTENTIAL  
FAILURE MODE AND EFFECTS ANALYSIS  
Front Door L.H.**

FMEA Number 1234

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Prepared By A. Tate - X6412 - Body Engr

System 1 - Automobile  
Subsystem 2 - Body Closures  
X Component 3 - Front Door L.H.

Design Responsibility Body Engineering

Model Year(s)/Program(s) 199X/Lion 4dr/Wagon Key Date 3/3/2003

FMEA Date (Orig.) 2/28/2003 (Rev) 3/3/2003

Core Team T. Fender - Car Product Dev., C. Childers - Manufacturing, J. Ford - Assy Ops (Dalton, Fraser, Henley Assembly Plants)

Item Function	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Class	Potential Cause(s)/Mechanism(s) of Failure	Occur	Current Design Controls	Detect	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
												Actions Taken	Sev	Occ	Det	RPN
3 - Front Door L.H.																
- Ingress to and egress from vehicle. - Occupant protection from weather, noise, and side impact. - Support anchorage for door hardware including mirror, hinges, latch and window regulator. - Provide proper surface for appearance items - paint and soft trim.	Corroded interior lower door panels	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.	7		Upper edge of protective wax application specified for inner door panels is too low.	6	Vehicle general durability test veh. T-118 T-109 T-301	7	294	Add laboratory accelerated corrosion testing.	A. Tate Body Engr - 2/25/2003	Based on test results (Test No. 1481) upper edge spec raised 125 mm.	7	2	2	28
					Insufficient wax thickness specified.	4	Vehicle general durability testing - as above. - Detection	7	196	Add laboratory accelerated corrosion testing.	A. Tate Body Engr - 3/28/2003	Test results (Test No. 1481) show specified thickness is adequate.	7	2	2	28
							Conduct Design of Experiments (DOE) on wax thickness.	A. Tate Body Engr - 3/28/2003	DOE shows 25% variation in specified thickness is acceptable.							
					Inappropriate wax formulation specified.	2	Physical and Chem Lab test - Report No. 1265. - Detection	2	28				7	2	2	28
					Entrapped air prevents wax from entering corner/edge access.	5	Design aid investigation with nonfunctioning spray head. - Detection	8	280	Add team evaluation using production spray equipment and specified wax.	Body Engr & Assy Ops - 3/28/2003	Based on test, addition vent holes will be provided in affected areas.	7	1	3	21
					Wax application plugs door drain holes.	3	Laboratory test using "worst case" wax application and hole size. - Detection	1	21				7	3	1	21
					Insufficient room between panels for spray head access.	4	Drawing evaluation of spray head access. - Detection	4	112	Add team evaluation using design aid buck and spray head.	Body Engr & Assy Ops - 3/28/2003	Evaluation showed adequate access.	7	1	1	7



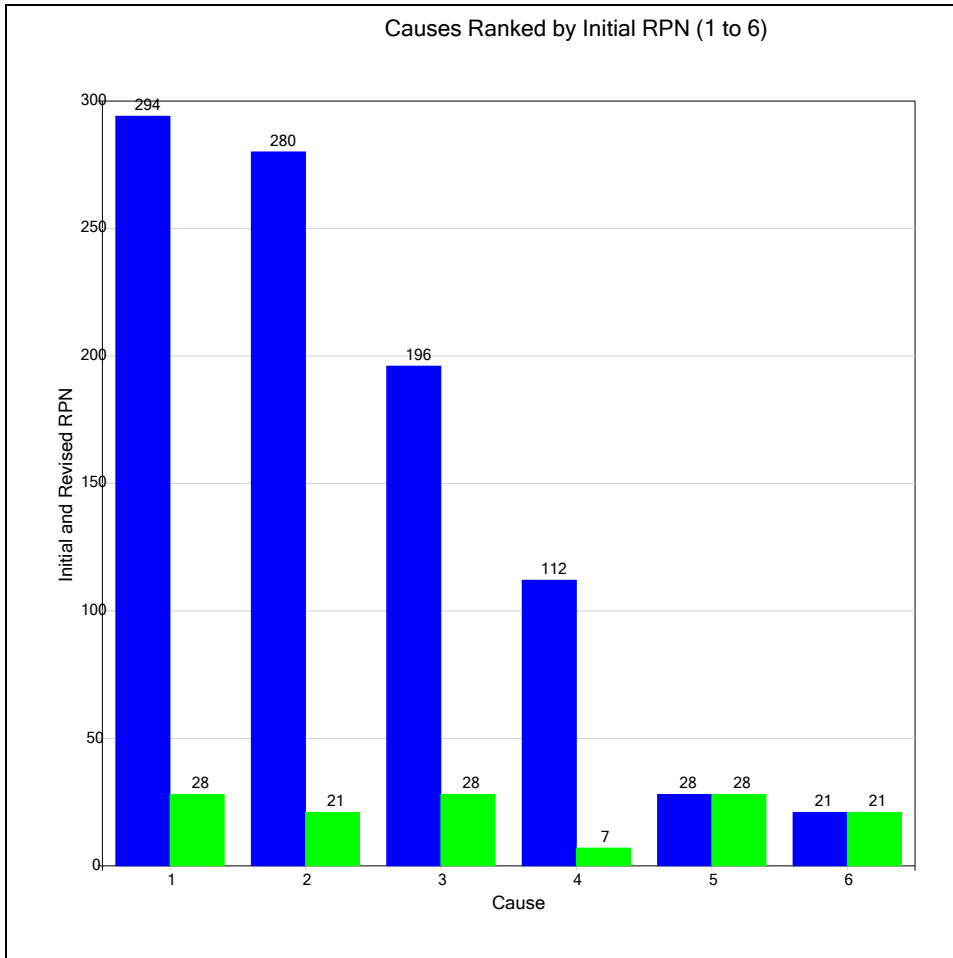
**RECOMMENDED ACTIONS  
(Summary Report)**

Date: 3/26/2003

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#	Recommended Action(s)	Target Completion Date	Responsibility	Actions Taken	Item	Potential Cause(s)/Mechanism(s) of Failure	Priority
1	Add laboratory accelerated corrosion testing.	2/25/2003	A. Tate Body Engrg	Based on test results (Test No. 1481) upper edge spec raised 125 mm.	Front Door L.H.	Upper edge of protective wax application specified for inner door panels is too low.	
2	Add laboratory accelerated corrosion testing.	3/28/2003	A. Tate Body Engrg	Test results (Test No. 1481) show specified thickness is adequate.	Front Door L.H.	Insufficient wax thickness specified.	
3	Conduct Design of Experiments (DOE) on wax thickness.	3/28/2003	A. Tate Body Engrg	DOE shows 25% variation in specified thickness is acceptable.	Front Door L.H.	Insufficient wax thickness specified.	
4	Add team evaluation using production spray equipment and specified wax.	3/28/2003	Body Engrg & Assy Ops	Based on test, addition vent holes will be provided in affected areas.	Front Door L.H.	Entrapped air prevents wax from entering corner/edge access.	
5	Add team evaluation using design aid buck and spray head.	3/28/2003	Body Engrg & Assy Ops	Evaluation showed adequate access.	Front Door L.H.	Insufficient room between panels for spray head access.	

#	Current Design Controls	Control Type	Item	Function	Potential Failure Mode	Potential Effect(s) of Failure	Potential Cause(s)/Mechanism(s) of Failure
1	Vehicle general durability test veh. T-118 T-109 T-301	Detection	Front Door L.H.	- Ingress to and egress from vehicle - Occupant protection from weather, noise, and side impact - Support anchorage for door hardware including mirror, hinges, latch and window regulator - Provide proper surface for appearance items - paint and soft trim	Corroded interior lower door panels	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time - Impaired function of interior door hardware	Upper edge of protective wax application specified for inner door panels is too low.
2	Vehicle general durability testing - as above.	Detection	Front Door L.H.	- Ingress to and egress from vehicle - Occupant protection from weather, noise, and side impact - Support anchorage for door hardware including mirror, hinges, latch and window regulator - Provide proper surface for appearance items - paint and soft trim	Corroded interior lower door panels	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time - Impaired function of interior door hardware	Insufficient wax thickness specified.
3	Physical and Chem Lab test - Report No. 1265.	Detection	Front Door L.H.	- Ingress to and egress from vehicle - Occupant protection from weather, noise, and side impact - Support anchorage for door hardware including mirror, hinges, latch and window regulator - Provide proper surface for appearance items - paint and soft trim	Corroded interior lower door panels	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time - Impaired function of interior door hardware	Inappropriate wax formulation specified.
4	Design aid investigation with nonfunctioning spray head.	Detection	Front Door L.H.	- Ingress to and egress from vehicle - Occupant protection from weather, noise, and side impact - Support anchorage for door hardware including mirror, hinges, latch and window regulator - Provide proper surface for appearance items - paint and soft trim	Corroded interior lower door panels	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time - Impaired function of interior door hardware	Entrapped air prevents wax from entering corner/edge access.
5	Laboratory test using "worst case" wax application and hole size.	Detection	Front Door L.H.	- Ingress to and egress from vehicle - Occupant protection from weather, noise, and side impact - Support anchorage for door hardware including mirror, hinges, latch and window regulator - Provide proper surface for appearance items - paint and soft trim	Corroded interior lower door panels	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time - Impaired function of interior door hardware	Wax application plugs door drain holes.
6	Drawing evaluation of spray head access.	Detection	Front Door L.H.	- Ingress to and egress from vehicle - Occupant protection from weather, noise, and side impact - Support anchorage for door hardware including mirror, hinges, latch and window regulator - Provide proper surface for appearance items - paint and soft trim	Corroded interior lower door panels	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time - Impaired function of interior door hardware	Insufficient room between panels for spray head access.



**XFMEA Database:** C:/Examples/Xfmea Demo.rs

**Project:** Design FMEA

**Selected Items:**

3 - Front Door L.H.

**Causes Ranked by Initial RPN (1 to 6)**

1: RPNi = 294, RPNr = 28 - Upper edge of protective wax application specified for inner door panels is too low. (Item: 3 - Front Door L.H.)

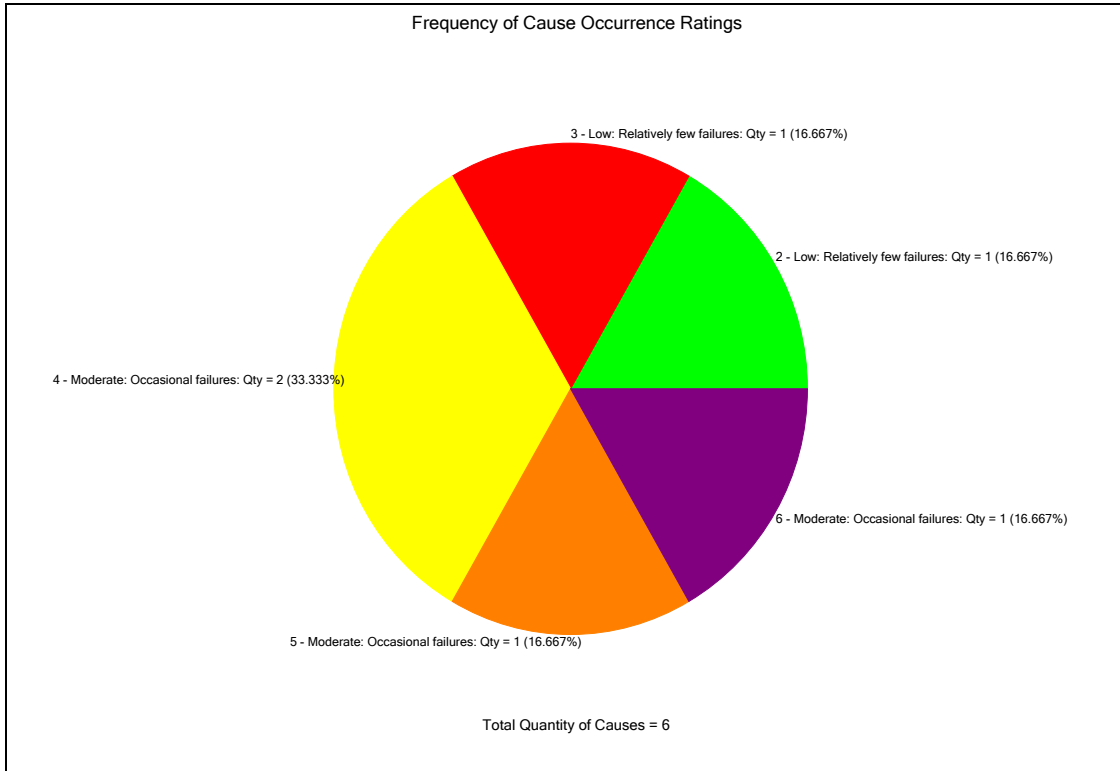
2: RPNi = 280, RPNr = 21 - Entrapped air prevents wax from entering corner/edge access. (Item: 3 - Front Door L.H.)

3: RPNi = 196, RPNr = 28 - Insufficient wax thickness specified. (Item: 3 - Front Door L.H.)

4: RPNi = 112, RPNr = 7 - Insufficient room between panels for spray head access. (Item: 3 - Front Door L.H.)

5: RPNi = 28, RPNr = 28 - Inappropriate wax formulation specified. (Item: 3 - Front Door L.H.)

6: RPNi = 21, RPNr = 21 - Wax application plugs door drain holes. (Item: 3 - Front Door L.H.)

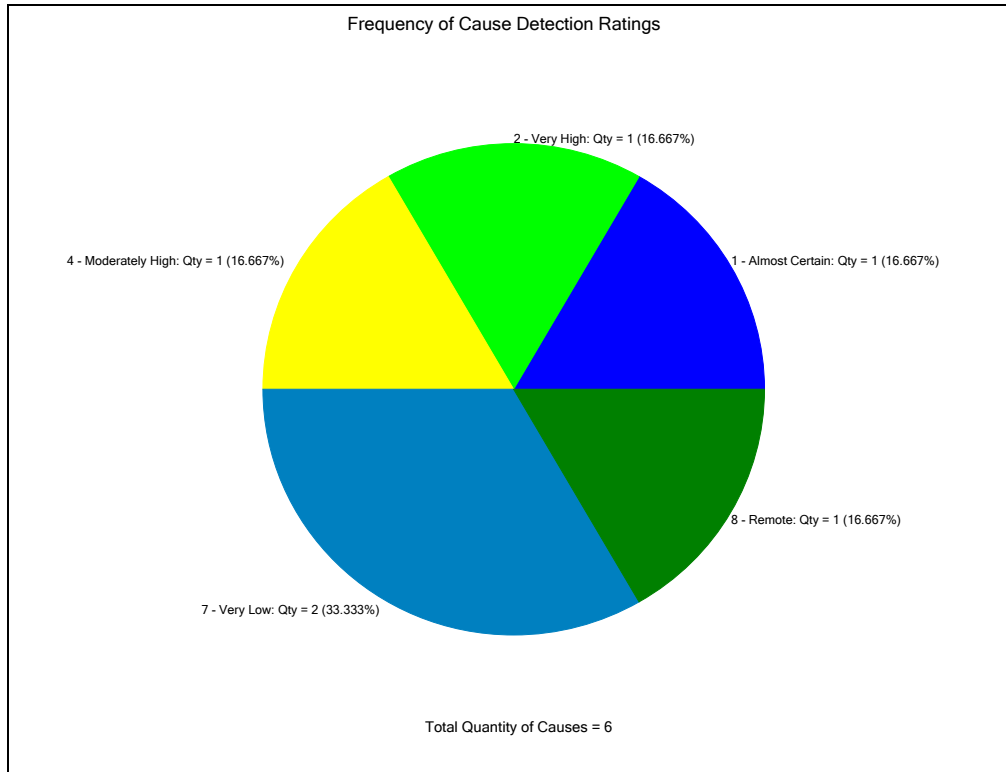


**XFMEA Database:** C:/Xfmea/Examples/Xfmea Demo.rsrf  
**Project:** Design FMEA

**Selected Items:**  
3 - Front Door L.H.

**Frequency of Cause Occurrence Ratings**  
 1 - Remote: Failure is unlikely: Qty = 0 (0%)  
 2 - Low: Relatively few failures: Qty = 1 (16.667%)  
 3 - Low: Relatively few failures: Qty = 1 (16.667%)  
 4 - Moderate: Occasional failures: Qty = 2 (33.333%)  
 5 - Moderate: Occasional failures: Qty = 1 (16.667%)  
 6 - Moderate: Occasional failures: Qty = 1 (16.667%)  
 7 - High: Frequent failures: Qty = 0 (0%)  
 8 - High: Frequent failures: Qty = 0 (0%)  
 9 - Very High: Persistent failures: Qty = 0 (0%)  
 10 - Very High: Persistent failures: Qty = 0 (0%)  
 Not Assigned: Qty = 0 (0%)





**XFMEA Database:** C:/Xfmea/Examples/Xfmea Demo.rsf  
**Project:** Design FMEA

**Selected Items:**

3 - Front Door L.H.

**Frequency of Cause Detection Ratings**

1 - Almost Certain: Qty = 1 (16.667%)  
 2 - Very High: Qty = 1 (16.667%)  
 3 - High: Qty = 0 (0%)  
 4 - Moderately High: Qty = 1 (16.667%)  
 5 - Moderate: Qty = 0 (0%)  
 6 - Low: Qty = 0 (0%)  
 7 - Very Low: Qty = 2 (33.333%)  
 8 - Remote: Qty = 1 (16.667%)  
 9 - Very Remote: Qty = 0 (0%)  
 10 - Absolute Uncertainty: Qty = 0 (0%)  
 Not Assigned: Qty = 0 (0%)