



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

Rating Criteria and Classifications

J1739 (2009)

Actions

## Xfmea Report Sample – Machinery 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.
- The Machinery FMEA (MFMEA) spreadsheet report in the SAE J1739 reporting format.
- A summary list of the recommended actions identified during the analysis.

*The report is based on the sample analysis provided in the SAE J1739 guidelines, on page 45.*



**RATING CRITERIA AND CLASSIFICATIONS**

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Severity Rating Scale		Criteria 1	Occurrence Rating Scale		Criteria
#	Description		#	Description	
1	None	No discernible effect.	1	Remote: Failure is unlikely	<= 0.01 per thousand vehicles/items
2	Very Minor	Fit and finish/Squeak and rattle item does not conform. Defect noticed by discriminating customers (less than 25%).	2	Low: Relatively few failures	0.1 per thousand vehicles/items
3	Minor	Fit and finish/Squeak and rattle item does not conform. Defect noticed by 50% of customers.	3	Low: Relatively few failures	0.5 per thousand vehicles/items
4	Very Low	Fit and finish/Squeak and rattle item does not conform. Defect noticed by most customers (greater than 75%).	4	Moderate: Occasional failures	1 per thousand vehicles/items
5	Low	Vehicle/Item operable but Comfort/Convenience item(s) inoperable. Customer somewhat dissatisfied.	5	Moderate: Occasional failures	2 per thousand vehicles/items
6	Moderate	Vehicle/Item operable but Comfort/Convenience item(s) inoperable. Customer dissatisfied.	6	Moderate: Occasional failures	5 per thousand vehicles/items
7	High	Vehicle/Item operable but at a reduced level of performance. Customer very dissatisfied.	7	High: Frequent failures	10 per thousand vehicles/items
8	Very High	Vehicle/Item inoperable (loss of primary function).	8	High: Frequent failures	20 per thousand vehicles/items
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.	9	Very High: Persistent failures	50 per thousand vehicles/items
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.	10	Very High: Persistent failures	=> 100 per thousand vehicles/items

Detection Rating Scale		Criteria 1	Classification Options	
#	Description		Abbreviation	Description
1	Almost Certain	Design Control will almost certainly detect a potential cause/mechanism and subsequent failure mode.	C	Critical
2	Very High	Very High chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.	KI	Key Intermediate
3	High	High chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.	KLd	Key Leading
4	Moderately High	Moderately High chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.	KLg	Key Lagging
5	Moderate	Moderate chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.	S	Significant
6	Low	Low chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.	KPC	Key Product Characteristic
7	Very Low	Very Low chance the Design Control will detect a potential cause/mechanism and subsequent failure mode.	KCC	Key Control Characteristic
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.		

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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.

**FAILURE MODE AND EFFECTS ANALYSIS**  
**Vacuum Pump**

Item 1.1 - Vacuum Pump  
 Model Year(s)/Program(s) 201X/AllStar  
 Design Responsibility Firebrakes (supplier)  
 Core Team Mike Brake, John Doe, Jim Dominion (Supplier)  
 Support Team \_\_\_\_\_

FMEA Number MF112  
 Key Date 5/2/2015  
 Prepared By John Doe  
 FMEA Date (Orig.) 2/2/2015

Name / Function	Potential Failure Mode	Potential Effect(s) of Failure	SEVl	Classification	Potential Cause(s)/Mechanisms of Failure	OCCI	Current Design Controls (Prevention)	Current Design Controls (Detection)	DETI	RPNl	Recommended Action(s)	Responsibility & Planned Completion Date	Action Results						
													Actions Taken & Actual Completion Date	SEVr	OCCr	DETr	RPNr		
<b>Vacuum Pump</b>																			
Provides vacuum to evacuate brake system. Achieve X millimeters in Y seconds as the furthest wheel from the vacuum source.	Partial or complete loss of air, water, and power supply to the weld gun.	Moderate downtime in replacing the dressing. Downtime varies from 10-30 minutes for replacement.	4		Flexing, rubbing of cables, jumpers and hoses with each other during welding.	6	Robot dressing practices. Recommended jumper and cable lengths. Preventive maintenance. Water Savers Machinery Controls stop the process.		5	120	Investigate longer life cables, hoses and jumpers. (Reduces occurrence)	Jim Manufacturing, Mike Cable, Supplier	3/30/2015	Selected cables and hoses with longer life than originally specified. - 3/30/2015	3	4	4	48	
											Investigate use of abrasion resistant protective covering for cables and hoses. (Reduces occurrence)	Joe Dressing, Supplier	3/12/2015						Abrasion resistant sleeves to be used at points that are subject to high wear and tear. - 3/12/2015
											Split cabling for water hoses/cables to minimize length of replacement. (Reduces downtime/effects severity)	Joe Dressing, Supplier	3/12/2015						Completed. - 3/12/2015
											Utilize infrared thermography to predict robot dressing failure. (Improves detection)	Joe Dressing, Assembly Plant 123	3/13/2015						Infrared Thermography incorporated into predictive maintenance plans. - 3/13/2015



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Action ID	Action #	Recommended Action(s)	Responsibility	Planned Completion Date	Actual Completion Date	Actions Taken	Planned Cost	Reviewer	Actual Cost	Review Date	Review Comments	Last Updated By	Last Updated	Name	Function	Potential Failure Mode	Potential Effect(s) of Failure	Potential Cause(s)/Mechanisms of Failure	RPNi	RPNr
5	1.1.1.1.1	Investigate longer life cables, hoses and jumpers. (Reduces occurrence)	Jim Manufacturing, Mike Cable, Supplier	3/30/2015	3/30/2015	Selected cables and hoses with longer life than originally specified.	0		0			ReliaSoft Corporation	7/29/2015 10:53 AM	Vacuum Pump	Provides vacuum to evacuate brake system. Achieve X millimeters in Y seconds as the furthest wheel from the vacuum source.	Partial or complete loss of air, water and power supply to the weld gun.	Moderate downtime in replacing the dressing. Downtime varies from 10-30 minutes for replacement.	Flexing, rubbing of cables, jumpers and hoses with each other during welding.	120	48
6	1.1.1.1.2	Investigate use of abrasion resistant protective covering for cables and hoses. (Reduces occurrence)	Joe Dressing, Supplier	3/12/2015	3/12/2015	Abrasion resistant sleeves to be used at points that are subject to high wear and tear.	0		0			ReliaSoft Corporation	7/29/2015 10:54 AM	Vacuum Pump	Provides vacuum to evacuate brake system. Achieve X millimeters in Y seconds as the furthest wheel from the vacuum source.	Partial or complete loss of air, water, and power supply to the weld gun.	Moderate downtime in replacing the dressing. Downtime varies from 10-30 minutes for replacement.	Flexing, rubbing of cables, jumpers and hoses with each other during welding.	120	48
7	1.1.1.1.3	Split cabling for water hoses/cables to minimize length of replacement. (Reduces downtime/effects severity)	Joe Dressing, Supplier	3/12/2015	3/12/2015	Completed.	0		0			ReliaSoft Corporation	7/29/2015 10:56 AM	Vacuum Pump	Provides vacuum to evacuate brake system. Achieve X millimeters in Y seconds as the furthest wheel from the vacuum source.	Partial or complete loss of air, water, and power supply to the weld gun.	Moderate downtime in replacing the dressing. Downtime varies from 10-30 minutes for replacement.	Flexing, rubbing of cables, jumpers and hoses with each other during welding.	120	48

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8	1.1.1.1.4	Utilize infrared thermography to predict robot dressing failure. (Improves detection)	Joe Dressing, Assembly Plant 123	3/13/2015	3/13/2015	Infrared Thermography incorporated into predictive maintenance plans.	0		0			ReliaSoft Corporation	7/29/2015 10:58 AM	Vacuum Pump	Provides vacuum to evacuate brake system. Achieve X millimeters in Y seconds as the furthest wheel from the vacuum source.	Partial or complete loss of air, water and power supply to the weld gun.	Moderate downtime in replacing the dressing. Downtime varies from 10-30 minutes for replacement.	Flexing, rubbing of cables, jumpers and hoses with each other during welding.	120	48
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