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

Report Summary
Rating Criteria and Classifications
J1739 (2009)
Actions

Xfmea Report Sample – Machinery FMEA

This report was generated with ReliaSoft Xfmea by HBM Prenscia 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.

Severity Rating Scale

#	Description	Criteria 1
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
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.

Classification Options

Abbreviation	Description
C	Critical
KI	Key Intermediate
KLd	Key Leading
KLg	Key Lagging
S	Significant
KPC	Key Product Characteristic
KCC	Key Control Characteristic

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	FMEA Number	MF112
Model Year(s)/Program(s)	201X/AllStar	Key Date	4/14/2017
Design Responsibility	Firebrakes (supplier)	Prepared By	5/2/2017
Core Team	Mike Brake, John Doe, Jim Dominion (supplier)	FMEA Date (Orig.)	2/2/2017
Support Team			

Name / Function	Potential Failure Mode	Potential Effect(s) of Failure	SEVi	Classification	Potential Cause(s) / Mechanisms of Failure	OCCi	Current Design Controls (Prevention)	Current Design Controls (Detection)	DETi	RPNi	Recommended Action(s)	Responsibility & Planned Completion Date		Action Results: Actions Taken & Actual Completion Date	Action Results: SEVr	Action Results: OCCr	Action Results: DETr	Action Results: RPNr
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.	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 Dressiing, Supplier	3/13/2017	Abrasion resistant sleeves to be used at points that are subject to high wear and tear. - 3/13/2017				
											Split cabling for water hoses/cables to minimize length of replacement. (Reduces downtime/effects severity)	Joe Dressing, Supplier	3/13/2017	Completed. - 3/13/2017				
											Utilize infrared thermography to predict robot dressing failure. (Improves detection)	Joe Dressing, Assembly Plant 123	3/13/2017	Infrared Thermography incorporated into predictive maintenance plans. - 3/13/2017				

Action ID	Action #	Recommended Action(s)	Responsibility	Planned Completion Date	Expected 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 Dressiing, Supplier	3/13/2017	3/13/2017	Abrasion resistant sleeves to be used at points that are subject to high wear and tear.	0		0			HBM Prenscia	11/17/2017 9:14 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	3/13/2017	3/13/2017	Completed.	0		0			HBM Prenscia	11/17/2017 9:14 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

8	1.1.1.1.4	Utilize infrared thermography to predict robot dressing failure. (Improves detection)	Joe Dressing, Assembly Plant 123	3/13/2017	3/13/2017	Infrared Thermography incorporated into predictive maintenance plans.	0		0			HBM Prenscia	11/17/2017 9:15 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