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 FAILURE CAUSES
5 RECOMMENDED ACTIONS (Summary Report)
6 CURRENT CONTROLS

Xfmea Report Sample – Process 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 Process FMEA (PFMEA) spreadsheet report in the AIAG FMEA-3 reporting format.
- A summary list of the potential causes of failure that were identified through the analysis, ranked by Initial Occurrence rating.
- A summary list of the recommended actions identified during the analysis.
- A summary list of the current controls identified during the analysis.

The report is based on the sample analysis provided in the AIAG FMEA-3 guidelines, on page 36.

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

Severity Rating Scale

#	Description	Criteria
1	None	Slight inconvenience to operation or operator or no effect.
2	Very Minor	A portion (less than 100%) of the product may have to be reworked, with no scrap, on-line but in-station.
3	Minor	A portion (less than 100%) of the product may have to be reworked, with no scrap, on-line but out-of-station.
4	Very Low	The product may have to be sorted, with no scrap, an a portion (less than 100%) reworked
5	Low	100% of product may have to be reworked, or vehicle/item repaired off-line but does not go to repair department.
6	Moderate	A portion (less than 100%) of the product may have to be scrapped with no sorting, or vehicle/item repaired in repair department with repair time less than half an hour.
7	High	Product may have to be sorted an a portion (less than 100%) scrapped, or vehicle/item repaired in repair department with repair time between half an hour and an hour.
8	Very High	100% of product may have to be scrapped, or vehicle/item repaired in repair department with a repair time greater than one hour.
9	Hazardous with warning	May endanger operator (machine or assembly) with warning.
10	Hazardous without warning	May endanger operator (machine or assembly) without warning.

Occurrence Rating Scale

#	Description	Criteria
1	Remote: Failure is unlikely	<= 0.01 per thousand pieces; Ppk => 1.67.
2	Low: Relatively few failures	0.1 per thousand pieces; Ppk => 1.30.
3	Low: Relatively few failures	0.5 per thousand pieces; Ppk => 1.20.
4	Moderate: Occasional failures	1 per thousand pieces; Ppk => 1.10.
5	Moderate: Occasional failures	2 per thousand pieces; Ppk => 1.00.
6	Moderate: Occasional failures	5 per thousand pieces; Ppk => 0.94.
7	High: Frequent failures	10 per thousand pieces; Ppk => 0.86.
8	High: Frequent failures	20 per thousand pieces; Ppk => 0.78.
9	Very High: Persistent failures	50 per thousand pieces; Ppk => 0.55.
10	Very High: Persistent failures	=> 100 per thousand pieces; Ppk => 0.55.

Detection Rating Scale

#	Description	Criteria
1	Very High	Discrepant parts cannot be made because item has been error proofed by process/product design.
2	Very High	Error Proofed or Gauging Inspection. Error detection in-station (automatic gauging with automatic stop feature). Cannot pass discrepant part.
3	High	Error Proofed or Gauging Inspection. Error detection in-station, OR in subsequent operations by multiple layers of acceptance: supply, select, install, verify. Cannot accept discrepant part.
4	Moderately High	Error Proofed or Gauging Inspection. Error detection in subsequent operations, OR gauging performed on setup and first-piece check (for setup causes only).
5	Moderate	Gauging Inspection. Control is based on variable gauging after parts have left the station, OR Go/No Go gauging performed on 100% of the parts after parts have left the station.
6	Low	Gauging or Manual Inspection. Control is achieved with charting methods, such as SPC (Statistical Process Control)
7	Very Low	Manual Inspection. Control is achieved w/ double visual inspection only.
8	Remote	Manual Inspection. Control is achieved w/ visual inspection only.
9	Very Remote	Manual Inspection. Control is achieved w/ indirect or random checks only.
10	Almost Impossible	Manual Inspection. Cannot detect or is not checked.

Classification Options

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

Project Properties

Project Name	Based on Profile
Process FMEA	AIAG PFMEA
Project Description	
This sample project was prepared based on the Process FMEA (PFMEA) on page 70 of the AIAG FMEA-3 guidelines.	
Remarks	
The information in this project could also be used to prepare a sample PFMEA like the one on page 42 of the SAE J1739 guidelines. To do this, the J1739 PFMEA profile must be applied to the project.	

Analysis Properties

ITEM	3 - Front Door L.H.					
FMEA Number	**Prepared By**	**Key Date**	**FMEA Date (Orig.)**	**FMEA Date (Rev.)**	**Primary Approval**	**Approval Date**
1450	J. Ford - X6521 - Assy Ops	3/31/2003	3/10/2003	3/21/2003		

Product	Model Year(s)/Vehicle(s)	Mission
	199X/Lion 4dr/Wagon	

Process Responsibility	Release Date	Core Team	Others Affected
Body Engineering		A. Tate Body Engrg, J. Smith - OC, R. James - Production, J. Jones - Maintenance	

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

	System	1 - Automobile		FMEA Number	1450
	Subsystem	2 - Closures		Page	4 of 7
X	Component	3 - Front Door L.H.	Process Responsibility	Body Engineering	Prepared By	J. Ford - X6521 - Assy Ops
Model Year(s)/Vehicle(s)		199X/Lion 4dr/Wagon	Key Date	3/31/2003	FMEA Date (Orig.)	3/10/2003 (Rev) 3/21/2003
Core Team		A. Tate Body Engrg, J. Smith - OC, R. James - Production, J. Jones - Maintenance			

Item / Process Function/Requirements	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Class	Potential Cause(s)/Mechanism(s) of Failure	Occur	Current Process Controls Prevention	Current Process Controls Detection	Detec	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results: Actions Taken	Sev	Occ	Det	RPN
3 - Front Door L.H.																	
Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.	7		Manually inserted spray head not inserted far enough.	8		Visual check each hour - 1/shift for film thickness (depth meter) and coverage.	5	280	Add positive depth stop to sprayer.	Mfg Engrg - 3/10/2003	Stop added, sprayer checked on line.	7	2	5	70
											Automate spraying.	Mfg Engrg - 3/10/2003	Rejected due to complexity of different doors on same line.				
					Spray head clogged - Viscosity too high - Temperature too low - Pressure too low.	5	Test spray pattern at start-up and after idle periods, and preventive maintenance program to clean heads.	Visual check each hour - 1/shift for film thickness (depth meter) and coverage.	3	105	Use Design of Experiments (DOE) on viscosity vs. temperature vs. pressure.	Mfg Engrg - 3/10/2003	Temp and press limits were determined and limit controls have been installed - control charts show process is in control Cpk = 1.85.	7	1	3	21
					Spray head deformed due to impact.	2	Preventive maintenance program to maintain heads.	Visual check each hour - 1/shift for film thickness (depth meter) and coverage.	2	28				7	2	2	28
					Spray time insufficient.	8		Operator instructions and lot sampling (10 doors/shift) to check for coverage of critical areas.	7	392	Install spray timer.	Maintenance - 3/10/2003	Automatic spray timer installed - operator starts spray, timer controls shut-off - control charts show process is in control Cpk = 2.05.	7	1	7	49

Cause RPN (Init)	Cause RPN (Rev)	% Reduction in RPN	Potential Cause(s)/Mechanism(s) of Failure	Occ (Init)	Occ (Rev)	Det (Init)	Det (Rev)	Class	Item	Process Function/Requirements	Potential Failure Mode	Potential Effect(s) of Failure
280	70	75	Manually inserted spray head not inserted far enough.	8	2	5	5		Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.
392	49	87.5	Spray time insufficient.	8	1	7	7		Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.
105	21	80	Spray head clogged - Viscosity too high - Temperature too low - Pressure too low.	5	1	3	3		Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.
28	28	0	Spray head deformed due to impact.	2	2	2	2		Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.

#	Recommended Action(s)	Target Completion Date	Responsibility	Actions Taken	Item	Potential Cause(s)/Mechanism(s) of Failure	Priority
1	Add positive depth stop to sprayer.	3/10/2003	Mfg Engrg	Stop added, sprayer checked on line.	Front Door L.H.	Manually inserted spray head not inserted far enough.	
2	Automate spraying.	3/10/2003	Mfg Engrg	Rejected due to complexity of different doors on same line.	Front Door L.H.	Manually inserted spray head not inserted far enough.	
3	Use Design of Experiments (DOE) on viscosity vs. temperature vs. pressure.	3/10/2003	Mfg Engrg	Temp and press limits were determined and limit controls have been installed - control charts show process is in control Cpk = 1.85.	Front Door L.H.	Spray head clogged - Viscosity too high - Temperature too low - Pressure too low.	
4	Install spray timer.	3/10/2003	Maintenance	Automatic spray timer installed - operator starts spray, timer controls shut-off - control charts show process is in control Cpk = 2.05.	Front Door L.H.	Spray time insufficient.	

#	Current Process Controls	Control Type	Item	Process Function/Requirements	Potential Failure Mode	Potential Effect(s) of Failure	Potential Cause(s)/Mechanism(s) of Failure
1	Visual check each hour - 1/shift for film thickness (depth meter) and coverage.	Detection	Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.	Manually inserted spray head not inserted far enough.
2	Test spray pattern at start-up and after idle periods, and preventive maintenance program to clean heads.	Prevention	Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.	Spray head clogged - Viscosity too high - Temperature too low - Pressure too low.
3	Preventive maintenance program to maintain heads.	Prevention	Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.	Spray head deformed due to impact.
4	Operator instructions and lot sampling (10 doors/shift) to check for coverage of critical areas.	Detection	Front Door L.H.	Manual application of wax inside door. To cover inner door, lower surfaces at minimum wax thickness to retard corrosion.	Insufficient wax coverage over specified surface.	Deteriorated life of door leading to: - Unsatisfactory appearance due to rust through paint over time. - Impaired function of interior door hardware.	Spray time insufficient.