FMEA Alignment VDA and AIAG

Status October 2017

Alignment of FMEA handbooks VDA and AIAG

Project Leader:

AIAG: Scott Gray
VDA: Jochen Pfeufer

Statement to the FMEA Presentation

The presentation is the current status of discussion of AIAG and VDA working group.
This presentation status is not fixed and nonbinding.

A validation phase was held in June/July 2017
with dedicated suppliers and evaluation of the results.

Release of Yellow Print 15th November 2017
following a 90 days stakeholder review.

Release of final version scheduled End of April 2018

Publish May 2018

Trainings to the new manual of FMEA in 2018
will be provided after release of the final manual (Red Print)
VDA-QMC, AIAG and their licensees.

FMEA Alignment of VDA and AIAG

The AIAG FMEA manual is a supplement to SAE J1739 for suppliers. Now, again there is the opportunity for cooperation between SAE and AIAG as was done at the last update and now a possibility between SAE, AIAG and VDA - Wow!
You have been given this great opportunity to build bridges!

Currently suppliers providing products to both German and N.A. OEM's are required to assess their products' failure modes and effects differently, based on differences between the Severity, Occurrence, and Detection rating tables in the VDA and AIAG FMEA Manuals.

This causes confusion and adds complexity to the product development and product improvement activities of the suppliers.

A common set of FMEA requirements/expectations will enable suppliers to have a single FMEA business process and associated set of methods and tools to produce robust, accurate and complete FMEA's that would meet the needs and expectations of any of their customers.

Attendees

AIAG Team

OEM: Fiat Chrysler Automobiles, Ford Motor Company, General Motors Company*, Daimler Trucks North America*, Honda North America

Supplier: Bendix Commercial Vehicle Systems, GKN Driveline, Lear Corporation, Nexteer Automotive*, ON Semiconductor, Visteon Corporation

* SAE Member

VDA Team

OEM: Daimler AG, Ford Europe, Volkswagen AG, Opel Automobile GmbH, AUDI AG, BMW AG

Supplier: Continental Automotive Systems, GKN Driveline International GmbH, Knorr Bremse, Robert Bosch GmbH, Schaeffler AG, ZF Friedrichshafen AG

Comparison of the FMEA Manual VDA and AIAG (Ford, GM, FCA)

Main focus of the project was the standardization of the criteria „severity“, „occurrence“ and „detection“ within the ranking tables.

During the discussion of the issues in the industry the team members of VDA and AIAG agrees that would be a good opportunity to harmonize and standardize other parts of the manual in addition.

Embedding of the method in development process

- FMEA has to be worked out according the project plan and evaluated to the project mile stones according to the status of the analysis
- FMEA should be an integrated in design discussions and releases

APQP Phases	Plan and Define Program	Product Design and Development Verification	Process Design and Development Verification	Product and Production Validation	Feedback Assessment and Corrective Action

- The process responsibility of the management is stressed
- Priority of FMEA, availability of resources and input dimensions => In practice often the biggest challenge
- Result communication and inspection
- Reviews with the management

VDA Maturity Level	RG0	RG1	RG2	RG3	RG4	RG5	RG6	RG7
	Innovation Approval for serial Development	Requirement Management for Procurement Extensive	Definition of the Supply Chain and Placing of Extensive	Approval of Technical Specification	Production Planning Done	Serial tools, Spare Parts and Serial Machines Available	Product and Process Approval	Project End, Responsibility Transfer to Serial Production, Start, Requalifikation

Projects meeting and face to face meetings (1/2)

- **Since May 2015 regular (weekly / bi-weekly) conference calls to align content of the manual**
- **Three face to face meeting took place**

1. **Design FMEA main results**

   Meeting in CW 07/2016 (AIAG)

   ✓ Review of VDA and AIAG approach
   ✓ Definition of 6 step approach
   ✓ Clarification of inputs and outputs of the 6 steps
   ✓ Review of Ranking Charts (S, O, and D)
   ✓ RPN is replaced by Action Priority (AP)
   ✓ DFMEA: Classification column special characteristics deleted

Projects meeting and face to face meetings (1/2)

- **Three face to face meeting took place - (duration 5 days)**

  2. **Process FMEA main results**

     Meeting in CW 17/2016 (VDA)

     - ✓ Chapter introduction in FMEA
     - ✓ Clarification of inputs and outputs of the 6 steps
     - ✓ Compare to D-FMEA with PFMEA 6 step approach
     - ✓ Review of Ranking Charts (S, O, and D)
     - ✓ Proceeded work on the templates
     - ✓ PFMEA: Classification column special characteristics remains
     - ✓ RPN is replaced by Action Priority (AP)

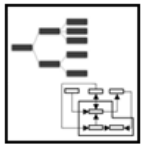
Projects meeting and face to face meetings (2/2)

- **Three face to face meeting took place - (duration 5 days)**

  3. **FMEA-MSR (Monitoring and System Response) main results Meeting in CW 04/2017 (AIAG)**
     - ✓ Chapter “Supplemental FMEA for Monitoring and System Response (FMEA-MSR)” added
     - ✓ Included comments to the draft of the team members and their company colleagues
     - ✓ Detailing of the rank charts
     - ✓ Review of existing chapters and fine tuning of the wording

- **Next planned face to face meeting after yellow book phase**

Six steps of FMEA

System Analysis			Failure Analysis and Risk Mitigation		
1st Step Scope Definition	2nd Step Structure Analysis	3rd Step Function Analysis	4th Step Failure Analysis	5th Step Risk Analysis	6th Step Optimization
					
Project identification	System structure for a product or elements of a process	Overview of the functionality of the product or process	Establishment of the failure chain (potential Failure Effects, Failure Modes, Failure Causes) for each product or process function (step)	Assignment of Prevention Controls (existing and/or planned) to the Failure Causes and Failure Modes	Identification of the actions necessary to reduce risks
Project plan	Visualization of the analysis scope using a structure tree or equivalent: block diagram, boundary diagram, digital model, physical parts, or process flow diagram	Visualization of product or process functions using a function tree (function net), function matrix parameter diagram or process flow diagram	Visualization of product or process failure relationships (failure nets and/or the FMEA worksheet)	Assignment of detection controls (existing and/or planned) to the Failure Causes and Failure Modes	Assignment of responsibilities and deadlines for action implementation
Analysis boundaries: What is included and excluded from the analysis	Identification of design interfaces, interactions, close clearances, or process steps	Association of requirements or characteristics to functions and functions to system or process elements	Creation of failure structures by linking the failures in the failure chain	Rating of Severity, Occurrence and Detection for each failure chain	Implementation and documentation of actions taken
Identification of baseline FMEA with lessons learned		Cascade of customer (external and internal) functions with associated requirements	Identification of product noise factors or process sources of variation (4M) using a fishbone diagram, parameter diagram, or failure network Collaboration between customer and supplier (Failure Effects)	Collaboration between customer and supplier (Severity) Action Priority (AP)	Confirmation of the effectiveness of the implemented actions Assessment of risk after actions taken Continuous Improvement of the product and process
Basis for the Structure Analysis step	Basis for the Function Analysis step	Basis for the Failure Analysis step	Basis for the record of failures in the FMEA form and the Risk Analysis step	Basis for the product or process Optimization step	Basis for refinement of the product and/or process requirements and prevention / detection controls

D1: DFMEA Rank Chart Severity

Product General Evaluation Criteria Severity S		Corporate or Product Line Examples
SEV	Potential Failure Effects rated according to what the End User might experience	
10	Affects safe operation of the vehicle and/or other vehicles, the health of operator or passenger(s) or road users or pedestrians.	
9	Noncompliance with regulations.	
8	**Loss** of essential vehicle function necessary for normal driving during expected service life.	
7	**Degradation** of essential vehicle function necessary for normal driving during expected service life.	
6	**Loss** of convenience function.	
5	**Degradation** of convenience function.	
4	Perceived quality of appearance, sound or haptics unacceptable to most customers	
3	Perceived quality of appearance, sound or haptics unacceptable to many customers	
2	Perceived quality of appearance, sound or haptics unacceptable to some customers	
1	No discernible effect.	

D2: DFMEA Rank Chart Occurrence

Occurrence Potential O for the Product Design				
OCC	**Expected Failure Occurrence (Design Newness and Prevention Controls Best Fit)** **Occurrence criteria for potential Failure Causes resulting in the Failure Mode, considering Prevention Controls, rated for the intended service life of the item (Qualitative rating)**	**Product Design Newness** **Novelty of Design, Application or Use Case**	**Prevention Controls - Procedural** **Best Practices, Design rules, Company Standards, Lessons Learned, Industry Standards, Material Specifications, Government Regulations**	**Prevention Controls - Analytical** **Effectiveness of Prevention oriented analytical tools including Computer Aided Engineering, Math Modeling, Simulation Studies, and Tolerance Stacks**
10	Occurrence during intended service life cannot be determined at this time, no preventive controls, or occurrence during intended service life is extremely high.	First application of new technology anywhere without operating experience and / or under uncontrolled operating conditions. Use Case or operating conditions vary widely and cannot be reliably predicted.	Standards do not exist and best practices have not yet been determined.	Not able to predict field performance.
9	Very high occurrence during intended service life.	First use of design with technical innovations or materials within the company. New use case, or change in duty cycle / operating conditions. Not previously …	Newly developed for this design. First application of new standards with no experience.	Not targeted to identify performance to specific requirements.
…	…	…	…	…
1	Possibility of failure is virtually eliminated through preventative control and history of failure-free series production.	Known system/ component with identical mature design. Same application, duty cycle, and operating conditions. Testing or field experience under …	Design proven to conform to Standards and Best Practices, considering Lessons Learned, which effectively prevents the failure from occurring.	Capable of ensuring with high confidence, that the failure can not occur.

Note: A 10, 9, 8, 7 can drop to a 5 or 3 after testing.

D3: DFMEA Rank Chart Detection

Detection Potential D for the Validation of the Product Design		
DET	**Ability to Detect**	**Detection Criteria**
10	Absolute uncertainty	No test or test procedure.
9	Very remote	Test procedure not designed to specifically detect the cause and/or failure mode.
8	Remote	Ability of detection control to detect the failure cause or failure mode is remote based on verification or validation procedure, sample size, mission profile, etc.
6	Low	Ability of detection control to detect the failure cause or failure mode is low based on verification or validation procedure, sample size, mission profile, etc.
4	Moderately high	Ability of detection control to detect the failure cause or failure mode is moderately high based on verification or validation procedure, sample size, mission profile, etc.
3	High	Ability of detection control to detect the failure cause or failure mode is high based on verification or validation procedure, sample size, mission profile, etc.
1	Almost certain	Design proven to conform to Standards and Best Practices, considering Lessons Learned and detection actions of previous generations, which effectively prevents the failure from occurring.

P1: PFMEA Rank Chart Severity

Process General Evaluation Criteria Severity S			
	Failure Effects rated for Manufacturing, Assembly, and End User as shown in PFMEA		
SEV	**Your Process Ownership Your Plant**	**The Next Process Ownership(s) (when known) Ship to Plant**	**End User (when known) Customer**
10	Failure may endanger operator (machine or assembly), Possible long-term effects on health of production associates	Failure may endanger operator (machine or assembly), Possible long-term effects on health of production associates	Affects safe operation of the vehicle and/or other vehicles, the health of operator or passenger(s) or road users or pedestrians.
9	Failure may result in in-plant regulatory noncompliance	Failure may result in in-plant regulatory noncompliance	Noncompliance with regulations.
8	100% of product affected may have to be scrapped.	Line shutdown greater than full production shift. Stop shipment possible. Field repair or replacement required (Assembly to End User) other than for regulatory noncompliance.	**Loss** of essential vehicle function necessary for normal driving during expected service life.
…	…	…	…
1	No discernible effect	Defective product triggers no reaction plan. Additional defective products not likely. Sort not required. Feedback to supplier not required.	No discernible effect.

P2: PFMEA Rank Chart Occurrence

Occurrence Potential O for the Process				
OCC	**Expected Failure Occurrence (Considering Process Maturity and Prevention Controls) Occurrence criteria for potential Failure Causes resulting in the Failure Mode within the manufacturing or assembly plant considering Prevention Controls (Qualitative rating)**	**Process Maturity** **Maturity of Process, Application or Use Case**	**Prevention Controls - Procedural** **Implementation of Best Practices and Standard Instructions (including work instructions, set-up and calibration procedures, preventive maintenance, error-proofing verification procedures, and process monitoring verification checklists)**	**Prevention Controls - Analytical** **Effectiveness of Prevention oriented solutions (product or process design, fixture and tool design, process sequence, error proof, traceability, machine capability, and SPC charting)**
10	Occurrence during manufacturing or assembly cannot be determined at this	New process without experience	Procedures do not exist and best practices have not yet been determined.	Not able to prevent failure.
9	Very high occurrence during manufacturing or assembly.	Limited experience with the process.	Newly developed for this process. First application of new procedures with no experience.	Not targeted to specific failure cause
…	…	…	…	…
1	Cause cannot occur because failure is eliminated through demonstrated preventative control.	Process proven to conform to procedures and Best Practices, ….	Capable of ensuring with high confidence (error proof), that the failure can not occur in series production.	Possibility of failure is virtually eliminated through preventative control and history of failure-free ..

Note: A 10, 9, 8, 7 can drop based on process validation activities prior to start of series production.

P3: PFMEA Rank Chart Detection

Detection Potential D for the Validation of the Process Design	
DET	Detection Controls rated according to the best fit for each detection activity. Frequency shall be established in the FMEA or control plan. Company/business unit non-conforming material handling procedures apply.
10	**TYPE:** Cannot detect failure or is not analyzed. **DETECTION CAPABILITY:** The malfunction or failure mechanism will not be proved. The failure will not or cannot be detected as no testing or inspection method has been established or is known.
9	**TYPE:** Failure is not easily detected. Random audits <100% of product. **DETECTION CAPABILITY:** It is unlikely that the testing or inspection method will detect a possible malfunction or fault mechanism.
8	**TYPE:** Defect (Failure Mode) detection downstream through visual, tactile or audible means. **DETECTION CAPABILITY**: The testing or inspection method is uncertain or the company/business unit has no experience with the defined testing or inspection method. The method relies on a human for verification and disposition.
…	…
2	**TYPE:** Error (Failure Cause) detection in-station through use of controls that will detect error and prevent discrepant product from being produced. **DETECTION CAPABILITY:** Proven testing or inspection method from identical processes under the same operating/boundary conditions (machines, material). Test/inspection/measuring equipment capability from identical processes confirmed through gauge repeatability and reproducibility evaluations. The required error proofing verification is performed.
1	**PREVENTION CAPABILITY:** Discrepant product cannot be physically produced due to design (part geometry) or process (fixture or tooling design). The effectiveness was demonstrated on this product.

DFMEA Spreadsheet

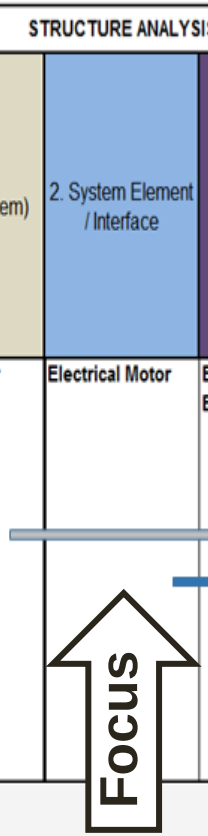
Design Failure Mode and Effects Analysis (Design FMEA)

Company Name: _____
Engineering Location: _____
Customer Name: _____
Model Year / Platform: _____

Subject: _____
DFMEA Start Date: _____
DFMEA Revision Date: _____

DFMEA ID Number: _____
Design Responsibility: _____
Security Classification: _____

STRUCTURE ANALYSIS			FUNCTION ANALYSIS			FAILURE ANALYSIS				RISK ANALYSIS					
1. System (Item)	2. System Element / Interface	3. Component Element (Item/ Interface)	1. Function of System and Requirement or Intended Output	2. Function of System Element and Intended Performance Output	3. Function of Component Element and Requirement or Intended Output or Characteristic	1. Failure Effects (FE)	Severity (S) of FE	2. Failure Mode (FM)	3. Failure Cause (FC)	Current Prevention Control (PC) of FC	Occurrence (O) of FC	Current Detection Controls (DC) of FC or FM	Detection (D) of FC/FM	AP	Filter Code (Optional)
Window Lifter	Electrical Motor	Brush Card Base Body	Raise and lower window according to parameterization.	Commutation system transports the electrical current between coil pairs of the electro magnetic converter	Brush card body transports forces between spring and motor body to hold the brush spring system in x,y,z position (support commutating contact point)	Torque and rotating velocity of the window lifter motor too low	6	Commutation system intermittently connects the wrong coils (L1, 3 and 2 instead of L1, 2 and 3), resulting in angle deviation	Brush card body bends in contact area of the carbon brush, due to too low stiffness in carbon brush contact area	Simulation of dynamic forces on brush card body acc. FEM 6370	2	Sample test: measuring the elastics and plastic deformation effects of brush card body acc. test spec. MRJ82/60	2	L	



DFMEA Report

Design Failure Mode and Effects Analysis (Design FMEA) Report				Company Name:					
STRUCTURE									
1. System (Item)		2. System Element / Interface		3. Component Element (Item/Interface)					
Window Lifter System		Electrical Motor		Brush Card Base Body					
FUNCTIONAL ANALYSIS									
1. Function of System and Requirement or Intended		2. Function of System Element and Intended Performance Output		3. Function of Component Element and Requirement or Intended Output or Characteristic					
Convert electrical energy into mechanical energy (acc. control signal)		Commutation system transports the electrical current between coil pairs of the electro magnetic converter		Brush card body transports forces between spring and motor body to hold the brush spring system in x,y,z position (support commutating contact point)					
FAILURE AND RISK ANALYSIS									
1. Failure Effects (FE)	Severity (S) of FE	2. Failure Mode (FM)	3. Failure Cause (FC)	Current Prevention Control (PC) of FC Preventive Action (PA)	Occurrence (O) of F	Current Detection Controls (DC) of FC or FM Detection Action (DA)	Detection (D) of FC or FM	AP	Filter Code (Optional)
			INITIAL STATE						
Torque and rotating velocity of the window lifter motor too low	6	Commutation system intermittently connects the wrong coils (L1, 3 and 2 instead of L1, 2 and 3), resulting in angle deviation	Brush card body bends in contact area of the carbon brush, due to too low stiffness in carbon brush contact area	Simulation of dynamic forces on brush card body acc. FEM 6370	2	Sample test: measuring the elastic and plastic deformation effects of brush card body acc. test spec. MRJ82/60	2	L	

Focus

FMEA Action Priority (AP)

Action Priority (AP)	Action Expectation
High	The team must either identify an appropriate action to improve prevention and / or detection controls or justify and document why current controls are adequate.
Medium	The team should identify appropriate actions to improve prevention and / or detection controls, or, at the discretion of the company, justify and document why controls are adequate.
Low	The team could identify actions to improve prevention or detection controls.
It is recommended that potential Severity 9-10 failure effects with Action Priority High and Medium, at a minimum, be reviewed by management including any actions that were taken.	
This is not the prioritization of High, Medium, or Low risk. It is the prioritization of the need for actions to reduce risk.	

Design FMEA Action Priority (AP)

S	O	D	AP	Justification for Action Priority - DFMEA
9-10	6-10	1-10	H	High priority due to safety and/or regulatory effects that have a **high** or **very high** occurrence rating
9-10	4-5	7-10	H	High priority due to safety and/or regulatory effects that have a **moderate** occurrence rating and **high** detection rating
5-8	4-5	5-6	H	High priority due to the loss or degradation of an essential or convenience vehicle function that has a **moderate** occurrence rating and **moderate** detection rating
5-8	4-5	1-4	M	Medium priority due to the loss or degradation of an essential or convenience vehicle function that has a **moderate** occurrence and **low** detection rating
2-4	4-5	5-6	M	Medium priority due to perceived quality (appearance, sound, haptics) with a **moderate** occurrence and **moderate** detection rating
2-4	4-5	1-4	L	Low priority due to perceived quality (appearance, sound, haptics) with a **moderate** occurrence and **low** detection rating
1	1-10	1-10	L	Low priority due to no discernible effect

Process FMEA Action Priority (AP)

S	O	D	AP	Justification for Action Priority - PFMEA
9-10	6-10	2-10	H	High priority due to safety and/or regulatory effects that have a **high** or **very high** occurrence rating
9-10	4-5	7-10	H	High priority due to safety and/or regulatory effects that have a **moderate** occurrence rating and **high** detection rating
5-8	4-5	5-6	H	High priority due to the loss or degradation of a primary or secondary vehicle function or a manufacturing disruption that has a **moderate** occurrence rating and **moderate** detection rating
5-8	4-5	2-4	M	Medium priority due to the loss or degradation of a primary or secondary vehicle function or a manufacturing disruption that has a **moderate** occurrence and **low** detection rating
2-4	4-5	2-4	L	Low priority due to perceived quality (appearance, sound, haptics) or a manufacturing disruption with a **moderate** occurrence and **low** detection rating
2-10	1	1	L	Low priority due to the failure being virtually eliminated through prevention controls
1	1-10	1-10	L	Low priority due to no discernible effect
2-10	1	2-10	Error	O=1 implausible without D=1
2-10	2-10	1	Error	D=1 implausible without O=1

Information flow from Design FMEA to Process FMEA

- Design FMEA contains information that is useful for Process FMEA
  - Failure Causes related to piece-to-piece
  - End User Failure Effects and Severity for the Failure Causes related to product characteristics
- Process FMEA contains information that needs alignment with the Design FMEA
  - Failure Effects and Severity for Failure Modes that are also shown in the Design FMEA
- **Not all Failures Causes in a Design FMEA are Failure Modes in a Process FMEA** .

Know-How Protection of the Design and Process FMEA

- The sharing of intellectual property between suppliers and customers is governed by legal agreements between suppliers and customers and is beyond the scope of this handbook.
- However, unless otherwise required by contractual agreement, for reasons of Intellectual Property (IP) protection the DFMEAs and PFMEAs prepared by suppliers for standard or "off the shelf" products should generally be considered proprietary information not given to the customers.
- But may be shown by special arrangement when requested.

Validation Testing

- **Participants**
  - Subdivision in design FMEA and process training FMEA
  - Maximum 2 participants per supplier
  - Maximum 12 participants per training
- **“Homework”**
  - Teams are asked to return to their organization, and using an existing product or process, develop a new FMEA.
  - The output will be evaluated by the team
    - 3 weeks to 30 days are needed for this assignment
- **No negative consequences for participants**
  - Free training as “a recognition” and manuals
  - Confidential agreement
  - Nomination of the participants in the FMEA Handbook

Validation Testing

- **Identify suppliers for the Validation Testing**
  - Range of tiers, sizes, commodities, skill levels
  - Need to ensure we include small, Tier 2/3 suppliers
  - Volunteers and recommendation of suppliers by Ford/GM/FCA/Daimler Truck and QMA of VDA
- **Training**
  - Explanation of the new methodology
    - Six Step Process
    - New S, O, D, Rating Tables
    - AP Methodology
    - New Forms with new approach
  - “Coaching” by the team members
  - Complete subjective feedback survey

Validation Testing

- **Training in N.A.**
  - DFMEA 15th, 16th June 2017
  - PFMEA 24th, 25th July 2017
- **Training in Germany**
  - DFMEA 29th, 30th June 2017
  - PFMEA 10th, 11th July 2017
- **Attendees DFMEA**

  Alpine Electronics, Aspöck Systems, Benteler Automobiltechnik, Dr. Schneider, EBK Krüger, Faurecia Automotive, Magna GETRAG, IMS Gear, WABCO
- **Attendees PFMEA**

  Alpine Electronics, Benteler Automobiltechnik, Dr. Schneider, EBK Krüger, Magna GETRAG, Heinrich Huhn, IMS Gear, Paul Craemer, PWO Progress-Werk, Wallstabe & Schneider

Validation Results

	DFMEA				PFMEA				D&PFMEA			
	VDA				VDA				VDA			
Question	1	2	3	4	1	2	3	4	1	2	3	4
Introduction	0	0	0	10	0	0	0	12	0	0	0	22
Basis of FMEA	0	0	0	10	0	0	0	12	0	0	0	22
External and Internal Req	0	0	0	10	0	0	2	10	0	0	2	20
FMEA Team for Design &	0	0	0	10	0	0	2	10	0	0	2	20
Demand for Action & Tim	0	0	0	10	0	0	3	9	0	0	3	19
Definition and Descriptio	0	0	0	10	0	0	1	11	0	0	1	21
1st Step: Scope Definition	0	0	2	8	0	0	2	10	0	0	4	18
2nd Step: Structure Analysis	0	0	2	8	0	0	1	11	0	0	3	19
3rd Step: Function Analysis	0	0	4	6	0	0	3	9	0	0	7	15
4th Step: Failure Analysis	0	0	0	10	0	0	0	12	0	0	0	22
5th Step: Risk Analysis	0	0	2	8	0	0	5	7	0	0	7	15
6th Step: Optimization	0	0	1	9	0	0	2	10	0	0	3	19
Annex	0	0	1	9	0	0	5	7	0	0	6	16
Rating Chart: Severity	0	0	1	9	0	0	2	10	0	0	3	19
Rating Chart: Occurrence	0	0	1	9	0	0	5	7	0	0	6	16
Rating Chart: Detection	0	0	0	10	0	1	3	7	0	1	3	17
FMEA Spreadsheet & Rep	0	0	1	9	0	0	3	8	0	0	4	17
Percentages	0%	0%	9%	**91%**	0%	0%	19%	**80%**	0%	0%	15%	**85%**

Question 1 I don't get it

Question 2 I understand partially, but would need some help in application

Question 3 I understand the major concepts, but have some questions on the details

Question 4 I get it, it is clear

http://www.vda-qmc.de/en/publications/fmea-alignment

Validation Results

	DFMEA				PFMEA				D&PFMEA			
	AIAG				AIAG				AIAG			
Question	1	2	3	4	1	2	3	4	1	2	3	4
Introduction	0	0	0	11	0	0	2	16	0	0	2	27
Basis of FMEA	0	0	0	11	0	0	1	17	0	0	1	28
External and Internal Req	0	1	2	7	0	0	3	15	0	1	5	22
FMEA Team for Design &	0	0	1	10	0	0	3	15	0	0	4	25
Demand for Action & Tim	0	0	2	10	0	0	2	15	0	0	4	25
Definition and Descriptio	0	0	3	8	0	0	3	15	0	0	6	23
1st Step: Scope Definition	0	0	4	7	0	0	5	13	0	0	9	20
2nd Step: Structure Analysis	0	3	6	2	0	1	7	10	0	4	13	12
3rd Step: Function Analysis	0	5	5	1	0	7	8	3	0	12	13	4
4th Step: Failure Analysis	0	2	8	1	0	1	6	10	0	3	14	11
5th Step: Risk Analysis	0	1	5	4	0	1	3	13	0	2	8	17
6th Step: Optimization	0	1	5	4	0	1	1	15	0	2	6	19
Annex	0	0	1	3	1	1	2	11	1	1	3	14
Rating Chart: Severity	0	1	3	6	0	0	7	10	0	1	10	16
Rating Chart: Occurrence	0	1	3	6	0	0	8	9	0	1	11	15
Rating Chart: Detection	0	1	3	6	0	0	4	13	0	1	7	19
FMEA Spreadsheet & Rep	0	2	3	1	0	1	4	9	0	3	7	10
Percentages	0%	11%	32%	**58%**	0%	4%	24%	**72%**	0%	7%	27%	**66%**

Question 1 I don't get it

Question 2 I understand partially, but would need some help in application

Question 3 I understand the major concepts, but have some questions on the details

Question 4 I get it, it is clear

https://vda-qmc.de/en/publications/fmea-alignment

Validation Results

	D&PFMEA VDA				D&PFMEA AIAG				D&PFMEA Overall			
Question	1	2	3	4	1	2	3	4	1	2	3	4
Introduction	0	0	0	22	0	0	2	27	0	0	2	49
Basis of FMEA	0	0	0	22	0	0	1	28	0	0	1	50
External and Internal Req	0	0	2	20	0	1	5	22	0	1	7	42
FMEA Team for Design &	0	0	2	20	0	0	4	25	0	0	6	45
Demand for Action & Tim	0	0	3	19	0	0	4	25	0	0	7	44
Definition and Descriptio	0	0	1	21	0	0	6	23	0	0	7	44
1st Step: Scope Definition	0	0	4	18	0	0	9	20	0	0	13	38
2nd Step: Structure Analysis	0	0	3	19	0	4	13	12	0	4	16	31
3rd Step: Function Analysis	0	0	7	15	0	12	13	4	0	12	20	19
4th Step: Failure Analysis	0	0	0	22	0	3	14	11	0	3	14	33
5th Step: Risk Analysis	0	0	7	15	0	2	8	17	0	2	15	32
6th Step: Optimization	0	0	3	19	0	2	6	19	0	2	9	38
Annex	0	0	6	16	1	1	3	14	1	1	9	30
Rating Chart: Severity	0	0	3	19	0	1	10	16	0	1	13	35
Rating Chart: Occurrence	0	0	6	16	0	1	11	15	0	1	17	31
Rating Chart: Detection	0	1	3	17	0	1	7	19	0	2	10	36
FMEA Spreadsheet & Rep	0	0	4	17	0	3	7	10	0	3	11	27
Percentages	0%	0%	15%	**85%**	0%	7%	27%	**66%**	0%	4%	21%	**75%**

Question 1 I don't get it

Question 2 I understand partially, but would need some help in application

Question 3 I understand the major concepts, but have some questions on the details

Question 4 I get it, it is clear

https://www.vda-qmc.de/en/publications/fmea-alignment

Further actions

- Weekly Meetings
  - ✓ Weekly Meetings for disposition of handbook
  - ✓ Align Design FMEA with Process FMEA
  - ✓ Align „Supplemental FMEA for Monitoring and System Response” (FMEA-MSR)
  - ✓ Discuss FMEA Review
- Evaluation of the results of the Validation Training and requested changes to handbook in progress
- Develop common training documents after start of Yellow Print phase with results of the Validation Training
- Trainings will be provided after release of the final manual (Red Print) in 2018 by VDA-QMC, AIAG and their licensees

High Level Project Plan and Timing (Draft October 2017)

Project Phases	Phase Description	Proposed Timing
Pre - Plan	Conceptual Work, organization, identify participants	Jan. 2015 - May 2015
Define	Kick off meeting, validate scope, define high level objectives and tasks, high level project schedule	5/28/15 to 07/16/15
Analyze	Review current process, identify opportunities for improvement, refine/update future state model	07/16/15 to 10/15/15
Build	Complete documentation, determine validation requirements/approach, disposition comments Editing/Translation AIAG/VDA	~~10/15/15 to 04/30/16~~ **=> End Oct. 2017*** **01st Nov. 2017***
Validate	Validation with dedicated suppliers **Start of formal stakeholder approval (90 days)** **End of stakeholder review** Start Disposition Comments and Feedback	June/July 2017 **15th Nov. 2017** **15th Feb. 2018** **08th Jan. 2018***
Release	Final release	**End of Apr. 2018***
Deploy	Create support materials (webinar, training) Publish Handbook	**Feb. 2018*** **May 2018***

* scheduled

FMEA Introduction

Communication

Accompanying communication from the yellow tape phase about various media

Events 2016/2017

✓	26.09.2016	IAA Hannover Expert's Forum
✓	08./09.11.2016	1. European FMEA Congress Vienna
✓	07./08.12.2016	Audi forum Neckarsulm
✓	04./05.05.2017	VDA QMC QM Symposium 2017
✓	15.09.2017	IAA Frankfurt Expert's Forum Licensee Meeting
	07./09.11.2017	2. European FMEA Congress Vienna

VDA Regional Conferences International 2017

✓	17.02.2017	Stuttgart	✓	25.08.2017	Frankfurt
✓	24.03.2017	Dresden	✓	06.10.2017	Coventry/UK
✓	12.05.2017	Florence /Italy		17.10.2017	Düsseldorf
✓	09.06.2017	Poznan/Poland		08.11.2017	Hannover
✓	21.07.2017	Seoul/South Korea		08.12.2017	München
✓	24.07.2017	Tokyo/Japan			

Status October 2017

Alignment of FMEA handbooks VDA and AIAG

Project Leader:

AIAG: Scott Gray
VDA: Jochen Pfeufer