Field Failure Analysis Process
Challenges in the implementation and view towards future development
Field Failure Analysis Process

Regeneration and Expansion

The level of quality in Motor vehicles has, considering the challenges of higher complexity, shorter development cycles and increased model variations, very much improved. At the same time warranty periods have been extended, in order to facilitate the increased consumer expectation.

More demanding efforts within the development and production processes in order to hand over mature, robust and fault free products to the consumer, deviations of the expected condition do occur in usage.

The changes in the IATF 16949:2016 and the VDA Band 6.3 demand from the supply industry already within the development process the planning of the warranty concepts for claimed parts which are returned from the field.

This shows clearly the elaborated demands for an effective Field Failure Analysis on returned parts.

To ensure comprehensive handling the VDA Band Field Failure analysis will be regenerated accordingly to the collected experiences
Motivation for the realization of an effective Field Failure Analysis Process

Environment

The annual warranty costs of the automotive industry are between two and four percent of the vehicle costs and therefore exceed the 30 billion US dollars estimated by experts within the industry.

Source: Automobilwoche 19th June 2006

In the face of global cost for warranty which is at a yearly rate of 45 to 50 billion US dollars, the significance of quality and warranty claims should not be underestimated.

Source: BearingPoint® 26th August 2014
Connection of a global sales organization with “networking” society and individual customer requirement

Reduction of analysis time is due to global same part strategies and therefore resulting high failure cost necessary

Constantly rising requirements through assistant and infotainment systems are increasing the vehicle complexity in all segments.

Motivation for the realization of an effective Field Failure Analysis Process
Motivation for the realization of an effective Field Failure Analysis Process

The year 2016 will be the second negative record year in automotive history since 2014 with regard to recalls. According to the Centre of Automotive Management (CAM) in Bergisch Gladbach have been only on the reference market USA a total of 51,1Mio. Pkw (incl. LCV) recalled out of safety relevant reasons. (2015: 45,8Mio).


Quelle: www.auto-institut.de
# Product liability (Samples)

<table>
<thead>
<tr>
<th>Fault Type</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design fault</td>
<td>Side airbag activates when vehicle drives over pot holes</td>
<td><img src="airbag_activation.png" alt="Airbag Activation" /></td>
</tr>
<tr>
<td>Production fault</td>
<td>Timing chain, engine tears (engine write-off)</td>
<td><img src="timing_chain_damage.png" alt="Timing Chain Damage" /></td>
</tr>
<tr>
<td>Instruction fault</td>
<td>Bonnet/hood, Opening while vehicle is moving</td>
<td><img src="bonnet_hood_opening.png" alt="Bonnet/Hood Opening" /></td>
</tr>
<tr>
<td>Faulty product observation</td>
<td>Accessory part, Resulted in fatal accident</td>
<td><img src="accessory_part.png" alt="Accessory Part" /></td>
</tr>
</tbody>
</table>

**Airbag-Judgment**
BGH, Urteil vom 16.06.2009, (VI ZR 107/08)
System was at point of public release not according to state of the art

**Production fault**
The die for the chain links had been used over and above the wear limitations

**Instruction fault**
Consumer buys used vehicle at an authorized dealer and is not informed regarding a recall of the manufacturer regarding corrosion at the Bonnet/hood locking device.

**Faulty product observation**
A manufacturer of motorcycles was aware that due to an accessory part wind deflector the vehicle became unstable at high speeds. However, the installation had not been prohibited.
Scope of observation by the standard

Final Customer/Workshop

Customer complaint

Workshop process

Warranty/claim request

Invoice

Part exchange

Request for parts

Manufacturer

Claim process

Warranty claim process

Agreement

Invoice

Supervisor

Quality process: field failure analysis
**Root Cause Analysis and Failure Elimination Process**

- **Part Analysis**
  - Standard tests
  - Jointly specified tests
  - OK based on standard tests
  - Customer complaint
    - Yes: 1. Failure-oriented tests
    - No: 2. Jointly specified tests

- **Tests under load**
  - OK based on part analysis

- **NTF Process**
  - Data collection and evaluation
  - System tests
  - Process study

**Continuous Improvement Process**

- **Field Failure Analysis Process**

**Concept**
Field Failure Analysis

2009
Field Failure Analysis

Standard-test
Test under load
NTF-Process

To emphasize the Problem-Solving-Process

2017
Field Failure Analysis

Analysis
NTF-Process
Problem Solving Process
Changes VDA Field Failure Analysis FFA 2009 to 2017/18

New in 2017/18

FFA 2009

With new relevance

FFA 2009
Challenges in FFA 2009:

Analysis

Standard-test
Customer complaint verified!
- passed with no problems?

Test under load
Customer complaint verified!
- passed with no problems?

Reference to failure conditions?

OK. according to analysis

NTF - Process

System-test

OK?

Data collection and evaluation

Process study

NTF - Process

Warranty parts

Problem analysis

Start Problem-Solving-Process

Root Cause

Corrective actions

Effectiveness check

Continuous improvement process for the field failure analysis process

Triggering criteria:
TC1 \( ^* \) = for NTF-Process reached?
TC2 \( ^{**} \) = for special case reached?

Exchange of information / parts handling by agreement
Challenges in the implementation of the NTF Process

Due to the complexity of reasons, every NTF process has to be structured like a project.

Behind every claimed part with NTF analysis “OK based on part analysis“ lies a system or process failure (… lies a reason)
Reasons for NTF

**Process**
- Wrongly assembled

**Workshop**
- Wrong service
- Faulty test equipment
- Inadequate communication customer/dealer
- Gaps in diagnosis directions

**Assembly**
- Wrongly assembled

**Analysis**
- Test equipment inadequate/inefficient
- Incomplete analysis method

**System**
- Unspecified usage conditions
- Uncoordinated changes

**Design / Concept**
- Unspecified usage conditions
- Uncoordinated changes

**State of the Art**
- Wrong Customer expectation

**Interconnection**
- Not specified usage conditions
- Faulty programming
- Faulty peripheral components
Example NTF Process

Failure cannot be found, customer complaint not plausible.
Implementation of target-oriented communication for all components through the release program as per VDA 2

For products which are suitable for an PPA process and if agreed with the specific customer, the use of the VDA publication „Field failure analysis“ must be demonstrated in appropriate form. Details must be agreed specifically with the customer, for example as part of the planning and agreement of the PPA process.
**VDA 6.3**

**Advantage:**

- Clear reference to the project
- Field Failure Analysis in all stages of the project

Reference only in P7.5

New reference in P3.4, P4.7, P7.4
Analysis

- Standard test
  - Customer complaint verified!
  - passed with no problems?

- Test under load
  - Customer complaint verified!
  - passed with no problems?

Reference to failure conditions?

Problem analysis

- Triggering criteria:
  - TC1*) = for NTF-Process reached?
  - TC2)** = for special case reached?

Start Problem-Solving-Process

- Root Cause

Corrective actions
- Effectiveness check

Continuous improvement process for the field failure analysis process
New Challenge in 2017/18: special cases

Reason for failure: customer habit

Design not according to customer usage

Interaction of all parts
New Challenges in 2017/18:

**Simplified presentation**

1. **Start**
2. Failure detection
3. Failure classification
4. Root cause detection
5. Elimination of cause of failure
6. Check corrective actions taken
7. **Stop**

**Application in field failure analysis**

1. **Start**
2. Field failure analysis
3. Problem analysis
4. Root cause analysis
5. Corrective measures
6. Check effectiveness of action taken
7. **Stop**
New in 2017/18: Audit standard Field Failure Analysis, expanded

The question catalogue of the audit standard will be incorporated into the booklet „Field Failure Analysis
The structure and the assessment logic will be made to suit the new VDA 6.3
To enable a more precise overall result the questions have been increased from 4 to 7 Chapters

Chapters today:

1. Planning
2. Analysis (Standard and Under Load)
3. NTF-Process
4. Problem analyse

Chapters future:

1. Organisation
2. Planning
3. Execution of the Field Failure Analysis
4. Analysis (Standard and Under Load)
5. NTF-Process
6. Problem analyse
7. Problem-Solving-Process

Therefore the question catalogue of the field Failure Analysis is covering the complete 8D-Process
Boundaries to the Field Quality Engineer and the Supplier Quality Engineer.

Field Failure Analysis

Basis

Field

Product life circle