VDA | Verband der Automobilindustrie

Joint Quality Management In the Supply Chain

Marketing and Service

- Field failure analysis
  Audit standard

1st edition, October 2011

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The Association of the German Automotive Industry (VDA) recommends its members to apply the following standard for the implementation and maintenance of quality management systems.

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Translations

This publication will also be issued in other languages. The current status must be requested from VDA QMC.

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1 Introduction

A comprehensive approach to the implementation of a competent field failure analysis is described in the VDA volume Field Failure Analysis. A uniform assessment standard has been developed to monitor and evaluate the use of the VDA volume Field Failure Analysis.

Requirements for field failure analysis are already found in separate accounts of current questionnaires and measurement criteria (e.g. VDA-MLA[1] - 4.2.5, VDA 6.3 - P7.5, ISO/TS 16949:2009 - 8.5.2.4). The focus of the existing process audits lies in the key aspects of product development and production processes. In these processes the field failure analysis process constitutes a small segment of a particular product. The audit on the field failure analysis focuses on the specific requirements of the field failure analysis processes.

In the development of the assessment standards, the target was to use the existing methodology in order to prevent any separate or additional approach. Therefore the process audit for field failure analysis is based on the composition of the questionnaire, the assessment logic and the evaluation of the established VDA 6.3.

Given that it is based on the VDA 6.3, already qualified auditors with the appropriate expertise can implement these process audits immediately. The possibility of taking advantage of existing qualification courses for auditor training is available for specialists in field failure analysis.

[1] Maturity Level Assurance (VDA Publication)

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2 Application Guidelines

With its four process elements, planning, part analysis, NTF (No Trouble Found) process and problem analysis, the questionnaire on field failure analysis covers the recommendations of the VDA volume Field Failure Analysis.

It is designed for auditing the field failure analysis process over the entire supply chain (OEM, supplier). Thus the process of field failure analysis can be audited not only internally for purposes of self-assessment but also externally by customers within the supply chain.

The structure of the individual questions is based on the questionnaire in the VDA volume 6.3. At the same time the “minimum requirements” cover the contents of the VDA volume. The “possible examples” are intended as support not only for the auditor but also for organizing the structure and the analysis of the processes. The chapters given in the column “Guidelines (Input/Output)” refer, if not otherwise indicated, to the VDA volume Field Failure Analysis.

The use of the questionnaire by an experienced VDA 6.3 auditor, who has the necessary qualifications in the field failure analysis process, is therefore unproblematic.

In the VDA 6.3 process audit the subject, field failure analysis, is handled in section P7 “Customer Support, Customer Satisfaction, Service” and in Question 7.5 “Is there a process, which effectively guarantees the field failure process?” The outcome of a process audit, field failure analysis, can be used here as an input for answering and assessing this question.

The following guidelines for the use of audit results comply with the specifications in the VDA volumes 6.1 and 6.3:

- The outcome of the assessment shall point out to the audited organization where its field failure analysis process conforms to VDA requirements and in which parts of the process there is a need for action.
- The audit results are signed by the auditor and by the auditee. With its signature the auditee confirms that the outcome has been discussed with them; they are free to make known their own comments.
- Information, which was acquired during the execution of the audit, is, except for audit purposes, confidential.

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- After the written release from the auditee on the cover of the audit, the auditee is free to use the audit results of other customers.

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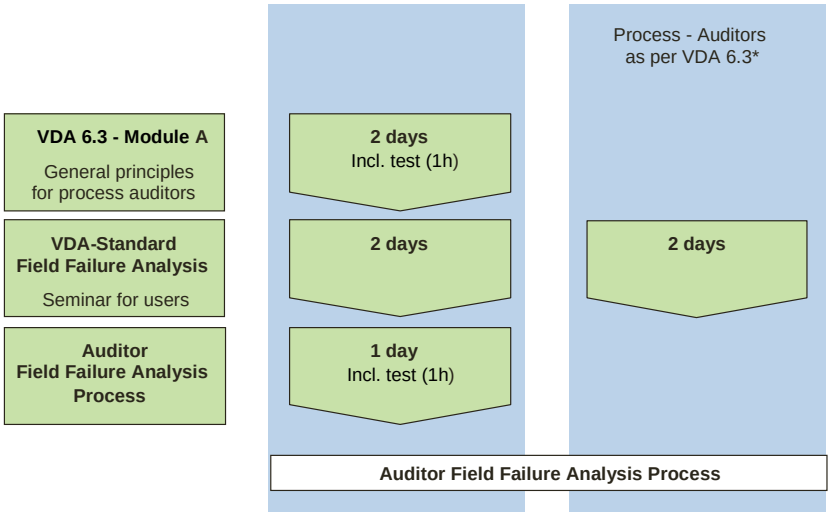
3 Requirements on Auditors Field Failure Analysis

The quality of the audit results are influenced largely by the qualifications of the auditors. Auditors in field failure analysis require expertise in field failure analysis process, methodical competence to carry out audits as well as at least two years practical experience in this field. They must conduct themselves according to the universally accepted code of conduct for auditors as in VDA 6.3. These requirements are equally valid for internal and external auditors.

The professional requirements include proof of participation in a VDA user seminar on VDA volume Field Failure Analysis.

The audit qualification is evidence of successful participation in a course for VDA 6.3 Process – Auditor. The audit qualification can also be acquired in a general basic training for process auditors (VDA 6.3 – Module A) combined with a specialized training on questionnaires for field failure analysis processes.



* VDA 6.3 Module BI/ BII or D

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4 Assessment

4.1 Assessment of the individual questions

Each question is assessed with regard to the consequent fulfillment of the individual requirements. 0, 4, 6, 8 or 10 points can be awarded on each question in the assessment, whereby the proven fulfillment of the requirements is the benchmark for the allocation of the points.

Score	Assessment of the fulfillment of individual requirements
10	Requirements fully met
8	Requirements mainly met*; slight deviations
6	Requirements partly met; larger deviations
4	Requirements insufficiently met, serious deviations
0	Requirements not met

*) It is understood by "mainly" that all appropriate requirements are effectively proven in more than approx. 3/4 of all relevant cases and there isn't any special risk.

If a question is not assessed (n.a.), the reason for this must be substantiated. In order to conduct an audit assessment at least 2/3 of the questions must be rated. Bearing in mind the comparability of the results, the questionnaire should be applied to its full extent.

Each question carries the same weight and therefore has equal influence on the overall result.

The degree of fulfillment for a process element is calculated from:

$$E_X\,[\%] = \frac{\text{Total points realized from the assessed questions in the process element}}{\text{Total all possible points from the assessed questions in the process element}}\ [\%]$$

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Process elements E_X are:

E_{PL}	Planning
E_B	Part analysis
E_{NTF}	NTF - Process
E_{PA}	Problem analysis

4.2 Overall assessment of the audit results

The degree of achievement for the entire process E_G is calculated from:

$$E_G\,[\%] = \frac{\text{Total points realized from all assessed questions}}{\text{Total all possible points from all assessed questions}}\ [\%]$$

Classification based on the degree of achievement:

Classification	Degree of achievement E_G [%]	Description of the classification
A	**$E_G \geq 90$**	**Capable of analysis**
B	**$80 \leq E_G < 90$**	**Partly capable of analysis**
C	**$E_G < 80$**	**Incapable of analysis**

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4.3 Handover of the audit results to the VDA 6.3 process audit

The handover to the VDA 6.3 process audit takes place beginning with the total degree of fulfillment through conversion to the score assessment for the individual question P7.5 “Is there a process, which effectively guarantees the field failure process?” [1]

Total degree of achievement Field Failure Analysis E_G [%]	Description of the classification	Points VDA 6.3 Question P7.5
$E_G \geq 90$	Capable of analysis	10
$80 \leq E_G < 90$	Partly capable of Analysis	8
$60 \leq E_G < 80$	Incapable of analysis	6
$40 \leq E_G < 60$		4
$E_G < 40$		0

[1] “VDA 6.3” refers to the Volume 6 Part 3, Process Audit Edition 2010.

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5 Field failure analysis – Audit standard - Questionnaire

1. Planning		
Minimum requirements / assessment-relevant:	**Possible examples of requirements and verification depending on product risk**	**Notes (input-output) and references**
1.1 Is the field failure analysis process implemented into the organisation?		
- Process description of the field failure analysis process - Defined responsibilities - Part analysis - Problem analysis - NTF-Process	- Procedure - Process description - Product development process - NTF- guideline - Budget planning	Cap. 5
1.2 Is the field failure analysis process planned, documented and with the customer agreed for each new product?		
- Test content of the standard test and the test under load - Triggering criteria NTF-Process - as by SOP agreed, feasible test specification including the necessary resources	- agreed test specification - documented triggering criteria - Test manual - test equipment planning - Budget planning - Personal planning - Part analysis locations - Releases for customer portals	Cap. 5

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2. Part Analysis (Standard Test and Test under Load)		
Minimum requirements / assessment-relevant:	**Possible examples of requirements and verification depending on product risk**	**Notes (input-output) and references**
2.1 Are the submitted parts and information for the field failure analysis process controlled (Input)?		
- description of receipt of goods and part registration - registration of the customer information - description of part flow - marking of the parts - ensuring of part traceability - requirements for transport, handling and storage	- goods receiving inspection - flow chart - Data from customer system - enclosed information on returned part - Barcode - Tracking-system - Analysis data bank/CAQ-system - quarantine store - suitable/agreed transport bins	Cap. 9 Cap 2.2 Cap 10.1.1
2.2 Are there test specifications for all parts to be analysed (process sequence)?		
- parts analysis flow - separate steps for standard test and test under load - test set up incl. layout and configuration - defined limits for all test characteristics - relevant functions - consideration of the define usage requirements - classification into jointly agree and failure oriented tests - part history/ change status - used test tool and measurement method for each used test characteristic - referencing of the respective test equipment - identification of destructive tests	- flow chart - test specification - check lists - EDV-systems	Cap. 5.1, 5.6

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Minimum requirements / assessment-relevant:	Possible examples of requirements and verification depending on product risk	Notes (input-output) and references
2.3 Is the part analysis (standard test and test under load) performed according to the guideline?		
Standard test: - execution according to the test specification - complete passage of the test steps in the specified test sequence - documentation and assessment of the test results Evaluation of the customer complaint: - assessment and classification of the customer complaint in order to determine the failure orientated test under load - plausibility check of the result from standard test and test under load against the customer complaint Test under load: - execution according to the test specification - documentation and evaluation of the test results	- recording and documentation of tests - procedures - check lists - test set up - execution using the example of returned parts	Cap. 2.3
2.4 Are the personnel requirements for the execution of the part analysis given (personal resources)?		
- responsibilities, tasks and authority incl. substitution rules - named and communicated partners in the organisation and at the customer - qualification of the employees - knowledge of product, known failures and possible failure consequences - adequate available capacity - planning for reorganisation by possible personnel bottle necks	- organisation chart - job description - procedure - qualification plan / -matrix - proof of qualifications - capacity planning	VDA 6.3: P6.3 Cap. 5.5

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Minimum requirements / assessment-relevant:	Possible examples of requirements and verification depending on product risk	Notes (input-output) and references
2.5 Are the material requirements for the execution of the part analysis given (material resources)?		
- suitable test equipment for all tests to be performed - calibration, monitoring and proof of capability of the test equipment - adequate capacity provisions of test equipment are available - planning for alternatives at material bottle necks	- reference sample - monitoring of test equipment - proof of calibration - proof of capability - layout of work station - planning of capacity - emergency planning	VDA 6.3: P6.4 Cap. 5.4, Cap. 5.1.1 Cap. 5.5
2.6 Is the part analysis effective and efficiently executed?		
- monitoring of the performance - improvement of effectiveness and efficiency - usage of key indicators for control of processes and escalation steps - adjustment of the part analysis process on the basis of new knowledge	- system of key indicators of compulsory KPI's " average part analysis period" and "number of OK parts based on part analysis" - conducted improvement processes (CIP),e.g. out of NTF-processes, lessons learned	Cap. 6 und 7
2.7 Are the results of the part analysis processed, documented and communicated (output)?		
- documentation of the test results - categorization in "n.OK" and "OK according to parts analysis" - communication of the test results to the customer according to the customer agreements - quality reports as per customer agreement - documentation of further usage of the parts according to the customer agreement	- test protocol - test report - input into customer system - storage of data - Pareto-Report - Panyter Chart - quarantine store - proof of shipping - proof of scrapping	Cap. 10.1.2 Cap. 5.3 Cap. 10.3.3 Cap 9.1

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3. NTF-Process		
Minimum requirements / assessment-relevant:	**Possible examples of requirements and verification depending on product risk**	**Notes (input-output) and references**
3.1 Are triggering criteria and a guideline for an NTF-process available and are they used (input)?		
- defined triggering criteria - monitoring system - triggering of the NTF-process after exceedance - NTF-process-line of action	- agreement to triggering criteria - KPI OK according to parts analysis - executed NTF-processes (especially lessons learned) - project and test plan - NTF-guideline	Cap. 3.1 Cap.6.1.2 Cap. 10.3.4 Cap. 5.2.1
3.2 Is the NTF-process executed according to the guideline?		
- execution on own responsibility at first step - usage of adequate methods - data collection / data assessment - possible system check/ process study - documentation of the process steps	- project management methods - QM-methods - NTF-reports - action plans - statistical analysis - multiple layer diagram	Cap. 3 Cap. 10.3.4
3.3 Are the personnel requirements for the performance of NTF-Process given (personnel resources)?		
- responsibilities, tasks and authority incl. substitution rules - communication of the contact partners at a joint NTF-process (organisation and customer) - professional expert for the current status of the NTF-process - adequate available capacity	- NTF-guideline - NTF-reports - project plan - capacity planning - method experts - field action on claimed vehicles	Cap. 5.2.1 Cap 10.3.4

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Minimum requirements / assessment-relevant:	Possible examples of requirements and verification depending on product risk	Notes (input-output) and references
3.4 Are the material requirements for the execution of the NTF-process given (material resources)?		
- access to all relevant data for data analysis - analysis possibilities within the framework of the data analysis - resources for the execution of possible system tests	- data access to relevant information resources - analysis tools - (partial-)system constructions - simulation of the vehicle environment - access to internal and external laboratories - budget for assignment of external services	Cap. 3.3 Cap. 3.4 Cap. 3.5
3.5 Are the results of the NTF-process processed, documented and communicated (output)?		
- documentation of the NTF-processes - communication of the results to the management and customers - knowledge transfer	- regular management information - NTF reports - lessons learned for future NTF processes	Cap. 3.7 Cap. 10.3.4 Cap. 7

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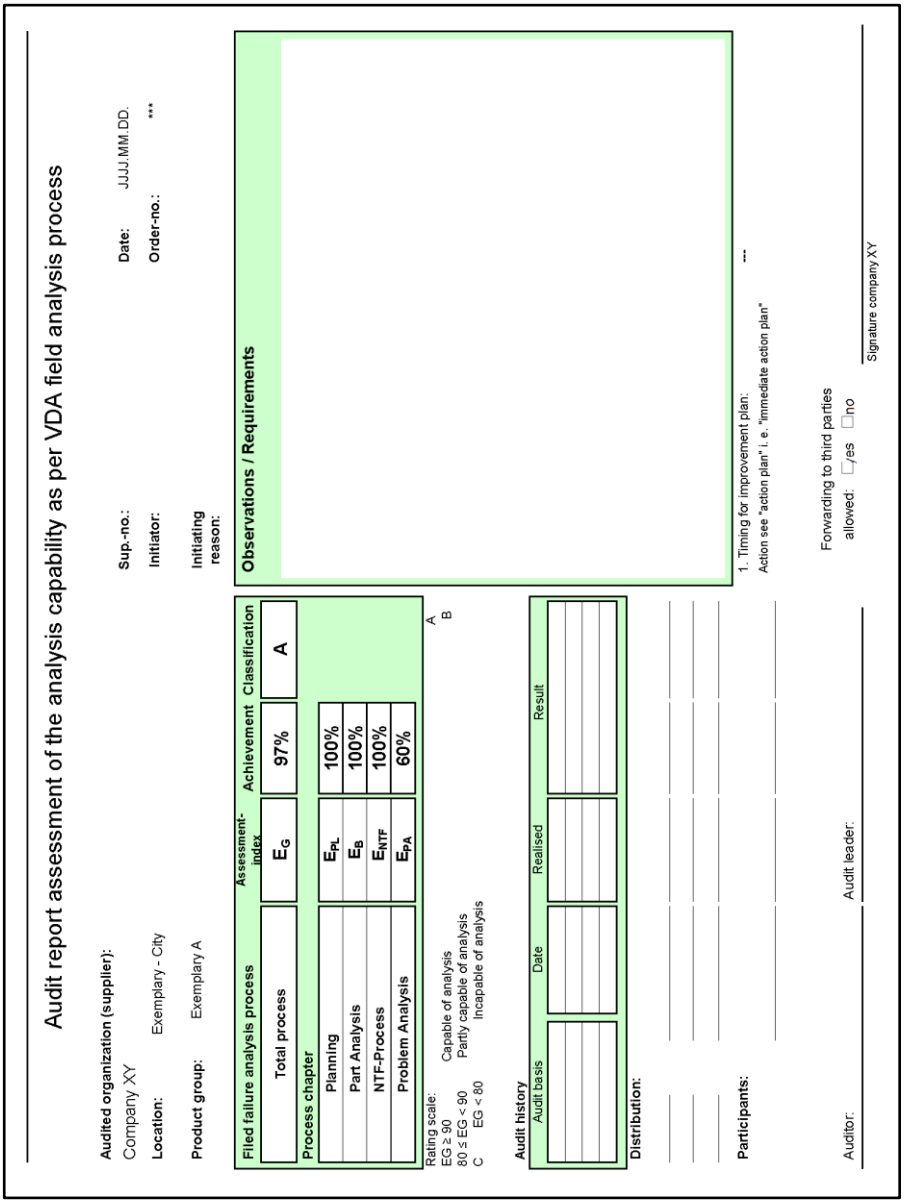
4. Problem Analysis		
Minimum requirements / assessment-relevant:	**Possible examples of requirements and verification depending on product risk**	**Notes (input-output) and references**
4.1 Is the relevant information for the analysis of an identified problem available (input)?		
- documented failures from the parts analysis or NTF-process - known problems within organisation (in process/finalized problem solving processes) - information transfer from part analysis to problem analysis	- data bank - test protocol - failure description - 8D-report - regular knowledge transfer between part analysis and problem analysis	Cap. 4
4.2 Is the reason for failure determined and passed on to the problem solving process (process flow)?		
- description of approach and responsibilities for the problem analysis - meaningful problem description - description of handover into the problem solving process	- process description problem analysis - process description problem solving process - process descriptions in 8D-reports - samples of handovers to problem solving process	Cap. 4
4.3 Are the results of the problem analysis documented and communicated (output)?		
- description of reason for failure for referencing of an existing or start of a new problem solving process - feedback of the results of the problem analysis to the customer	- description of failure reason - failure originator according to problem analysis - failure description - 8D-report number - failure conditions from part analysis	Cap. 10.1.2

6 Result sheet



Audit report assessment of the analysis capability as per VDA field analysis process

Audited organization (supplier):
Company XY

Location: Exemplary - City

Product group: Exemplary A

Sup.-no.:

Initiator:

Initiating reason:

Date: JJJJ.MM.DD.

Order-no.: ***

Filed failure analysis process	Assessment-index	Achievement	Classification
Total process	E_G	97%	A
Process chapter			
Planning	E_{PL}	100%	
Part Analysis	E_B	100%	
NTF-Process	E_{NTF}	100%	
Problem Analysis	E_{PA}	60%	

Rating scale:
EG ≥ 90 Capable of analysis
80 ≤ EG < 90 Partly capable of analysis
C EG < 80 Incapable of analysis

A
B

Observations / Requirements

1. Timing for improvement plan: ---
Action see "action plan" i. e. "immediate action plan"

Audit history

Audit basis	Date	Realised	Result

Distribution:

Participants:

Forwarding to third parties allowed: ☐yes ☐no

Auditor: _____ Audit leader: _____

Signature company XY

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7 Plan of action

Action plan

Supplier: Company XY
Location: Exemplary - City

Order - no.: ***
Date: JJJJ.MM.DD.

to be completed by the auditor				to be completed by the auditee			
Pos.	Question No.	Weaknesses / recommended actions, observation	Points	Actions and root course analysis	Date	Responsibility	Effectivity
	P1	**Planning**					
	1.1	no weekness	10				
	1.2	no weekness	10				
	P2	**Befundung**					
	2.1	no weekness	10				
	2.2	no weekness	10				
	2.3	no weekness	10				
	2.4	no weekness	10				
	2.5	no weekness	10				
	2.6	no weekness	10				
	2.7	no weekness	10				
	P3	**NTF-Prozess**					
	3.1	no weekness	10				
	3.2	no weekness	10				
	3.3	no weekness	10				
	3.4	no weekness	10				
	3.5	no weekness	10				
	P4	**Problemanalyse**					
	4.1	no weekness	10				
	4.2	no weekness	10				
	4.3	no weekness	10				

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