Driveline and Chassis Technology

8D Problem Solving
8D问题解决

Agenda

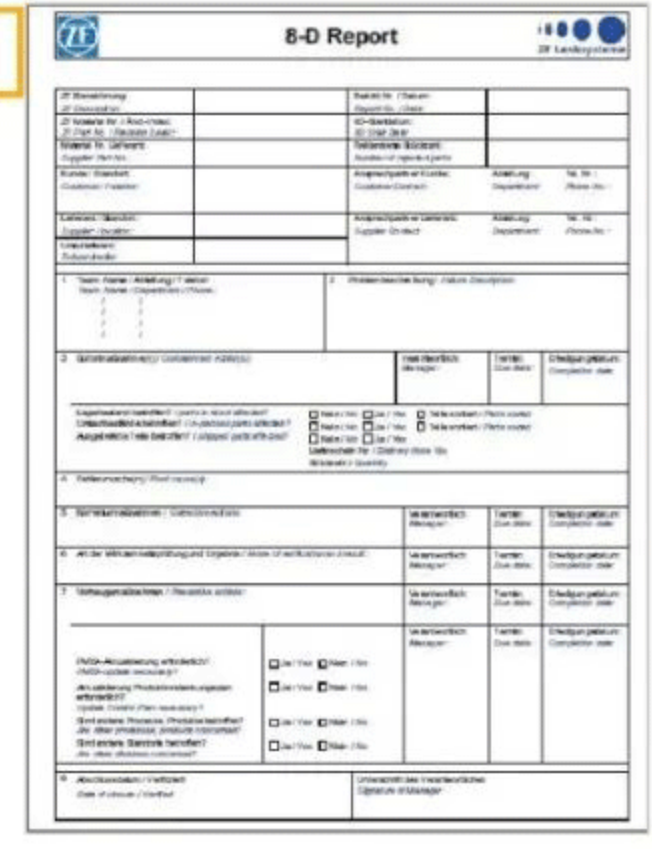
Introduction 介绍

- Presentation Round 自我介绍
- Work Guidelines 工作指南
- Objectives of the Seminar 研讨会的目标
- ZF specific Requirements 采埃孚特殊要求

The 8D Process 8D程序

- Brief Overview 简明概述
- The single Steps in Detail 每一步骤详述
- Workshops 课堂练习

Conclusion and Feedback 结论和反馈



Introduction介绍
Presentation Round自我介绍

- Where are you from (company/ location)? 你来自哪里（公司/地点）？
- In which department do you work? 在哪个部门工作？
- What are your expectations for today? 今天期望学到什么？

Introduction介绍
Objectives of the Seminar
研讨会目标

- You understand the importance of the zero defect strategy 理解零缺陷策略的重要性
- You acquired/ refreshed existing knowledge of the ZF specific problem-solving requirements and form sheets

  了解或回顾采埃孚关于问题解决的要求和相关工作表单

  - You know how to identify customer requirements

    了解如何识别客户的要求

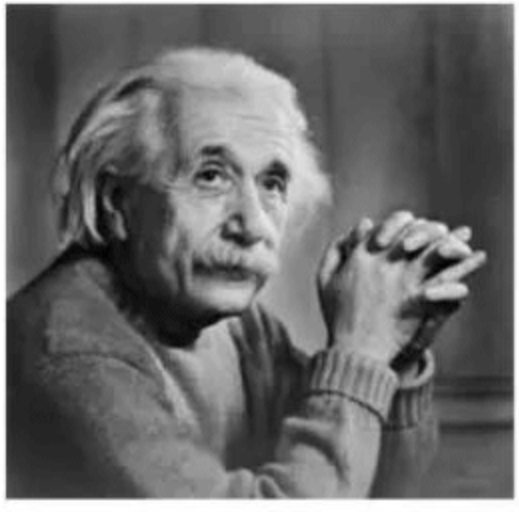
  - You know a method which helps you to sustainably improve and maintain customer satisfaction

    了解有助于持续改善和提高客户满意度的方法

- You understand the 8D problem solving method and are capable to implement it

  了解8D问题解决的方法并能够实施

Introduction介绍
Objectives of the Seminar
研讨会目标



Albert Einstein (1879-1955)
Physicist & Nobel Laureate

„The mere formulation of a problem is often far more essential than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions and explore new possibilities requires us to regard old problems from a new angle. This requires creative imagination and marks real advances in science."

“对一个问题的清晰简洁的表述，往往比其解决方案更为重要，解决方案可能仅仅是数学结论或实验技巧。为了提出新的问题和探索新的可能性，需要我们从新的角度去关注旧有的问题，这要求有创造性的想象力，并标志真正的科学进步。”

Introduction介绍
Necessity and Benefits of 8D
实施8D的必要性和益处

- Understanding the importance of the zero defect strategy

  理解零缺陷策略的重要性

- Each mistake is one mistake too much

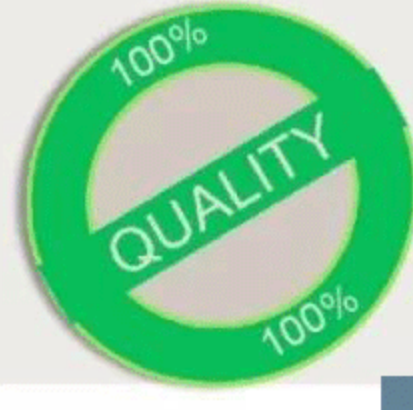
  不能放过任何一个错误

- Every product or process failure costs

  每个产品或过程的失效成本

  - **Time 时间**
  - **Money 金钱**
  - **Image 形象**

Quality is a competitive factor 质量是一个竞争因素。



Introduction介绍
Necessity and Benefits of 8D
实施8D的必要性和益处

99,9 % adherence to the requirements lead to

99,9%符合标准会导致

- 1 hour of impure water per month 每月1小时不纯净的水
- 1 insecure landing at Munich Airport per week

  每周在慕尼黑机场有1次不安全的着陆
- 16.000 wrongly delivered mailings per hour

  每小时16000封发错的邮件
- 20.000 wrongly issued medical prescriptions per year

  每年20000个错误的医疗处方
- 32.000 missing heartbeats per year

  每人每年少了32,000 次心跳

Introduction介绍
Necessity and Benefits of 8D
实施8D的必要性和益处

8D provides a standardized, systematic and simple tool for the solving of problems and the documentation of results

8D为问题解决和相关证明文件，提供了标准化的、系统化的、简明化的工具

The effective implementation of 8D means有效实行8D意味着：

- Elimination of the real root cause 消除真正的根源原因
- Prevention of recurring failures 防止失效的重复发生

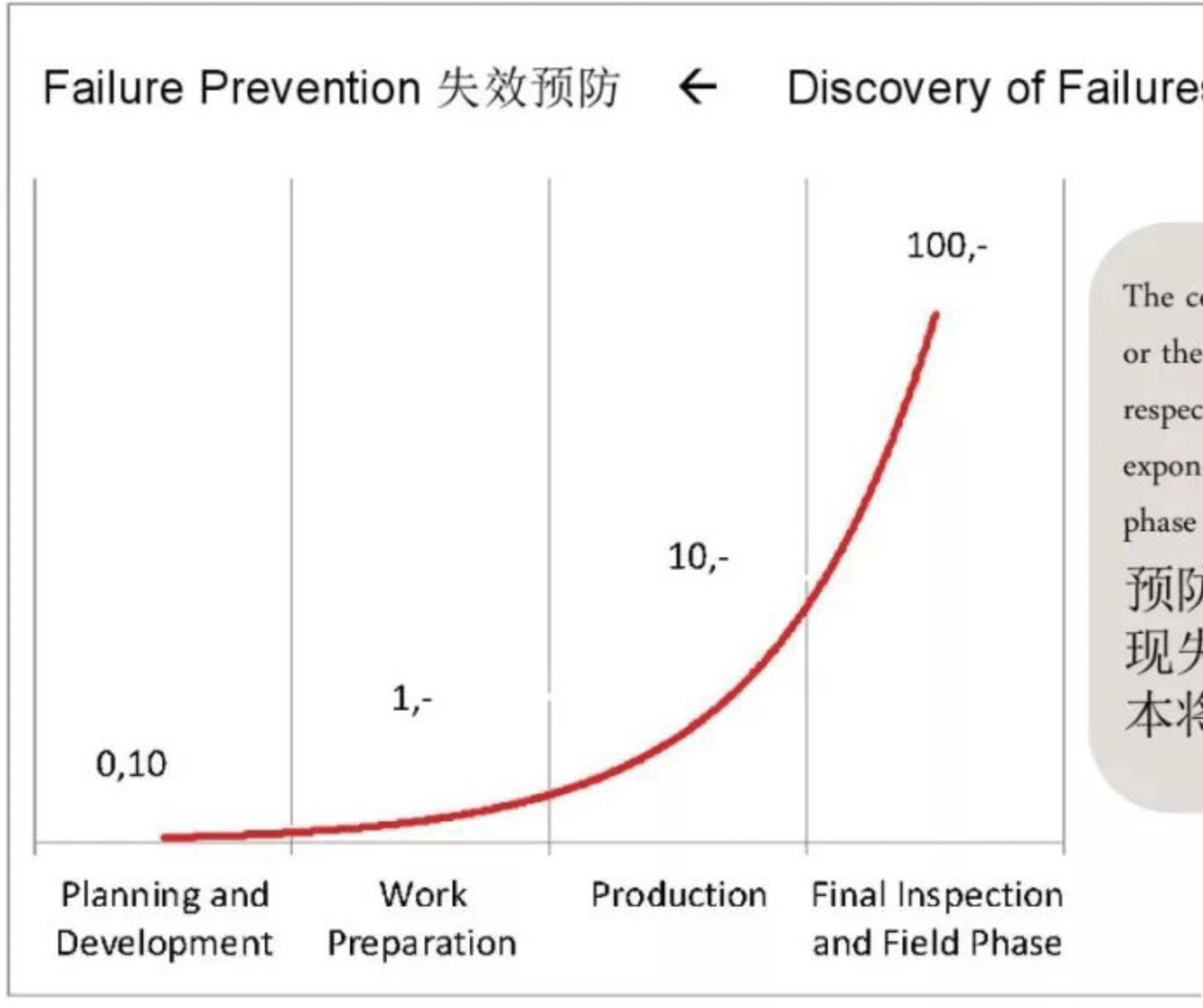
and leads to
导致

- More time for essential issues 将更多的时间花在关键事情上
- Less failure costs (internal and external) 较少的失效成本（内部和外部）
- Advantages over competitors 超越竞争对手的优势
- Higher degree of satisfaction – for you and your customer
  较高的满意度 -- 组织内部以及客户

Introduction介绍

The 1:10:100 Rule of Failure Prevention

1: 10: 100的失效预防规则



The costs for failure prevention or the discovery of failures, respectively, increase exponentially from phase to phase

预防失效，还是发现失效，其失效成本将指数级递增

Introduction介绍
ZF specific Requirements
采埃孚的特殊要求

ZF specific requirements can be found in the QR83 (Quality Directive ZF Group) 采埃孚的特殊参见QR83

„**Quality** is essential to success. In a competitive environment, **quality** is no longer a differentiating factor, it is a basic requirement. ZF customers expect reliable, zero-defect products and services.

http://www.zf.com/corporate/de/company/purchasing_logistics/quality_guidelines/quality_guidelines.html

"质量是成功的关键。在当前的竞争环境中，质量不在是差异性因素，而是基本要求。ZF的客户要求可靠的、零缺陷的产品和服务。

Introduction介绍
ZF specific Requirements
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Excerpt from the seminar ZF Impulse Days in line with the QR83:

摘自采埃孚 QR83 Impulse Days：

Root cause analyses have to be carried out using appropriate methods (Ishikawa, 5 Whys, photos, etc.)

必须用适当的方法（ Ishikawa, 5 Whys, photos, etc）开展根本原因分析

- If required, immediate measures have to be reported and must be sent via 8D report within one day 如需要，必须要**在1天之内**，以8D报告的形式报告所采取的立即措施
- Other affected ZF plants are to be informed **通知其它受影响的工厂**
- The effectiveness of the corrective measures has to be communicated to ZF
  必须同采埃孚**沟通**纠正措施的有效性
- If demanded, further analyses must be conducted 如果有要求，必须开展进一步分析
- Marking after previous claim 投诉后**标记**
- Transmission of the 8D report via Supply On (Problem Solver) or email
  通过 Supply On（Problem Solver）上传或 通过Email传递**8D报告**

Introduction介绍
ZF specific Requirements
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8D Report at ZF

„After a complaint made by the ZF purchasing plant, corrective actions must be introduced immediately, documented, and if requested by ZF, submitted punctually in a structured manner using form F06 „8-D Report““ (QR83, 2011, p.13)

当收到ZF采购工厂提出的投诉后，供应商应立即采取纠正措施，该纠正措施必须以ZF规定的表格形式加以记录和组织，如表F06“8D报告”的结构格式，表格应在规定期限内递交给ZF的采购工厂。

8-D Report

ZF Lenksysteme

ZF Bezeichnung: *ZF Description:*		Bericht Nr. / Datum: *Report No. / Date:*	
ZF Material Nr. / Änd.-Index: *ZF Part No. / Revision Level:*		8D-Startdatum: *8D Start Date:*	
Material Nr. Lieferant: *Supplier Part No.:*		Reklamierte Stückzahl: *Number of rejected parts:*	

Excerpt „Form Sheet F06 8-D Report“ QR83, 2011, p. 52

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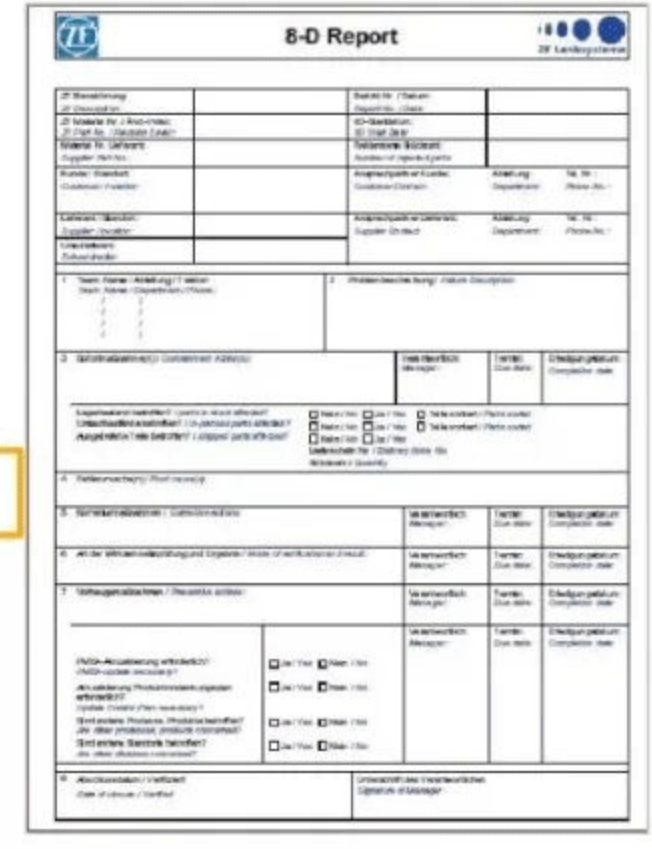

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The 8D Process 8D程序
Brief Overview – History 简要概述-历史

- In the end of the 1960's, the Jet Propulsion Laboratory (JPL) developed the 4D method in the USA on behalf of the NASA. These were the 4 Do's :

  在60代末，JPL在美国代表NASA开发了4D法，这就是4 Do's 时代

  - Do: Describe the problem 问题描述
  - Do: Initiate immediate actions 立即措施
  - Do: Analyze the problem cause 问题分析
  - Do: Take corrective actions 纠正措施
- In the beginning of the 70s: Adoption of the method by Ford and many other automotive companies

  从70年代的开始，福特和很多其它汽车公司开始采用该方法
- 1978: Development of the 8D method by Ford　　1978年福特开发了8D法
- 1981: 8D has become standard for Ford, its subsidiaries as well as for all Ford suppliers

  1981年8D 成为福特、其子公司以及其供应商的标准

The 8D Process 8D程序
Brief Overview – History 简要概述-历史

- 1981: „ Do" was replaced by „ Discipline" 1981 "Do"被by "Discipline" 代替
- End of the 80s: Adoption of the method by many European OEMs, systems suppliers as well as many non-automotive companies in the USA

  80年代末：8D被很多欧洲整车厂采用，在美国整车供应商包括很多非汽车行业也采用8D
- Examples of further problem solving techniques/ methods

  其它的问题解决工具/方法的例子：
  - Xerox 6 Step 施乐 6 步法
  - Procter & Gamble 8 Step P&G 8步法
  - GM 5-Phase 通用5步法
  - Kepner & Tregoe Problem Solving & Decision Making KT法
  - Shainin 夏宁法
  - Six Sigma 六西格玛

8D is the Standard of the Automotive Industry

The 8D Process 8D程序
Brief Overview – Definition 简要概述-定义

- Team-oriented procedure/ process for the solving of problems

  以团队合作为导向的问题解决的程序/过程

- Fulfills three standardized and complementary functions

  实现3个标准化和补充的功能

  - Function 1: Problem identification 问题识别
  - Function 2: Problem solving 问题解决
  - Function 3: Documentation 文件化

The 8D Process 8D程序
Brief Overview – Scope of Application
简要概述-适用范围

8D
Suitable for technical and non-technical problems
适用技术非技术的问题

Non-technical 非技术性的

- Customer is not satisfied 顾客不满意
- Delayed delivery 发运延迟

Technical 技术性的

- Construction failure 结构失效
- Defective product 不良产品

Support by 8D
Root cause analysis during series production
对于量产件根本原因分析

- 7 Quality tools 7大工具
- 3 x 5 Why

Support by 8D
During the product evolution process or during re-engineering
在产品开发和再设计过程中

- Local distribution 局部分布
- Variable comparison 变量比较
- Component comparison 零件比较
- Check sheet for concept comparison 设计比较
- Taguchi 田口法
- Etc. 等等

The 8D Process 8D程序
Brief Overview – Purpose 简要概述-目的

8D is suitable for the solving of internal problems and the handling of external customer complaints 8D

适用解决内部问题和外部客户投诉

- Suitable for the in-depth analysis of problems as well as for the elimination of the root causes of failures

  适合深入的问题分析并能**消除根本的失效原因**

- Used for the preparation of information within the company in order to prevent the recurrence of failures

  用于公司内部信息预备，以便**预防失效的重复发生**

- Customers are informed fast and on a regular basis and are thereby always updated as to the newest information and knowledge available

  快速并定期通知客户，及时更新信息

- Reveals multiple root causes and systematic failures

  揭示多重根本原因和系统性失效

The 8D Process 8D程序
Deming's Rule of Thumb戴明的经验法则

- 85% of all failures are **system-induced** 85%的失效是**系统所造成的**
- It is of crucial importance to separate the problem from the person

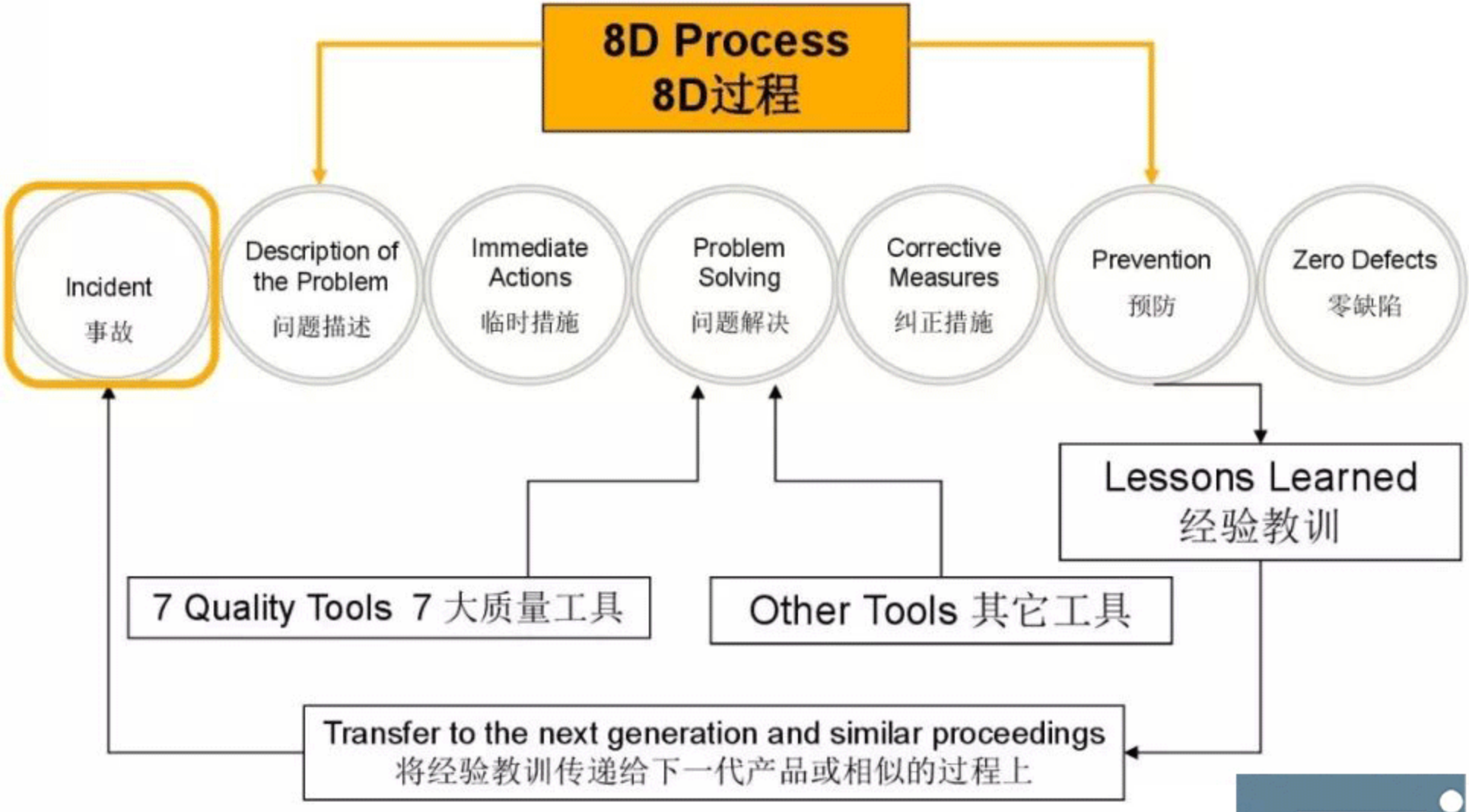
  把**问题和人分开**，这非常重要
- „Troubleshooting" is principally not supposed to be a search for the person responsible for the failure

  "解决问题"的重要的是**不试图寻找造成失效的人员**
- First question: „**Why** has the system not been able to prevent/ discover the failure?" and **not** „**Who** made the failure?"

  第一个问题:„**为什么系统没有能够阻止/发现问题**?" 而不是，谁造成了问题?"

The 8D Process 8D程序
Brief Overview 总览

8D and the tools in context　8D和工具



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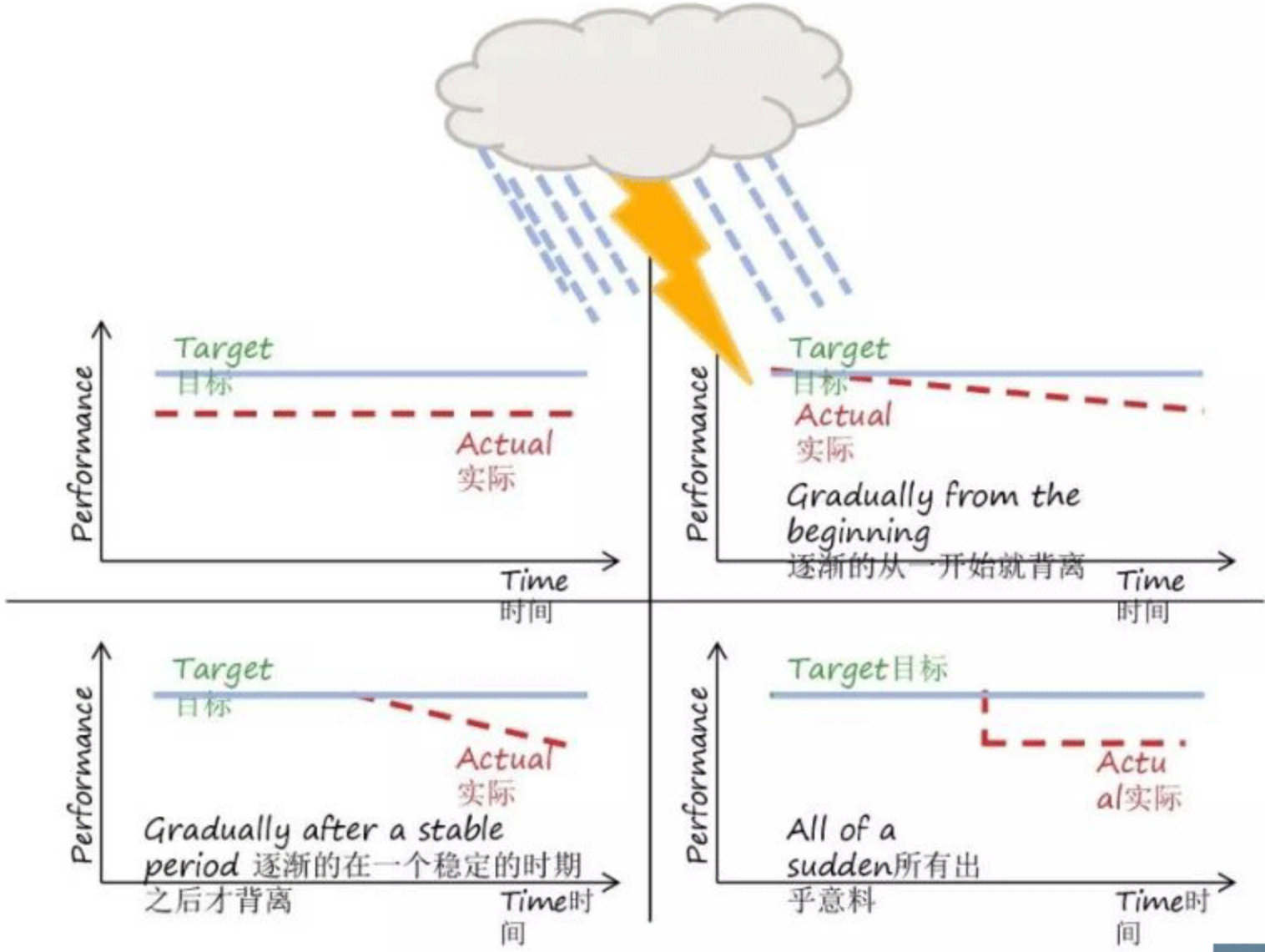
The 8D Process 8D程序
Trigger 触发源

- Incident = undiscovered mistake (failure, inconsistency) which turns into a problem at the time that it is discovered; like for example product failures, audit results, field errors, customer complaints, etc. …

  事故=未发现的错误（失效，不一致），当被发现时就成为一个问题，比如产品失效、审核结果、现场失效、客户抱怨等等

- The incident triggers the 8D process 事故触发8D
- Once the problem has been identified, the following information has to be gathered 一旦问题已经被确认，以下的信息必须被收集
  - Time of the discovery? 发现的时间
  - How many parts are affected? 有多少产品受到影响
  - Where has the problem been discovered?发现的地方
  - Part number? 零件号
  - Wording of the problem message? 发出问题消息
  - Etc. …等等

The 8D Process 8D程序
Trigger 触发源



The 8D Process 8D程序
The single Steps in Detail每一步骤详解

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The 8D Process 8D程序
The single Steps in Detail每一步骤详解

- D1: Installation of a problem solving team 建立问题解决小组
- D2: Problem description 问题描述
- D3: Implementation and verification of containment actions
  实施和验证遏制措施
- D4: Determination and analysis of possible root causes
  决定和分析可能的根本原因
- D5: Review of possible procedures and planning of corrective measures 评审和策划纠正措施
- D6: Implementation and verification of the planned corrective actions
  实施和验证纠正措施
- D7: Initiation of actions to prevent recurrence 采取行动防止再发生
- D8: Final talks/ lessons learned 最终交流/经验教训

The 8D Process 8D程序
D1 – Installation of a Team建立小组

D1

- Build-up of a „core team“ with persons who 建立包括以下成员的核心小组：
  - Dispose of the required process and product knowledge (experts)
    了解过程及产品的专家
  - Bring in time and commitment 有时间和承诺
  - Dispose of the competencies as well as the internal authorization to solve the problem, take decisions and to initiate measures
    有能力以及内部授权的人，能够解决问题、做决定和实施相应措施
- The team must not consist merely of members from the quality department
  小组不可以仅仅只由质量人员组成
- The „causer“ of the problem should be a part of the team
  小组需包含问题的“引发者”
- Nomination of an internal „champion“ 需任命一个小组的负责人
- If required, invite experts as extended team members
  如果需要，可以邀请外部的专家作为小组成员

The 8D Process 8D程序
D1 – Check Sheet 检查清单

D1

- Are all relevant documents available? 是否有所有的文件
- Are the right persons in the team? (professional and technical experience)
  团队中人员是否合适（专业和技术经验）？
- Are the members of the core team trained accordingly?
  核心团队的人员是否经过相应的培训？
- Is every team member acquainted with the respective task/ responsibility?
  是否团队的每个成员都熟悉自己的任务/责任？
- Should customers/ suppliers participate at the meeting?
  客户和供应商应该参加会议吗？
- Are all participants informed as to the venue and the date of the meeting?
  会议的时间和地点，通知了所有参加的人员吗？
- Have all team members confirmed their attendance?所有参会人员是否确认到会？
- Are both the documentation and the reporting ensured? 文件和报告是否准备好？
- Has the problem been sufficiently defined? 问题是否被充分定义？

The 8D Process 8D程序
D2 – Problem Description问题描述

D2

- Verification of the reported information　确认被通报的信息
- Identification and quantification of the problem source 问题的识别和量化 (Where/ when/ how did the problem occur?) 哪里/什么时候/问题是怎么发生的
- Determine how many parts are concerned: 确定涉及多少零件
  - At the customer level 在客户方的
  - In circulation/ transport在流通/运输过程的
  - In the production/ goods issue 在生产环节的
- Analysis of the problem‘s consequences (affected parts, versions, vehicles, etc.) 分析问题的后果（受到影响的零件，版本，车型等等）

The 8D Process 8D程序
D2 – Problem Description问题描述

D2

- Describe the problem as precise as possible 尽可能**精确**描述问题
- Describe the problem as simple as possible 尽可能**简单**描述问题
- If the situation is difficult to describe: indication that there is more than just one problem which needs to be resolved 如果情况很难描述：表明有可能不止一个需要解决的问题
- Add pictures or sketches (e.g. technical drawings, photos, process flow charts) **附图片或者示意图**（如技术图纸，相片，过程流程图）
- Check if you are dealing with a recurrent failure 检查你是否在处理重复发生的失效
- Analyze the team structure once more: Are all required persons in the team? 再一次分析团队结构：是否所有需要的人都在团队中
- Review the problem description from the internal/ external customer point of view: Is the description factual, clear and comprehensible? 从内部 / 外部客户的角度审视描述问题：是否是具体的、清楚的、可理解的

The 8D Process 8D程序
D2 – Problem Description问题描述

D2

	IS是	IS NOT不是
What? 什么	Unbalance不平衡	Crack 断裂
	Transmission ring 3rd gear 传动环 第3号齿轮	All other gears 所有其它齿轮
When? 什么时候	发现问题时间：March 1-7 3月1号到7 发生问题时间：xx xx	Previously or afterwards 在这之前或之后
Where?什么地方	Inner side 内侧	Exterior side 外测
	At customer 客户处	At quality assurance 质量保证部
How? 如何	Discovered during production inspection 在生产检验时	Discovered through incoming goods inspection 在来料检验时
How often?/ 频率 How many? 有多少	5 parts 5个零件	More or less parts 其它数量

The 8D Process 8D程序
D2 – Check Sheet检查清单

D2

- Have defective products been inspected?否检查过了有缺陷的产品（实物）
- Is it expedient to sub-divide the problem? 是否细分了问题
- Are all relevant numbers/ facts/ data available? 是否有相关的数量/现象/数据
- How serious is the problem?问题有多严重
- Which products/ product types are affected? 什么产品/什么类型受到影响
- Which customers are affected? 哪些客户受影响了
- How large is the affected range of parts 零件影响的范围有多大

The 8D Process 8D程序
D2 – ZF 8D Form Sheet采埃孚 8D 表格

D2

8-D Report

ZF Lenksysteme

ZF Bezeichnung: *ZF Description:*		Bericht Nr. / Datum: *Report No. / Date:*		
ZF Material Nr. / Änd.-Index: *ZF Part No. / Revision Level::*		8D-Startdatum: *8D Start Date:*		
Material Nr. Lieferant: *Supplier Part No.:*		Reklamierte Stückzahl: *Number of rejected parts:*		
Kunde / Standort: *Customer / location:*		Ansprechpartner Kunde: *Customer Contact:*	Abteilung: *Department:*	Tel. Nr.: *Phone No.:*
Lieferant / Standort: *Supplier / location:*		Ansprechpartner Lieferant: *Supplier Contact:*	Abteilung: *Department:*	Tel. Nr.: *Phone No.:*
Unterlieferant: *Subcontractor:*				

1 Team: Name / Abteilung / Telefon: *Team: Name / Department / Phone:* / / / / / / / /	2 Problembeschreibung / *Failure Description:*

Excerpt „Form Sheet F06 8-D Report" QR83, 2011, p. 52

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The 8D Process 8D程序
D3 – Containment Measures遏制措施

D3

- Protection of the internal/ external customers from the problem's consequences until permanent corrective measures are implemented effectively

  保护内/外部客户免受问题的影响，直到永久措施有效的实施

- Verification of the effectiveness of the implemented measures; if required, determination and implementation of additional measures

  验证实施措施的有效性；如果需要，决定和实施额外的措施

- Implementation of necessary field measures if the defective parts have reached the end customer

  如果不良品已经到达最终客户端，可以实施必要的现场作业方法

- Evaluation of potential risks

  评估潜在风险

The 8D Process 8D程序
D3 – Containment Measures遏制措施

D3

- Possible measures are for example blocking/ testing/ sorting of goods, arrangement of replacement deliveries, initiation of rework activities, etc…
  可能的方法例如围堵/测试/挑选，替换品发运的安排，返工的启动，等等。
- Do not forget不要忘记
  - Marking of the sorted “OK” parts 标识已挑选出的‘ok’的产品
  - Verification of the effectiveness of the containment measures
    对遏制措施的有效性进行验证
  - Evaluation of possible side effects 评估可能的影响
  - Containment actions only fight the symptoms; however, they do not solve the problem 遏制措施只能解“燃眉之急”，但不能解决根本的问题
- Containment actions are temporary measures 遏制措施是临时措施
- Marking of inspected goods with the form sheet F11 „Identification of certified material after complaint“ 根据表格F11对已经检验的产品进行标识

ZF Lenksysteme

Kennzeichnung geprüfte Ware nach Reklamation
Identification of certified material after complaint

Excerpt „Form sheet F11: Identification of certified material after complaint“ QR 83, 2011, p.55

The 8D Process 8D程序
D3 – ZF Requirements采埃孚要求

D3

Marking after previous complaint 投诉后标记

„Subsequent deliveries from warehouse and work in progress which have been subjected to 100% testing due to a previous fault must be marked with the form F11 „ Identification of certified material after complaint“ until it has been proven that the fault has been remedied. Each individual container must be clearly identified with Form F11. The type of marking on the individual part needs to be agreed with the ZF receiving plant.“ (QR83, 2011, p. 14)

客户投诉后，供应商仓库库存品和在制品需经过100%的检测才能发货至ZF，此类货物应当用表F11“投诉后认证的识别”进行标记，直至错误被证明已经得到纠正。
每个包装箱都应当用F11表标示。
单个零件上的标记方法应取得ZF工厂的同意。

The 8D Process 8D程序
D3 – ZF Requirements

D3

Complaints from the field 售后投诉

„In the event of complaints from the field, the supplier is to carry out methodic analyses, in particular for components for which no faults were found in the appraisal process.“ (QR83, 2011, p. 14)

在售后投诉时，供应商应进行方法分析，尤其针对评估过程中未发现的缺陷的部件。

The 8D Process 8D程序
D3 – ZF Regulations ZF规定

D3

„[…] immediate actions are to be reported to ZF within one working day at the latest and in writing.“ 如果ZF要求，供应商应最迟在一个工作日内向ZF书面报告所采取的临时措施。

„Other affected ZF plants are to be informed immediately by the supplier.” 供应商应立即通知其它受影响的ZF工厂。

„ZF is to be notified about the effectiveness of the corrective actions taken.“ 应将已采取纠正措施的有效性及时通知给ZF公司。

(QR83, 2011, p. 13f.)

3 Sofortmaßnahme(n) / *Containment Action(s):*	Verantwortlich: *Manager :*	Termin: *Due date:*	Erledigungsdatum: *Completion date:*
Lagerbestand betroffen? / *parts in stock affected?* ☐ Nein / *No* ☐ Ja / *Yes* ☐ Teile sortiert / *Parts sorted* Umlaufbestände betroffen? / *in-process parts affected?* ☐ Nein / *No* ☐ Ja / *Yes* ☐ Teile sortiert / *Parts sorted* Ausgelieferte Teile betroffen? / *shipped parts affected?* ☐ Nein / *No* ☐ Ja / *Yes* Lieferschein Nr. / *Delivery Note No.* Stückzahl / *Quantity*			

Excerpt „Form Sheet F06 8-D Report“ QR83, 2011, p. 52

The 8D Process 8D程序
D3 – Official Due Dates正式的完成预期

D3

Within 1 working day* **1个工作日内：**
Written reactions to the customer on the future proceedings (main data, D1 and D2 filled in as completely as possible)
以书面形式向客户报告未来的相应措施（主要数据，D1和D2，尽可能填写上完整的信息）

Within 2 working days* **2个工作日内：**
The first results of the failure analysis and the containment measures have to be communicated to the customers in writing in order to protect them from further defects/ failures (adjusted main data, D1, D2, D3)
以书面的形式向客户传达关于失效的首次分析结果和采取的遏制措施，以免于客户受到更多缺陷/失效的影响（调整过的主要的数据，D1，D2，D3)

If due dates cannot be adhered to, this has to be communicated immediately to the customer together with an explanation. Moreover, the further proceedings should be agreed upon with the respective supplier. In these cases, a report with the interim results
and an action plan including due dates has to be forwarded as well.
如果完成预期没有得到实现，必须立即和客户进行沟通并做解释。此外，应就下一步的方案与各自的供应商达成一致。在这种情况下，必须同时提交包含阶段性结果和行动计划在内的报告。

The 8D Process 8D程序
D3 – Check Sheet 检查清单

D3

- Have successful immediate actions been launched?
  是否已经启动了立即的行动?
- How or in which way has the effectiveness of the measures been verified?
  方法的有效性是如何或者通过什么方式进行验证的?
- Are the employees who are responsible for the conduction of the measures sufficiently instructed? 负责实施的员工是否接受足够的指导?
- Is it ensured that the measures initiated do not lead to new failures?
  能否保证实施方法不会导致新的失效?
- Is the customer -by means of the immediate measures- sufficiently protected from further failures? 在各种临时的措施中，客户是否得到充分的保护以免遭受更多的失效模式
- Is it ensured that no further defective products are being delivered?
  是否确定没有更多的不良品被发运?
- Are defective products identified and sorted out as soon as possible during the product evolution process?
  在产品评估过程中，不良品是否能被理科识别和挑出?

The 8D Process 8D程序
Workshop D1, D2, D3 课堂练习D1,D2,D3

- **D1: Installation of a problem solving team 建立问题解决小组**
- **D2: Problem description 问题描述**
- **D3: Implementation and verification of containment actions 实施和验证遏制措施**
- D4: Determination and analysis of possible root causes 判定和分析可能的根本问题
- D5: Review of possible procedures and planning of corrective measures 评审和策划纠正措施
- D6: Implementation and verification of the planned corrective actions 实施和验证计划的纠正措施
- D7: Initiation of actions to prevent recurrence 启动行动预防再复发
- D8: Final talks/ lessons learned 经验教训

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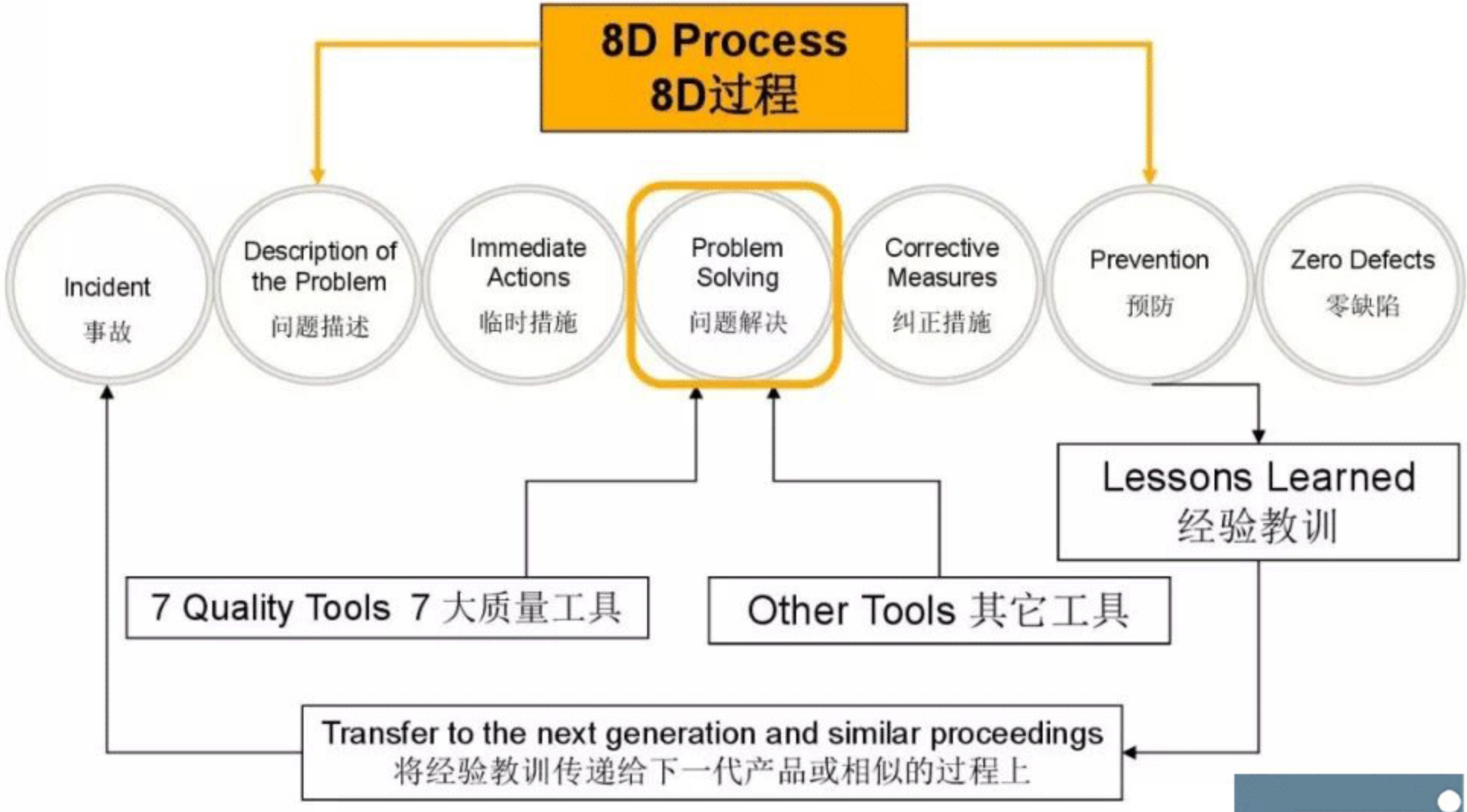
The 8D Process 8D程序
D4 – **Determination and Root Cause Analysis** 确定和分析根本原因

D4



The 8D Process 8D程序
D4 – **Determination and Root Cause Analysis** 确定和分析根本原因

D4

- Problems and failures do not just occur out of the blue – they get caused
  问题和失效的发生不是偶然的-他们是有原因的
- Search for all possible causes which might explain the problem
  找寻所有可能的解释问题的原因
- Verify through analyses if one or more causes might be the root cause(s)
  当一个或多个原因可能是问题的根本原因时，通过分析进行验证
- Root cause analysis through standard quality tools and other tools
  通过标准质量工具和其它工具分析根本原因
- Verification of the root cause through „switching on and off“ the cause
  通过“**施加和撤销**”的方式**验证根本原因**
- Results have to be based on facts, not on assumptions
  结果要以事实为依据，不能假设。

Do not settle for one cause too fast. 不要太快地归因于某个原因
Stay consistent and search thoroughly for all causes.
保持一致和彻底搜索所有原因

The 8D Process 8D程序
D4 – **Determination and Root Cause Analysis** 确定和分析根本原因

D4

- The goal of this step is to identify the real root cause
  这个步骤的目标是识别真正的根本原因。
- In order to do so, you should always carry out two separate analyses
  为了识别根本原因，你应该总从两个方面进行分析

Why did the failure **occur**?
为什么会发生失效？

Why has the failure not been **discovered**?
为什么没有发现失效？

The 8D Process 8D程序
The 7 Quality Tools 7大质量工具

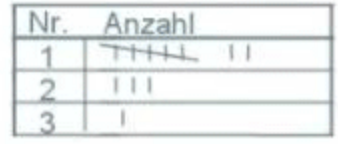
D4

- Check Sheet 计数表
- Histogram 直方图
- Pareto Diagram 排列图
- Scatter Diagram 散布图
- Flow Chart 流程图
- Control Chart 控制图
- Cause and Effect Diagram (Ishikawa) 因果图（石川图）

These and other tools are treated more in detail in the seminar „problem solving techniques“ 以上工具已经在“问题解决工具”中详细讲解。

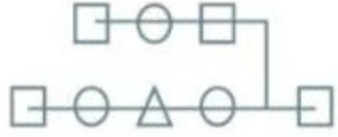
The 8D Process 8D程序
The 7 Quality Tools – ZF Examples
7大质量工具-- ZF应用举例

- **Check Sheet 计分表**
  E.g.: Check list for random controls
  检查表用于随机检验

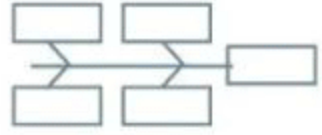


- **Histogram 直方图**
  E.g.: Statistical evaluations like capability studies
  统计评估，如能力研究

- **Flow Chart 流程图**
  E.g.: Visualization of sequences in process descriptions
  过程次序目视化描述



- **Cause and Effect Diagram 因果图**
  E.g.: Component of the cause determination within the 8D systematic
  用于8D中的原因分析



- **Scatter Diagram 散布图**
  E.g.: Utilization in the standard software QS-Stat
  利用标准软件QS-Stat

- **Control Chart 控制图**
  E.g.: Utilization in the monitoring of the production process
  用于监控生产过程

- **Pareto Diagram 排列图**
  E.g.: Visualization of the FMEA results. 可视化的FMEA的结果

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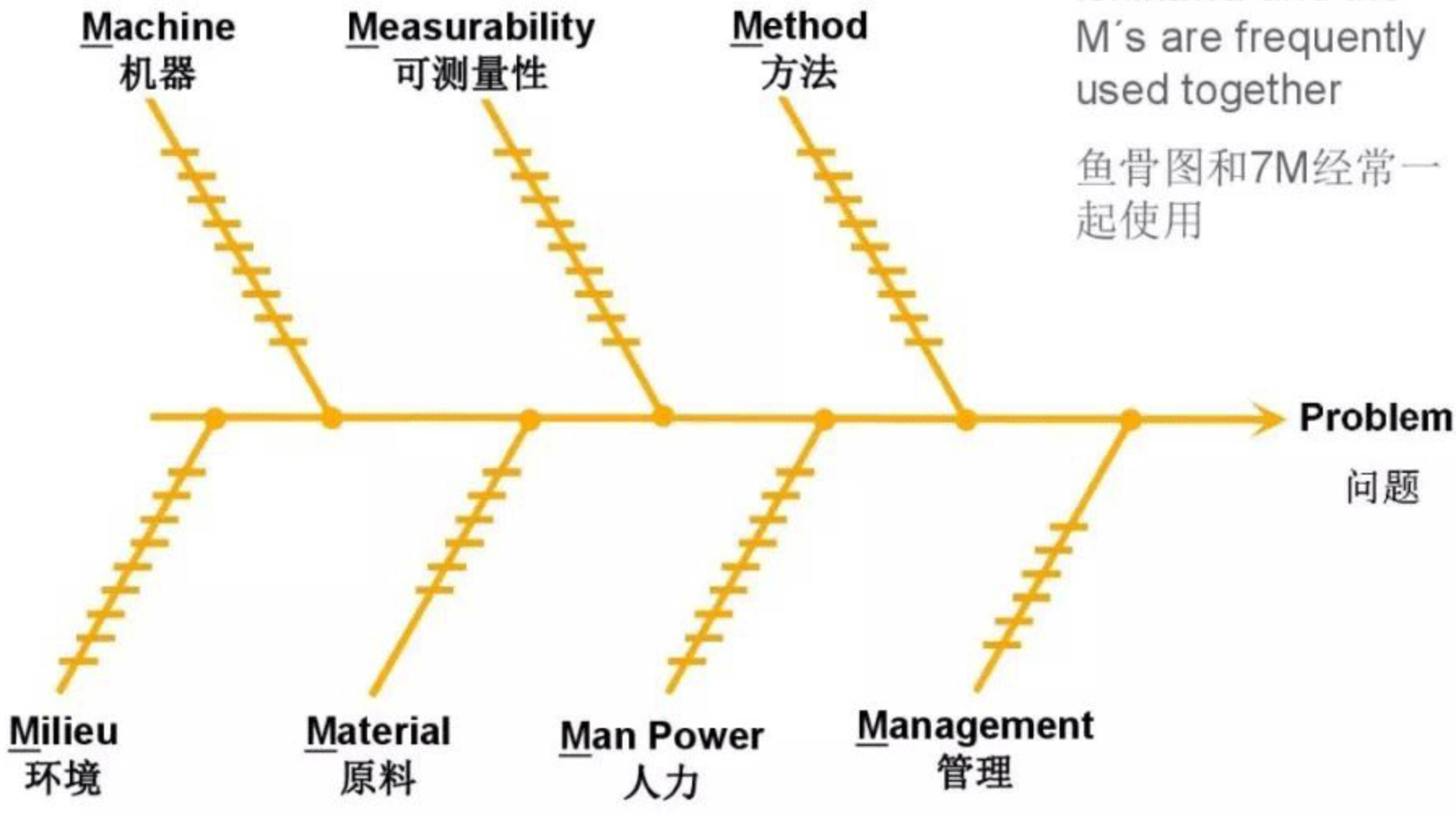
The 8D Process 8D程序
Cause and Effect Diagram 因果图

D4

Example of 7M 7M举例



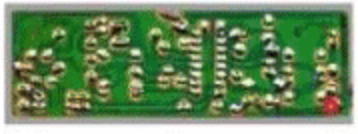
Ishikawa and the M´s are frequently used together

鱼骨图和7M经常一起使用

The 8D Process 8D程序
5 x Why – Example 5xWhy-举例

D4

Problem: Electronic tool stopped working! 问题：电动工具停止工作！



Visible Phenomena
表面现象

WHY?

Printed circuit board partially molten 印刷电路板部分融化

WHY?

Printed circuit board overheated 印刷电路板过热

WHY?

Non-adequate air supply 无足够的空气供应

WHY?

Air filter not replaced 空气过滤器没有更换

WHY?

No preventive maintenance 没有预防性维修

Root Cause
根本原因

The 8D Process 8D程序
D4 – **Determination and Root Cause Analysis** 确定和分析根本原因

D4

After the identification of the root cause:

识别根本原因后：

- Verification of the effectiveness of the implemented immediate measure(s)
  验证所采取的临时措施的有效性
- Analysis and verification of the potential risk for the customer
  分析和验证客户的潜在风险

The 8D Process 8D程序
D4 – Check Sheet 检查表清单

D4

- Have all sources of information been considered during the determination of the causes?

  在确定原因时，所有信息来源都被考虑了吗?
- Why has the problem not occurred previously?

  为什么以前没有发生这个问题。
- Is there a relationship between the problem and certain processes?

  问题和某些过程之间是否有关联?
- Have relevant processes been checked for weak points?

  检查了相关过程的薄弱环节吗?
- Are all processes capable? (SPC) 所有过程能力满足要求吗？SPC
- Which systems, procedures and instructions have enabled/ favored the problem's occurrence?

  哪些系统、程序和指导书会导致这个问题的发生?
- Are process flows and FMEAs up to date? 过程流程图和失效模式是否更新?
- Through which measures have the causes been confirmed?

  通过什么方法能证实产生的原因?

The 8D Process 8D程序
Workshop D4 课堂练习

- D1: Installation of a problem solving team 建立问题小组
- D2: Problem description 问题描述
- D3: Implementation and verification of containment actions
  实施和验证遏制措施
- **D4: Determination and analysis of possible root causes**
  决定和分析可能的根本原因分析
- D5: Review of possible procedures and planning of corrective measures 评审和策划纠正措施
- D6: Implementation and verification of the planned corrective actions 实行和验证策划纠正措施
- D7: Initiation of actions to prevent recurrence 采取行动防止再发生
- D8: Final talks/ lessons learned最终交流/经验教训

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The 8D Process 8D程序
D5 – Review of the Procedure
评审纠正措施

D5

- Selection of the best permanent measure to eliminate the root cause

  选择最永久的措施以便消除根本原因

- Check 检查
  - If the success of the measure is sustainable 该方法的有效性是否可持续
  - If the problem is definitively resolved for the customer 客户的问题是否得到彻底解决
  - If no negative side effects occur 是否没有负面的影响

The steps 4 and 5 are performed as long as the effectiveness of the measures for the solving of the problem and the root cause have been verified
执行步骤4和5,只要有效的措施解决这个问题，根本原因就已经被证实。

The 8D Process 8D程序
D5 – Review of the Procedure
评审纠正措施

D5

- Evaluate the effectiveness of the selected corrective measures
  对已选纠正措施的有效性进行评估
- Develop an action plan with measures, due dates and responsible persons
  制定行动计划与措施，完成预期和负责人
- Once again. it is important to perform this step „twice“
  重申，重要的是从两方面实施

Definition of measures against the **occurrence** of failures
此失效为什么发生

Definition of measures against the **non-discovery** of failures
为什么没有发现

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The 8D Process 8D程序
D5 – Measures against Recurrence
纠正措施能防止问题复发

- Change the processes or procedures which are inadequate, wrong or unclear
  修改不充分的、错误的、不清楚的过程或程序
- Which processes or procedures are missing and must here be introduced?

  哪些流程或程序缺失?
- Try to consider this step as a **chance** to optimize your processes – this is a benefit in return for the spent resources

  将该步骤当成优化你的过程的**机会** – 这是一个所花费资源的利益回报
- Ask yourself:

  Which further products and/ or processes show similar failure situations?

问问你自己:

哪些产品/过程会出现相同的故障?

The 8D Process 8D程序
D5 – Measures against Recurrence
纠正措施能防止问题复发

- Check your quality process/ Poka Yoke within the affected production line or the production process, respectively

  分别检查受到影响的生产线或生产过程的质量流程/ 防错系统

Consider the following questions:

考虑如下问题

- Why hasn't the potential failure risk been considered in your planning process or FMEA(s)?

  为什么潜在失效风险没有在您的策划过程或FMEA(s)中？

- Why has your production process not been able to identify the failure?

  为什么生产过程中不能够识别该失效？

- Why has your quality process not been able to protect the customer from receiving the defective parts?

  为什么您的质量流程不能保护客户免于收到不良品？

The 8D Process 8D程序
D5 – Check Sheet 检查清单

D5

- Have all possible means regarding the permanent corrective measures been exhausted expediently?
  对于永久纠正措施而言，是否已经用尽**一切可能的**方法？
- Have all risks in conjunction with the selected measures been considered?
  是否考虑了被选的纠正措施的**所有风险**？
- Have the „right“ indicators been used to verify the effectiveness of the corrective measure? 是否有“正确”指标已经被用来验证纠正措施的**有效性**？
- Has it been proven in sufficient frequency through suitable tests that the root cause has been eliminated?
  是否通过适当的测试、充分的频次证明了根本原因已经被消除
- Is there an emergency plan if the corrective measures do not result in the desired success? 如果纠正措施没有达到预期成功的话，是否有应急预案？
- Is there an emergency plan if the corrective measures are causing other/ new failures? 如果纠正措施引发其它/ 或者新的问题，是否有应急预案呢？
- Have responsible persons as well as due dates for the implementation been determined? 实施措施的负责人以及完成预期是否已经确定？

The 8D Process 8D程序
D6 – Implementation of Procedure
执行纠正措施

D6

- Implementation of permanent corrective measures (occurrence/ non-discovery) which ensure a sustainable elimination of the root cause

  实施永久纠正措施（发生/未发现），以确保持续消除根本原因

- Development and implementation of the action plan 制定和实施行动计划
- Check if the measures effectively solve the problem for the end customer

  检查措施是否有效解决了终端用户的问题

- Verify the introduced immediate measures and check if they really provide remedy to the problem 验证采取的临时措施确实提供了问题的解决方法
- Monitor the timely implementation of long-term corrective measures 实时监控长期的纠正措施的执行

Do not transfer the responsibility for the implementation of corrective measures to someone from outside the team! 不要纠正措施的责任推给问题解决团队之外的人！

The 8D Process 8D程序
D6 – Check Sheet 检查清单

D6

- Do the selected measures provide the best possible long-term solution?

  是否选取措施提供了最可能的长期解决方法?

- Has a schedule for the implementation of the measures been created?

  对于措施的执行，是否制定了一个计划?

- Which monitoring methods have been set?
  (Proof of effectiveness; both short- and long-term)

  已设置监控方法了吗？（有效性证明；短期和长期）

- Have suitable key performance indicators for the monitoring of the effectiveness been determined?

  有效性监控的关键性能指标已经确定了吗？

- Have all affected systems, processes and procedural directives been modified according to the knowledge now available?

  根据现有的掌握情况，是否对所有受影响的系统、流程和程序指令进行了修订?

The 8D Process 8D程序
D7 – Preventive Measures预防措施

D6

- Modification of the management and monitoring system, the processes as well as the general procedures so that the same (or similar) problems do no recur in the future (through procedural instructions, FMEAs, control plan, etc, …)

  改进管理和监控系统、过程，以及一般程序，以防止相同（或类似）的问题不在将来再发生（通过程序化的指导书，FMEAs，控制计划等，…）

- Documentation of the results in a data base which records the component process history in order to ensure that similar problems do not occur with new developments or design changes

  将结果输入到记录零件历史的数据库中，以确保证类似的问题不会再出现在新的开发或设计变更中

- Utilization of the results of the 3 x 5 x Why as well as the lessons learned method for other processes, products, plants, business units or divisions

  将 3 x 5 x Why 的分析结果，以及经验教训方法推广到其它的过程、产品、工厂、业务单元或部门

The 8D Process 8D程序
D7 – Preventive Measures预防措施

D7

- Does the problem also occur with other customers?

  这个问题也发生在其它客户身上吗？
- Does the current problem cause additional problems for other customers?

  目前问题是否引发影响其它客户的问题？
- Examination of other potential/ additional failures

  对其它潜在的/额外的失效进行检查
- Selection of a sponsor (champion/ responsible)

  选择发起人（支持者/负责人）

The 8D Process 8D程序
D7 – Check Sheet 检查清单

D7

- Have suitable measures for the prevention of recurrence been initiated?
  是否预防复发的有效措施被启动了？
- Have all processes been examined and improved appropriately?
  是否所有过程被检查和适当地改进了？
- Have all systems and processes been optimized?
  所有的系统和过程是否已经被优化了？
- Have FMEAs been created/ updated? FMEAs被创建/更新了吗？
- Have all procedural directives been updated? 所有程序指令被更新了吗？
- Has an effective improvement been installed? 有效改善被实施了吗？
- Have milestones for the monitoring of the effectiveness as well as evaluations of the long-term success been determined?
  有效性监控以及长期评估的里程碑被确定了吗？

The 8D Process 8D程序
D8 – Conclusion总结

D8

- Hold an open discussion on the resolved problem

  对于已解决问题，举行开放式讨论
- Recording of the “lessons learned” 记录“经验教训”
- Signing rules according to the directives 根据要求，进行8D报告的签署
  - Signing of the 8D report through the responsible quality manager of the customer

    客户质量经理签署8D报告
  - Communication of the 8D report to the responsible quality manager of the customer and subsequent release through the respective person

    与客户质量经理沟通8D报告，然后发布给相关人员
- Reward for both commitment and success

  对解决问题人员的参与和成功解决问题进行奖励
- Conclusion and official dissolution of the 8D team

  8D小组总结，并正式解散

The 8D Process 8D程序
Excerpt from the 8D Report of ZF 8D
摘录自ZF的8D报告

4	Fehlerursache(n) / *Root cause(s):*			
5	Korrekturmaßnahmen / *Corrective actions:*	Verantwortlich: *Manager :*	Termin: *Due date:*	Erledigungsdatum: *Completion date:*
6	Art der Wirksamkeitsprüfung und Ergebnis / *Mode of verification and result:*	Verantwortlich: *Manager :*	Termin: *Due date:*	Erledigungsdatum: *Completion date:*
7	Vorbeugemaßnahmen / *Preventive actions:*	Verantwortlich: *Manager :*	Termin: *Due date:*	Erledigungsdatum: *Completion date:*
		Verantwortlich: *Manager :*	Termin: *Due date:*	Erledigungsdatum: *Completion date:*
	FMEA-Aktualisierung erforderlich? *FMEA-update necessary?* — ☐ Ja / *Yes* ☐ Nein / *No*			
	Aktualisierung Produktionslenkungsplan erforderlich? *Update Control Plan necessary?* — ☐ Ja / *Yes* ☐ Nein / *No*			
	Sind andere Prozesse, Produkte betroffen? *Are other processes, products concerned?* — ☐ Ja / *Yes* ☐ Nein / *No*			
	Sind andere Standorte betroffen? *Are other divisions concerned?* — ☐ Ja / *Yes* ☐ Nein / *No*			

Excerpt „Form Sheet F06 8D-Report" QR83, 2011, p. 52

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Official Due Dates 正式截止日期

Within determined due dates* (to be agreed upon with ZF site):

在确定的截止日期之内完成（需要得到采埃孚的同意）

A proof for the elimination of the failure has to be presented via 8D report. The results and the 8D report are to be forwarded to the customer (the complete 8D report is filled)

消除失效的证据必须通过8D报告提交。结果和8D报告需传递给客户（完整的8D报告）

* If due dates cannot be adhered to, this has to be communicated immediately to the customer together with an explanation. Moreover, the further proceedings should be agreed upon with the respective supplier. In these cases, a report with the interim results and an action plan including due dates has to be forwarded as well.

如果在截止日期前不能完成，必须立即通报客户进行解释。而且，下一步措施必须得到相应供应商的同意。在这种情况下，包含中期结果及有完成日期的行动计划，递交给客户。

The 8D Process 8D程序
Escalation ZF　ZF投诉升级模式

Escalation Modell Supplier/ Purchased Parts 供应商/ 采购件的投诉升级模式

„In the case of inadequate quality of supplied parts, ZF retains the right to take measures in accordance with the ZF escalation model supplier/purchased parts (see ZF Internet). This escalation model is divided into several stages. Escalation can be effected in the case of::

- *Non-successful complaint management of the supplier*
- *Long-term and/or multiple cases of missed target agreements*
- *Customer complaints due to defective purchased parts*

(QR83, 2011, p. 14)

若供应部件的质量不达标，ZF公司拥有根据ZF供应商/采购件事态升级模式的要求（参见ZF网站）而采取相应措施的权利。该模式分为几个阶段：

在下列情况下可产生投诉升级：

- 供应商投诉管理失败
- 长期/或多次未达到协议的目标
- 由于采购件导致客户投诉

The 8D Process 8D程序
Workshop D5-D8 课堂练习D5-D8

- D1: Installation of a problem solving team 建立问题小组
- D2: Problem description 问题描述
- D3: Implementation and verification of containment actions
  实施和验证遏制措施
- D4: Determination and analysis of possible root causes
  决定和分析可能的根本原因分析
- **D5: Review of possible procedures and planning of corrective measures 评审和策划纠正措施**
- **D6: Implementation and verification of the planned corrective actions 实行和验证策划纠正措施**
- **D7: Initiation of actions to prevent recurrence 采取行动防止再发生**
- **D8: Final talks/ lessons learned最终交流/经验教训**

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The 8D Process 8D程序
Summary 汇总

- Installation of a team: Problems can only be solved thoroughly by a **cross-functional team** 建立团队：问题由一个**跨功能小组**彻底解决
- Problem description: The **problem description builds the basis** for the problem solution 问题描述：**问题描述为问题解决奠定基础**
- **Containment action(s) for immediate protection of the customer** from faulty products. Containment actions will remain active until a permanent solution is implemented. **遏制措施立刻保护了客户免于不良品影响**。能够一直保持遏制措施，直到永久措施得到实施。
- What is the real root cause: Do not make assumptions. Carry out a methodological and systematic analysis 什么是真正的根本原因：不能凭假设，应实施**方法论和系统化的分析**
- Implement **suitable permanent corrective actions** that **target the root cause(s)**. 实施了**适当的针对根本原因的永久纠正措施**
- Can you demonstrate that the **corrective actions** solved the problem? Do not implement a "Band-Aid solution", otherwise the failure most likely will recurrence. 是否**验证了纠正措施**能解决问题，而不是仅仅采取了"创口贴"办法，否则失效很有可能重复发生。

The 8D Process 8D程序
Summary 汇总

- Derive standards: Use „**Lessons Learned**“ in order to achieve improvements in both your product and production process 运用**“经验教训”**以对你的产品和过程进行改进
- Document “Lessons Learned” and make it available for other persons in your company 记录“经验教训”，以便公司内的其他员工了解
- 8D is not only a form sheet which ZF requires to be filled in! Implement a **project management**; define activities, dates, responsibilities and use the 8D report for documentation and the subsequent follow-up
  不要将8D当做仅仅是采埃孚所要求的一种需要填写的格式，而是应该进行**项目管理**：定义活动、日期、职责和运用8D报告进行记录和随后的跟进
- Hold an open discussion on the resolved problem举 行针对解决问题的公开讨论

Electronic Handling of Complaints
投诉的电子处理

What do we understand by Electronic Communication? 电子通信技术

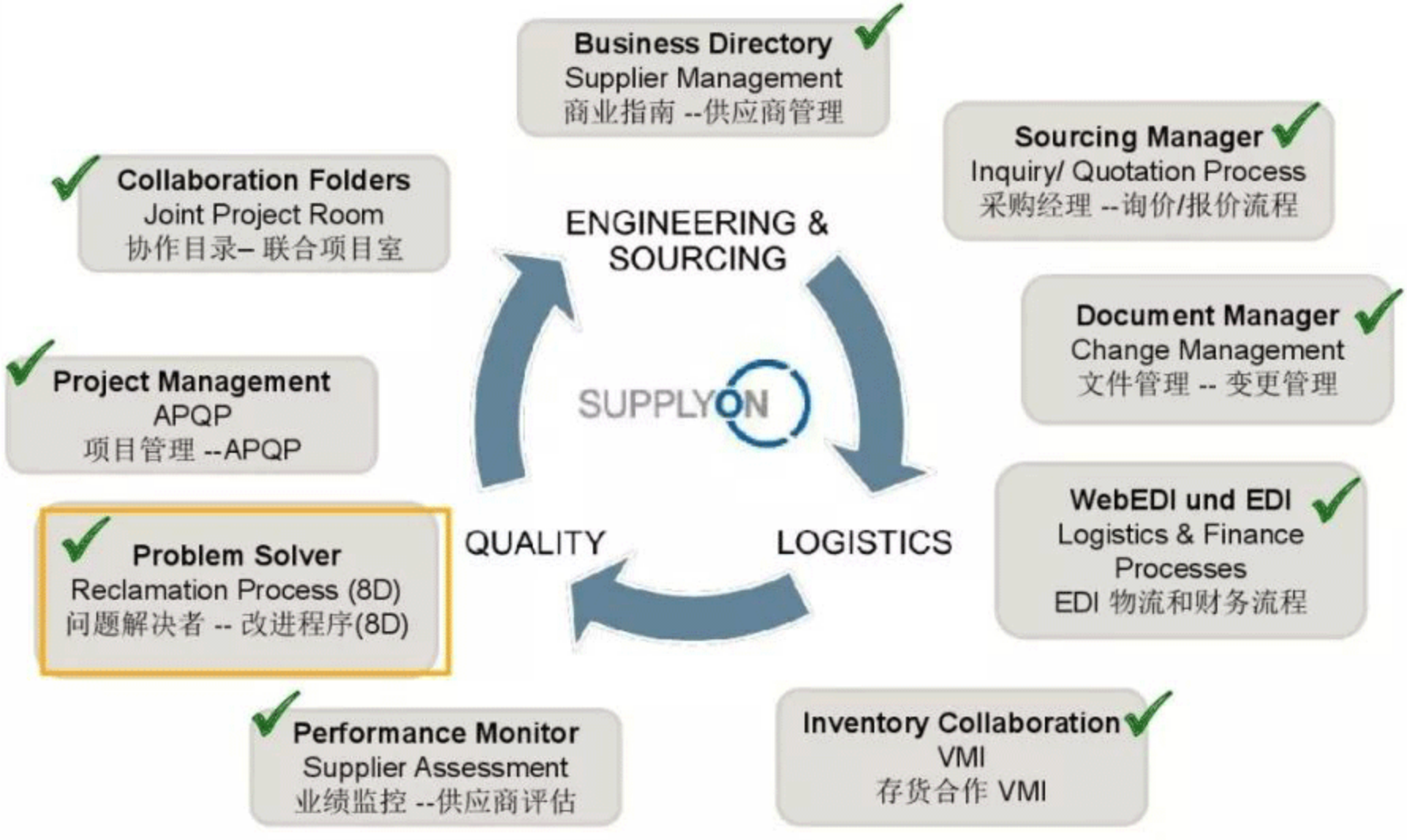
- A multitude of processes within the operative supplier communication is still based on media such as telephone, fax, paper or email 大量与供应商的沟通在执行的过程仍然是基于电话、传真、纸张或电子邮件等方法
- The goal is to change these processes over to internet/ EDI technology and to integrate them with IT systems wherever possible 目标是将这些程序通过互联网/ EDI技术和IT系统尽可能的整合

Was is the SupplyOn Problem Solver? 什么是SupplierOn问题解决者

The SupplyOn **Problem Solver** depicts the interactive complaint and problem-solving process between customer and supplier in line with the 8D method
SupplyOn

问题解决者实现了在客户和供应商之间以8D方法为基础的投诉和问题解决过程的互动

Supply On Services used by ZF
采埃孚所使用的SupplyOn上的服务内容



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Agenda

Introduction 介绍

- Presentation Round 自我介绍
- Work Guidelines 工作指南
- Objectives of the Seminar 研讨会的目标
- ZF specific Requirements 采埃孚特殊要求

The 8D Process 8D程序

- Brief Overview 简明概述
- The single Steps in Detail 每一步骤详述
- Workshops 课堂练习

Conclusion and Feedback 结论和反馈

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Conclusion and Feedback
结论和反馈

- Have your expectations been met? 你的期望得到满足吗?
- What did you particularly like about the seminar?
  在关于该研讨会什么是你特别喜欢的?
- What can be improved? 可以改善什么?

Thank you very much for your Attention!