Lufthansa Technik

More mobility for the world

SMCG – Second Industry day

19.04.2013

Lufthansa Technik Group

“Measurement and driving of Safety Performance”

Lufthansa Aviation Group

Passenger Transportation

The Group's airlines rank among the world's leading carriers.

Logistics

Lufthansa Cargo –
One of the world's leading cargo carrier in international air traffic.

Lufthansa Technik

Maintenance, Repair, Overhaul

Lufthansa Technik –
Leading supplier of engineering services in the world's airline business.

Catering

LSG Sky Chefs –
World's largest provider of airline catering and integrated in-flight solutions.

IT Services

Lufthansa Systems –
One of the world's leading IT service providers for the airline and aviation industry.

Lufthansa Technik Group

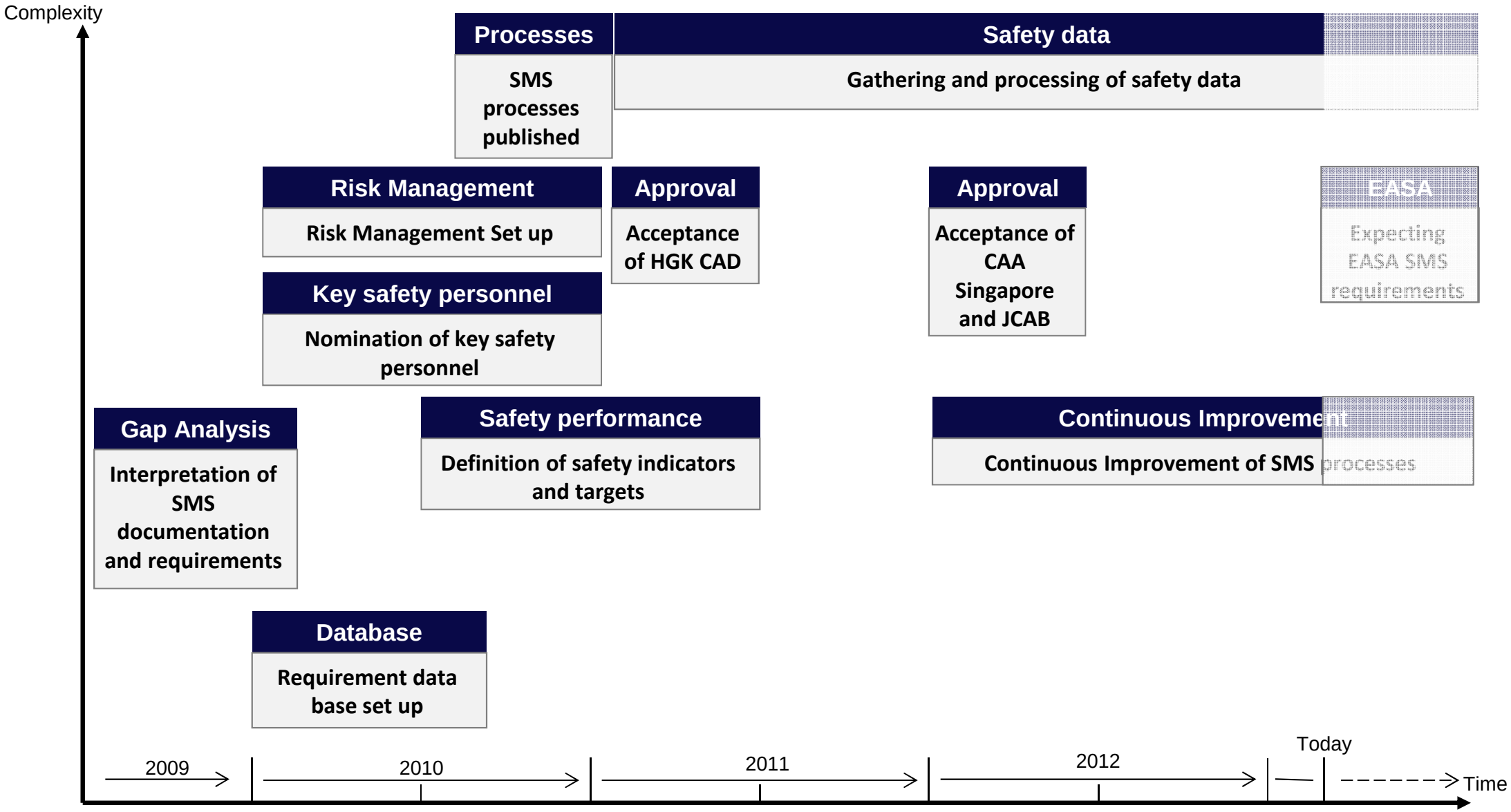
- **731** customers worldwide
- **2.249** aircraft under exclusive contracts
- **2.375** engines under contract
- **1.700** aircraft inspections per day
- **30** subsidiaries and affiliates worldwide
- **58** line maintenance stations worldwide
- **20.282** employees worldwide

Lufthansa Technik Product divisons (PDs)

Aircraft Maintenance Services	Aircraft Overhaul Services	Engine Services	Component Services	Landing Gear Services
				

SMS at the LHT Group

History

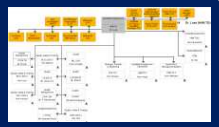


Lufthansa Technik

SMS at the LHT Group

The set up of SMS

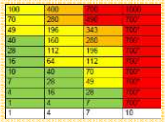
SMS Processes



Standardized processes and clearly assigned responsibilities

Integrated Management System

SMS Tool



Workflow management system and risk management module

SMS Reporting

LHT Group

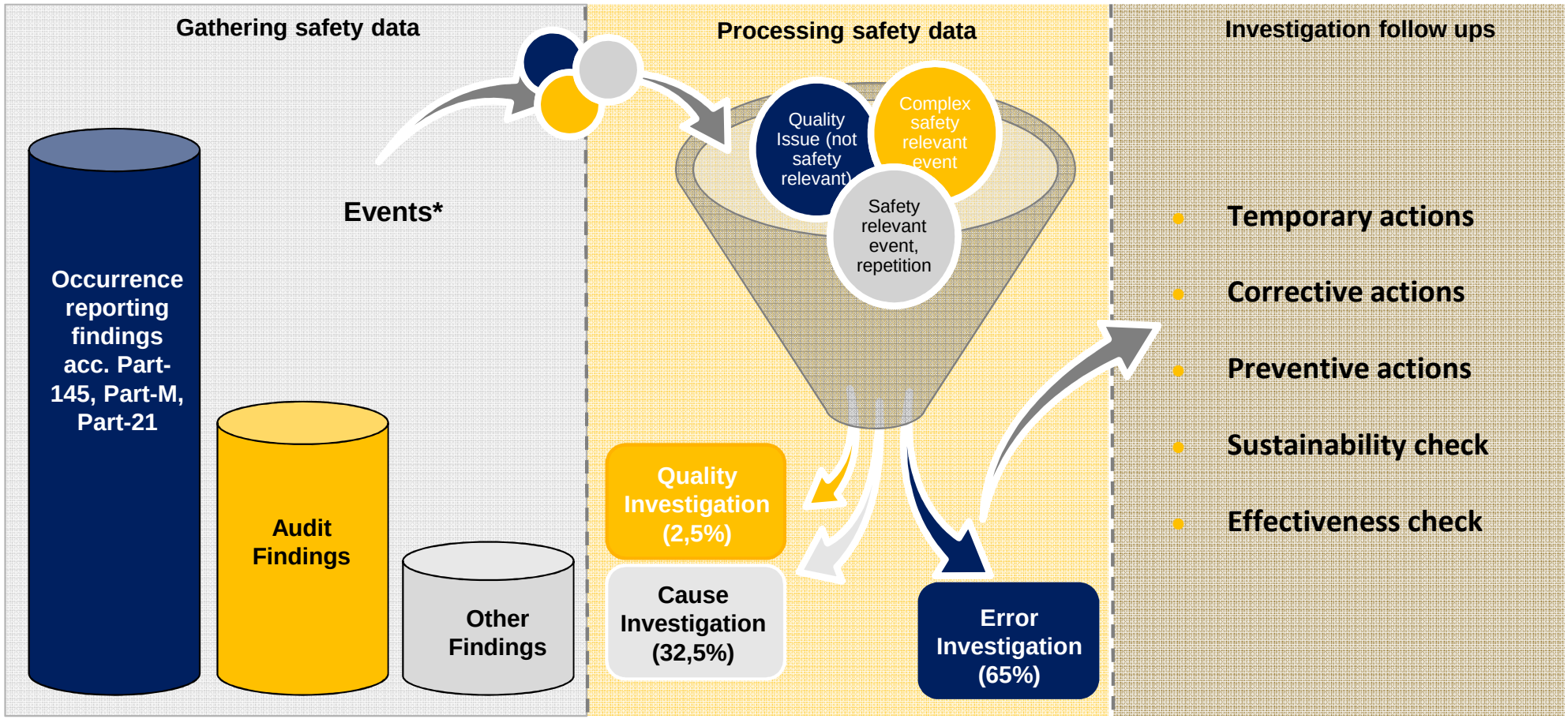
Safety Level

QualitySystem

Single items and KPIs
Trends
Learning's

Gathering and processing of safety data

* 2012: 2500 events



Measuring safety performance

Reporting structure

LHT Quality Management Review Process

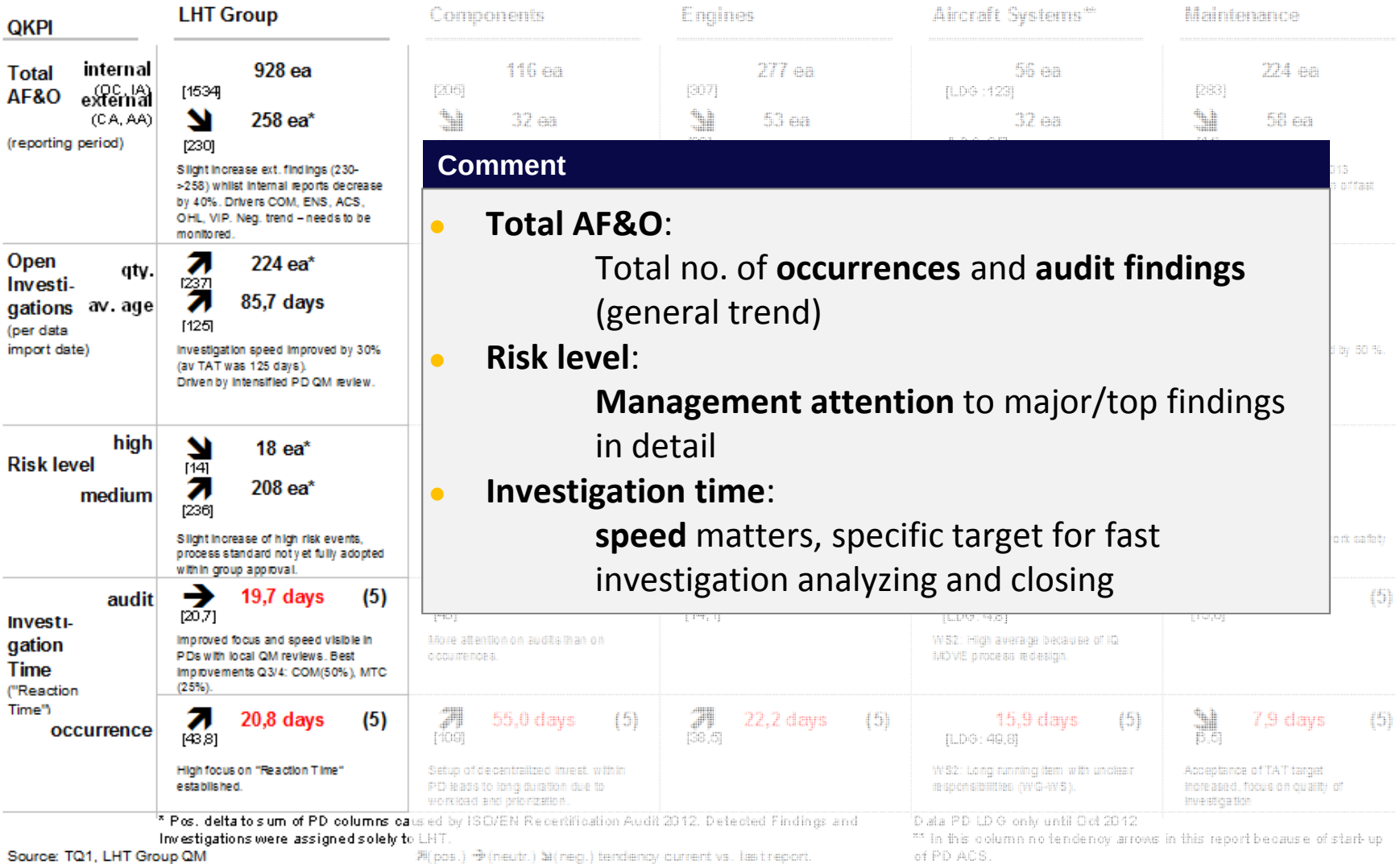
Accountable Manager / Senior Persons / Safety Manager LHT Group

- **Efficiency** of LHT **quality management system** and its processes
- Reports published **semi-annually** and **quarterly**
- **KPI's** cover **key compliance issues**, **safety and quality indicators**
- **Scope:** Binding for LHT Group companies

- KPI definition, data supply and comments **by process owner** and **Safety Manager**
- Reports are **cascaded** for reviews on Group and PD level:
  - **LHT Group report**
  - **Product Divison report**
  - **Detailed report**

LHT measurement facts Q3/Q4 2012

Measurement and driving of safety performance



Lufthansa Technik

LHT measurement facts Q3/Q4 2012

Measurement and driving of safety performance – example of major finding

Customer	QFA
Risk level	high
Repetition	N
CNQ	

A/C reg. / PNR / Engine type	VH-XXX, VH-XXX
ID	A-001065
Source*	QI

* IA = Internal Audit, AA = Authority Audit,
CA = Customer Audit, OC = Internal Occurrence,
QI = Quality Investigation, SC = Spotcheck

Source: TQ2

Qantas-Deviation from AD/SB performance procedure

Description

- Deviation from AD/SB performance procedure by replacing a clamp in the A 380 fuel pipe system.
- SB was performed by using a non Qantas approved alternate method.
- Finally a workflow has been signed which is indeed acc. to SB-procedure and did not fit to the alternate method.

Causes

- The LHT mechanic did contact Qantas personal, in this case a LAME (similar to an EASA CAT-C qualification), but he did not realize that this person is not authorized to approve alternate methods for Quantas.

Actions

Actions	Owner	Due date
CT training extented.	WB6	Closed
Part 145 organization must work acc. maintenance data. i.e. any deviation must be approved by an authorized person with a design qualification.	WB6	28.02.13
Under no circumstances it will be allowed nor accepted to sign workflows which are not in coincidence with the performed work.		

LHT measurement facts Q3/Q4 2012

Top items are distributed throughout the entire LHT Group

LEARN

Lufthansa Error Analysis Reporting Network

Lufthansa Technik

Issue 1.2013

2 Nearly half a million euros
A component loss resulted in high avoidable costs.

3 Domino effect!
A chain of events led to the total loss of an engine and more.

4 Severe frostbite
Upon activation of a fire extinguishing system, an employee was seriously injured.

5 Customers are not all the same
A procedure was transferred to another customer without paying attention to the applicable rules.

6 Foreign object
An unusual foreign object located on ETB's an A320

7 In brief
Short news.

Domino effect!
Page 3

Through the eyes of our customers

Among other things in this issue, we describe an event that is not unique. The implementation of an Airworthiness Directive (AD) to modify fuel lines was carried out with a technically very advantageous solution for which an application as AMOC (Acceptable Means of Compliance) via an Engineering Order (EO) was made.

This modification was then also carried out on an aircraft registered outside Germany in a country for which we have no approval as a design organization. However, those involved did not obtain approval through the aircraft owner from the responsible authority.

There was a comparable case long ago when a foreign aircraft was repaired as part of line maintenance, but the repair unexpectedly became so extensive that it became a base maintenance event – except that there was no base maintenance approval for this site from the aviation authority of the aircraft's country of registration.

A third case occurred during the fusion of Continental Airlines with United Airlines: personal authorizations by Continental, our customer, were not completely transferred to United, which resulted in an AOG situation and the re-entry of fuel tanks with a duplicate inspection.

In all these cases, a technically correct, even commendable repair or maintenance procedure was carried out, but could not be formally concluded.

In all these cases, we deployed our technical expertise and our product knowledge perfectly, but we failed to completely adopt the viewpoint of our customer and the customer's regulatory requirements.

Yet our customers must be able to rely on us to fulfill their individual requirements rigorously and entirely, regardless of whether they come from them or their authorities.

Next to our technical competence, this customer orientation is Lufthansa Technik's great strength. It is up to us to eliminate the few exceptions to this.

Thanks very much for participating!

Dr. Hans Jürgen Loss
Vice President
Quality Management
Lufthansa Technik AG

LEARN Lufthansa Error Analysis Reporting Network

ıot all the same

ıa was intended to save work and turnaround time. orrect implementation resulted in precisely the

customer A ation to the ıs modification ory in an . One of the y out the shortening the rocedure was engineering o implement EO). raft that same to be he mechanic e same one rder variant w that the shortened

procedure was in progress at customer A, he proposed this time-saving variant to the customer B layover coordinator, who had the required release authorization. The customer B coordinator agreed to allow the time-saving variant to be carried out at one of the four positions. Weeks later, the shorter variant was performed on another aircraft belonging to customer B, but this time on all four positions.

During a further layover several weeks later, an engineering employee of customer B noticed that the work had not been carried out according to the manufacturer's Service Bulletin (SB). At that point, the fuel lines that had been modified using the shorter procedure were modified again, but this time according to the manufacturer's SB and by the customer.

nic had the idea ut and remove ıle the fuel line rd, the new two- stalled. Since o be removed, it lace the O-rings ngineering at gestion and rmal implemen- Order (EO). ving the same aircraft from cus- nic suggested oordinator (who horization) to ariant used for g authorized agreed to this d not realize that e had already ıe Lufthansa ed that the thin his given ator directed sition no. 2 be ned procedu- re should be manufacturer's course of s inform the partment. ll the necessary dion from the rdinator moni- no. 2 and then be documented completed

according to the manufacturer's SB. Our employee thus signed off on tasks for this position that he had not carried out according to the job card. Since the work on this job card was marked as "Customer Inspection Required", the customer B layover coordinator also stamped the card. For the Lufthansa Technik employee, this was another reason to believe that the procedure that had been carried out was correct. At this point, it was not clear to any of the employees involved that formally, the performance of the work did not conform to the AD. This is the equivalent of not having carried out the work at all, and means that formally, the airworthiness of the aircraft ceases when the AD's final deadline has elapsed.

- During another layover involving another aircraft belonging to customer B, all four positions were modified using the shortened procedure. Here as well, the work was signed off as having taken place according to the job card – and thus according to the manufacturer's SB. In this case too, the customer B layover coordinator, who had release authorization, stamped the job card.
- During a further layover, an engineering employee of customer B noticed that the modification had not been carried out in conformance with the AD. All the positions on the affected airplanes were then modified again according to the manufacturer's instructions.
- The Lufthansa Technik Quality Manager was requested by the customer's aviation authority to appear and explain the circumstances.

Corrective action:
The following changes were made by the responsible department:

- Employee information describing the procedure for customer layovers and its documentation was produced and distributed.

Above the fuel line pre-modification with the single-piece retainer. Below the two-piece retainer post-modification.

What to LEARN:

- We as technicians are surely in agreement that the shortened procedure is doubtless sensible from a technical point of view. Nonetheless it represents a deviation from the requirements of an aviation authority, and deviations are definitely only legal when the corresponding instructions (EO, etc.) are available in writing from the customer's engineering.
- Never sign off on tasks that you have not performed. From a legal point of view, doing so can represent intentional document falsification.
- Procedures and processes are not automatically transferable from one customer to another. You must comply with the aviation requirements and contracts applicable to the aircraft you are working on. If in doubt, please consult your quality department or the customer coordinator.

Issue 1.2013 | 5

LHT measurement facts Q3/Q4

Measuring of safety performance - examples

Customer	LCAG
Risk level	high
Repetition	N
CNQ	Kasko

A/C reg. / PNR / Engine type	D-AXXX
ID	A-001031
Source*	QI

* IA = Internal Audit, AA = Authority Audit,
CA = Customer Audit, OC = Internal Occurrence,
QI = Quality Investigation, SC = Spotcheck

Source: TQ2

LCAG MD11F, D-AXXX cable fire

Description

- During troubleshooting in fuel tank system a cable fire occurred, although all CBs in the concerned system were pulled.

Causes

- No obvious reason for the cable fire was found, therefore the behaviour of Kapton wire in combination with humidity was blamed on that.
- Boeing statement: very small damage to the Kapton layer of the wires suspected. Due to the known facts that the wire is hygroscopic (i.e. absorbs water) rendering it susceptible to wet arc tracking and due to wire aging, hairline cracks will appear after the wire has dried which can lead to micro current leakage (i.e. electrical 'ticking' faults) which in turn can eventually culminate in an explosive arc tracking event. (i.e. short circuit).

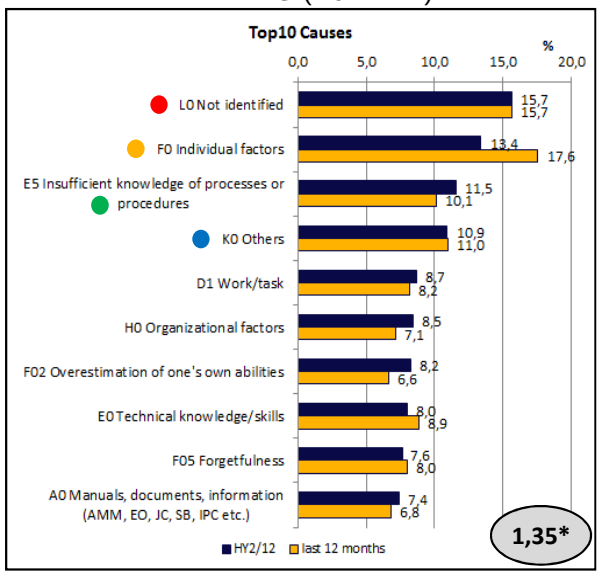
Actions

Actions	Owner	Due date
As a precaution and based on the experience made in SHJ, the mechanics are obliged to follow the guideline of AMM and FIM before a CB will be reset again and the work will be confirmed via CRS.	ZK5	28.02.13

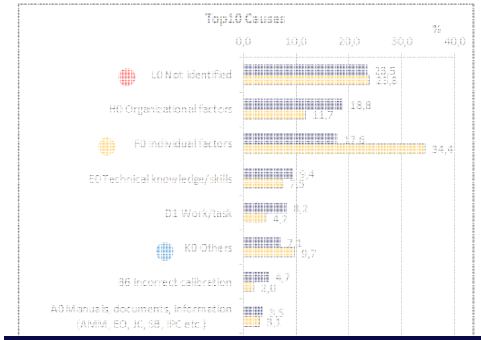
LHT measurement facts Q3/Q4

Measurement and driving of safety performance – Top Ten causes

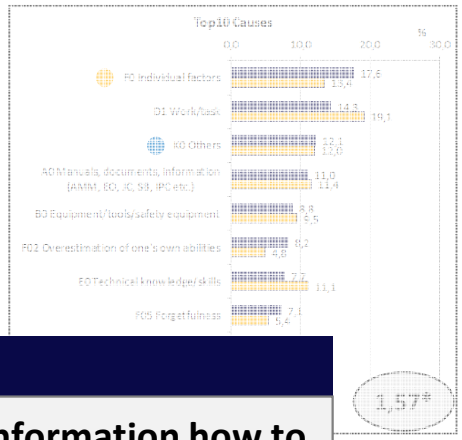
LHT AG (incl. LTMI)



WG



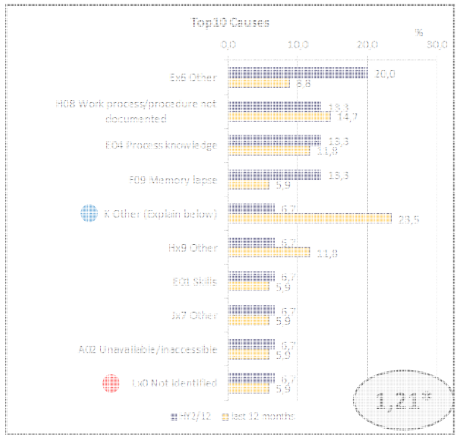
WT



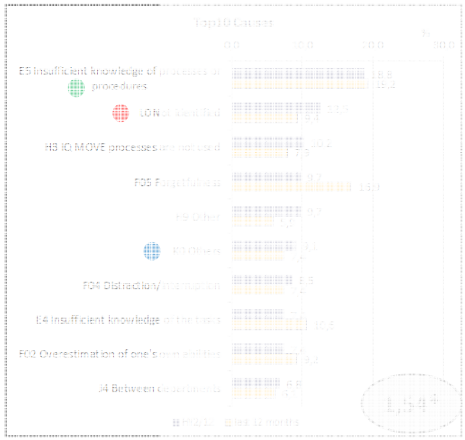
Comment

- **Top Ten causes give us well information how to prioritize general “construction sites”**

WS (incl. WL)



WF (incl. LTMI)



WD

WY

LHT measurement facts Q3/Q4

Driving safety performance

QKPI		LHT Group	Components	Engines	Aircraft Systems**	Maintenance
Open actions (per data import date)	qty.	→ 197 ea [190]				
	av. age	↘ 116,4 days [75,7]				
		Increase of av. age driven by audit related actions primarily of PD MTC/TQ24.				
Imple-mented actions	qty.	1248 ea [1411]				
	av. age	→ 22,2 days [23]				
Effective-ness	qty.	↗ 233 ea [186]				
	%	↗ 87,1 % [81,2]				
(reviewed actions and success rate)		Increase of reviews by 25% - Interpretation of process can be improved still.	No proof of effectiveness after a defined timeframe yet. Will be defined by WG Quality Circle.			

Comment

- **Effectiveness**: **positive trend in use** of sustainability checks (+25%), improved process understanding will be supported.

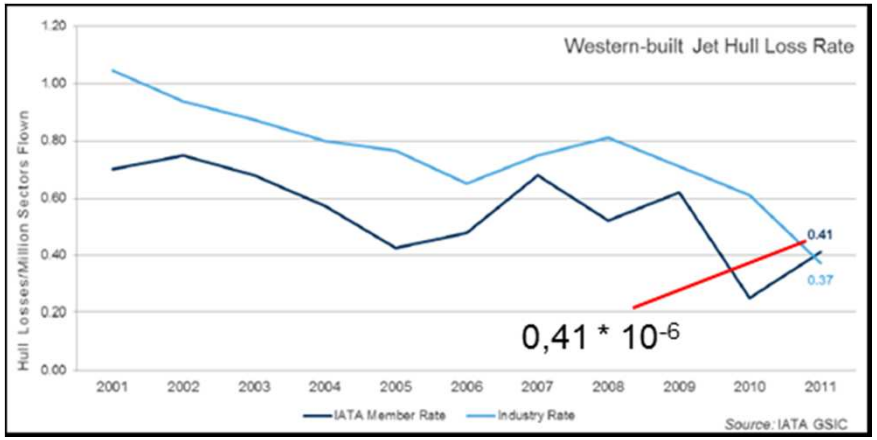
Data PD LDG only until Oct 2012

** In this column no tendency arrows in this report because of start-up of PD ACS.

Future

SMS challenges

- Lufthansa Airline interface – How to take part of the 10^{-8*}



- Safety information: Gathering of customer feedback information

- Expecting EASA regulation

10^{-8} = The overall safety goal of the Lufthansa Group

Hendrik Bödecker

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Thank you very much…