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Experience Feedback in the Air Transport

Why an experience Feed-Back ?

- Airbus is an aircraft manufacturer and not an operator
 - The manufacturer has no direct knowledge of encountered difficulties
- Obviously, an aircraft manufacturer's number one goal is to sell as many aircraft as possible.
- To accomplish this goal, however, the manufacturer must produce safe aircraft.
 - It is hard to imagine how a manufacturer could remain in business if its aircraft were found to be unsafe.
 - Public perception of an aircraft's safety plays a major role.

Why an experience Feed-Back ?

- To be successful, a manufacturer must continuously modify its products to :
 - Improve operating efficiency and enhance safety.
 - Accommodate changes in technology and flight operations.
 - Sell aircraft in a highly competitive market.
- Therefore, to be successful, the manufacturer must listen to the marketplace and listen to operators of its aircraft.

Experience Feedback Process

- To achieve these goals, a manufacturer must establish a process which provides continuous dialog with its customers.
- For this process to be productive :
 - The manufacturer must listen to operators of its aircraft.
 - The operators must report to the manufacturer “The things that do not work properly”.
 - The manufacturer must provide feedback to the operators
- This continuous dialog with the operators provides “*Experience Feedback*” to the manufacturer.
- Experience Feedback is indispensable to the continuous product improvement process.

Airbus Operators Commitment for Reporting

- The operators are required, by contract, to provide certain important information to Airbus.
- Clause 19 of the Standard Sales Contract states :
 - The buyer shall provide the seller, as the seller may reasonably request, with all the necessary data pertaining to the operation of the Aircraft for an efficient and coordinated survey of all reliability, maintainability, operational, and cost data with a view to improving the safety, availability, and operational costs of the aircraft.
- This provision has been in all contracts, beginning with the first Airbus (Industrie) aircraft in the early 1970s.
- Operators and manufacturers must also report to the Airworthiness Authorities

A Few Figures on Experience Feedback

- Number of A/C in service (end of Aug. 2004) : 3386
- Number of Operators (August 2004) : 223

- Total Flight Hours : Approx. 73 billions
- Total number of Take-off (end July 2004) : Approx. 36 billions

Figures per families of aircraft (end of July 2004)

A300, A300-600, A310 : 26.492.436 / 13.503.593

A318, A319, A320, A321 : 35.293.752 / 20.143.848

A330, A340, A340-600 : 11.261.314 / 2.349.917

A Few Figures on Experience Feedback

- In 2003, the Airbus fleet accumulated approximately 9.000.000 FH et 4.000.000 FC
- Number of queries received by Airbus in 2003 : 36.180
- The most significant events are submitted on a formal report called a “Technical Event Report”.
- Number of significant events reported to the Authorities in 2003 : 885

Means of reporting

- Most events are reported to Airbus through the Resident Customer Support Managers.
- With some airlines, a computerized process is under evaluation
- Other events are reported :
 - During regular operational and technical visits.
 - During operator symposiums and conferences,
 - Through other sources, such as pilot associations and the regulatory authorities.

Airbus Feedback to Operators

- All reported events are carefully analyzed by Airbus.
- Depending on the gravity of the event, Airbus may implement some or all of the following actions.
 - Provide information to all operators through :
 - Operator Information Telex (OIT)
 - Flight Operations Telex (FOT)
 - Service Information Letters (SIL)
 - Technical Follow Up reports (TFU)
 - Temporary modification of operational procedures by issuing Operations Engineering Bulletins (OEB).
 - Implement mandatory maintenance actions or inspections through an All Operators Telex (AOT),

Airbus Feedback to Operators (Continued)

- Depending on the gravity of the event, Airbus may implement some or all of the following actions (continued).
 - Changes to operations and maintenance procedures, such as those in :
 - Flight Crew Operating Manual (FCOM).
 - Aircraft Maintenance Manual (AMM).
 - Maintenance Planning Document (MPD).
 - Trouble Shooting Manual (TSM).
 - Modifications to the aircraft, its systems, or its engines by :
 - Changing the design and incorporating these new features in production aircraft.
 - Issuing a Service Bulletin (SB) to permit these modifications to be retrofitted into existing aircraft

Feedback to operators - Some figures

- During Year 2003, Airbus has issued :
 - Operators Information Telex (OIT) : 195
 - Flight Operations Telex (FOT) : 53
 - All Operators telex (AOT) : 37, including 12 revisions
 - Service Bulletins (SB) :
 - 468 new SBs
 - 528 revisions of existing SBs

Implementation of Corrective Actions

- Airbus defines corrective actions for :
 - All significant technical events.
 - All repetitive minor events.
- However, this does not automatically mean that these corrective actions are retrofitted into aircraft that are already in service.
- Therefore, it is necessary to mandate all of the safety related modifications and procedural changes.
- The Airworthiness Authorities issue Airworthiness Directives (ADs), in coordination with Airbus, to mandate the critical actions.

Is Experience Feedback efficient ?

- How well has the Experience Feedback process worked at Airbus ?
- For technical issues, the process has worked well and it is efficient.
- The main reasons for this success are :
 - The large number of reports received.
 - The high quality documentation which accompanies most of the reports.
 - The fact that operators benefit from the product improvement modifications which result from Experience Feed-back, even though the process costs them money.

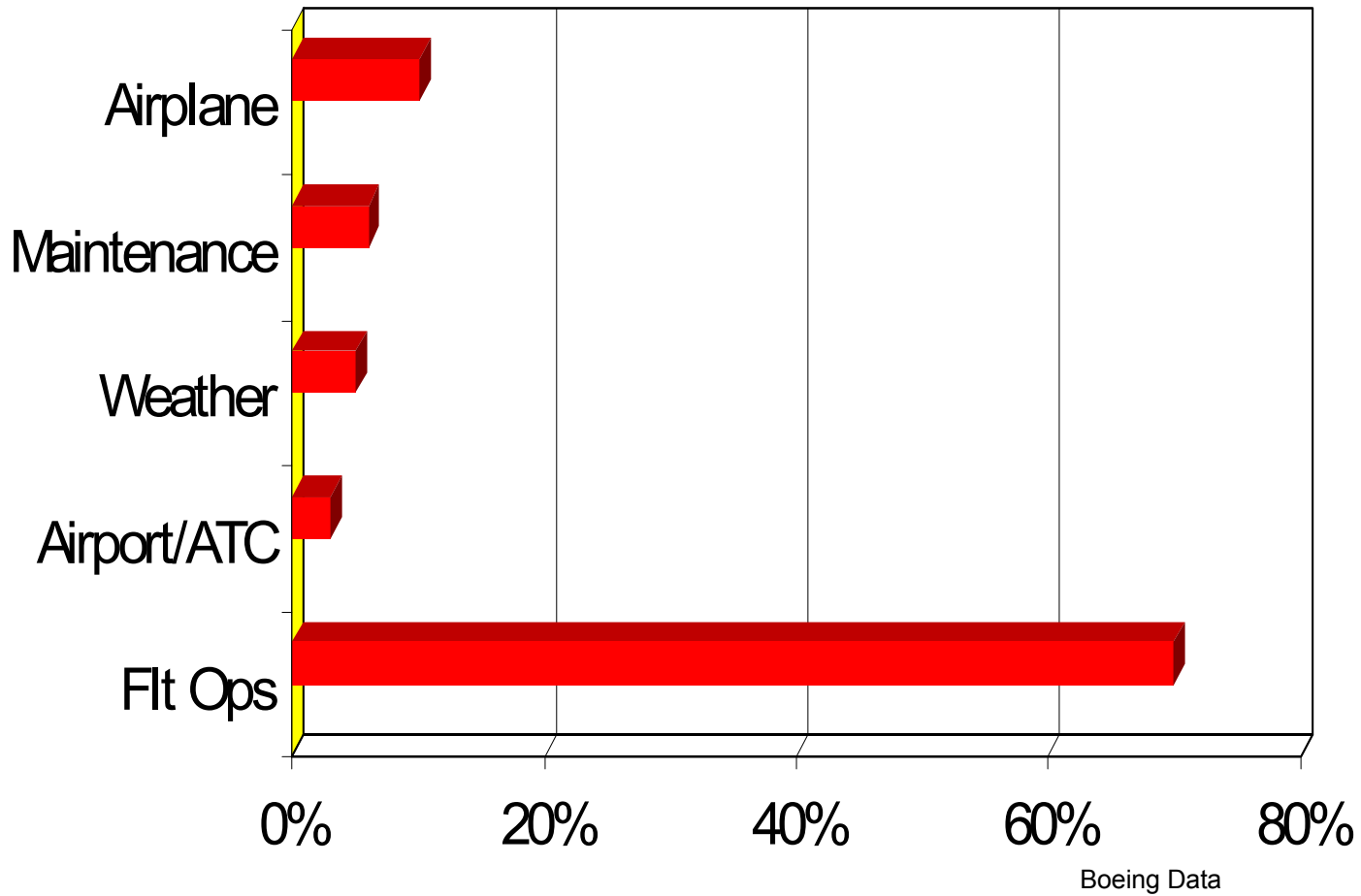
Experience Feedback and Accident Prevention

- Experience feedback generates a very important activity.
- But most of this activity is related to **technical issues**.
- It is a must in term of Flight Safety Enhancement and Accident Prevention
 - but is this sufficient ?
- Are we addressing the most frequent accident main causes ?

Lessons Learned From History

- The aviation industry currently has an excellent safety record, especially when compared to other means of transportation.
- However, many people claim that it is necessary to further improve this record, as aviation grows, to maintain the confidence of the travelling public.
- To do this requires a more global approach to obtaining Experience Feedback.
- A review of accident statistics shows one major area where improvements can be made.

Primary Causes of Turbojet Accidents



Turbojet Accident History

- These statistics are published by Boeing to show the percentage of turbojet accidents attributed to each accident category.
 - Only about 1 out of 10 accidents is attributed to technical failure.
 - About 10 % are attributed to maintenance.
 - About 10% are attributed to the operating environment, such as weather, ATC, or airports.
 - About 70% are attributed to flight crew related factors.
- The logical question to ask is “How well does the Experience Feedback process work on operational issues ?”

Accident Prevention Strategies

- The statistics show that failure in human performance is the primary cause of a large majority of serious accidents.
 - 95% of all accidents with Airbus Industrie aircraft fall into this category.
- Unfortunately, there are many instances where the manufacturer only becomes aware of potentially serious operational events (or a series of events) during investigations associated with a major news story or an accident.
- In a number of cases, it has been evident that the mishap could have been prevented if the manufacturer or the management of the airline had been made aware of the previous similar events.

Will it remain “too late”

- The manufacturer almost always asks the same questions during the investigation of an human error incident or accident.
- Was the human error caused by :
 - Inadequate procedures ?
 - Improper understanding of the procedures ?
 - Inadequate or improper training ?
 - Failure to diligently apply good procedures ?
 - Inadequate situation awareness ?
 - Difficulty in understanding displayed information ?
 - Difficulty in using controls or displays ?
 - ...
- Why did we not know about this possibility before ?
- Why no report of precursor events ?

What are the Road Stoppers

- Some factors in the pilot community are :
 - Fear of sanctions, many countries have criminal codes.
 - Fear of losing the job.
 - Fear of “losing face”.
 - Labor / Management issues.
 - Not understanding “what really happened” or why.
- Some factors within airline management are:
 - Preserving the corporate image, “l’Image de Marque”,
 - Fear of sanctions, especially criminal liability.
 - Lack of resources to analyze the events.

The Two Main Issues

- There are two common themes which prevent pilots and management from providing meaningful Experience Feedback to manufacturers.
- The two main issues are :
 - The fear of the consequences of reporting the event to someone else.
 - Failure to conduct basic analysis of the events.
- The good news is that there are several proven ways to improve the situation.

Airbus Safety Initiatives from 1994

- The Flight Safety Confidential Reporting System was implemented in March 1995.
- The Aircrew Incident Reporting System, based on the BASIS software, was implemented in 1996. The software is available, free of charge, to all operators.
- Flight Safety Conferences are held once a year to share experience.
 - 11th Flight Safety Conference was held at Toulouse, October 12-14 2004 with 114 participants from 88 operators

Airbus Safety Initiatives from 1994 (Continued)

- A flight safety magazine called “HANGAR FLYING” is widely distributed and provides a new means of disseminating “lessons learned” to pilots and operators.
- Upon operator request, Airbus Industrie performs in-depth confidential analysis of operational events.
- A flight data analysis program (FOQA) has been developed and is proposed to the operators.

Conclusions

- Experience feedback is a permanently running activity,
- It is a very significant activity in terms of workload
- It allows to continuously refine the quality and the safety of the air transport

- Several running programs were developed by Airbus to address the reporting of the operational events, to better define and implement appropriate safety strategies

- It is an endless task