THE LOSS OF RAF NIMROD XV230

A FAILURE OF LEADERSHIP, CULTURE AND PRIORITIES
My Involvement
The Incident

- The Nimrod, a derivative of the De Havilland Comet, has a long and distinguished record in maritime reconnaissance and other roles over 40 years, and continues to play an important role in Defence.

- XV230 was the first Nimrod to enter service with the RAF on 2 October 1969.

- RAF Nimrod XV230 was lost on 2 September 2006 on a mission over Afghanistan when it suffered a catastrophic mid-air fire, leading to the total loss of the aircraft and the death of all 14 service personnel on board.
Fatal Design Flaws

Design flaws introduced at three stages played a crucial part in the loss of XV230.

• First, the original fitting of Cross-Feed hot air ducts by Hawker Siddeley in about 1969
• Second, the addition of the SCP (also hot air ducts) by British Aerospace in about 1979
• Third, the fitting of the temporary Air-to-Air Refuelling modification during the Falklands war in 1982 and made permanent by British Aerospace in about 1989.
Learning Point

Don’t Assume old systems are safe by design and because they haven’t gone wrong so far
Fuel Lines v Hot Pipes

Fuel Vent Couplings

Cross-Feed Duct

Multiple Fuel Couplings

SCP Duct at lowest point of Dry Bay
No 7 Dry Bay

View from Underneath No 7 Dry Bay
Learning Point

Changing the role changes the risk
Prevention - Safety Case System

• An incident database may tell you what has happened in the past, it does not tell you what might or could happen in the future. It should be remembered that the day before the Piper Alpha disaster itself in 1988, and the Challenger disaster in 1986, the platforms involved were ‘safe’ based on an analysis of past incidents alone.

• The MOD had implemented ‘Safety Cases’ based on the 1984 CIMAH Regulations which implement the 1982 EC Directive on major industrial accidents.

• A Safety Case was defined as “a structured argument, supported by a body of evidence, that provides a compelling, comprehensible and valid case that a system is safe for a given application in a given environment”.

Prevention – Nimrod Safety Case

The Nimrod Safety Case was drawn up between 2001 and 2005 by BAE Systems and the MOD Nimrod Integrated Project Team (IPT) with QinetiQ acting as independent advisor.

The Nimrod Safety Case represented the best opportunity to capture the serious design flaws in the Nimrod which had lain dormant for years.

If the Nimrod Safety Case had been drawn up with proper skill, care and attention, the catastrophic fire risks to the Nimrod MR2 fleet presented by the Cross-Feed/SCP duct and the Air-to-Air Refuelling modification would have been identified and dealt with, and the loss of XV230 in September 2006 would have been avoided.
Safety Case – Failure

Enquiry Report found:

Lamentable job

“Unfortunately, the Nimrod Safety Case was a lamentable job from start to finish. It was riddled with errors. It missed the key dangers. Its production is a story of incompetence, complacency, and cynicism. The best opportunity to prevent the accident to XV230 was, tragically, lost”

General malaise

“The Nimrod Safety Case process was fatally undermined by a general malaise: a widespread assumption by those involved that the Nimrod was ‘safe anyway’ (because it had successfully flown for 30 years) and the task of drawing up the Safety Case became essentially a paperwork and ‘tickbox’ exercise”
Why Did the Safety Case Process Fail - BAE

• The work was poorly planned, poorly managed and poorly executed, work was rushed and corners were cut.

• BAE Systems had left 40% of the hazards “Open” and 30% “Unclassified”.

• The work was riddled with errors of fact, analysis and risk categorisation

• The critical catastrophic fire hazard relating to the Cross-Feed/SCP duct had not been properly assessed and was one of those left “Open” and “Unclassified”.

• At handover meetings in 2004, BAE Systems gave the misleading impression that the task had been properly completed. and could be signed off and deliberately did not disclose to its customer the scale of the hazards it had left “Open” and “Unclassified”

The Nimrod IPT and QinetiQ representatives were lulled into a false sense of security.
Why Did the Safety Case Process Fail - MOD

The MOD Project Team (IPT) failed to spot obvious errors

- Safety Case task delegated to a junior person
- Lacked required skills and knowledge
- There was no oversight or supervision of his work
- Failed to involve equipment operators
- Failed to check the BAE report thoroughly

The Nimrod IPT work was described as sloppy, complacent and it had outsourced its thinking.
Learning Points

Don’t assume contractors/consultants have done what you asked of them or that they have done it properly.

Retain the skills necessary to properly review and assess any work that has been outsourced.
MOD – Underlying Problems

The Enquiry found that during the period 1998 – 2006 those involved in the MOD suffered from:

- Cuts
- Change
- Dilution
- Distraction

Financial pressure drove a cascade of organisational changes which diluted the airworthiness (safety) regime.
Cuts and Change

CUTS

The 1998 Strategic Defence Review Called for a 20% reduction in budgets and much attention was focussed on achieving this aim.

CHANGE

Organisational changes had severely affected the Project Teams ability to do their jobs.

“There was so much successive change-upon-change and not enough support to people like the Projects Teams in understanding exactly what the environment (organisation) looked like, what their responsibilities were and what help they needed to undertake those responsibilities.”
Dilution of Airworthiness Regime and Culture

A marked dilution of the airworthiness regime and culture took place in the MOD during the period 2000 to 2006.

The implementation of the Strategic Defence Review and the 20% ‘Strategic (savings) Goal’ held centre stage.

- First, there was an inexorable shift from a ‘safety and airworthiness culture’ to a ‘business culture’ during this period in the MOD.

- Second, the organisational changes in the MOD led to a safety and airworthiness regime which was organisationally complex, convoluted, confused and seemingly dysfunctional.

- Third, meanwhile, there was also a steady dismantling of some of the important features of the safety and airworthiness regime which had previously existed.
Distraction

The enquiry quotes witnesses who said:

“Re-structuring, organisational changes, new initiatives and reports tumbled one after another, with little time to bed down. They had to support two operations and provide savings which had already been taken by Long Term Costings.”

“There are lots of ‘change managers’ but nobody manages change.”
Leadership

The focus of the Senior Leadership in the MOD became:

• Delivering change/ the change programme
• Achieving the 20% savings goal

Leadership had given the impression that budgets were more important than safety.

“There was no doubt that the culture at the time had switched. In the days of Sir Colin Terry you had to be on top of airworthiness. By 2004, you had to be on top of your budget, if you wanted to get ahead”
Government Inquiry – Summary

• A failure to adhere to basic Principles;
• A Military Airworthiness System that is not fit for purpose;
• A Safety Case regime which was ineffective and wasteful;
• An inadequate appreciation of the needs of an Aged Aircraft;
• A series of weaknesses in the area of Personnel;
• An unsatisfactory relationship between the MOD and Industry;
• A Safety Culture that has allowed ‘business’ to eclipse Airworthiness.
We manage aged assets with design flaws.
We have probably changed the way we operate our assets
We often rely on industry experts for advice
We often go through periods of significant change
Financial pressures are ever present

We need to ensure the errors that caused the MOD to take its eye off the ball on aircraft safety are not repeated in our own organisations.
Key Learning Points

1. Don’t base future risk assessments just on previous performance

2. Don’t assume consultant/contractors have done what you asked. Thorough checking by competent individuals is essential.

3. Ensure the staff engaged on making safety critical decisions are experienced, trained and have the skills to do so.

4. Carefully manage change so it does not become endless and confusing

5. Recognise the Importance of leadership – if leaders at all levels don’t make safety a priority no one else will.
QUESTIONS ?