

Learning From Experience The Human Element of Aircraft Accidents

Wing Commander Ross Priday

Engineer Officer, Royal Air Force, United Kingdom

Keywords. Lessons, Behavior, Interventions, Accidents

Abstract: Few Royal Air Force officers will have had to deal with the aftermath of two separate fatal air accidents, the second happening right in front of personnel under his command. This is the leadership challenge that Wing Commander Ross Priday faced as the chief engineer of the Red Arrows in November 2011. With the future of the world famous aerobatic team in doubt, the cause of the accident needed to be quickly and positively determined so that measures could be put in place to restore confidence in the aircraft and equipment. Trust between the aircrew and groundcrew became strained and pilots were understandably nervous about returning to flight without a clear root-cause being determined. Ultimately, the accident highlighted that no matter how unlikely a scenario might be, the holes in the Swiss cheese model could still line up and cause a fatality. The subsequent Military Air Accident Investigation Branch (MilAAIB) findings had far-reaching implications for military aircraft operations in the RAF, challenging cultures and procedures that had been in place for many years. With a focus on learning from experience, Priday openly talks through the most difficult, but also the most rewarding 2 years of his life.

1. Introduction

In 2011, the Royal Air Force Aerobatic Team (RAFAT), known as The Red Arrows, suffered two separate fatal aircraft accidents. Whilst the cause of the first accident was quickly established and well understood, the second accident, an inadvertent ejection from an aircraft on the ground, was far more complex with respect to causal factors. As a consequence, the team found themselves grounded for a number of months while accident investigators and the team's engineers tried to piece together what went wrong. With a bereaved family and considerable press and media attention, the spotlight on the team had never been greater. The pressure on the team was immense and was felt most acutely by the team's engineers who believed that their own credibility and professionalism was in question. Procedures were scrutinised and changed, training was reviewed, and behaviours were questioned.

Engineers were interviewed by civilian and military police, the MilAAIB and the Health and Safety Executive (HSE) as the investigation focused more closely on maintenance procedures. As the team continued to prepare for the 2012 display season, the pressure took its toll, with some personnel being given time off for stress related reasons. With very limited information available from the ongoing investigations, the atmosphere of uncertainty and self-doubt pervaded for almost 18 months, until the final MilAAIB report was published.

Focusing on the human dynamics, the presentation details how, at an individual and team level, personal and professional relationships were tested to the limit. Individuals suffered stress and depression as a result of the pressure they were under. The team faced its biggest challenge yet in its illustrious 50-year history and as flying re-commenced in early 2012, the future of the team was far from certain. Under a

microscope from senior officers, open reporting and just culture principles on the team were challenged by over-reactions and inappropriate responses to low-level events.

The presentation analyses what went wrong, but it also describes how personal and team confidence was restored and how, under continued scrutiny from regulators, air accident investigators and the HSE, the team came to terms with why one of their own died in such tragic circumstances.

2. Methods

The presentation is given by the team's senior engineer officer at the time of the accidents and it explains what happened, how it happened and then explores the human behavioural complexities surrounding why it happened, drawing on comparisons with other organisations and disciplines both within and outwith aviation. With some analysis of human behaviour, the presentation highlights the natural cognitive responses that contributed to the accident scenario. Comparisons to aviation security procedures and medical screening techniques are considered, using references to recent statistics and associated human behavioral theory.

Whilst the case study draws heavily on the personal experiences of the senior engineer, gained from living through the accidents and their aftermath, it also refers out to relevant academic studies and human behaviour theory to offer a balanced view on why something so simple went so badly wrong. The accident is analysed from a personal, team and organisational perspective and it offers an open and frank critique of decisions made at the time, whether good or bad.

The presenter goes on to share his experiences of a legal system that, in his opinion, has yet to fully integrate the apparent vagaries of human performance into a black and white legal process. He offers some thoughts on the admissibility of Service Inquiries in a court of law and considers the unintended consequences of an organisation pursuing legal recourse for something that was ultimately natural human behaviour.

Finally, the presenter offers some thoughts and lessons that could be applied to any scenario where human behavior and performance has the potential to cause accidents.

3. Results

Presented through a series of PowerPoint slides and a video, the case study uses publically available information to provide an explanation of the accident, its causes and effects, from a human factors perspective. With comparisons drawn to both airport security and medical screening processes, the presentation offers much food for thought with respect to human performance, with lessons offered for both the practitioner and senior leader alike.

By addressing equipment design issues, the potential for human behavior to cause an undesirable outcome through interaction with that equipment can be vastly reduced. The presenter focuses on the need for intelligent and sustainable interventions to accidents and incidents, but also discusses how we can measure the effectiveness of those interventions to gain assurance that they are having the desired effect.

Picking up on observations and comments from other human factor experts, the presentation concludes by suggesting that organisations and senior leaders need to challenge traditional thinking and responses to human error scenarios.