

Challenges for Safety Investigation

The ATSB's Executive Director, Mr Kym Bills, was honoured to be invited to make the opening address at this, the 2008 Australasian Air Safety Seminar – Transport Safety – Past, Present, Future. I know that he is disappointed that he could not accept the invitation due to commitments in St Petersburg in his role as the past Chairman of the International Transportation Safety Association. This did of course open the door for me to be here today to stand in for Kym, and I consider it a great privilege to have the opportunity to provide the opening address, in this 30th anniversary year of the Australian Society of Air Safety Investigators. This year is also my 30th anniversary of involvement in aviation, having launched my career in 1978, when I entered the Air Force as an air traffic control officer. Thirty years sounds like a long time, but it has passed for me – as I am sure it has for you – almost in the blink of an eye. The aviation industry has evolved and changed in that time and advancements in technology that we have seen probably couldn't have been imagined 30 years ago.

When invited to give this presentation, it was suggested that, consistent with the conference theme, it would be appropriate for a presentation on the ATSB, perhaps briefly reviewing the development of the ATSB, but more importantly, looking forward to possible changes and developments in safety investigation. In doing so this morning, I will briefly cover the development of the ATSB, and will look to changes and developments in safety investigation by way of a discussion of some of the challenges facing aviation.

In reviewing the development of the ATSB, we need to look back some considerable period of time. The first aircraft accident in Australia involved an attempted flight of a Wright Flyer at Rose Hill, NSW in 1910. The aircraft crashed during takeoff. The first controlled aircraft flight recorded in Australia occurred in 1911 at Diggers Rest in Victoria and involved a flight by Harry Houdini piloting a French-built Voison aircraft. However, the first accident recorded by the Commonwealth occurred on 28 March 1921 and involved a Mono Avro aircraft and resulted in the death of the pilot and one passenger and serious injuries to the other passenger. The accident report stated: 'Doubt as to cause, but suspicion of interference by passengers with pilot'.

Prior to 1927, accidents were investigated by Boards of Inquiry. Separate Boards were assembled for each accident, members being selected from suitably qualified officers of the Commonwealth Public Service: but public dissatisfaction led in 1927 to the creation of the Air Accident Investigation Committee to investigate all civil and RAAF aircraft accidents which the Committee deemed advisable to investigate.

With the formation of the Department of Civil Aviation in 1938, following the loss of the DC 2 aircraft *Kyeema* near Mt Dandenong, Victoria, and the subsequent public inquiry, air safety investigation became the responsibility of the aviation regulatory authority within the Department. In the 1950s, a specialist Air Safety Investigation Branch was formed within the Department to carry out that role and included the establishment of a number of regional offices.

Rapid post-war developments in aviation, including the increasing sophistication of modern aircraft and the introduction of cockpit and flight data recorders (for which accident investigators will remain eternally grateful to Dr Warren) demanded a more forensic approach to aviation safety investigation.

To prevent conflicts of interest, the Air Safety Investigation Branch reported directly to the Director General of Civil Aviation, rather than through the departmental chain of command. In practice, however, this arrangement could not always completely refute perceptions that the Department was 'investigating itself'. This was particularly so where one branch within the Department came under scrutiny for its part in the development of an accident or an air safety incident.

The formation of the Bureau of Air Safety Investigation (BASI), in May 1982, as an operationally independent entity linked to the Commonwealth Department of Aviation reporting directly to the Minister of Aviation and operationally entirely separate from the regulatory functions of the Department, was a major change in the way air safety investigation and, particularly air accident investigations were conducted and administered. It is interesting to note that with the creation of BASI, there was in one sense a return to the situation that existed prior to 1938. The separation between air investigator and regulator was furthered with the creation of the separate regulator, the Civil Aviation Authority in 1988.

The idea of a multi-modal Australian Transport Safety Bureau (ATSB) flowed out of draft recommendations to then Transport Department Secretary, Allan Hawke, during the 1998-99 McGrath Review of the Bureau of Air Safety Investigation. BASI had a great reputation but there was an opportunity to do even better in a multi-modal environment that included non-regulatory aspects of the Federal Office of Road Safety, the Marine Incident Investigation Unit (MIIU) and a new rail safety unit. The ATSB was subsequently established on 1 July 1999, with Kym Bills as its first Executive Director.

BASI and later the ATSB have played a significant role in promoting aviation safety within Australia. At times, BASI and ATSB investigations have resulted in significant advancements to aviation safety worldwide. The bureau was among the first agencies worldwide to move from a focus on sharp end performance and 'pilot error' to a more systemic approach to investigation and (from Monarch 1983) to adapt the work of James Reason. Complementing that approach, the Bureau has been a leader in the discipline of human factors (especially via Dr Rob Lee) and the heavy commitment of human factors resources and to examining organisational issues have been a key feature of the Bureau's work.

In order to stay at the 'top of its game', the ATSB has had to remain both vigilant and agile. This is particularly important as the level of external scrutiny and challenge to the ATSB's investigation processes and findings has increased, with higher expectations of the ATSB's work being demanded and more instances where the safety messages have been refuted or diluted by other parties for purposes other than transport safety.

The principles of independence and the protection of sensitive safety information in the interests of future safety have been firmly protected. These are considered non-negotiable ingredients for a successful safety investigation agency. These principles have been bolstered with the introduction of the *Transport Safety Investigation Act 2003* after nearly two years of consultation.

The ATSB's continuing acknowledgement that human fallibility requires transport systems to be error resistant or error tolerant remains a feature of its investigation methodology. However, rapid changes in technology in all modes of transport have necessitated both a rethink in terms of the mix of investigation expertise required within the ATSB and an increased focus and commitment to ongoing training for investigators to keep up with those changes. Underpinning that commitment is the Bureau's accreditation as a Registered Training Organisation, appointment of a full time dedicated training manager and the Bureau's Diploma in Transport Safety Investigation program. Such changes in technology include satellite-based navigation systems, high-efficiency engines, increased use of composite materials for the construction of transport vehicles, the introduction of glass cockpits and the move from mechanical to fly-by-wire systems.

There have also been changes in the tools available to investigators to carry out their work that have helped to improve the rigour of safety investigations. Accident site mapping can now be accomplished with the use of laser scanners. The ability to forensically examine a failed component has been made easier and quicker with improvements to electron scanning microscopy. Visual simulations can now be developed using data from flight recorders which serve as a powerful tool for the understanding and analysis of accident sequences. In addition, in recent times the ATSB has made major advancements in the rigour and structure of its analysis methodology. The introduction of the the ATSB's Safety Investigation Information Management System (SIIMS) in 2007, and its associated investigation and analysis tools, which complement that methodology has, I believe, propelled the ATSB to the forefront of contemporary transport safety investigation practice. That is not to suggest that we can be any less vigilant and agile in meeting the challenges of enhancing aviation safety. Indeed, in placing some context on the operation of the ATSB, I have already alluded to a number of challenges that are a feature of the current aviation safety investigation environment, some of which I will return to as ongoing challenges for the future.

As part of my preparation for this address, I separately asked my senior colleagues at the ATSB to give me their top two challenges facing aviation safety and investigation. It was interesting that the first point raised by each of them related to skills shortage across the industry, including pilots, air traffic controllers and maintenance staff. We see an increasingly competitive labour market, with low unemployment levels, sound economic growth and continued high labour demand, particularly as we see continued growth in the low cost sector. Intertwined with this are the changing demographics of the aging baby boomer (the 48 to 65 year olds) and, to a lesser degree, generation X (28 to 47 year olds) population. Consider also the greater dependence that will need to be placed in the future on generation Y (ie the 6 to 27 year olds); attracting and retaining these people in the aviation workforce – these people who collectively have decidedly different beliefs to the majority of us here – who are likely to embrace constant change as a

way of life – who do not define themselves by their jobs – and who will probably consider 4 to 5 years as long term employment, is going to be difficult to say the least.

All these factors strongly indicate to an industry where experience levels are reducing dramatically. Add to this the financial pressures of rising fuel costs and rapid growth, and we are starting to paint a picture of an industry that will need to withstand increasing stress in the future. In Australia in particular, there will be significant challenges for the industry to meet societal and political expectations that rural and regional Australian air services will be maintained to a high standard. We face an environment where resistance to pressures to cut corners in training will be paramount; where real and meaningful safety management systems need to be integral to an organisation's operation. It would come as no surprise to you I am sure that the ATSB has seen many examples during investigations of safety management systems that are little more than a book on a shelf, or loose words that are readily bandied about. Hand in hand with this is the need for commitment to the establishment of strong safety cultures. Again, while we see excellent examples of such strong cultures, we see many examples where translation of the words into action and reality is far removed, and it is clear that manager lack of awareness of human performance remains an issue in this regard.

It is a matter of some frustration that we continue to see the same types of fatal accidents, particularly controlled flight into terrain, VFR into IFR conditions, fuel exhaustion/starvation, wire strikes and needless and indeed reckless high risk GA behaviour. While, some are what I would describe as the unfortunate result of innocent human fallibility, we continue to see too many of these accidents that are clearly avoidable and the result of poor preparation and decision making, and what it seems can only be described as a disregard for the lessons of the past. Learning from others and mindfulness of past lessons are crucial to curbing the continuing trend of avoidable accidents. Understanding of the limits to human performance and organisational behaviour, risk analysis, and threat & error management will need to feature more so than ever in the future.

I mentioned earlier that the ATSB has had to respond to changes in technology in all modes of transport. Indeed such advances in technology will present challenges to the industry in general. Greater reliance on satellite-based navigation systems, high-efficiency engines, increased use of composite materials for the construction of transport vehicles, the introduction of glass cockpits, the move from mechanical to fly-by-wire systems, and the introduction and increased use of UAVs, are just a few examples that are presenting unique challenges to operators, maintainers, regulators and obviously investigators alike. A specific example that comes to mind is the affordability of VLJs. This will see high performance, high technology and high altitude aircraft placed in the hands of private pilots. Introduction of these aircraft represents a new frontier in aviation and there is no doubt that there is a learning curve ahead for owners, maintainers, air traffic services providers and investigators alike.

In many respects the task of investigating is getting just plain harder. Investigation agencies are not immune to the competitive labour market and challenge of the industry in general to attract and retain appropriately trained, skilled and

experienced staff. It is also a fact that 'gross problems' or 'big ticket items' that have been identified in accident and incident investigation in the past are becoming much rarer. Investigation is becoming much more forensic in nature and I believe we are seeing more frequently that investigations are resulting more often in influencing incremental change.

While the need for timeliness in investigation has always been important (if not always achieved), media, political and societal expectations have certainly changed, and there is a need more than ever to strive for better timeliness. Careful consideration is needed as to what trade-offs might be made between investigation timeliness and thoroughness, but the greatest challenge is probably how we achieve both.

A prime example is the ATSB's Lockhart River investigation report. I believe the quality of this 500-page report into the worst civil aviation accident in Australia since 1968 is first rate, but more problematic was that the final report took almost two years to be released. While there were several interim reports and the investigation was complicated by an inoperative CVR, no witnesses and the extent of destruction of the Metroliner 23, two years is a long time. The ATSB is examining ways that this could be improved, which may require directing fewer resources to other lesser priority investigations.

I suspect that the ATSB is not alone in battling with this problem, and while there will always be exceptions, getting the balance right between professionalism and timeliness and explaining any need to take longer than societal expectations, will be an increasing challenge if safety investigations are to remain relevant.

The other matters that featured strongly in the responses from my colleagues when questioned on challenges for the future, were the need to strike the right balance between no-blame and culpability in a 'just culture', and the need to strike the right balance between the need to protect safety data and the demands of legal systems.

The confusion or industrial agenda that 'just culture' means no blame or liability, even in instances of serious and deliberate wrongdoing by aviation industry practitioners is an issue that needs to be addressed. As James Reason has argued, engineering a 'just culture' in which the 10 per cent or so of wilful and culpable actions do not escape sanction, while encouraging reporting and learning from the other 90 per cent of actions that lead to accidents and incidents is 'the all-important early step'. But there are those who would suggest that a just culture involves only 'no-blame' investigation and who seek protection for 100 per cent of behaviours. Meanwhile, we have seen judicial systems imprison crew members who have done little more than be involved in an accident because of actions and omissions that were the types of error expected among all humans. Closer to home we are seeing safety investigations becoming increasingly subject to external scrutiny. On one level, such external scrutiny should be welcome and investigations should withstand reasonable objective scrutiny. Significant scrutiny of ATSB investigation reports is applied through coronial inquests. However, while technically inquisitorial in nature, such forums are in reality often adversarial as our increasingly litigious society has led to parties attempting to

divert attention from, and dilute important safety issues in pursuit of their own agendas. This unfortunately often leads to protracted proceedings and results in a significant drain on ATSB investigative resources.

The desired implementation of the Global Aviation Safety Roadmap in terms of protecting safety data to enable its wider and timelier sharing is predicated on robust legislation in member states. This is a great challenge for many poorer ICAO states, but also for some of the otherwise best practice members. For example, the US NTSB is required to make available much sensitive data it holds, including CVR transcripts, in a public docket even where it is sourced from another state of occurrence, and France's BEA has similar challenges because of the power of its judicial system. The new Attachment E to Annex 13 seeks to provide guidance with respect to some of these legal difficulties but serious tensions remain in the Annex itself.

In Australia, the ATSB has not been immune from legal and regulatory pressures. The *Transport Safety Investigation Act 2003* mentioned earlier, protects safety information obtained and analysed by the ATSB as a 'no-blame' safety investigator. As an example, the TSI Act recently stood up to legal challenge, in what became known as the Elbe shipping case, where a party in a civil case relating to the leakage of oil from a ship in Gladstone harbour sought to obtain the ATSB's investigation evidence. The Executive Director refused to issue a certificate for the release of the evidence and the party challenged the TSI Act as being unconstitutional, as it claimed such decisions should reside with the courts. The Federal Court upheld the legitimacy of the TSI Act and the party was ordered to pay costs.

That is not to suggest that the ATSB doesn't recognise the need for a just culture. A just culture is preserved through the ATSB taking a cooperative approach to any required parallel investigations by regulators, police or other bodies, which must be entirely separate and gather their own data and evidence. This is particularly important because the ATSB can compel evidence that may otherwise incriminate and ATSB reports are unable to be used in criminal or civil courts. However, as I mentioned earlier, they can be used in a coronial inquest. In addition, Australian legislation provides for a CVR to be used in cases of severe criminality unrelated to normal crew duties, such as in the case of drug running or terrorism.

Accident investigation by safety investigators remains essential, if only to remind us of the continuing need for vigilance to avoid the human and other factors that have led to so many unnecessary accidents and fatalities in the past. In many cases, professional investigations do much more than just remind us of past lessons. There are new and novel twists based on differing organisational cultures and pressures, regulatory environments and human interfaces with other humans and with changing systems and technologies.

In closing, it is clear that using all available means to avoid a major accident is a primary challenge. This includes good safety management systems among all key players, understanding of the limits to human performance and organisational behaviour, risk analysis, data collection and analysis, threat & error management, and excellence in regulation. Human factors will without doubt continue to

dominate as a key element of safety investigation. It is crucial that we learn the lessons from the past and the experiences of others. Close cooperation within the aviation community is essential to ensure that those lessons that will benefit safety are shared openly.

I thank you again for the opportunity to make this opening address and I look forward to an enjoyable, productive and stimulating seminar.