



Australian Government

Australian Transport Safety Bureau

*Safe
Transport*

New Challenges in Aviation Safety Investigation

A presentation to the 2009 ANZSASI Regional Air Safety Seminar

5-7 June 2009

Neville Blyth

Senior Transport Safety Investigator
Australian Transport Safety Bureau



A Brief History of Aviation Safety Investigation in Australia

- From the commencement of aviation activity in Australia, separate Boards of Inquiry were convened to investigate each significant accident.
- Public dissatisfaction led to the Air Accident Investigation Committee being created in 1927 – investigating those civil and military accidents that the Committee deemed advisable.
- The growth of aviation stretched the resources of the AAIC, and criticism was directed at the private nature of the investigation and reporting process.
- After the *Kyeema* accident in 1938, the Government convened a public inquiry and fielded further calls for a reform of the investigation of accidents.
- *Air Courts of Inquiry* were subsequently held for major accidents, at the discretion of the Minister.
- In 1947, new Air Navigation Regulations were introduced, following the Chicago Convention (part of the development of ICAO).
- In 1952, the functions of incident and accident investigation were combined under the Division of Aviation Safety Investigation (DASI), later becoming the *Air Safety Investigation Branch* (ASIB).



A Brief History of Aviation Safety Investigation in Australia

- ASIB expanded through the 1950's and '60's, with branches in all states.
- 'Courts of Accident Inquiry' became 'Boards of Accident Inquiry' in 1955.
- With the increasing sophistication of aircraft and investigation techniques, including the introduction of on-board recorders (CVR, FDR), investigation facilities were progressively improved and specialist staff recruited.
- The ASIB central office relocated to Canberra in 1983, becoming the *Bureau of Air Safety Investigation* (BASI).
- On 1 July 1999, the multi-modal *Australian Transport Safety Bureau* (ATSB) was formed from BASI, the Marine Incident Investigation Unit (MIIU) and the non-regulatory parts of the Federal Office of Road Safety (FORS).
- The *Transport Safety Investigation Act* was introduced in 2003, providing a significant streamlining the investigative process and providing sound protections for sensitive information that may be obtained by investigators.
- On December 2, 2008, as part of its 'Aviation Green Paper', the Government announced that the ATSB would become a fully independent, statutory commission on 1 July 2009.



Why investigate aviation accidents or incidents?

Is this a silly question?

- Aviation, like all modes of transport, involves some level of risk.
- *Safety* can be defined as the comparative absence of risk.
- Contemporary risk assessment involves an exploration of the *likelihood* and *consequences* of an event.
- When an event occurs, it *in itself*, is an indicator of likelihood and consequences.
- The investigation process, in its most basic form, involves the determination of likelihood (by identifying the factors that contributed to the event) and consequences (by looking at the event outcomes or potential outcomes).

Why investigate aviation accidents or incidents?

- Consider safety investigation as 'error analysis', in the learning by 'trial-and-error' philosophy.
- The investigation outcome provides the information (evidence) needed to precipitate change (risk reduction).
- Where do preventative systems (e.g. SMS, FOQA, LOSA) fit into the *Safety Assurance* framework? Are these a substitute to investigation?
- Are both reactive and preventative systems needed? History would suggest they are.

Change Influences – the past

- In years past, the Australian Air Safety Investigator would attend a broad range of accidents and incidents – in many cases individually.
- Investigators quickly became very efficient, able to attend upward of 30 accident sites per year.
- The work of the ASI was often 'taken as presented' in inquests and later civil court actions.
- Smaller investigations tended to be an overview of the occurrence – gathering the information that came to hand quickly, and publishing an 'Occurrence Brief'.
- Over the years, stakeholders began to demand increasing thoroughness and detail in investigations – necessitating larger teams and longer investigations.
- It became evident to managers, that some types of accident could yield little information of general benefit.
- Those accidents (fatal injuries or otherwise) were given a lower priority and sometimes not attended by a site team.
- Societally, this did not sit well – there was an expectation that a government agency should investigate fatal aviation accidents.

Change Influences – the present

- In 2007 – 08, the ATSB received approximately 15,200 notifications, of which 8,299 were recorded as aviation safety occurrences and 77 investigations commenced (0.93%).
- Accidents and incidents involving recreational, amateur built and non-VH registered aircraft are not investigated by the ATSB – the relevant association or federation may assist police in preparing a report for the coroner in the case of fatal accidents.
- Coronial inquests into fatal aviation accidents are often held, with ATSB investigators being compellable by subpoena to attend as expert witnesses. Preparation for inquests and the increasingly commonplace challenge to the published investigation findings adds a considerable resource burden
- Under legislation, the ATSB has primacy over the collection of evidence in an investigation it has initiated, and that evidence is then classified as 'restricted information' – protected against disclosure.
- The restriction of information has drawn criticism from stakeholders and others, including the judiciary, directly-involved parties and regulatory agencies.

New Challenges

- Selective Investigation
 - *Safety benefits vs. finite resources*
 - *Societal expectations*
 - *Risk acceptance*
- Depth of Investigation
 - *Toward root cause analysis*
 - *The 80/20 rule*
- 'Just Culture' vs. Justice
 - *Disclosure of information*
 - *Protections*



Selective Investigation

- ICAO Annex 13 (1944 Chicago Convention) says, in respect of aviation accidents –

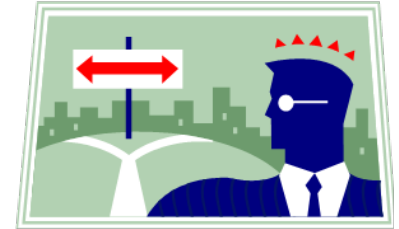
“The State of Occurrence ***shall*** institute an investigation into the circumstances of the accident and be responsible for the conduct of the investigation....” (Chapter 5.1)
- Australia (and some other signatory States) have filed a notice of difference with ICAO, in respect of chapter 5.1 –

“In respect of ultralights and sport aviation, for example, microlights, gyrocopters, gliders and hang gliders, investigations will be conducted only if ***benefits*** to future safety are evident and ***resources*** allow for such investigation.”

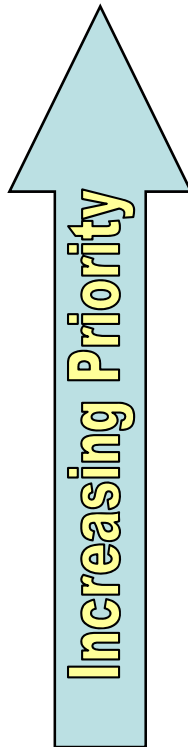
Selective Investigation

- Drivers for the decision to investigate:
 - The potential safety benefit that may be gained – i.e. how much could be learned that would assist in the reduction of likelihood and/or consequences in the future?
 - The size of the risk presented by a recurrence of the event
 - The consequences of the event – i.e. magnitude of loss of life or injury
 - The public profile of the occurrence
 - The extent of resources available, and likely to be consumed by investigating
 - Any risks associated with not investigating

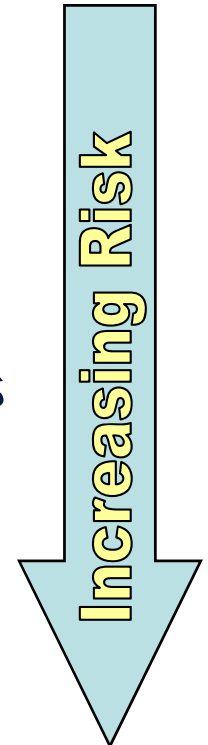
Selective Investigation



- *Prioritisation...*



- Passenger transport – large aircraft
- Passenger transport – small aircraft
- Commercial, fare paying recreation
- Flying training
- Aerial work with participating passengers
- Other aerial work
- Private transport
- Recreational / sports aviation
- Experimental aircraft operations



Depth of Investigation

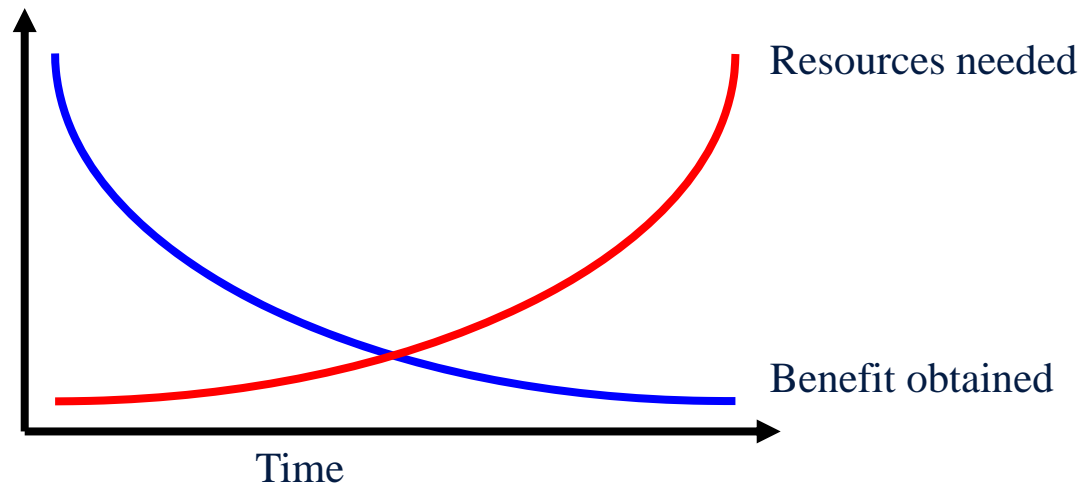


- *Too much vs. not enough*
 - The ideal - full *Root Cause* analysis
 - Fully investigate every potential contributing factor
 - Inevitably arrives at human factors considerations
 - Very expensive
 - Very time consuming
 - Poor efficiency, in regard to Outcomes vs. Resources

Depth of Investigation



- *The 80/20 rule*
 - 80% of the findings (thus potential benefits) come within the first 20% of the nominal time allocated
 - Flexibility to terminate an investigation is important (but should publish outcomes and justifications)



‘Just Culture’ vs. Justice

- What is ‘Just Culture’?
 - An industrial or political culture where “frontline staff are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but....
 - where gross negligence, wilful violations and destructive acts are not tolerated.” ICAO Working Paper A36-WP/112



'Just Culture' vs. Justice

- What is Justice?

- "Judgement of persons or causes by a judicial process"

Macquarie Dictionary 2007

- What is 'Natural Justice'?

- "that justice which responds to fundamental logic and absolute fairness rather than to the laws of a particular place and time."

Macquarie Dictionary 2007



‘Just Culture’ vs. Justice

- Just Culture in Safety Management
 - The concept and importance of establishing a Just Culture has been recognised as of major importance in safety management – principally as a mechanism to encourage reporting of safety occurrences.
 - Has evolved from the concept of ‘blame free’ reporting.
 - Is created by providing protections on the information gathered for the purposes of a safety investigation (ICAO Annex 13)

'Just Culture' vs. Justice

- **Transport Safety Investigation Act, 2003**
 - Establishes the concept of 'Restricted Information' i.e.
 - All statements obtained from persons by a staff member in the course of an investigation
 - All information recorded by a staff member in the course of an investigation
 - Records of the analysis of information acquired during the course of an investigation
 - Protects that information i.e.
 - A person who has access to restricted information must not disclose that information to any person, or to a court

‘Just Culture’ vs. Justice

- Justice & the Law
 - Increasing ‘criminalisation’ of actions
 - Increasing focus on responsibilities and accountabilities
 - Increasing trend toward litigation
 - Decreasing societal acceptance of misfortune
 - Greater drive towards appropriating liability
 - the “Blame Culture”



‘Just Culture’ vs. Justice

- **Where are the conflicts?**
 - Judicial investigations require, and are empowered to obtain evidence
 - Information from safety investigation is evidence.....
- **Factors contributing to conflict**
 - Mutual lack of understanding of safety / judicial investigation
 - Media and political pressures
 - Societal pressures
 - Catch-22 i.e. penalties for both disclosing and divulging information

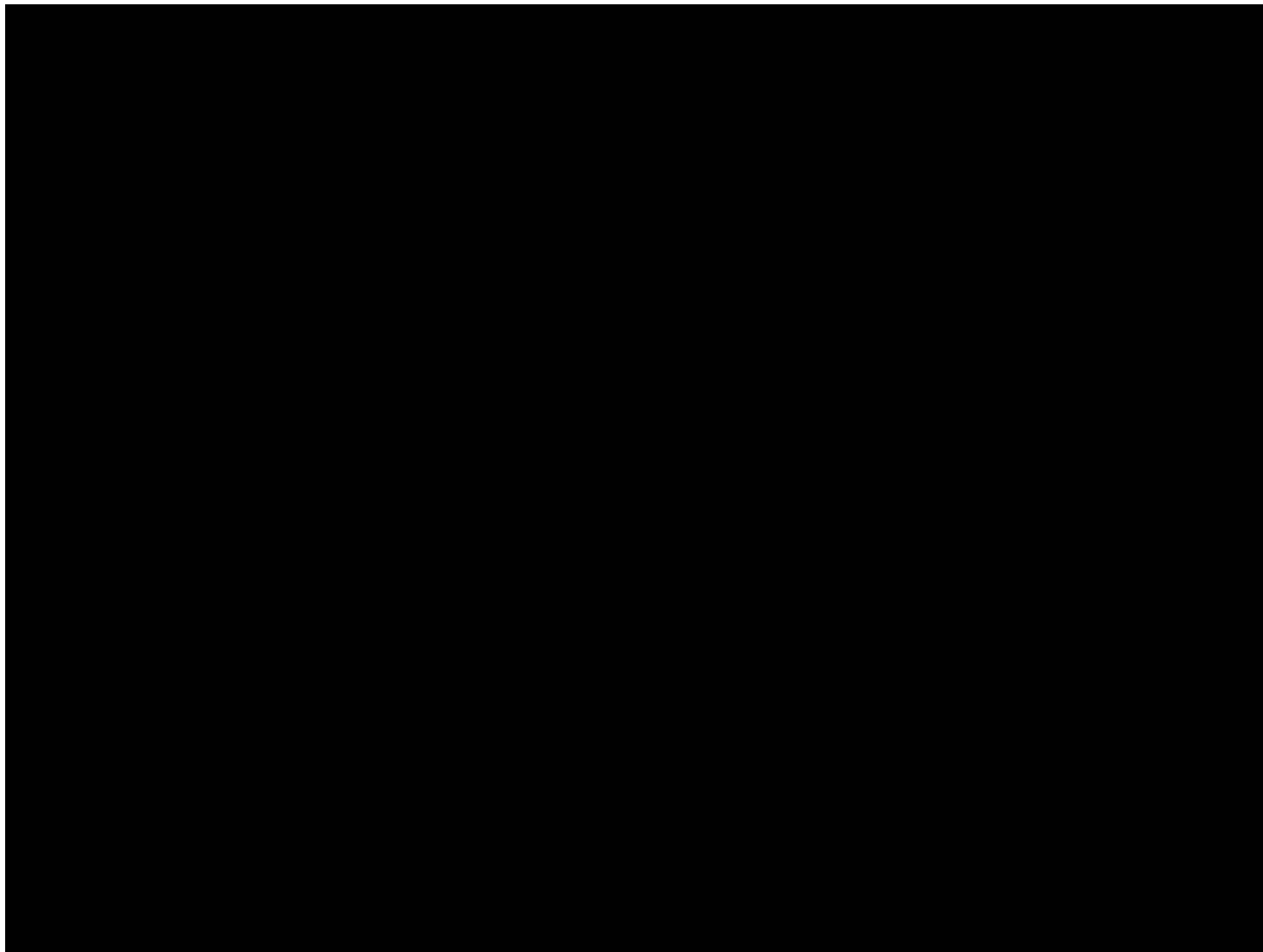
'Just Culture' vs. Justice

'The Vicious Circle'



‘Just Culture’ vs. Justice

- Überlingen mid-air collision, 1 July 2002
 - Tu-154M with 69 passengers and crew – many children and families
 - B757 freighter with 2 crew.
 - Both at FL360 on conflicting courses.
 - Controller handling two consoles & relying on a secondary radar system, as the primary system was in maintenance.
 - Controller, realising the conflict, gave Tu-154 instruction to descend, but shortly after, the on-board Traffic alert and Collision Avoidance System (TCAS) instructed the pilots to climb. The pilots followed the controller’s instruction.



Excerpt from BBC 'Crowded Skies'

'Just Culture' vs. Justice

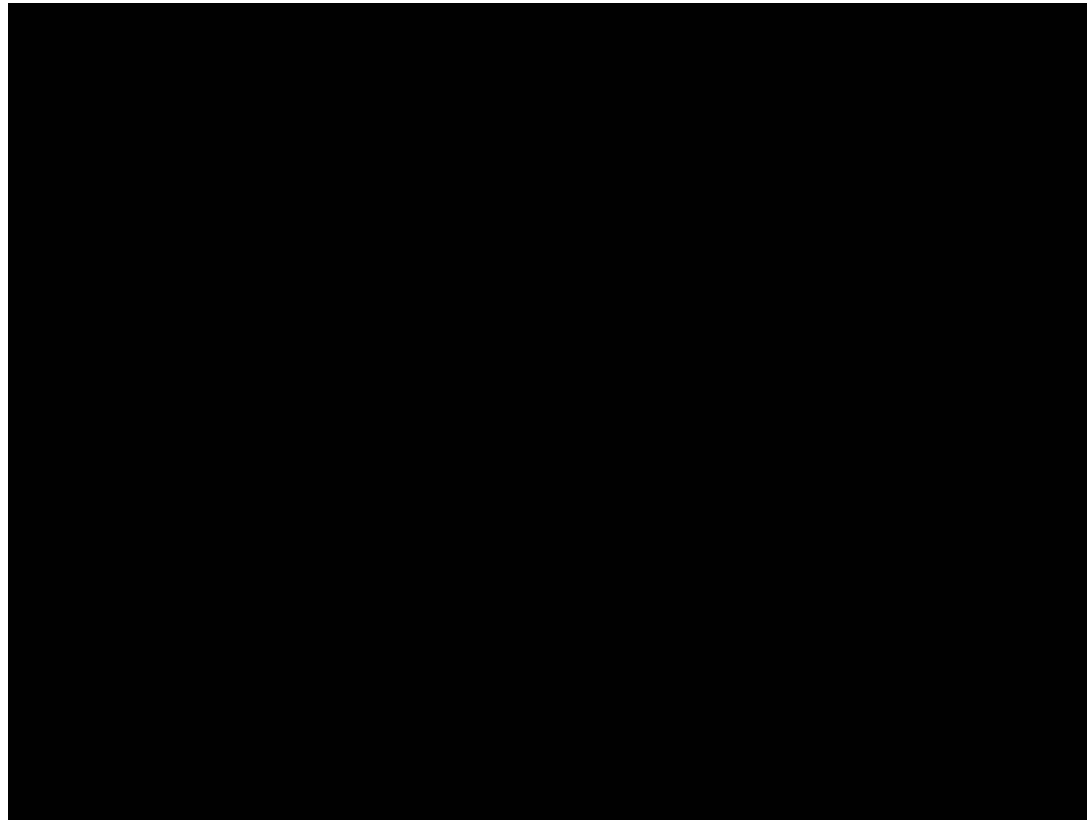
- Überlingen mid-air collision, 1 July 2002
 - the aftermath
 - Controller resigned from his job, overwhelmed by guilt & grief
 - In 2004, official investigators found that organisational mismanagement and systems failures were the main contributing factors
 - In February 2004, the controller on duty at the time of the accident was murdered by an aggrieved next-of-kin who had lost his wife and two children in the accident.
 - 2006 Court in Germany found that fault lay with the German Government, for allowing an international company to control air traffic in German airspace
 - In 2007, four managers of the Air Traffic Control company were convicted of 'homicide by negligence'.

‘Just Culture’ vs. Justice

- **Milan – Linate Runway Collision - 8 October 2001**
 - McDonnell Douglas MD-87 (110 pob) collided with a Cessna Citation (4 pob) in heavy fog, after the Cessna incorrectly entered the runway during the MD-87's takeoff roll.
 - All on-board both aircraft died, together with four ground personnel.
 - Controllers could not visually confirm the location of the aircraft (visibility less than 200m) and the airport did not have a functioning ground radar system.
 - A suitable system had been delivered some *years* beforehand, but not installed.
 - Taxiway markings were inconsistent with the controller's layout maps, and were not regulation.
 - In 2004, four persons, including the airport director and air traffic controller were convicted and sentenced to 8 years imprisonment.
 - A 2006 appeal discharged two persons, and convicted another four.

‘Just Culture’ vs. Justice

- Milan – Linate Runway Collision - 8 October 2001
- the emotional impact & reactions....



*Excerpt
from BBC
‘Crowded
Skies’*

‘Just Culture’ vs. Justice

- How will a balance be achieved?
 - Improved cooperation between Air Safety and Legal investigations
 - Processes for considering public interest
 - Mutual education & respect
 - Adequate release of factual information
 - Proper consideration of protections applied
 - Mediation and dispute resolution processes –
i.e. “Hot Tubbing”

Summary

- Many new challenges in contemporary Aviation Safety Investigation have socio-political influences.
- There is no 'perfect' arrangement.
- 'Change is a constant'
- Communication, understanding and respect between stakeholders and the investigating agency is paramount

Thanks & Questions!

