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Human Factors at ATSB

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Australian Transport Safety Bureau

Who we are

- ATSB is an independent federal government commission
- Head office in Canberra
- Field offices
  - Brisbane (aviation, marine and rail),
  - Perth (aviation)
  - Adelaide (rail)

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What we do

- Australia's prime agency for transport safety investigations
- Conduct no-blame investigations into aviation, marine and rail occurrences to prevent future accidents
- Conduct safety research and analysis and have a role in fostering safety awareness, knowledge and action

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What we do

- International cooperation
  - Indonesia – investigations and training
  - PNG - investigations
- Training courses
  - Internal
  - External – police, defence
  - International

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Our people

- Just over 100 personnel
  - 60 investigators (aviation, rail and marine)
- Multi disciplinary teams
  - Aviation – Pilots, Engineers, Air Traffic Control, HF
  - Rail – Drivers, Engineers, Controllers, HF
  - Marine – Ship Captains, Ship Chief Engineers, HF
- HF and technical analysis (materials failure and flight recorders) span all three domains

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Human factors

- ATSB's forerunner – Bureau of Air Safety Investigation (BASI) recruited a human performance specialist in 1983
- BASI was one of the world's first civil air safety investigation agencies to recruit HF
- 1989 BASI appointed HF specialist as head of the bureau (another world first)
- Since mid 1990's, all investigators have received training in human factors

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Systems Safety

- BASI was the first civil aviation accident investigation body in the world to incorporate human and organisational factors into standard investigation methodology
- Based on Reason's accident causation model
- Now considered standard practice around the world
- Recently reviewed and improved – SIIMS project

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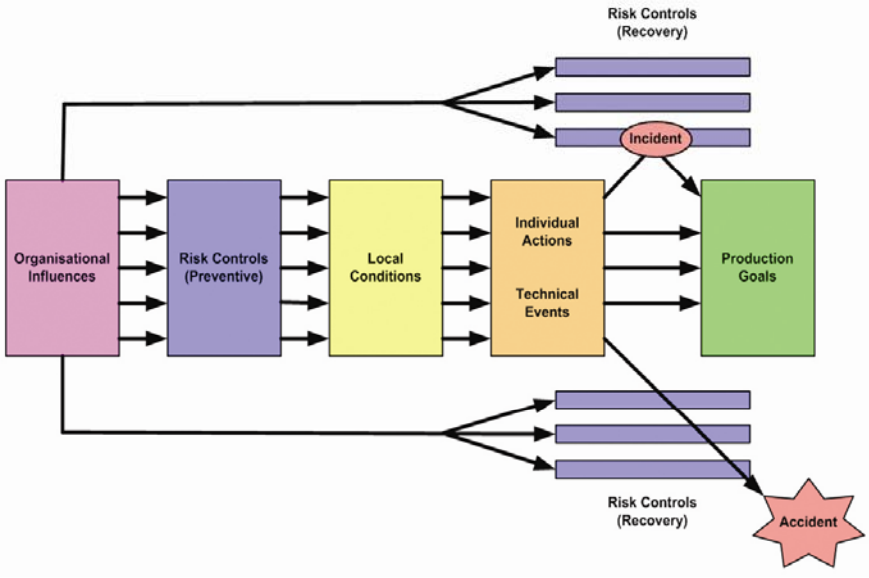

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Human factors group

- Made up of:
  - 1 surface safety investigator
  - 2 aviation investigators
  - 3 Managers with HF background
  - Currently recruiting another HF/SMS investigator
- Mix of qualifications and backgrounds – psychology, human factors

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Human factors group

- Deployed on-site as part of multi disciplinary team
- Cover cabin safety
  - QF30 – B747 depressurisation – cabin safety & passenger survey
  - QF72 – A330 In-flight upset event – cabin safety & passenger survey, HF as investigator in charge
- Flight crew HF
  - EK407 – A340 tailstrike and runway overrun
  - QF32 – A380 uncontained engine failure

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Existence and Influence

- ATSB's findings are centred around having evidence to prove that a safety factor existed and if so, evidence that it influenced the outcome
- If it did exist but didn't influence – does it have importance?

Example - Fatigue

- What evidence do we use?
  - Crew interviews and actual sleeping patterns (if possible)
  - Rosters
  - Sleep opportunity (given by rosters, taken by crew)
  - Recorded information – e.g. CVR – any overt symptoms of fatigue? Yawning, comments, withdrawal?
  - Witness/family statements
  - Medical conditions – sleep apnoea, insomnia
  - Research/scientific papers and guidelines – ICAO, TSB
  - Operator's FRMS (if applicable)

EK407 - Tailstrike

- A340-500 registered A6-ERG commenced take-off from runway 16 at Melbourne
- The First Officer (FO) rotated the aircraft at V1, the aircraft did not immediately pitch up
- The FO applied further nose-up command and the aircraft nose raised and the tail made contact with the runway
- The Captain commanded and selected TOGA
- ECAM message – ‘Tailstrike’

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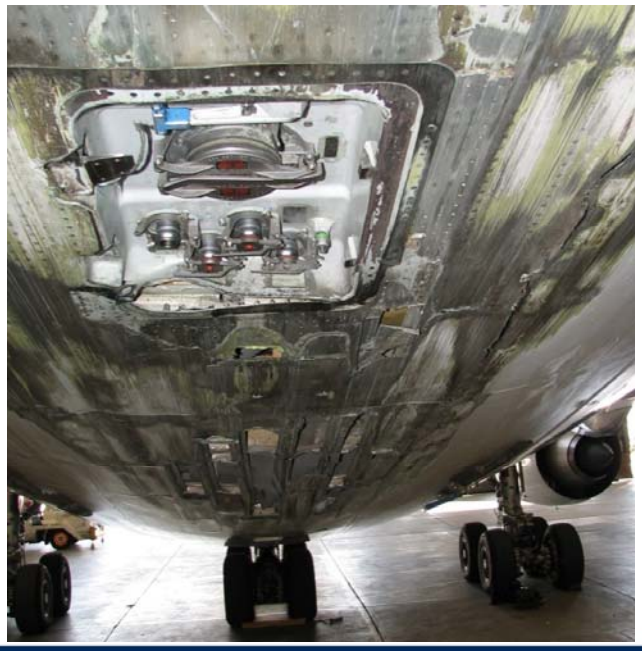

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EK407

- After reviewing the aircraft's performance documentation, the flight crew noticed an error of 100 tonnes with the take-off weight
- As a result, the engine thrust settings and take-off reference speeds were lower than those required for the aircraft's actual weight
- The FO inadvertently entered 262.9 tonnes, instead of 362.9 tonnes into the electronic flight bag

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EK407

HF for flight crew:

- Error potential/formation/detection
- Existence and influence of distraction/interruption
- Other similar events – 33 in the previous 20 yrs (another 3 since those were analysed)
- Fatigue – no evidence from initial data that the flight crew's performance was adversely affected by fatigue

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HF in cabin – QF30

- HF input predominately in the area of cabin safety
- Some interesting information from passenger surveys
  - Response rate 51%
  - Majority aware of depressurisation event
  - 47% very confident they knew how to operate mask, 46% somewhat confident, 7% not confident
  - 88% thought the safety demonstration and/or safety card assisted them in knowing what to do with most saying they had given full or some attention to the safety demo

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QF30

- Cabin crew response
  - Majority of cabin crew remained seated
  - Two got up to assist passengers
  - Some reported running to crew seats instead of using closest spare mask and reported feeling light-headed and dizzy
- Overall there was good communication between flight and cabin crew and within cabin as well as to passengers

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HF input – VH-NXE

- B717 Stickshaker on approach (bank angle, high nose-up pitch change rate and airspeed below approach speed)
- Autothrottle inadvertently not engaged, automatic flight system disconnected
- Captain's jugdement and monitoring ability probably adversely affected by personal and work stress and associated fatigue

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HF in research

- Number of research reports have HF input
  - Take-off performance calculation and entry errors: A global perspective
  - Factors influencing misaligned take-off occurrences
  - Perceived threats, errors and safety in aerial work and low capacity air transport operations
  - Attitudes towards training and applicability of TEM to general aviation and low capacity air transport ops
  - Aircraft Depressurisation - passenger and crew briefing

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Conclusion

- Human Factors is a major part of what we do at the Bureau
- Crosses all three modes of transport investigation
- ATSB has a strong foundation/history in HF and we are continuing to highlight this in the future

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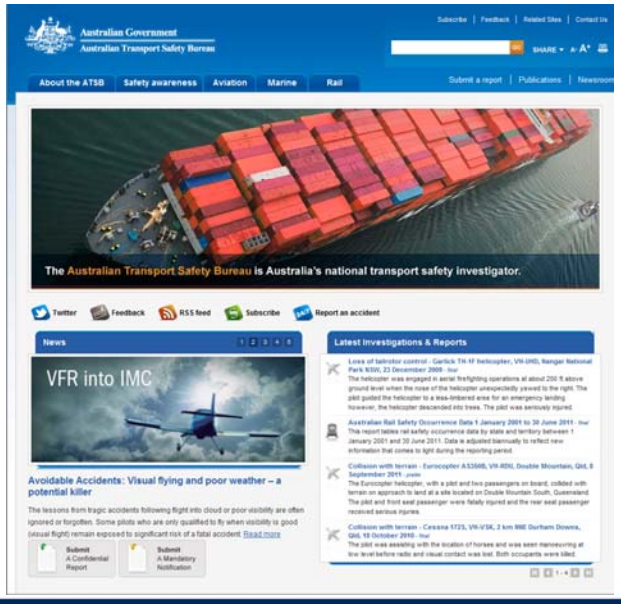
http://www.atsb.gov.au



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