Safety Risk

Aligning perception with reality

CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

Operating instructions…

- ***Perception*** **– a person's recognition of the nature and degree of risk affecting an activity**
- ***Reality*** **– accurate assessment of risk based on all relevant information (acknowledging that risk pertains to a potential event and as such is not 'real')**

Premise

- **Risk perception affects decisions made at a system, organisation, and individual level**
- **Initiatives which bring perception closer to reality, and create awareness of the relationships between the various levels, will result in better decisions and cohesion, and consequently better safety outcomes**

Non-Routine Flight Operations

Memorial to honour those lost in the Airbus A320 crash near Perpignan, France. (November, 2008)

Crew Psychological Assessment; Flight Deck Policies

Germanwings Flight 9525, French Alps. (March, 2015)

Challenges

Barriers to accurate perception of risk

Affecting decision-makers at all levels

Level	System	Organisation	Individual
Decision-maker	Regulator	Management	Crew members LAMEs Dispatchers Crew Schedulers etc.

Regulator

Challenges

- **Data rich – intelligence poor**
- **Reactive**
- **Compliance-focused not risk-based**
- **Ineffective surveillance processes**
- **Silo rather than systems thinking**
- **Capability and capacity**
- **Biases (e.g. based on historical information)**
- **Airline sector = HRS → lowered perception of risk (complacency)**

Regulator example

Accident Report

NTSB/AAR-10/01
PB2010-910401

National Transportation Safety Board

Require operators to address fatigue risks associated with commuting

Develop more stringent standards for surveillance of operators that are experiencing rapid growth, increased complexity of operations, accidents and/or incidents, or other changes that warrant increased oversight

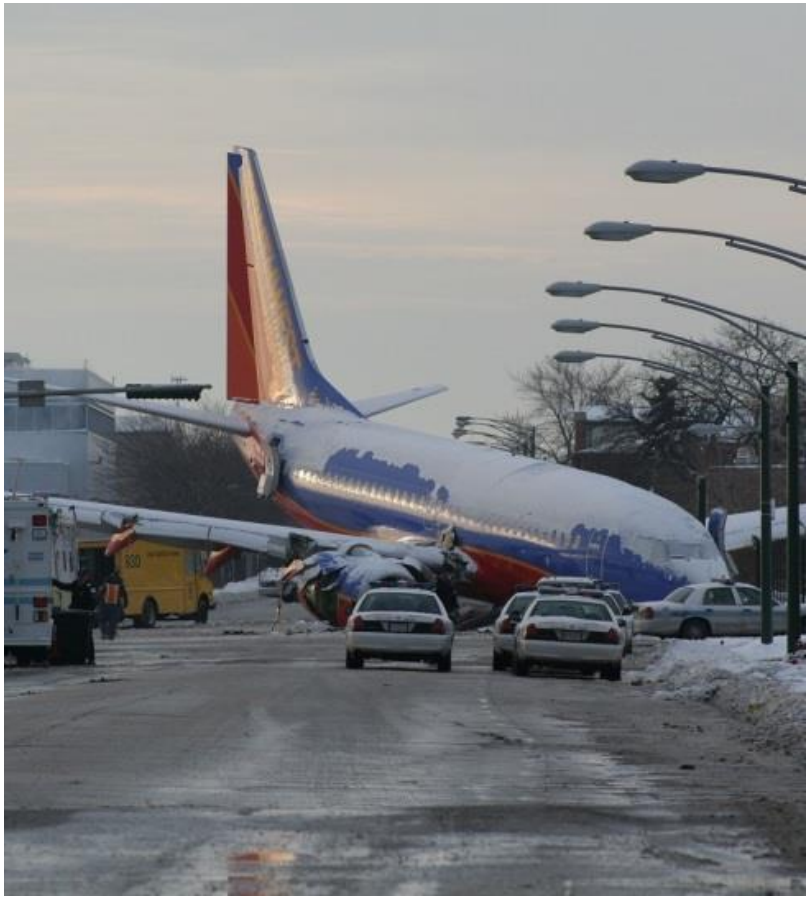
Colgan Air Flight 3407, Buffalo, USA. (February, 2009)

Operator Management

Challenges

- **Incomplete reporting**
- **Limited data set, silos, not using data**
- **RM 'triggers' not adequate or well-defined**
- **RMP implementation & follow-up**
- **Overconfidence in policy/procedure compliance**
- **Failure to learn from near misses**
- **Safety culture not led / guided**
- **Not dealing with poor performance or negative behaviours**
- **Lack of critical or imaginative thinking**

Operator example



NTSB Report:

Operator contributing factors:

1. Guidance and training re landing distance calculations;
2. Performance computer not properly programmed;
3. Flawed implementation of new autobrake procedures; and
4. Failure to include a margin of safety in the arrival assessment to account for operational uncertainties.

Southwest Airlines Flight 1248, Chicago, USA. (December, 2005)

Crew Member

Challenges

- **Insufficient or ambiguous operational information**
- **Ineffective CRM (e.g. SA, workload management)**
- **Threat(s) identified but not managed**
- **Human decision-making modes (fast and slow)**
- **Cognitive biases, including:**
  - **Confirmation bias**
  - **Plan continuation bias**
  - **Optimism / expert / overconfidence**
- **Emotion affecting risk perception**
- **Culture (individual, group)**
- **Fatigue & other factors affecting performance**

Crew Member example

Causes?

- **Training – risks associated with CBs**
- **Insufficient weather info (planning, en-route)**
- **Overreliance on automation (weather radar displays)**
- **Confirmation bias (flawed mental model)**
- **Plan continuation bias**

Numerous examples of aircraft severely damaged by hail, including these aircraft (June 2006; August 2015).

Crew Member

Boeing/CAST Study – Loss of Control in Flight*

- **18 LOC-I events studied (2003-2012)**
  - **In all 18 events, Distraction played a role**
  - **In 16 events, CRM was not effective (failed to communicate to understand problems, pilot monitoring)**
  - **In 14 events, crew had confusion or lack of awareness of state/mode of automation**

*Boeing 'AERO' magazine. Quarter 01, 2015

Opportunities

- **Quality of decisions ≈ accurate perception of risk**
- ➢ **Focus on initiatives & strategies to enhance perception of risk**
- **Accurate perception of risk**

  ≈ completeness and accuracy of information; and

  ≈ information "processing"

Regulator	Operator Management	Crew members

Regulator

(Practical) Improvement Opportunities

- **Safety data analysis + operational/technical input = intelligence**
- **Engagement (industry, other NAAs, ICAO etc.)**
- **Risk-based safety oversight**
- **Thematic and systemic investigations**
- **Sector risk reviews**
- **Participant risk profiling**
- **Human Factors training**

Operator Management

(Practical) Improvement Opportunities

- **Data analysis – occurrences, FOQA, LOSA, training, HR**
- **Hazard identification**
  - **Methods; risk assessment triggers**
- **Robust & proactive risk management**
- **Safety investigation criteria**
- **Monitoring & management of safety controls (effective?)**
  - **Policies, procedures, RMPs, CAPs**
- **Enhancing culture for safety**
- **Communication of critical safety information**
- **Training improvements – hazards, CRM, HF (incl. cognitive biases), TEM**
- **Performance management**

TFASAB

Time For A Short Acronym Break

And now, let’s continue…

Crew Member

(Practical) Improvement Opportunities

- **Reporting, sharing experience, mentoring**
- **Human Factors**
  - **awareness of cognitive biases**
  - **Understanding heuristics, decision-making**
  - **Understanding cultural differences**
- **CRM**
  - **Situational awareness → seek information, solve ambiguity**
  - **Managing distractions**
  - **Pilot Monitoring**
  - **Workload management → create time**
- **Robust application of TEM**
- **Professionalism (knowledge, procedural compliance, etc.)**
- **Personal pre-flight – Are you ready to fly?**
  - **http://www.avkiwi.co.nz/**

Safety – our common purpose

Working together to improve safety

- **Achieve: interconnection, awareness, system alignment, coherence, and synergy**
- **By: sharing information *and* cooperative efforts to identify/manage safety risk**

Working together

- Sharing safety data and analysis
- Communication of safety critical information
- Risk assessment participation - “diagonal”
  - Representatives from every level
  - Representatives from a range of disciplines
- Integrate HF training into all aspects of aviation
- Leading indicators (precursors, surveys, etc.)
- Introduction of new technology & safety initiatives
- “Challenge thinking” = invite diversity of input, active listening
- Learning from others – e.g. this conference!

Final thoughts

Thank you

CIVIL AVIATION AUTHORITY
OF NEW ZEALAND