Medium and Large Aircraft Air Transport Sector Risk Profile

Human Factors Reference Material
Human Factors

Description

Human Factors developed from a realisation that it was the human rather than mechanical failures that accounted for 70% of incidents and accidents. Often considered synonymous with Crew Resource Management (CRM) it is, however, much broader in both its knowledge base and scope, gathering information about human abilities and limitations and applying it to tools, machines, systems, tasks, jobs and environments.

HF previously had not been considered a scientific discipline, relying mainly on qualitative research but as the discipline has progressed Human Factors is contributing to a better understanding of how humans can most safely and efficiently be integrated with the changing technology by informing design, training, policies and procedures. We can only do that by having a sound, scientific base for assessing human performance implications.

Neuro-ergonomics is emerging combining the science of the brain and Human Factors allowing us access to how and why we perform the way we do and how we can discipline our brains with cues aligned to how we think. Considers mental workload and adaptive automation to enhance human-system performance (Parasuraman and Wilson, 2008)

Benefits of introducing Human Factors

By having a sound and robust Human Factors element within a company, crew are given the means and formula for efficient and safe performance by influencing attitudes and behaviours whilst embedding HF thinking into everything that is done.

To gain an understanding of what we do right and what mistakes we make we cannot underestimate the value of a transparent and open reporting system operating under a Just Culture in order to allow and encourage crew to admit to errors the industry can learn from.

Scientific research develops from data collected and shared information and is necessary to build up a wider picture for prevention.

Areas of Human Factors identified

3 over-arching areas of Human Factors were identified in the SRP as being of most importance by the participants:

Normalised inappropriate behaviour (including work-arounds, shortcuts, etc.):

- Behaviour becomes normalised for a number of reasons:
  - Drift – a slow Incremental movement of systems operation towards the edge of their safety envelope. (eg: small change that would not alter the situation very much. However, as a number of changes are made, each one is compared only to the last one made – not the distance from the starting point.)
  - Commercial pressure – to get the ‘job done’ leads to shortcuts and work arounds – these become normalised and accepted
  - At risk attitude – ‘she’ll be right’.
Controls to mitigate (for consideration):

- LOSA – a methodology of observing normal behaviour in the cockpit, rather than the ‘angel behaviour’ of a line check. Although LOSA has its critics it has been used successfully in identifying clusters of errors, SOP’s that don’t work, reasons for checklists being missed and issues with external agencies like ATC. More recently LOSA has been adapted in airlines to determine errors in specific operations, routes or identified problem areas.

- LOSA:SP – LOSA has been adapted to a single pilot environment and in other industries such as rail, maintenance, military etc. It would be interesting to see if any 125 IFR SP operators were considering a LOSA type study.

- Verbalisation has been muted as a means of increasing performance in SP operators. Has to be conducted in a safe environment. Can it help?

- How to reduce commercial pressure?

- Workgroups formed with smaller operators to have a body of expertise and experience to go to for advice and support.

**Inadequate and/or inconsistent training standards:**

- Requirement for operators to have comprehensive and competency testing systems/procedures with training manuals reviewed regularly.

- Affecting training is commercial pressure – when companies are struggling, training is the first to go (cost of training outweighs benefits). Benefits of people maintaining competency in training v earning money in the live environment.

- This leads to short cuts with line checks and OCA’s and corner cutting with SOP ’s and procedures being normalised.

- Perceptions of adequacy of training abounds and may be driven by current pilot shortage and younger, inexperienced pilots replacing more experienced ones (how do we adequately manage losing those senior captains to new recruits). Inexperienced crew should really have more robust training. Experience, it can be argued can only be gained in time, not through short term training.

- Present issues in flying arise from increasing automation and our trust in it. Pilots are losing hand flying skills . Should they be trained for automation surprise rather than what we currently train eg: engine failure on take off which is rare?

- Sully’s of the world acquired a different skill set particularly with decision making. Does MPL offer adequate training ? HF does pilot have same skill set when never gone solo? Not a problem in NZ so do we need to look at it?

Controls to mitigate (for consideration):

- Simulator check and training to include Human Factors assessment – how crew communicate, the TCGA, teamwork and leadership etc.

- Focus training on traditional elements - Airbus new policy of basic flying first then building block approach of increased automation. Gives clearer idea of how aircraft operates when things go wrong and skill set to deal with it.

- Priority to teach risk based, strategic scenarios rather than prescriptive list – EFATO is perhaps not as relevant now as previously. More important to teach automation surprise etc
• Allow teaching through failing and learning (*MAPP debriefing by Tim Mavin). Difficult concept from companies point of view to allow a pilot to fail a simulator test. Does it depend on what they failed? If it was challenging and deliberately set to stretch a pilot's knowledge and skills, is that different from a routine incident? Does the value of the training and learning experience override the negative perception of 'poor' performance?

• Competency and evidence based training – based on quality (competencies and evidence) rather than number of hours.

• Importance of debriefing – retrospective video for context and learning.

• Scenario based HF ground training instead of traditional classroom teaching, combining cabin crew as well as pilots to joint training initiatives.

**Fatigue Management:**

What we are doing CAA – FRMS discussion document and working group. Over 600 submissions.

Prescriptive will not necessarily help with fatigue. Provide methods and means of compliance (AC and information) how to deal with fatigue. What it is, how to mitigate etc

Harder with smaller airlines/owner operated. Corporate pressures etc to get the job done.

**Controls to mitigate (for consideration):**

Fatigue reporting systems essential under Just Culture environment, Plus feedback so crew know their issues are being listened to and dealt with

General fatigue and regular awareness training from expert. Fatigue training for families (easier in small companies)

CAA to produce videos and booklets for FRMS guidance and increase awareness across country with roadshows.

**Documents and Information**

ICAO Doc 9683iAN/950 1986 Human Factors Training (regularly updated)

NZCAA Advisory Circular Human Factors. AC 121-4 December, 2013


Earl et al LOSA:SP Paper

“Foresight is not hindsight – there is a profound revision of insight that turns on the present. It converts a once vague, unlikely future into an immediate, certain past.” Dekker, 2015
References


*MAPP – Model for Assessing Pilots’ Performance