

Strengthening the effectiveness of your Safety Management Systems (SMS) through Human Factors Integration (HFI)

Webinar presented by Kathryn Harvey
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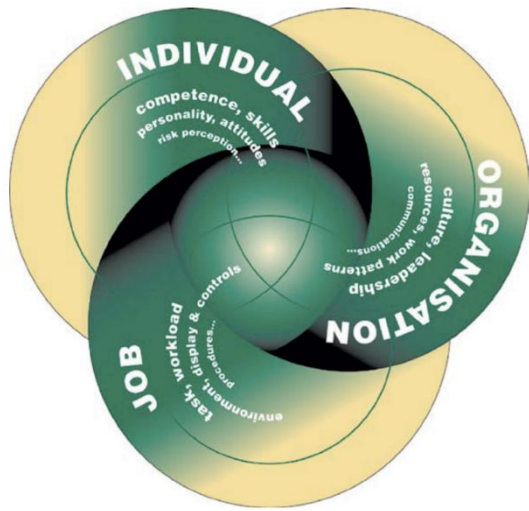
flightlogics

The logo for flightlogics features the company name in a lowercase, sans-serif font. A thin, dark blue line starts under the 'l' in 'logics' and curves upwards and to the right, ending under the 's'.

Agenda

1. What is Human Factors (HF) and Human Factors Integration (HFI)?
2. Benefits of HFI
3. Legislation, Standards, Guidance and Good Practice
4. HFI in Safety Management Systems (SMS)
5. Ideas for integration across the four pillars of safety
 - Safety Policy
 - Risk Management
 - Safety Assurance
 - Safety Promotion

What is Human Factors (HF)?



*“the scientific discipline concerned with the understanding of **interactions among humans and other elements of a system**, and the profession that **applies theory, principles, data and methods to design** in order to **optimise human wellbeing** and **overall system performance**. HF helps to **harmonise** things that interact with people in terms of people's **needs, abilities and limitations**”*

Reference: International Ergonomics & Human Factors Association, 2000

HF makes it possible to:

- ✓ reduce the potential for human error
- ✓ limit the consequences of human error
- ✓ Improve human performance
- ✓ increase the margin for safety
- ✓ increase efficiency and effectiveness

Benefits of HF Integration (HFI) into your organisation

Safety

Health and Wellbeing

Employee Engagement

Financial

Passenger experience

Compliance

Operational effectiveness

Efficiency

Usability

Reputation

CAAP SMS-1(0) highlights business benefits as well as safety benefits relating to the integration of HF in safety management systems (SMS)

Business benefits

Improves overall safety performance in the organisation and reduces the number of incidents

Demonstrates all reasonable steps have been taken to manage safety and control risk from the perspective of human performance

Reduces indirect costs (such as staff turnover and stress-related leave);

Improves staff acceptance of change.

Helps to meet legal and regulatory obligations

Safety benefits

Promotes a duty of care throughout the organisation

Increases understanding and ownership of the safety processes

Promotes the use of good communications and feedback throughout the organisation

Establishes, maintains and improves the safety culture of the organisation

Promotes and develops a proactive and predictive management of risk.

Legislation, Guidance and Good Practice

Legislation

Civil Aviation Act (CAA) (1988)

WH& S/OH&S Act and Regs

Delegated legislation *(instruments issued under the Act)*

Civil Aviation Safety Regulations (CASR) (1998)

Civil Aviation Regulations (1988)

Civil Aviation Orders (CAO)

Airspace Regulations (2007)

Manual of Standards (MOS)

Airworthiness Directives (AD)

Codes of Practice and Standards

Various

Guidance

Advisory Circulars (ACs)

Civil Aviation Advisory Publications (CAAPs)

Good Practice

- Use qualified and competent HF personnel to inform your approach
- Approach should be:
 - Scaled to the complexity and nature of your business
 - Suitable to the maturity level of your business
 - Risk-based and data-led
 - Integrated
- Take into account various workgroups activities and interactions between workgroups as well as ensuring you engage across all levels of the business to understand risk-exposure
- Change management carefully considered and paced accordingly with suitable engagement and consultation

Gap Analysis – a good first step

Identify the **relevant legislation an/or guidance material** for your business

Determine **scope** of gap analysis including:

- Confirm documents used to assess gaps against
- Identify workgroups
- Identify risks and focus on those that present higher risk exposure, including tasks that are safety critical
- What time and resource is available to conduct the assessment
- SMS priorities

**HF competence: undergraduate or post graduate degree in Psychology, Engineering, HF/Ergonomics or similar with at least 7 years experience in the application of HF in high-risk sectors or overseen by personnel with such experience. Preferably a member of, or accredited by a recognised HF organisation such as the HFESA, HFES, or CIEHF*

Suitable methods to conduct a gap analysis:

- Document review
- Interviews and focus groups
- Observations

Ideally, a combination of all the above.

HF competence* a must-have

Contributors to human error

Organisational

Leadership
Safety Culture
Worker status
Task planning
Time / productivity pressure
Industrial relations climate
Monitoring
Contractors
Emergency operations arrangements
Hazard analysis
Organisational learning

Human

Cognitive workload
Distraction
Vigilance
Stress
Colour coding
Monotony / boredom
Situational awareness
Reliance on undocumented information
Human machine Interface
Alarm management
Physical requirements

Environment

Thermal comfort
Ventilation
Humidity
Vibration
Noise
Glare / reflection
Lighting
Wildlife
Weather conditions
Exposure to chemicals, vapours, dust

System of work

Shift work
Contractors
Manual Handling
Night operations
Crowd behaviour
Traffic / Pedestrian movements
Training
Procedures
Remote/isolated work
Equipment, design, suitability
Communications arrangements

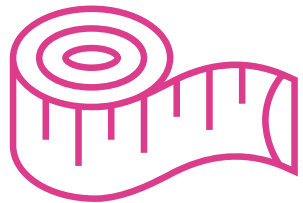
Gap Analysis Example



Requirement

Part 119 of the Civil Aviation Safety Regulations (1998): 119.175 Program for training and assessment in human factors principles and non-technical skills

An Australian air transport operator must have a program for training and assessing operational safety-critical personnel in human factors principles and non-technical skills.



Business Alignment to Requirement:

Determine how the requirement is met, and to what level?



Recommendation based on alignment and requirement

Observation and interviews with staff

- HF principles cannot be easily recalled by some workgroups
- Many staff unable to provide a definition or basic understanding of HF
- No recent review of HF training content and format suitability, nor Training Needs Analysis (TNA)

Resources/ Enablers / Software etc

- Learning Management System is in place
- Combination of internal and external training providers available
- Learning resources & information not readily available
- Personnel responsibilities not clear

Integration with SMS documents

- Safety Policy commitment to training
- Risk Register demonstrates evidence of HFI (e.g.: HF hazards are suitably identified and controlled) although it is not formally addressed via documented procedures.
- HF and NTS training is detailed and documented in the SMS (e.g.: under Training or Safety Promotion procedures/processes) however it is not supported by a TNA

Example Recommendations

1. Clearly define roles and responsibilities including who is responsible for conducting Training Needs Analysis and sourcing appropriate training.
2. Establish monitoring processes to ensure all personnel who require training receive the training.
3. HF input required to develop a TNA
4. Have a HF Specialist review current training content and format to ensure it aligns the TNA,

Gap Analysis Themes

We have found it useful to identify **themes**, and then, **risk assess the impact** of those themes to **prioritise** actions and project planning of HFI.

Risk Management	Assurance	Training and Promotion	Fatigue Risk Management
Change Management	Psychosocial Hazards and Risks	Crew Resource Management	Job Design
Safety Culture	Design and Equipment	Performance Variability	Team Dynamics
Technology	Safety Critical Communication	Threat and Error Management	Human Machine Interface

HFI and the 4 Pillars of the SMS



- HFI effectiveness relies upon the effectiveness of the broader SMS
- HFI must be deliberately and carefully implemented
- HFI usually starts with training and awareness
- Enhance SMS through HF principles by ensuring the language and layout of your SMS is user-friendly (simple language, short sentences, avoid negatives, use visual aids, consistent format/templates)

CASA suggests HFI into the following areas, as a minimum:

- identifying hazards and reducing risk
- managing change
- designing systems and equipment
- design jobs and tasks
- training of operational staff
- safety reporting and data analysis
- investigating incidents.

Safety Policy - ideas for HFI



- Make reference to HF as part of Policy, Objectives and Safety Performance Indicators (SPIs)
 - E.g. HFI is systematically applied to risk management activities
 - E.g. Promote a culture where human performance limitations are understood and addressed
 - E.g. Apply HF and Just Culture in incident investigations.
- Develop an Annual Safety Strategy and include HFI
 - Develop a HF procedure
 - Conduct a HF Gap Analysis
 - Use HF tools to review your business' top risk and implement

Risk Management - ideas for HFI



- Hazard identification is supported by the application of HF principles and solid HF input (using those competent and experienced in HF)
- Document how HFI will occur through risk management processes.
- Integrate HF in training
 - E.g.: job/task training, hazard identification and risk management training, investigation training, fatigue risk management
- Use HF methods and tools to identify, assess and mitigate risk
 - E.g.: workload analysis, design reviews, roster reviews, error analysis, technology reviews, culture assessment
- Use consultation and communication channels to enhance the capture HF hazards and risks

• *“Human factors principles means principles concerned with the minimisation of human error and its consequences by optimising the relationships within systems between people, activities and equipment.”* Civil Aviation Safety Regulation (CASR) (1998).

• Human Performance Principles ICAO
Resource:

<https://www.icao.int/safety/OPS/OPS-Normal/Pages/HPP.aspx#Principal1>

Risk Management - ideas for HFI



Safety Management Systems
for aviation: a practical guide

SMS 6 Human factors and human performance

3rd Edition



Human factors and job and task design

- identify safety-critical tasks, those who perform them and the environment in which the tasks will be performed (the context)
- design the task objectives, sequences, and actions to be performed
- structure the task so it supports safe performance by the individual and team
- consider the working environment so it supports safe performance of the task
- assess the potential risks associated with non-compliance, human capabilities, and limitations
- implement risk management strategies to manage identified human performance risks
- evaluate human performance and safety performance against the stated objectives

<https://www.casa.gov.au/sites/default/files/2021-06/safety-management-systems-book-6-human-factors.pdf>

Human factors and hazard management checklist

- Do you consider human factors and human performance issues in general risk assessments where hazards are identified?
- Are the human factors issues involved with hazards understood?
- Are different error types associated with hazards recognised?
- Are the workplace factors that increase the error potential for hazards, such as high workload, distractions or inadequate equipment availability or design, considered?
- Do you consider human performance issues in regular staff workshops identifying potential safety hazards?
- Is your hazard reporting process user-friendly?
- Does your reporting process prompt users to consider human factors and human performance issues? What errors might result if the hazard is not managed well?
- Have you identified the human factors issues with the greatest implications for safety or performance?
- Is there a standard process to investigate and analyse human factors issues?
- Do you include human factors risks on your risk register?
- Do you keep clear records of how you have resolved these human factors risks?

Safety Assurance - ideas for HFI



- Integrate HF as part of safety investigations
 - E.g.: HFACS (Human Factors Analysis and Classification System)
 - E.g.: AcciMap
- HFI as part of Projects and built into assurance programs/tools/processes.
 - E.g.: set HF requirements → embed HF requirements → check requirements are/were met
- Review HF via audits
- Establish relevant HF SPIs which may be reviewed via Safety Committee Meetings (or similar)
 - E.g.: Number HF hazards identified
 - Number of Fatigue reports
 - Number of findings which emanate from system issues
 - Number of investigations which integrated HF
- Integrate HF considerations in change management activities. This might include stakeholder analysis and needs analysis, timing considerations, HF informed risk assessments, consultation etc

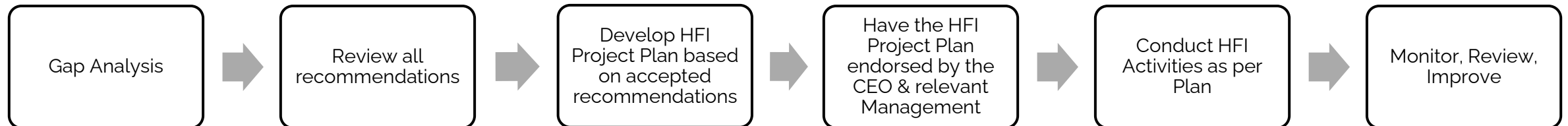
Safety Promotion - ideas for HFI



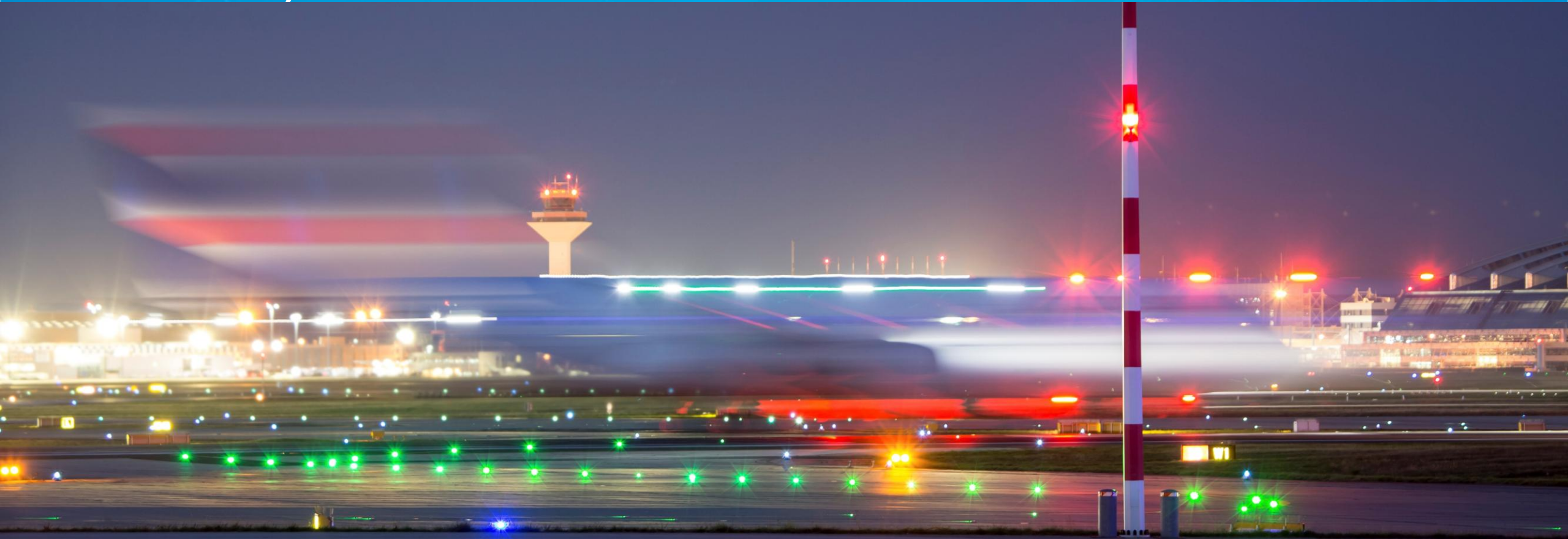
Safety
Promotion

- Undertake a Training Needs Analysis (TNA) (who need what based on tasks/role and risk exposure)
- Document a TNA to justify your Training Program
- Include HF in safety promotion opportunities such as induction, newsletters, other training initiatives, consultation activities,
- Use activities to highlight where applicable the importance and relevance of HFI e.g.: before a risk assessment, during safety meetings, discussion lessons learned, developing corrective actions.
- Make HF information available and accessible to staff and ensure communication is supported by experienced and competent HF input, or uses well regarded sources/resources (e.g.: ICAO, HFESA, peer-reviewed journals).

HFI and SMS



Thankyou



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