The Interface between Human Performance and Fatigue Management

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Humans, Fatigue and Supporting Performance

- Human Performance Principles
- Human Capabilities and Limitations
- Manage fatigue through supporting people
Human Performance Principles
ICAO SARPS - Background

- Throughout the ICAO provisions reference is made to human performance or human factors “principles”.

- No guidance is given to understand what these terms mean.

- ICAO set up a taskforce to develop this guidance material.
Making it **easy to do the right thing**, making it **difficult to do the wrong thing** and making it **almost impossible to do the catastrophic thing**
Principle One

People’s performance is shaped by their capabilities and limitations.
Principle Two

People perform in ways that make sense to them at the time.
Principle Three

People adapt to the demands of a complex and dynamic work environment.
Principle Four

People assess risk and make trade-offs all the time.
Principle Five

People’s performance is influenced by interactions with technology and other people.
Human Capabilities and Limitations
People’s capabilities and limitations

Capabilities

- Problem Solvers
- Resilient
- Creative
- Supportive of others
- Trainable

Limitations

- Can’t see in the dark
- Can’t lift heavy weights
- Get distracted
- Suffer from fatigue
People – limitations and capabilities

- “Making errors is about as normal as breathing oxygen.”
  - James Reason

People are associated with successes and failures of systems.

People are both important safety barriers and sources of recovery.
Cognitive Performance when Fatigued

Reduced Alertness
Negative mood
Reduced communication
Slips and lapses
Slower reaction time
Poor memory
Reduced attention
Impaired problem solving
Increased risk taking
Reduced Cognitive Performance in Pilots leads to:

- Inaccurate flying
- Missed radio calls / read back incorrect
- System warnings missed or slow to pick up
- Routine tasks performed inaccurately or forgotten
- Micro sleeping
- Memory impairment
- Task fixation
- Taking risks to finish the duty
- Inaccurate situational awareness
- Dependence on automatics
- Poor CRM (Crew Resource Management) – everyone on transmit, no one on receive
As a result these things might happen:

**Worse case outcomes:**
- Loss of control in Flight
- Runway Excursion
- Midair Collision

**Some Possible outcomes:**
- ACAS event / Air Prox
- Level bust
- Aircraft System limits exceeded
- Poor / late decision making
Managing Fatigue through supporting people
Understand the influences on People

- What do they do
- What are the particular challenges they face
- How can they be supported to do their best

Everyone has a role to play –
Regulator, Operator, Individual
Managing Fatigue

- Limits are only individual outer boundaries
- Schedules (rosters, routes and pairings) should consider scientific principles
- Cumulative fatigue must be considered
- The impact of workload, in all its forms, needs to be understood
Workload – Task related considerations

- The mental or physical demand
- Environmental conditions
- Airports
- Aircraft
  - Experience
  - Facilities for support
  - Type of operation
  - Training requirements
Understand operational fatigue issues

- Conduct a fatigue survey
- Review all safety reporting mechanisms
- Look for performance indicators of fatigue

Then ask:
- What other routes or operations of the same type or similar type might have similar issues?
- How many crew are subject to pattern or work combination?
- How frequently is operation / work combination under assessment?
Core principles

- Understand the scientific principles
- Look for fatigue related performance indicators
- Understand the operational environment
- Review patterns and combinations of duties
- Develop options
- Get feedback
- Continuous review process
Fatigue and Performance - Summary

- People’s have known capabilities and limitations
- Support the crew so they can do their best
- Managing fatigue enables crew to support the safe outcome of the flight
Any Questions?