Fatigue Risk Management Systems. Not just for flight crew members

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Disclosure

• Paulo M. Alves is a full-time employee of MedAire
• MedAire is the business of ground-based medical support, medical kits and education
• Opinions are the author’s only and not necessarily reflects the company’s position
Object of safety
Human factors

1. Lack of communication
2. Complacency
3. Lack of knowledge
4. Distraction
5. Lack of teamwork
6. Fatigue
7. Lack of resources
8. Pressure
9. Lack of assertiveness
10. Stress
11. Lack of awareness
12. Norms
Contributing factors for fatigue

Figure 1. Workplace and personal factors contributing to employee fatigue. Adapted from the Australian National Transport Commission (2004).
Fatigue symptoms

- Decreased (fixed) attention
- Increased reaction time
- Decreased alertness levels
- Deficient communication
- Apathy / complacency
- Grumpiness
- Decreased decision making
- Daytime sleepiness
Fatigue builds up at the expense of alertness
Fatigue can be masked

- Exercise
- Anxiety
- Excitement
- Caffeine
- Other drugs
- Monotony
  unmasks fatigue
The spectrum of alertness

- Fully Alert/awake
- Reduced performance
- Asleep
Sleeping is an active process!!
• Good quality sleep is the sum of Stage 3 and 4 plus REM sleep
Sleep composition/quality

- Average 7-8 hours
- Range 4-11 hours
- 5% are short or long-sleepers
- Main difference is in stage 2
- Need for uninterrupted sleep
- Paying your sleep debt
Circadian Rhythms
Alertness components in a night shift

Two process model: homeostatic drive for sleep and endogenous circadian timing

Source: Airbus – L.A.A.
Predicting alertness

- SAFE – QinetiQ – UK
- SAFTE/FAST – IBR – USA
- TMP – BAM – Boeing
- CAS – Circadian
Sleeping after prolonged wakefulness

- More slow-wave sleep in the first night (good sleep opportunity)
- More REM sleep in the second night
- Usual sleep pattern is normalized by the third night
Quality: The Sleep Environment
Napping

- 20 minutes to 2 hours
- Restorative effect
- Alleviates sleep pressure
- Increase alertness
Operational Countermeasures

- Judicious use of “masking” strategies
  - Caffeine
  - Exercise
  - Napping
FRMS Structure (ICAO-IATA-IFALPA)

Fatigue Safety Action Group coordinates fatigue risk management activities

Policy

Documentation

SMS

Risk management processes
- Identification of fatigue hazards
- Risk assessment
- Risk mitigation

Safety assurance processes
- Monitoring FRMS performance
- Managing changes
- Continuous improvement

Promotion processes
- Training
- Communication
SMS Model

- Event reporting
- Use of technical documentation
- Human factors training
- Shift and task turnover
- Fatigue

www.humanfactorsinfo.com
SMS Model

• Upper level management commitment
• Communicate
SMS Model

- Write detailed procedures
- Document responsibilities
- Develop error/incident reporting system
SMS Model

- Document responsibilities
- Assess work schedules / sleep opportunities
- Training and education
- Assure regulatory compliance
SMS Model

• Work routine
  – Close supervision
  – Task rotation
  – Checklists
  – Work in pairs

• Safety audits
SMS Model

- Accident/incident investigation
SMS Model

• Reporting
  – Risk report
  – Recommendations
Resources

Fatigue Risk Management in Aviation Maintenance: Current Best Practices and Potential Future Countermeasures

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Final Report
Take aways

• Fatigue is a major safety issue in maintenance activities
• Circadian disruption can occur in shift work
• A significant number of medical conditions impact alertness
• Education is a major element in preventing fatigue
Thank you!!
Questions?