



NTSB National Transportation Safety Board

Managing Fatigue in Air Transport Operations

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Board Member

Go! Flight 1002



NTSB



Runway Incursion at LAX



NTSB



Honorable John K. Lauber:

No Accident \neq
Safe Operation

Guantanamo Bay Cuba

First NTSB aviation accident to cite fatigue as probable cause





Kirksville, Missouri, October 19, 2004

Shuttle America Flight 6448



Continental Connection (Colgan Air) Buffalo NY (February 12, 2009)



NTSB



Fatal Airline Accidents (fatigue cited)

- 8/97 Guam: 228 fatalities
- 6/99 Little Rock AK: 11 fatal
- 10/04 Kirksville MO: 11 fatalities
- 8/06 Lexington KY: 49 fatalities
- 2/09 Buffalo NY: 49 fatalities

Fatigue Risks

Fatigue can degrade
every aspect of
human capability.

Fatigue Risks



Fatigue Factors

- sleep
- circadian clock
- hours awake
- sleep disorders

Fatigue Factors

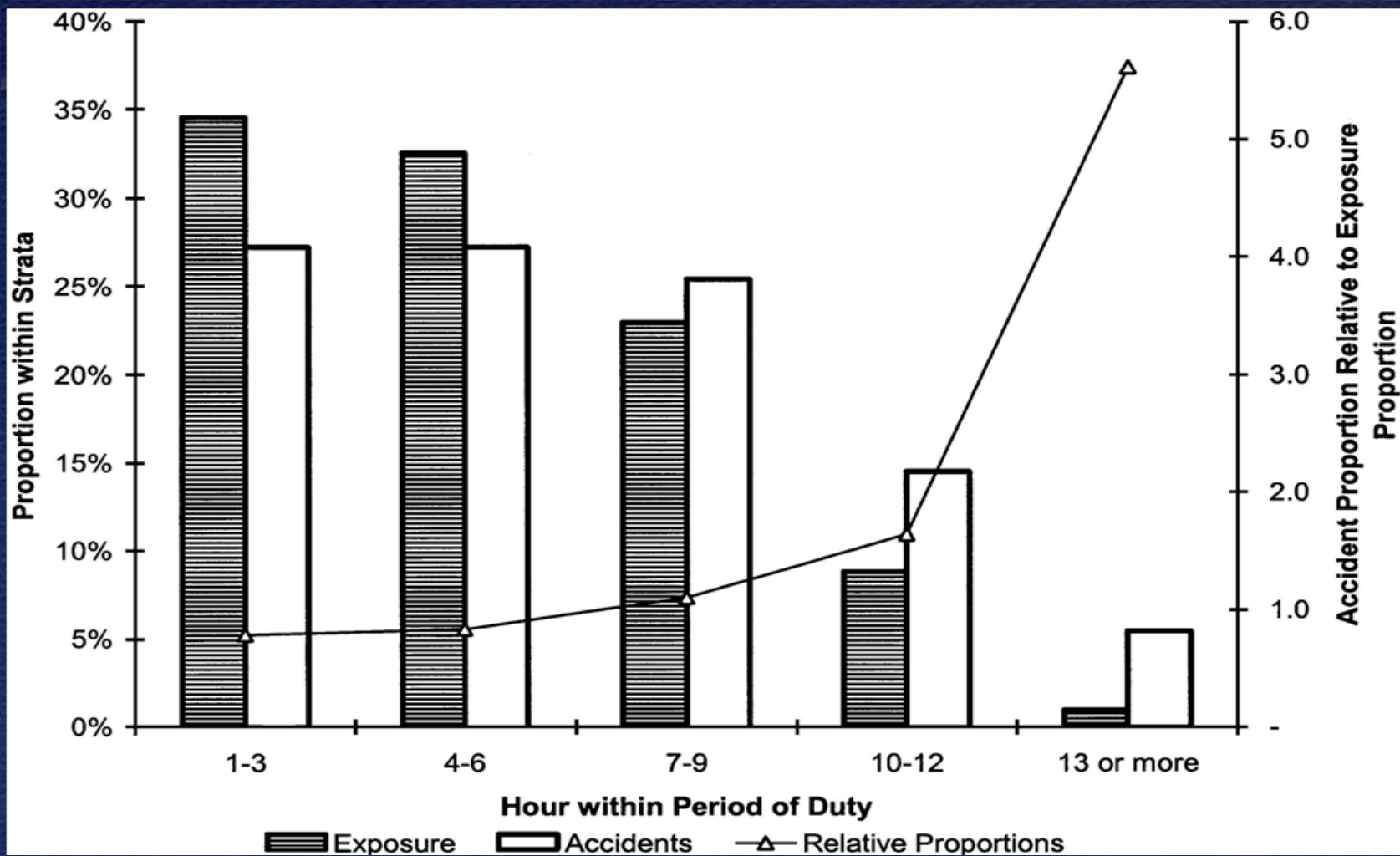
- sleep
 - acute sleep loss
 - cumulative sleep debt
- circadian clock
- hours awake
- sleep disorders

Fatigue Factors

- sleep
- circadian clock
 - 'sleepy' windows
 - 'alert' windows
 - irregular schedule
 - time zones
- hours awake
- sleep disorders

Fatigue Factors

- sleep
- circadian clock
- hours awake
 - > 12 hrs
 - > 16 hrs
 - 24 hrs
- sleep disorders



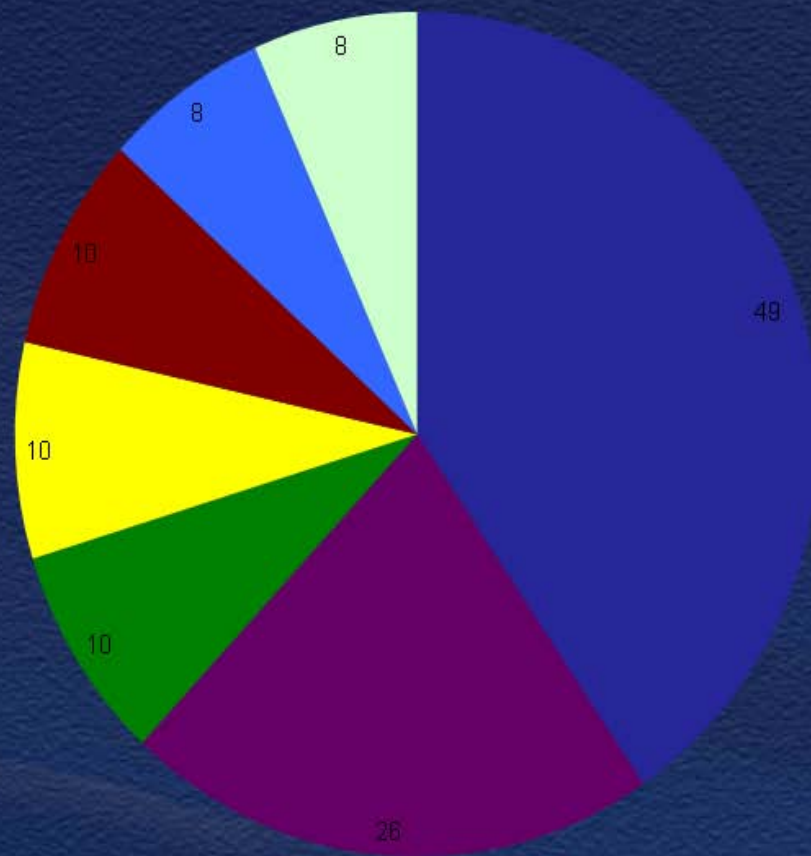
Fatigue Factors

- sleep
- circadian clock
- hours awake
- sleep disorders
 - ~ 90 sleep disorders
 - sleep apnea

NTSB Recommendations

- 150+ fatigue recommendations
- MOST WANTED since 1990

Complex Issue: Requires Multiple Solutions



- Scheduling Policies and Practices
- Education
- Organizational Strategies
- Raising Awareness
- Healthy Sleep
- Vehicle and Environmental Strategies
- Research and Evaluation

Hours of Service / Scheduling

- Science-based hours of service
- Allow for at least 8 hours of uninterrupted sleep
- Reduce schedule irregularity and unpredictability

Education

- Develop a fatigue education and countermeasures training program
- Educate operators and schedulers
- Include information on use of strategies: naps, caffeine, etc.
- Review and update materials

Health Related Recommendations

- Develop standard medical exam to screen for sleep disorders; require its use
- Educate companies and individuals about sleep disorder detection and treatment, and the sedating effects of certain drugs
- Establish a system to track prescription and OTC drug use of operators

Organizational Policies

- Implement fatigue call-in policy
- Have written policies
- Address administrative implications of fatigue calls
- On-duty mitigation strategies
- Off-duty rest

Fatigue Management Systems

- Develop guidance based on empirical and scientific evidence for operators to establish fatigue management systems
- Develop and use a methodology that will continually assess the effectiveness of fatigue management systems

NTSB Continuing Fatigue Efforts

- Studies
 - Fatigue Investigation Methodology Study
- Outreach
 - Training Center Course:
Investigating Human Fatigue Factors
- Recommendations and Advocacy
- Most Wanted List



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