Joint Session

Operational Drivers of Fatigue: National Transportation Safety Board Findings

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Factors Contributing to Fatigue in Air Traffic Control Settings

William J. Bramble, Jr., Ph.D.
National Transportation Safety Board

10:40 - 11:00

June 17, 2008

Presented at the FAA Fatigue Management Symposium: Partnerships for Solutions; Vienna, VA: June 17-19, 2008

William J. Bramble, Jr., Ph.D.
Biography

William J. Bramble, Jr. has worked as a human performance investigator for the National Transportation Safety Board since 2002. He has investigated human performance aspects of numerous aviation accident and incidents including the 2007 crash of a Kenya Airways Flight 507 near Douala, Cameroon; the 2006 crash of Comair Flight 5191 in Lexington, Kentucky; the 2004 near-collision of a B-747 and a B-737 at Los Angeles International Airport, the 2004 crash of Flash Airlines Flight 504 near Sharm el-Sheik, Egypt; and the 2003 crash of Air Midwest Flight 5481, in Charlotte, North Carolina. From 1999 to 2002, Bill worked in the Board's Safety Studies Division and completed a study of public aircraft safety. Past employers have included FlightSafety International and the Institute for Simulation and Training. Bill is a private pilot and holds a Ph.D. in human factors psychology from the University of Central Florida.

NTSB National Transportation Safety Board

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Senior Human
Performance Investigator

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Topics to be Covered

- Operational drivers
- Personal drivers
- Operational safeguards
- Controller awareness

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Operational Drivers of Fatigue

- Short rest periods between shifts
- Rapid rotation of shift start times
- Morning and graveyard shifts

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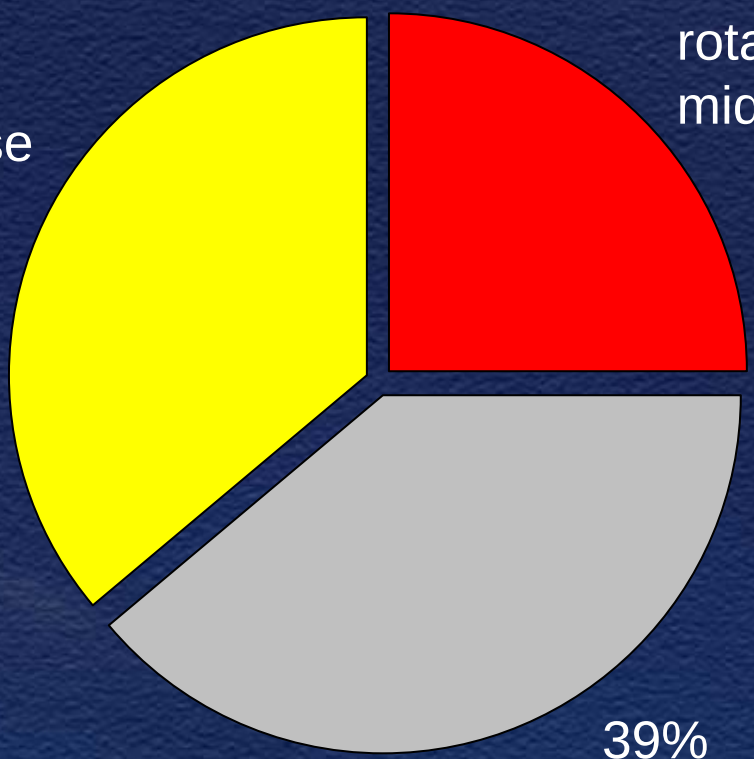
Operational Drivers of Fatigue



25%
Counterclockwise rotation with at least one midnight shift per week

36%
Counterclockwise rotation, no midnight shifts

39%
Schedules other than counter-clockwise rotation

(Della Rocco, Dobbins, & Nguyen, 1999)

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Operational Drivers of Fatigue

August 19, 2004 Incident – Controller Schedule

- Short, 8-hour rest period between shifts
  - Worked 1530 – 2330
    Slept 5 or 6 hours
  - Worked 0730 – 1455*
- Some positions combined
- > 5.5 / 7.5 hours on position
- Busy, moderately complex traffic
- Incident occurred near end of shift

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Operational Drivers of Fatigue

- Was briefed that the B-747 would land runway 24L
- Came to believe the B-747 was landing runway 24R
- Cleared B-737 to take off on runway 24L
- B-747 captain initiated a go-around, and flew 200 feet above the B-737

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Operational Drivers of Fatigue

Operational Drivers of Fatigue

Probable Cause of August 19, 2004 Incident

"A loss of separation between Southwest flight 440 and Asiana flight 204 due to the LC2 relief controller's failures to appropriately monitor the operation and recognize a developing traffic conflict. Contributing factors included the FAA's position relief briefing procedures, the formatting of the DBRITE radar displays in the LAX tower, controller fatigue, and the tower supervisor's staffing decision on the day of the incident."

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Personal Drivers of Fatigue

- Outside employment
- Sub-optimal utilization of off-duty rest periods
- Untreated medical conditions

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Personal Drivers of Fatigue

Synopsis of November 10, 2004 Incident at LAX

Missed incorrect read-back of landing clearance, cleared airplane to cross in front of landing traffic

Personal Drivers of Fatigue

- Averaged 6-7 hours of sleep per night
- During days off
  - Slept 6 hours per night
  - Worked as attorney
  - Stayed up late watching movies

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Personal Drivers of Fatigue

Synopsis of March 21, 2006 Incident at ORD

Issued conflicting takeoff clearances for intersecting runways

Operational Driver of Fatigue

None documented

Personal Driver of Fatigue

Previously diagnosed, untreated sleep disorder

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Personal Drivers of Fatigue

Synopsis of March 23, 2006 Incident at ORD

Issued conflicting crossing and takeoff clearances

Operational Driver of Fatigue

8.5 hour rest period between shifts before reporting for early morning shift at 0630

Personal Driver of Fatigue

Late-night television, slept only 4 hours

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Drivers of Fatigue

Review

- Operational and personal factors contribute to controller fatigue
- Both must be addressed to reduce the incidence of fatigue

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Operational Safeguards – LAX Example

Probable Cause of August 19, 2004 Incident

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Operational Safeguards

- Position relief briefings
- Display of traffic information
- Controller memory aids
- Required procedures and best practices
- Vigilance, communication, and assertiveness

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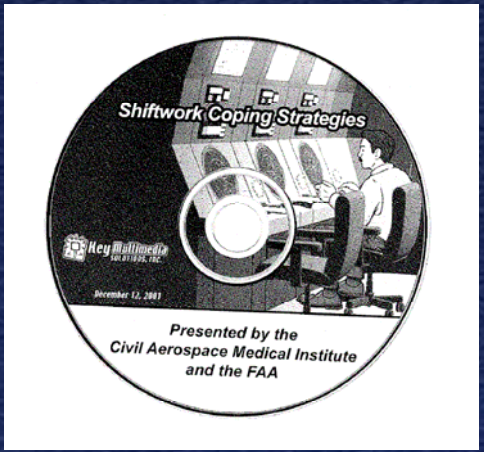
Controller Awareness

- Little recollection of 2002 fatigue training



- Lack of awareness and knowledge
- Limited use of fatigue countermeasures

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Controller Awareness

Controller at a Major Tower

"Recently, they mentioned something to us about [fatigue], but it's never been an issue." When asked if he felt fatigued during midnight shifts - "Yes, but not so where I can't do my job."

Supervisor at a Major Tower

"Controllers here don't think [fatigue] is a problem."

Presentation Review

- Operational drivers
- Personal drivers
- Operational safeguards
- Controller awareness

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