



NTSB National Transportation Safety Board

Managing Fatigue in 24/7 Operations: Advancing Transportation Safety

Honorable Mark R. Rosekind, Ph.D.
Board Member

Delaware Police Chiefs
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SUBCHAPTER 5—GENERAL

§1181. Definitions

Section 40102(a) of this title applies to this chapter.

SUBCHAPTER 6—ORGANIZATION AND ADMINISTRATIVE

§1183. General organization

(a) ORGANIZATION.—The National Transportation Safety Board is an independent constitutional body of the Government.

(b) APPOINTMENT OF MEMBERS.—The Board is composed of 5 members appointed by the President, with the advice and consent of the Senate. Not more than 3 members may be appointed from the same political party. Members shall be appointed on the basis of technical qualification, professional standing, and demonstrated knowledge of accident reconstruction, safety engineering, human factors, transportation safety, or transportation regulation.

(c) TERMS OF OFFICE AND REMOVAL.—The term of office of each member is 7 years. At the end of the term, the President may appoint a member to fill a vacancy occurring before the expiration of the term for which the predecessor of that member was appointed for the remainder of that term. When the term of office of a member ends, the President may appoint a successor if the member is appointed and qualified. The President may remove a member for inefficiency, neglect of duty, or other cause in office.

(d) CHAIRMAN AND VICE CHAIRMAN.—The President shall designate, by and with the advice and consent of the Senate, a Chairman of the Board. The President also shall designate a Vice Chairman of the Board. The terms of both the Chairman and Vice Chairman are 2 years. When the Chairman is absent or unable to perform his or her duties, the Vice Chairman shall act as Chairman.

Mission

The NTSB is charged with:

- 1) determining the probable cause of transportation accidents
- 2) making recommendations to prevent their recurrence



The NTSB is Responsible for Investigating:

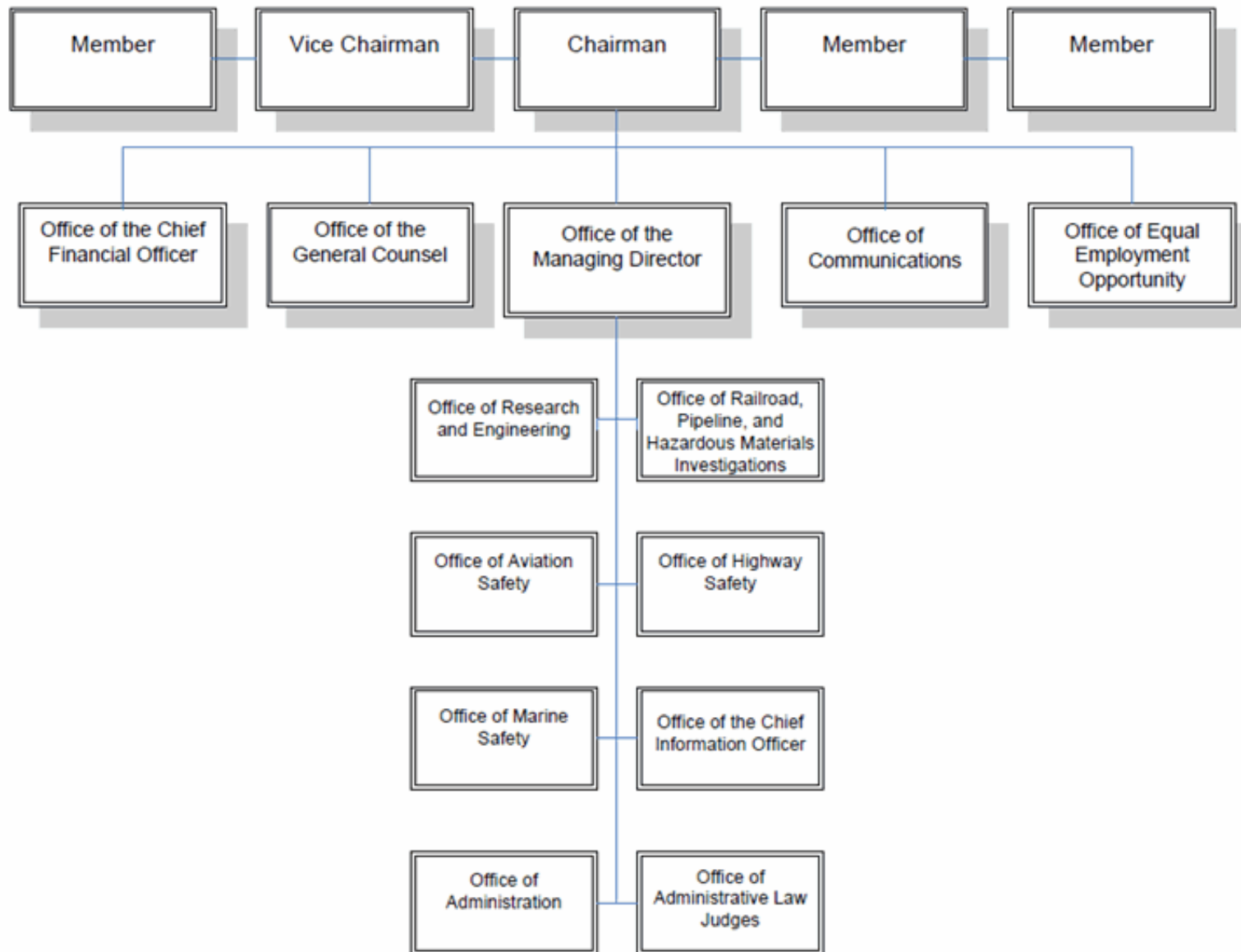
**Aviation, highway, rail, marine, pipeline,
and hazardous material accidents**





- 130,000+ accident investigations
- 13,000+ safety recommendations
 - 82% acceptance rate

NATIONAL TRANSPORTATION SAFETY BOARD



NTSB: The Board

- Five Members:
 - President nominates
 - Senate confirms



Mark Rosekind
Member



Chris Hart
Vice Chairman



Debbie Hersman
Chairman



Robert Sumwalt
Member



Earl Weener
Member

Go! Flight 1002



- early starts, multiple segment days, sleep apnea

NTSB



Guantanamo Bay Cuba

First NTSB aviation accident to cite fatigue as probable cause



- acute sleep loss, sleep debt, circadian disruption

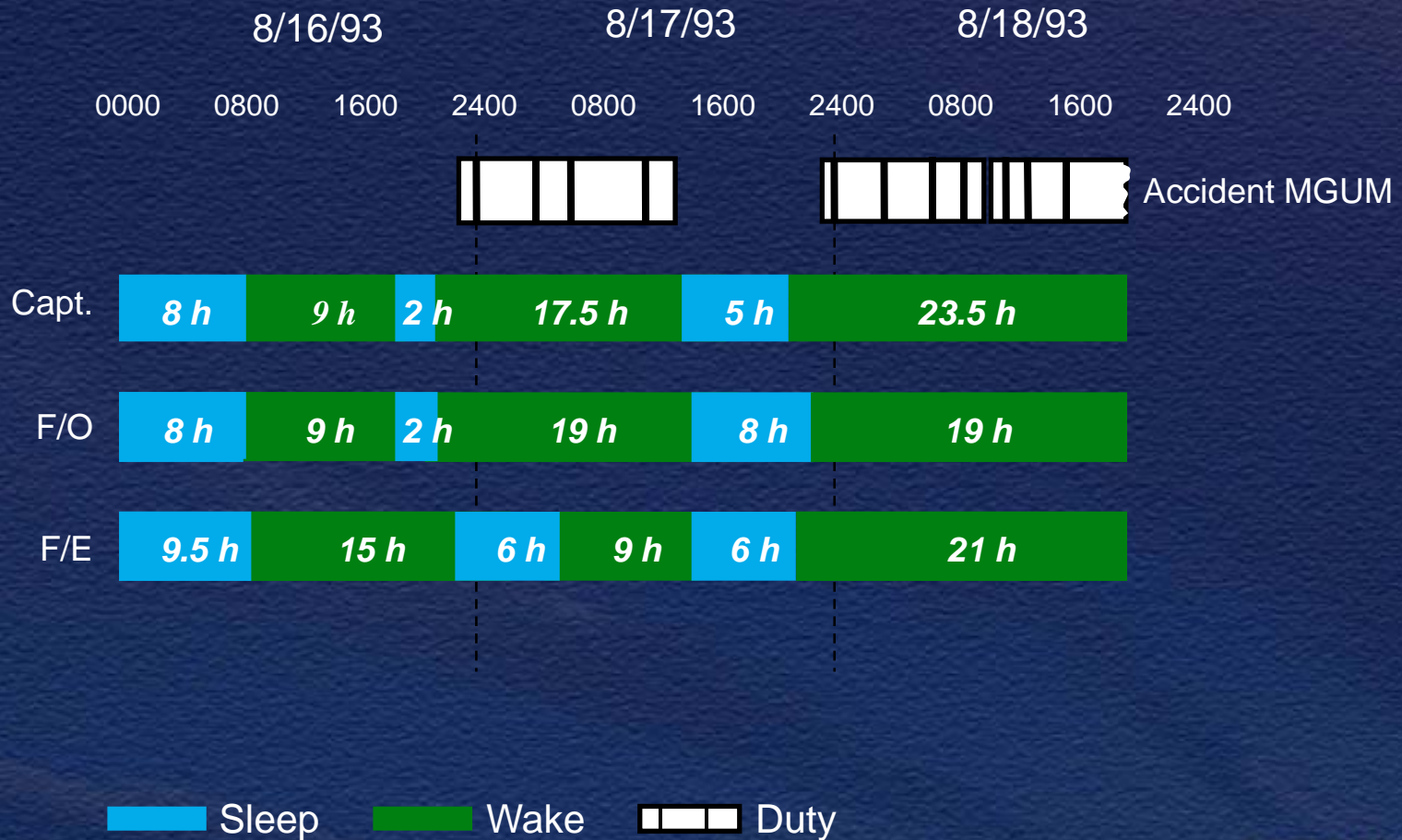
NTSB



Fatigue Factors: Accident Investigation

- Acute sleep loss/cumulative sleep debt
- Continuous hours of wakefulness
- Time of day/circadian effects
- Sleep disorders

Crew Sleep History



Observed Performance Effects

- Degraded decision-making
- Visual/cognitive fixation
- Poor communication/coordination
- Slowed reaction time

**Uncontrolled In-Flight Collision with Terrain
AIA Flight 808, Douglas DC-8-61, N814CK
U.S. NAS, Guantanamo Bay, Cuba, August 18, 1993**

“The National Transportation Safety Board determines that the probable causes of this accident were the impaired judgment, decision making, and flying abilities of the captain and flight crew due to the effects of fatigue...”

Owatonna, MN/July 31, 2008



8 fatalities

NTSB



Owatonna Crew Fatigue Factors

- acute sleep loss (Capt/FO)
- cumulative sleep debt (FO)
- early start time (Capt/FO)
- excessive sleep need (Capt)
- insomnia (FO)
- self-medicate/prescription sleep med (FO)

Probable Cause/Contributing Factors

“The National Transportation Safety Board determines that the probable cause of this accident was the captain’s decision to attempt a go-around late in the landing roll with insufficient runway remaining. Contributing to the accident were (1) the pilots’ poor crew coordination and lack of cockpit discipline; **(2) fatigue, which likely impaired both pilots’ performance;** and (3) the failure of the Federal Aviation Administration to require crew resource management training and standard operating procedures for Part 135 operators.”

Fatal Airline Accidents (Examples) (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
- 7/08 Owatonna MN: 8 fatalities
- 2/09 Buffalo NY: 49 fatalities

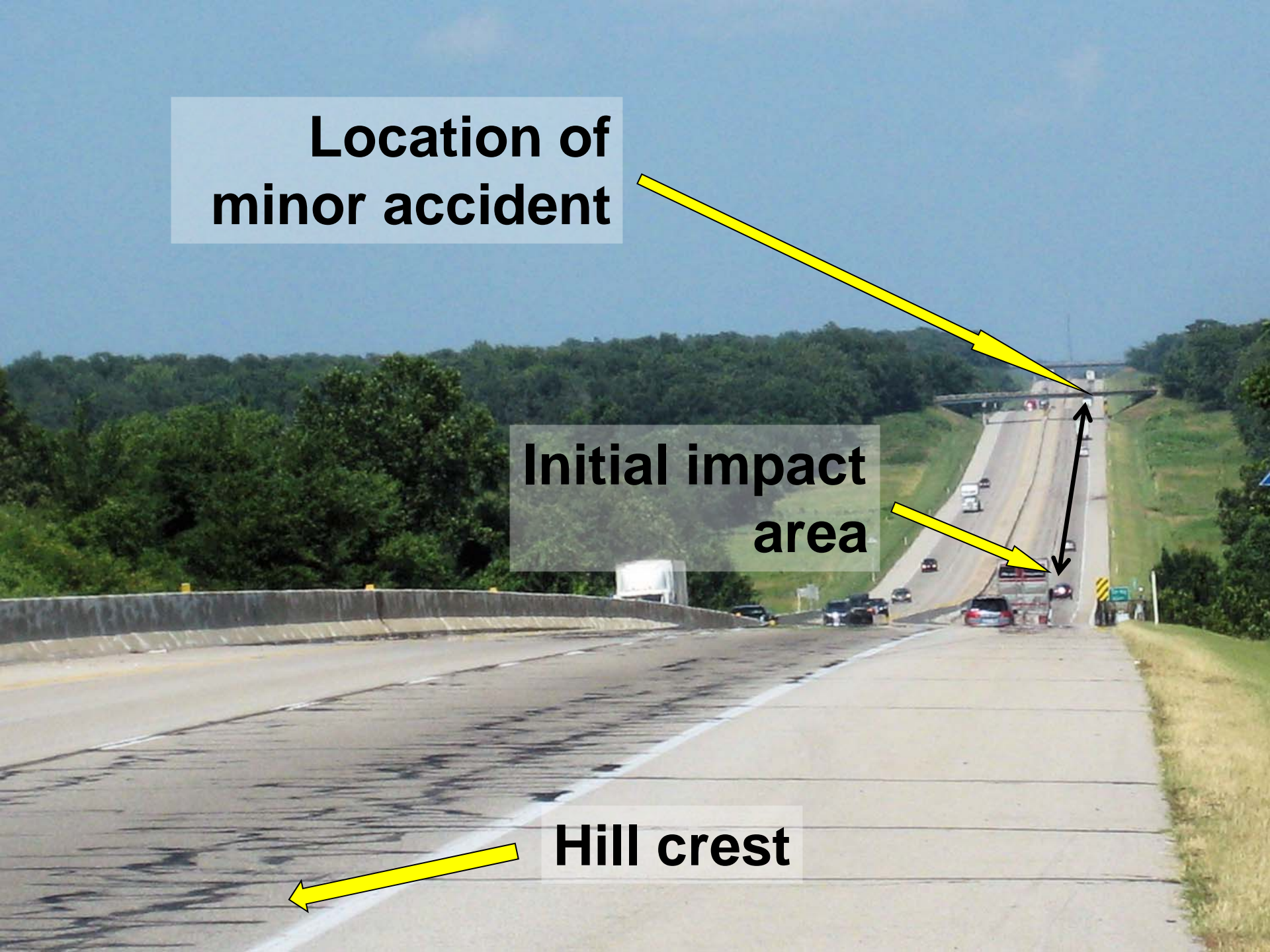
Miami, Oklahoma (June 26, 2009)

- Initial minor accident (~1:13 pm)
 - blocked eastbound I-44
- 2008 Volvo truck-tractor (~1:19 pm)
 - refrigerated semitrailer
 - traveling eastbound on I-44
 - 69 mph with cruise control engaged
 - without slowing or braking collided into queue of slowing & stopped vehicles

**Location of
minor accident**

**Initial impact
area**

Hill crest



10 fatalities
3 serious injuries
2 minor injuries
5 no injuries

**Ford
Windstar**



**Hyundai
Sonata**

**Kia
Spectra**

Fatigue Factors

- Off work for 3 weeks
- Kept day active/night sleep schedule when off
- Had one work day prior to accident
- 3am to 3pm shift work/drive schedule (since 1997)
- Obtained min 3 hrs/max 5 hrs sleep prior to accident
- Early bedtime (2 hr phase advance in sleep time)
- Subsequently diagnosed with mild sleep apnea

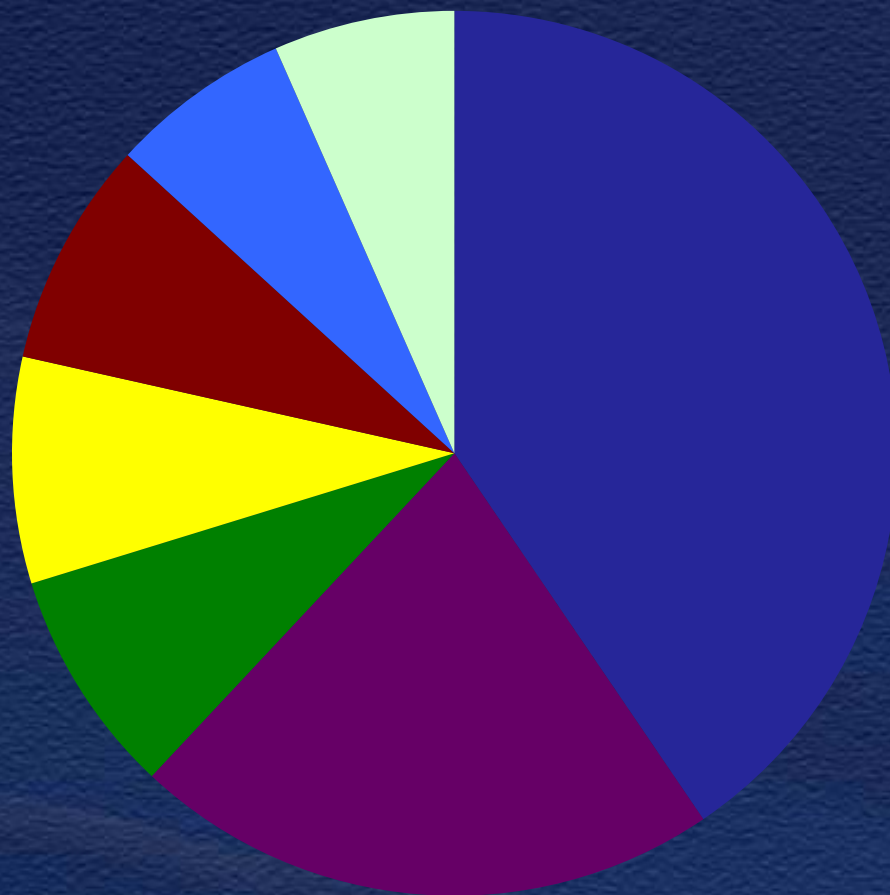
Probable Cause (fatigue)

“ . . . driver’s fatigue, caused by the combined effects of acute sleep loss, circadian disruption associated with his shift work schedule, and mild sleep apnea, which resulted in the driver’s failure to react to slowing and stopped traffic ahead by applying the brakes or performing any evasive maneuver to avoid colliding with the traffic queue. . . . ”

NTSB Fatigue Recommendations

- MOST WANTED since 1990
- 190+ fatigue recommendations

Complex Issue: Requires Multiple Solutions



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

Education/Strategies

- 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

Scheduling Policies and Practices

Victoria, Texas, January 2, 2008



Victoria, Texas Fire Department

- 1 fatality, 47 injuries; day sleep, night drive, ~ 4 am WOCL

NTSB



Hours of Service / Scheduling

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

Healthy Sleep

Mexican Hat, UT, January 6, 2008



- 360 rollover, 50/53 ejected, 9 fatalities; OSA (-CPAP)

NTSB



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

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



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