NTSB National Transportation Safety Board

Investigating Fatigue in Transportation Accidents: A Board Member's Perspective

Robert L. Sumwalt
September 29, 2015

Charles A. Lindbergh

"My mind clicks on and off... I try letting one eyelid close at a time when I prop the other open with my will. But the effort's too much. Sleep is winning. My whole body argues dully that nothing, nothing life can attain is quite so desirable as sleep. My mind is losing resolution and control."

The Spirit of St. Louis
- Charles A. Lindbergh

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NTSB reports on pilots falling asleep

Feds want to rewrite rules to curb fatigue

By Alan Levin
USA TODAY

WASHINGTON — Two airline pilots fell asleep while cruising over Hawaii last February, flying past their destination toward open ocean for 18 minutes before waking up and returning for a safe landing, federal accident investigators revealed Tuesday.

That incident and an accident in Traverse City, Mich., last year highlight the need for more comprehensive rules to stem the growing list of crashes attributed to the lengthy hours that pilots routinely work, the National Transportation Safety Board (NTSB) said. Crashes linked to fatigue have killed 249 people since 1997, according to NTSB records.

By Marco Garcia, AP

Fatigue to blame: Two Go Airlines pilots working a "demanding" schedule fell asleep and flew past their destination February.

"It's an insidious issue," NTSB Chairman Mark Rosenker said. "Many times the pilots themselves don't recognize that they are fatigued when they get into that cockpit."

The NTSB voted to recommend that federal aviation regulators and airlines use fatigue studies to rewrite the rules for how long pilots can legally fly. Currently, federal law allows pilots to work up to 16 hours a day, including up to eight hours behind the controls, and loopholes allow longer days in some situations.

Air-traffic controllers frantically radioed Go Airlines Flight 1002 from Honolulu to Hilo, Hawaii, for 18 minutes on Feb. 13, but got no response from the pilots, said NTSB investigator Jana Price.

In the safety board's first disclosure of details from the investigation, Price said both pilots "unintentionally fell asleep" as the Bombardier CRJ-200 jet flew at 21,000 feet. The jet carried 40 passengers.

The two pilots had been flying together for three arduous days "that involved early start times" and a "demanding" sequence of short flights, Price said. Since the incident, the captain had been diagnosed with severe obstructive sleep apnea, she said. Apnea causes people to repeatedly wake up during the night and has been linked to poor work performance and accidents.

In a separate investigation, the NTSB concluded that a regional airline crash last year in Traverse City was probably triggered by fatigue. Pinnacle Airlines Flight 4712 skidded off the end of a snowy runway on April 12, 2007, after landing in the early hours of the morning. None of the 49 passengers, two pilots and a flight attendant were injured.

The NTSB found that the pilots of the Bombardier CRJ-200 should never have attempted the landing.

The runway was too slick to land under the airline's rules, but the pilots failed to perform a basic landing calculation and missed other warning signs that the weather was deteriorating.

The accident happened after the pilots had worked 14 hours. The cockpit recorder overheard the pilots yawning and the captain made repeated references to being tired, the NTSB found.

The NTSB has been calling for reform of pilot work rules for decades. Several attempts to rewrite pilot work rules have failed in the face of opposition from airlines and pilot groups.

Contributing: Dennis Cauire of Gannett News Service

DEREK GEE/BUFFALO NEWS VIA ASSOCIATED PRESS

The NTSB concluded that this 2009 plane crash outside Buffalo was the result of pilot error and that the pilots were probably fatigued.

A lag for fatigue-related safety rules

Efforts to ensure pilots, drivers get enough rest

The crash of Continental Connection Flight 3407 outside Buffalo in February 2009 heightened concerns about pilot fatigue. Four

This project

This article is one of several from a project detailing troubles with the

Seven years after that recommendation, a cruise ship ran aground off the Alaskan coast after its pilot erred while trying to guide the ship over a well-know

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Lady Gaga's latest album, Born This Way, draws influence from '80s. Review, 1D

By Dave Hogan, Getty Images

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ily. Results, 1-2, 4B

Chrysler Town & Country by Cars.com

Many pilots exposed to fatigue

Thousands of flights are at riskier hours

By Alan Levin and Barbara Hansen
USA TODAY

Airlines operate thousands of flights each day that expose pilots to potentially dangerous fatigue, schedule data and the latest fatigue shows.

A USA TODAY

"The nose is down, the wing low, the plane is diving and turning. I've been asleep with open eyes... I kick left rudder and pull the stick back...

"My eyes jump to the altimeter...I'm at 1600 feet. The turn-indicator leans over the left - the airspeed drops - the ball rolls quickly to the side...My plane is getting out of control!"

The Spirit of St. Louis
- Charles A. Lindbergh

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Captain’s Training History

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Captain's record of failed FAA checkrides

Date of Checkride	Certificate Attempted
October 1991	Instrument Rating
May 2002	Commercial SEL
March 2004	Commercial MEL
October 2007	ATP and Saab 340 type rating

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Additional training difficulties

Date	Difficulty Encountered	Checking Event
October 2005	graded “train to proficiency”	initial Saab 340 flight check
October 2006	unsatisfactory	recurrent Saab 340 flight check
October 2007	unsatisfactory	Saab 340 upgrade proficiency check

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- Captain had not established good foundation of attitude instrument flying skills early in career
- Weaknesses in basic aircraft control and instrument flying continued

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- Successful transition to Q400 in Dec. 2008
  - Flying Q400 for 2 months at time of accident
- Simulator instructor: captain was rough on flight controls and over-controlled roll axis
  - Consistent with previous aircraft control problems

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Role of Fatigue

- Captain
  - Reduced sleep opportunities
  - Stayed overnight in crew room
  - Accessed company computer at 0310
  - Accident occurred at normal bedtime
  - Had likely been awake for at least 15 hours at the time of the accident
  - Sleep debt of 6 – 12 hours over the 3 days prior to the accident

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Role of Fatigue

- First officer
  - Overnight transcontinental commute
  - Slept on airplanes and in crew room

"This is one of those times that if I felt like this when I was at home there's no way I would have come all the way out here."

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Probable Cause

- The captain's inappropriate response to the activation of the stick shaker, which led to an aerodynamic stall from which the airplane did not recover.

<u>Contributing to the accident:</u>

1) the flight crew's failure to monitor airspeed in relation to the rising position of the low-speed cue
2) the flight crew's failure to adhere to sterile cockpit procedures
3) the captain's failure to effectively manage the flight
4) Colgan Air's inadequate procedures for airspeed selection and management during approaches in icing conditions.

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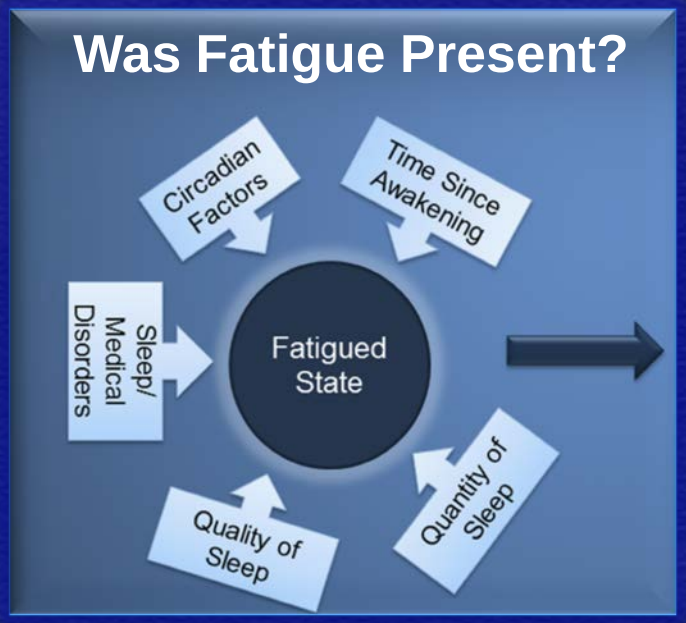
Two Prongs that Must be Met to Show Fatigue was a Factor in Accident's Causation



Did Fatigue Adversely Affect Performance

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Were the crewmembers fatigued?

Did fatigue adversely affect their performance?

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Did fatigue adversely affect their performance?

- Throughout the flight the pilots were engaged in conversation.
- Neither acted withdrawn, lethargic or made any statements about being tired or receiving inadequate sleep.

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Did fatigue adversely affect their performance?

- “The errors of the crew cannot be solely attributed to fatigue because of other explanations for their performance.”
  - Monitoring error made my other crews, as well
  - Captain’s errors consistent with his pervious performance deficiencies

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Did fatigue adversely affect their performance?

"The pilots' performance was likely impaired because of fatigue, but the extent of their impairment and the degree to which it contributed to the performance deficiencies that occurred during the flight cannot be conclusively determined."

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NIGHTLY NEWS
LACK OF EXPERIENCE AND BASIC SKILLS
CREW FATIGUE
LACK OF TRAINING
LACK OF PROFESSIONALISM
msnbc.com

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Comair Airlines Flight 5191
Lexington, Kentucky

- Bombardier CRJ
- 49 Fatalities
- First officer severely injured
- Wrong runway takeoff

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Air Traffic Controller Fatigue

Saturday, August 26

- Worked from 0540 – 1430
  - Napped from 1530 – 1730
  - Ate dinner, ran, visited with friends
- Returned to work at 2325

Sunday, August 27

- Scheduled to work until 0800
  - Accident occurred at 0606

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Air Traffic Controller Fatigue

- The controller had slept 2 out of the 24 hours preceding the accident.
- Time of day – 0606

Was the controller fatigued?

Did fatigue adversely affect the controller's performance?

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Did fatigue adversely affect the controller's performance?

- The controller was not in the habit of monitoring takeoffs.

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Did fatigue adversely affect the controller's performance?

"The controller was most likely fatigued at the time of the accident, but the extent that fatigue affected his decision not to monitor the airplane's departure could not be determined in part because his routine practices did not consistently include the monitoring of takeoffs."

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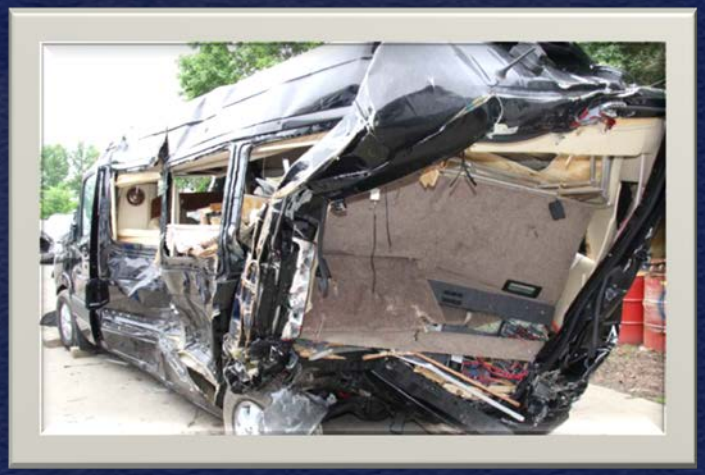
June 7, 2014



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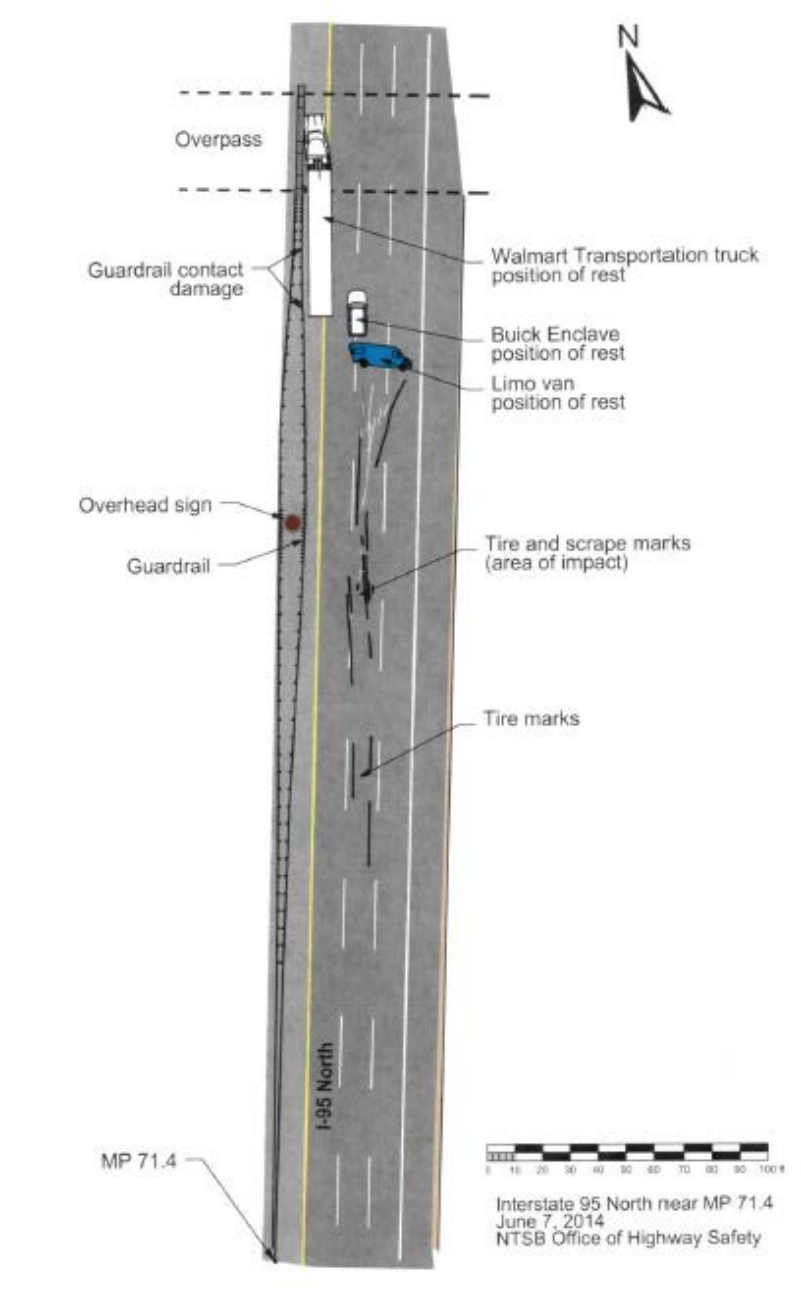

Truck skid marks began 95 feet south of the impact area

Did not respond to visible tail lights until appx. 200 ft.

No reaction to slowing traffic

Did not slow to comply with reduced speed limit

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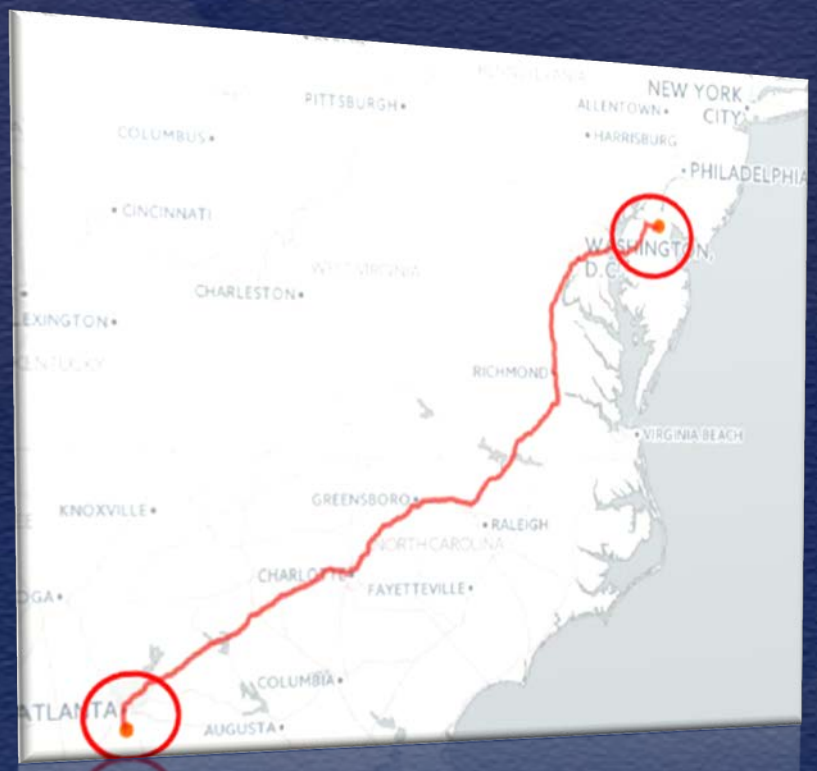
Driver Factors



- Departed Georgia between 8:30 pm and 10:30 pm
  - Arrived in Delaware around 11 am
  - 800 driving miles
- After arriving in Delaware, drove 451 miles
  - 13 hours, 32 minutes

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Driver Factors

- 4 hours of sleep opportunity in previous 33 hours
- Awake more than 28 hours
- Missed sleep cycle
- Crash occurred at 12:55 am

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“I fell asleep”

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Was the truck driver fatigued?

Did fatigue adversely affect his performance?

NTSB

Was the truck driver fatigued?

"The driver of the Walmart Transportation truck was fatigued due to his failure to obtain sleep before reporting for duty, resulting in acute sleep loss and excessive time awake."

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Did fatigue adversely affect his performance?

"Due to his fatigued condition, the Walmart Transportation truck driver had a delayed response to slowed traffic in an active work zone."

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Probable Cause

"The Walmart Transportation truck driver's fatigue, due to his failure to obtain sleep before reporting for duty, which resulted in his delayed reaction to slowing and stopped traffic ahead in an active work zone and his operation of the truck at a speed in excess of the posted limit."

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"I've got to find some way to keep alert. There's no alternative but death and failure."

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