



# National Transportation Safety Board

## **NTSB Efforts to Enhance Safety: Reducing Distraction and Fatigue in Transportation**

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Southern District Institute of Transportation Engineers  
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# Federal Agencies: Transportation

NTSB

FMCSA

FRA

NHTSA

PHMSA

DOT

MARAD

FTA

FHWA

FAA



NTSB





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





# All Modes

# PG&E/San Bruno Gas Pipeline Explosion

- 8 fatalities
- 10 serious injuries
- 48 minor injuries



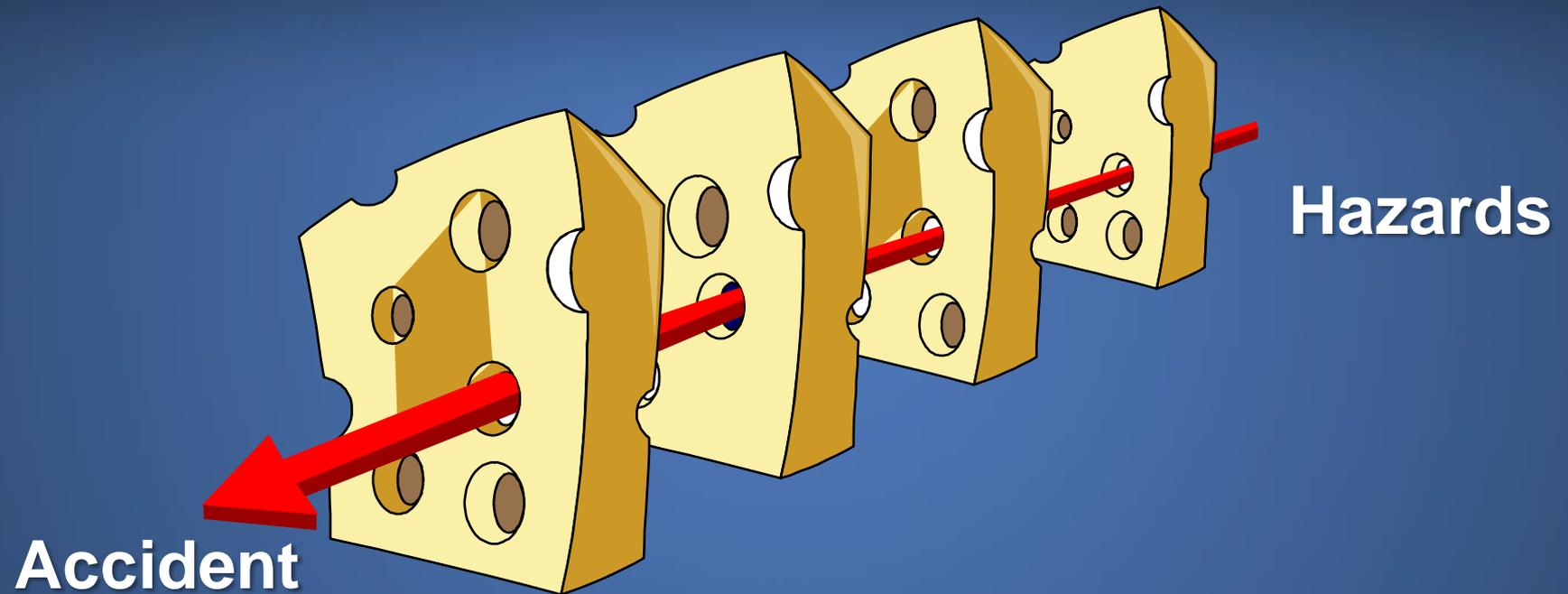
- 108 homes affected
  - 38 destroyed
  - 17 sev - mod damage
  - 53 minor damage

# Independent Federal Agency: Created in 1967

- ~ 132,000 accident investigations
- 13,500+ safety recommendations
- ~ 2,500 organizations/recipients
- 82% acceptance rate



# “Swiss Cheese” Model (Reason)



Successive layers of defenses, barriers, and safeguards

# NTSB Characterized as:

‘moral compass and industry conscience’

NTSB Chairman Deborah A.P. Hersman



NTSB

# Distraction: 10+ Years of NTSB Investigations



NTSB

**Ford Explorer Sport Collision  
With Ford Windstar Minivan  
and Jeep Grand Cherokee  
on Interstate 95/495  
Near Largo, Maryland  
February 1, 2002**



**Highway Accident Report**  
NTSB/HAR-03/02

PB2003-916202  
Notation 7561



**National  
Transportation  
Safety Board**  
Washington, D.C.



**NTSB**

# Largo, MD (February 1, 2002)

- 20 year old driver
- SUV driver's handheld cell phone found
- Wireless records showed:
  - starting at 4 pm, driver placed/received 15 calls
  - 12 to/from friend's wireless number
  - call #15 at 8 pm (accident occurred ~ 8 pm)



5 fatalities  
1 injury



SUV



minivan



NTSB

# Probable Cause

“ . . . failure to maintain directional control . . . due to a combination of . . . and distraction caused by use of a handheld wireless telephone.”



# Recommendations

## **To the National Highway Traffic Safety Administration:**

Develop, in conjunction with The Advertising Council, Inc., a media campaign stressing the dangers associated with distracted driving. (H-03-03)

Develop, in conjunction with the American Driver and Traffic Safety Education Association, a module for driver education curriculums that emphasizes the risks of engaging in distracting behavior. (H-03-04)

Determine the magnitude and impact of driver-controlled, in-vehicle distractions, including the use of interactive wireless communication devices, on highway safety and report your findings to the U. S. Congress and the States. (H-03-05)

## **To the 48 States that do not have legislation prohibiting holders of learner's permits and intermediate licenses from using interactive wireless communication devices:**

Enact legislation to prohibit holders of learner's permits and intermediate licenses from using interactive wireless communication devices while driving. (H-03-08)

## **To the 34 States that do not have driver distraction codes on their traffic accident investigation forms:**

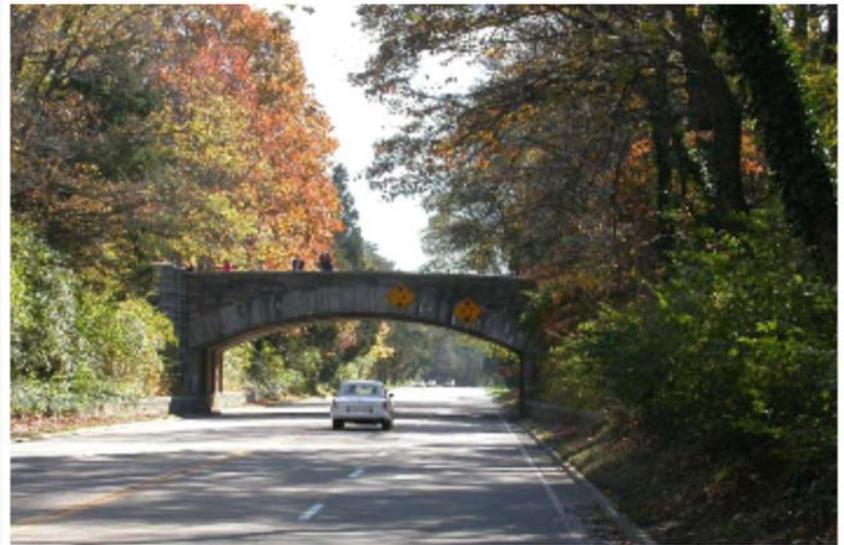
Add driver distraction codes, including codes for interactive wireless communication device use, to your traffic accident investigation forms. (H-03-09)

## **To the American Driver and Traffic Safety Education Association:**

Develop, in conjunction with the National Highway Traffic Safety Administration, a module for driver education curriculums that emphasizes the risks of engaging in distracting behavior. (H-03-10)



# Alexandria, VA (November 14, 2004)



11 injuries



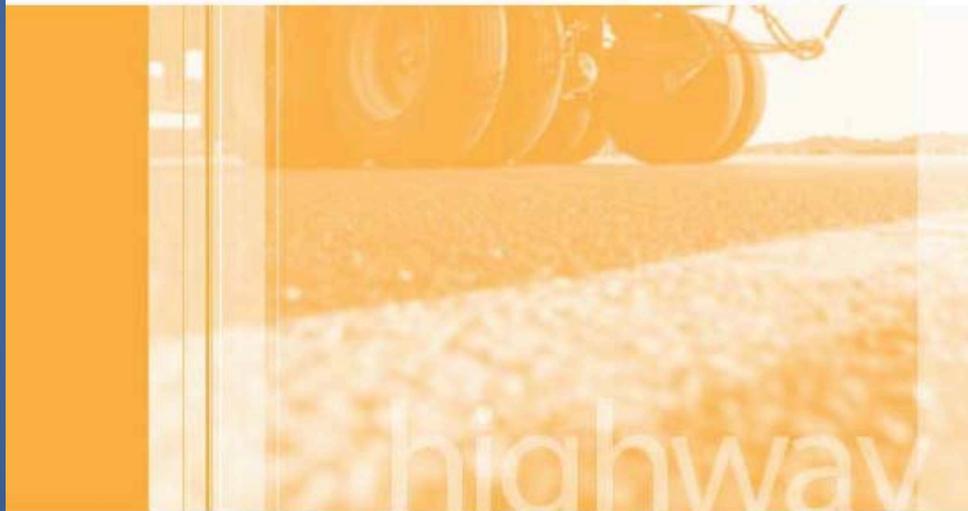
NTSB

# Probable Cause

“ . . . bus driver’s failure to notice and respond to posted low-clearance warning signs and to the bridge itself due to cognitive distraction resulting from conversing on a hands-free cellular telephone while driving.”



Truck-Tractor Semitrailer Median Crossover  
Collision With 15-Passenger Van  
Munfordville, Kentucky  
March 26, 2010



**Accident Report**

NTSB/HAR-11/02  
PB2011-916202



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# Munfordville, KY (March 26, 2010)

- truck-tractor semitrailer combination unit
- departed the left lane of southbound Interstate 65
- crossed a 60-foot-wide median
- struck and overrode a cable barrier system
- entered the northbound travel lanes
- struck a 15-passenger van
  - 11 passengers (eight adults, two children, infant)



# Munfordville, KY (March 26, 2010)

- driver used his mobile phone for calls and text messages a total of 69 times while driving in the 24-hour period prior to the accident
- driver made four calls in the minutes leading up to the crash
- last call at 5:14 a.m. CDT, coinciding with the time that the truck departed the highway





- crossed 60 ft median
- overrode cable barrier

### Fatalities

- truck driver
- van driver
- 9 van passengers

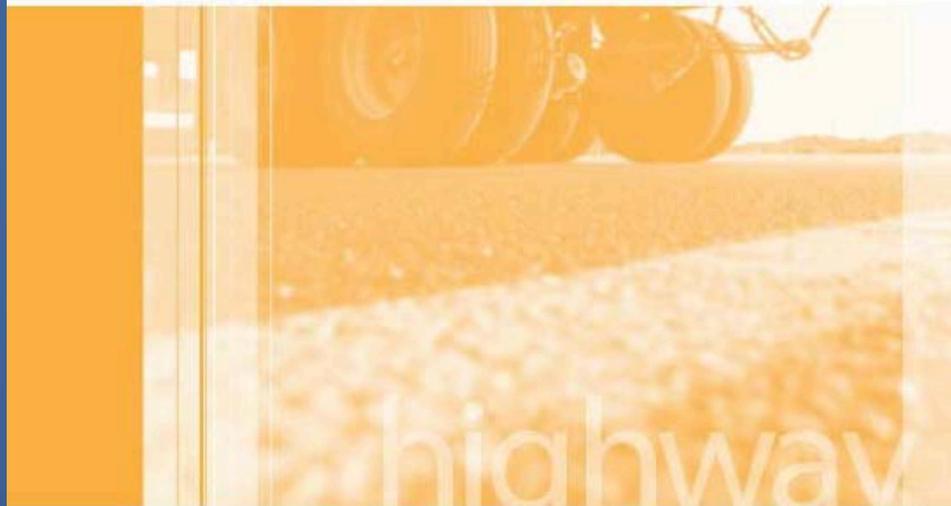


# Probable Cause

“ . . . the truck driver’s failure to maintain control of the truck-tractor combination vehicle because he was distracted by use of his cellular telephone.”



Multivehicle Collision  
Interstate 44 Eastbound  
Gray Summit, Missouri  
August 5, 2010



**Accident Report**

NTSB/HAR-11/03  
PB2011-916203



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# Gray Summit, MO (August 5, 2010)

- pickup driver cell phone use:
  - 11 minutes prior to accident,  
11 text messages (6 sent/5 received)
- witness: driver appeared to lean to right
- witness: did not see brake lights illuminate
- pickup's sensing and diagnostic module (SDM):
  - brakes not applied in seconds before impact





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2 fatalities  
37 injuries

# New Recommendations

**To the 50 states and the District of Columbia:**

(1) Ban the nonemergency use of portable electronic devices (other than those designed to support the driving task) for all drivers;



Fatigue is a safety risk.



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# Miami, Oklahoma (June 26, 2009) Fatigue Factors

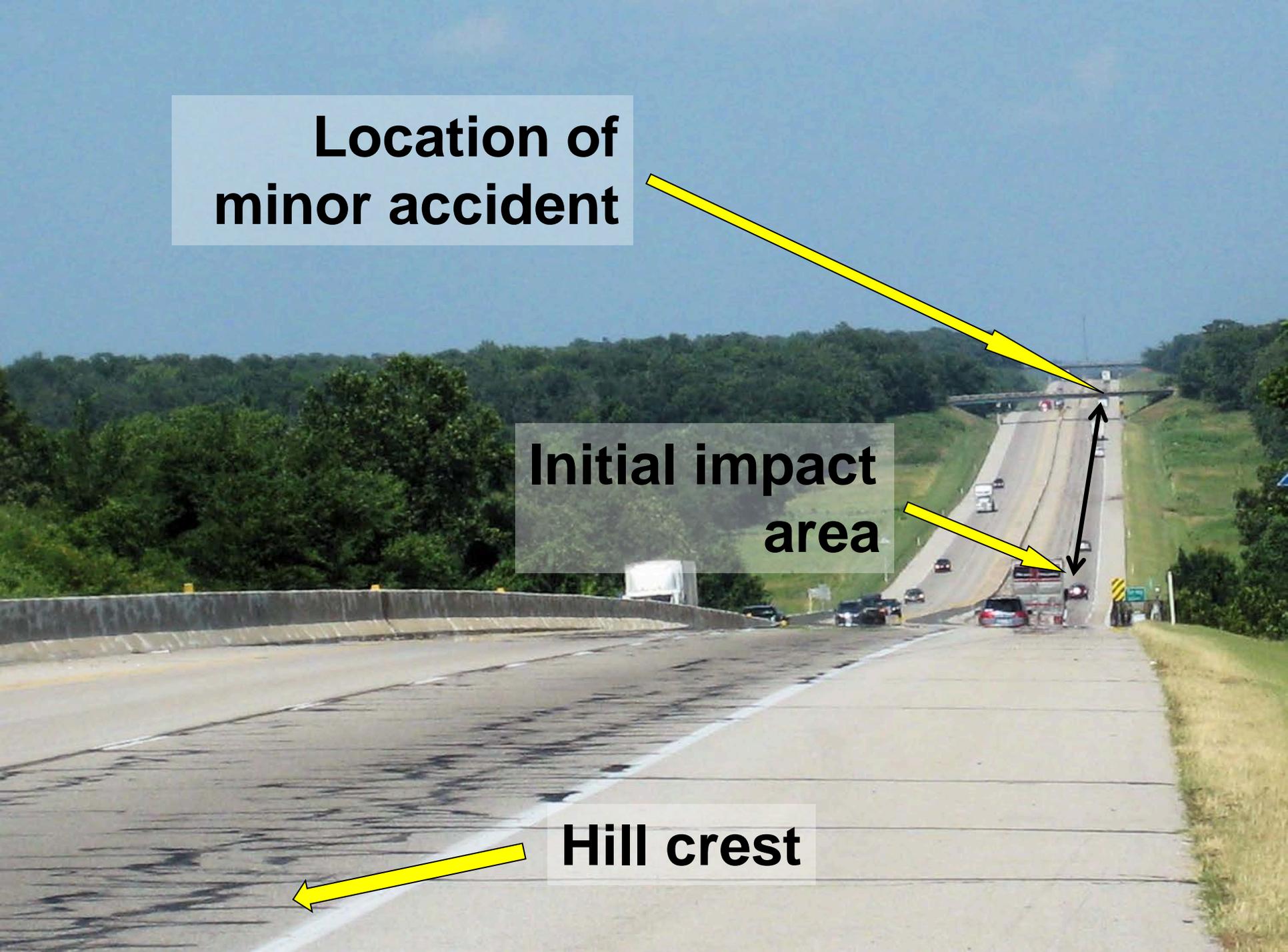
- Off work for 3 weeks: day active/night sleep schedule
- 3am to 3pm shift work/drive schedule (since 1997)
- Early bedtime (2 hr phase advance in sleep time)
- Obtained min 3 hrs/max 5 hrs sleep prior to accident
- Subsequently diagnosed with mild sleep apnea



**Location of  
minor accident**

**Initial impact  
area**

**Hill crest**



# Miami, OK (June 26, 2009)

10 fatalities  
3 serious injuries  
2 minor injuries  
5 no injuries

**Ford  
Windstar**



**Hyundai  
Sonata**

**Kia  
Spectra**

# 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. . . . ”





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**Animation of Accident Reconstruction**

**Motorcoach Run Off Road-Collision with  
Bridge Signpost**

Interstate Highway 95 Southbound  
New York, New York  
March 12, 2011

HWY11MH005

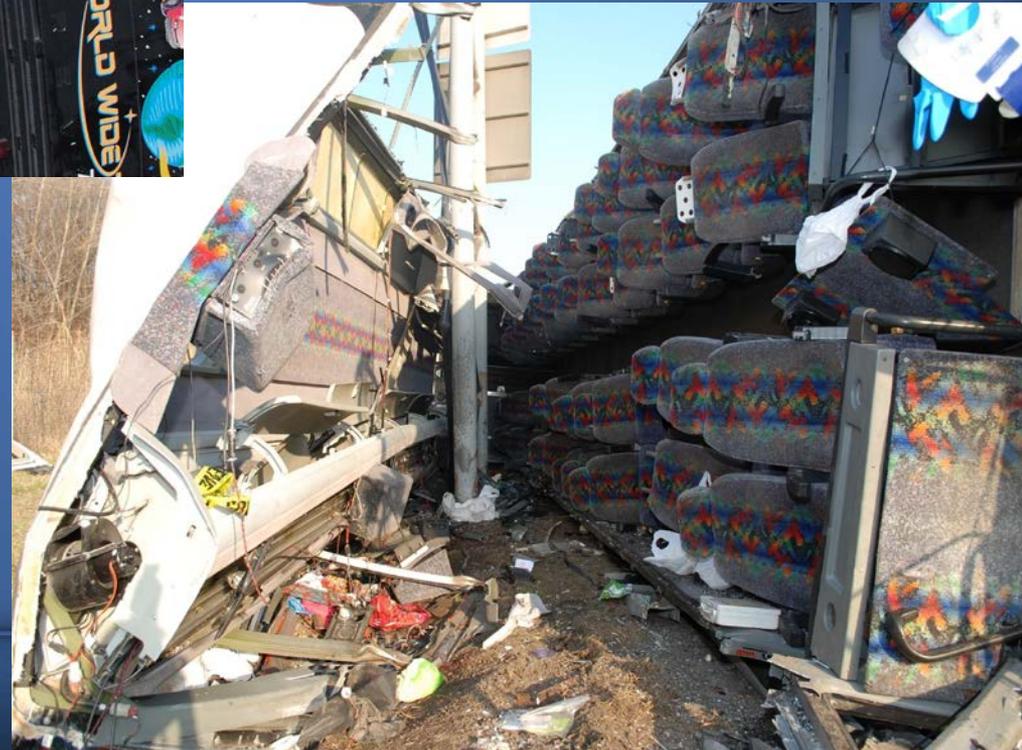


**NTSB**

# 'Bronx Bus', New York, NY (March 12, 2011)



15 fatalities  
17 injuries

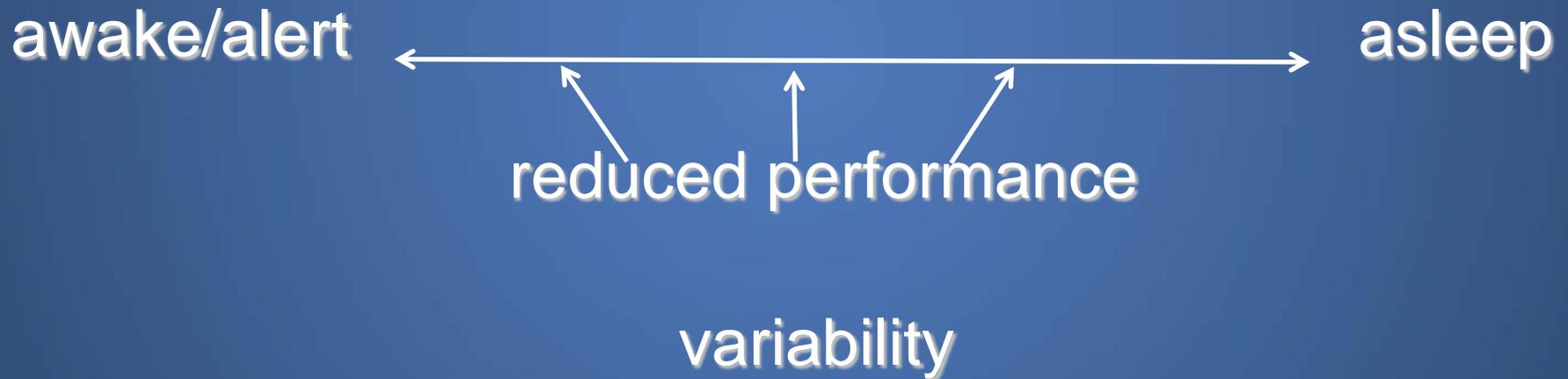


# Probable Cause

“The National Transportation Safety Board determines that the probable cause of the accident was the motorcoach driver's failure to control the motorcoach due to fatigue resulting from failure to obtain adequate sleep, poor sleep quality, and the time of day at which the accident occurred.”



# Fatigue Risks



# Fatigue Risks

- degraded 20 – 50%+:

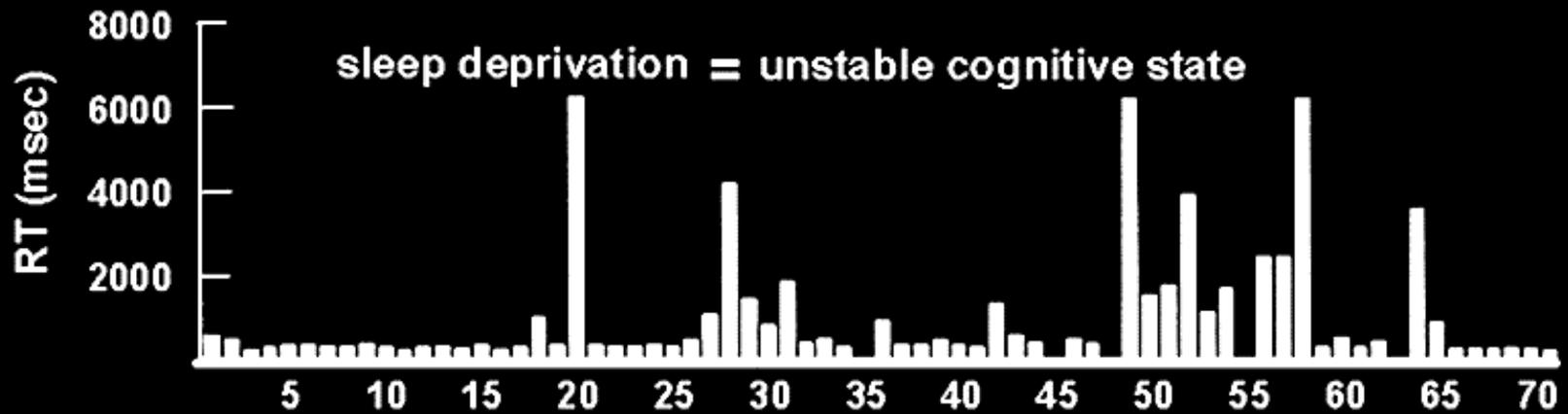
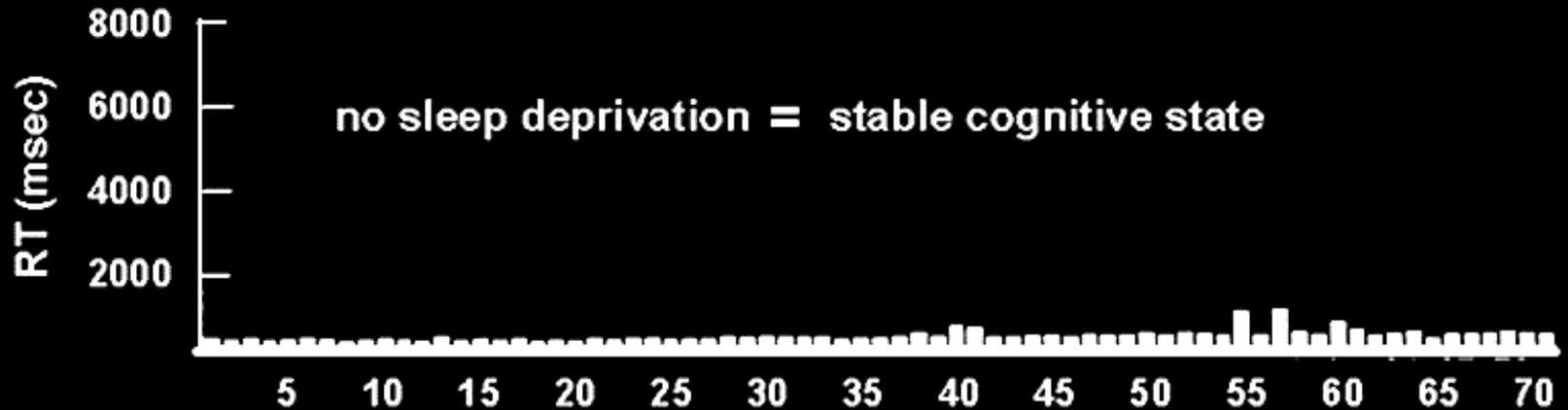
- reaction time
- memory
- communication
- situational awareness
- judgment
- attention
- mood

- increased:

- irritability
- apathy
- attentional lapses
- microsleeps

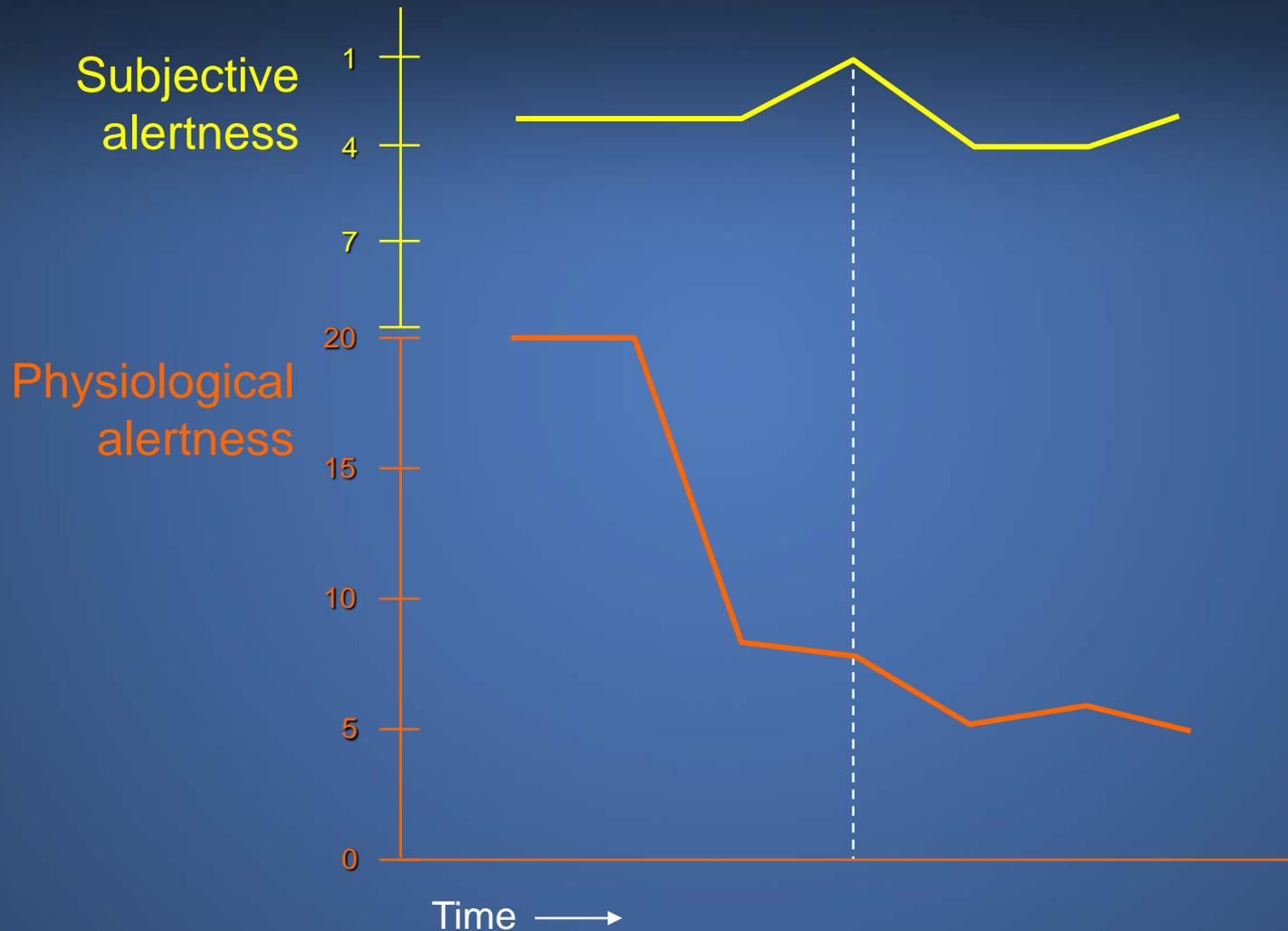


# Fatigue and Reaction Times



consecutive RTs across a 10-min PVT performance task

# Alertness Reports Often Inaccurate



Adapted from Sasaki et al., 1986



NTSB



Home > Transportation Safety > Most Wanted List

SHRE

## MOST WANTED LIST

A program to increase the public's awareness of, and support for, action to adopt safety steps that can help prevent accidents and save lives. The following are ten of the current issues.



Addressing Human Fatigue



General Aviation Safety



Safety Management Systems



Runway Safety



Bus Occupant Safety



Pilot & Air Traffic Controller Professionalism



Recorders



Teen Driver Safety



Addressing Alcohol-Impaired Driving



Motorcycle Safety

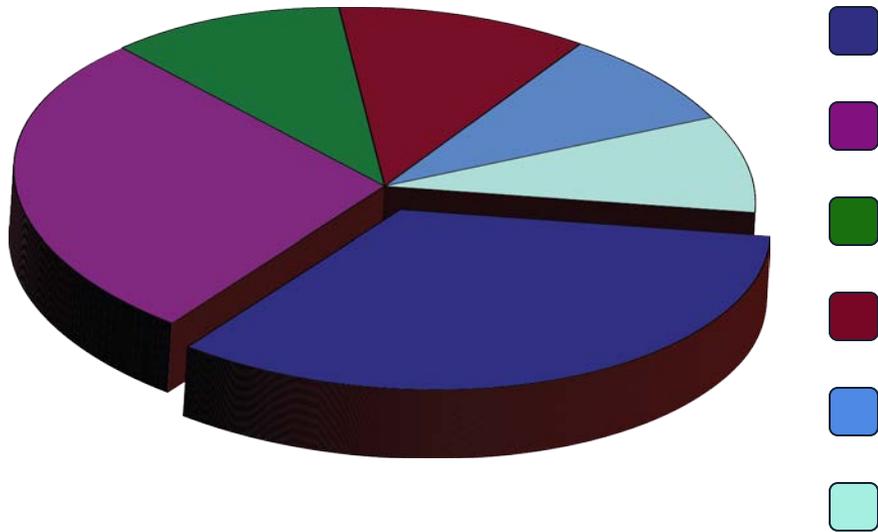


# NTSB Safety Recommendations: Fatigue

- MOST WANTED 1990 - 2011
- ~200 fatigue recommendations

# Complex Issue:

Requires Multiple Solutions



[www.nts.gov](http://www.nts.gov)

