



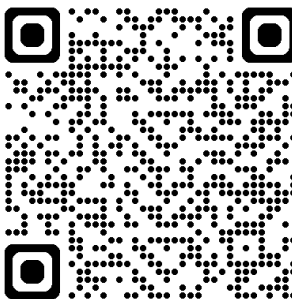
Driver Fatigue and Sleep Apnea Investigation Techniques in Six NTSB Crash Investigations

Nebraska Post-Crash Investigation Course

Kearney, Nebraska

October 5, 2026

Get this slide deck at NAFMP.org/events



Overview



01 Sleep Biochemistry



02 Fatigue Characteristics



03 Obstructive Sleep Apnea



04 Fatigue Management Program (FMP)



05 NTSB Investigation Techniques and Findings of Six Fatigue Crashes



06 NAFMP Resources and Questions

Sleep Biochemistry



What will kill you faster?

A

No sleep

B

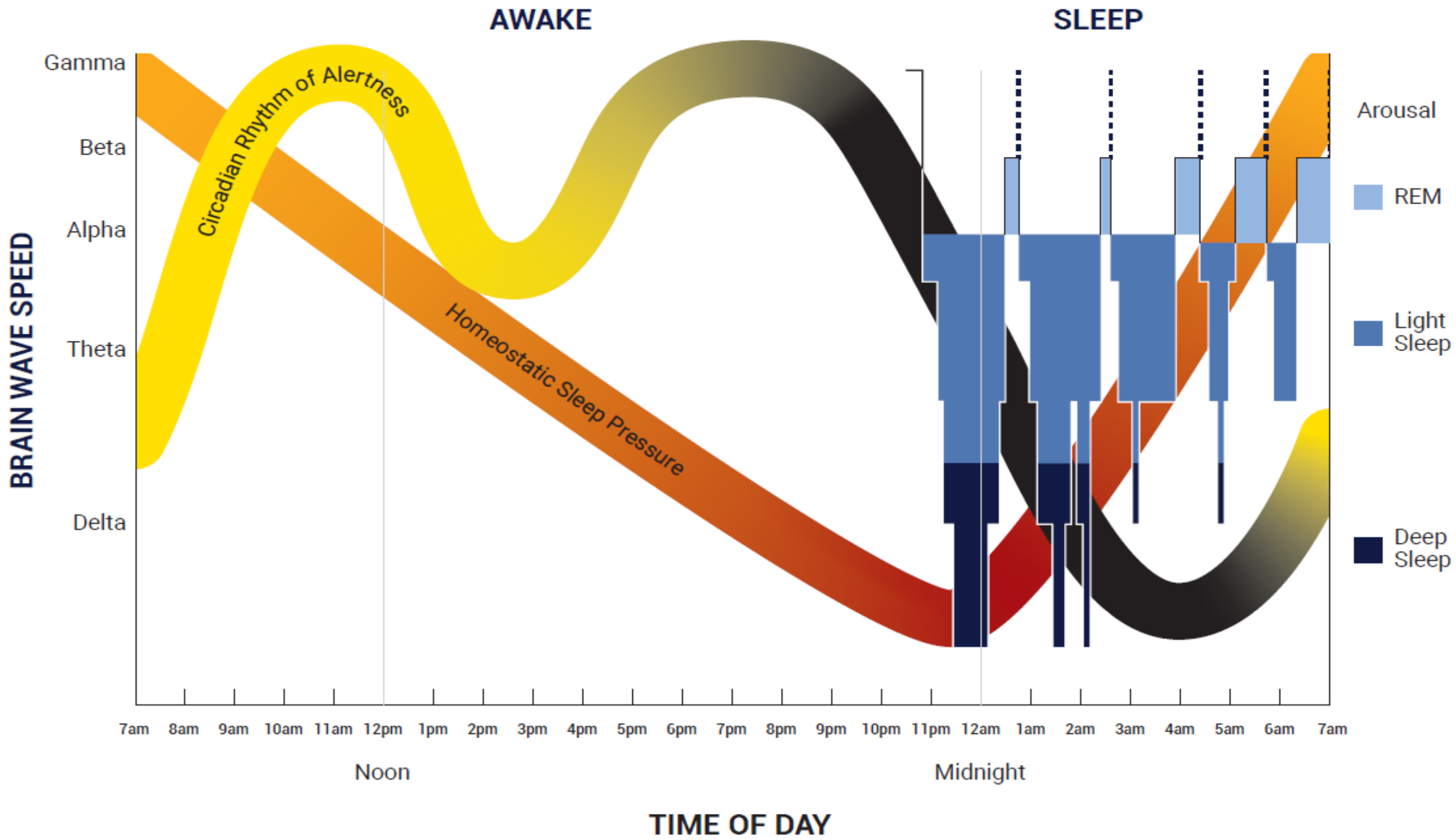
No breathing

C

Starvation

D

Dehydration



Characteristics of Fatigue

Poll



Alertness and fatigue are like an on/off switch, you are either awake or asleep

A

True

B

False

Alertness Spectrum



Delta brain waves	Deep sleep	1 to 4 Hertz
Theta brain waves	Sleeping or daydreaming when awake	4 to 8 Hertz
Alpha brain waves	Awake and calm	8 to 12 Hertz
Beta brain waves	Awake, alert, busy, and focused	12 to 38 Hertz
Low beta waves	Thinking	12 to 15 Hertz
Beta waves	Performing or focusing	15 to 22 Hertz
High beta waves	Excited or anxious	22 to 38 Hertz
Gamma brain waves	Highly alert and consciousness	30 to 80 Hertz

Silent Killer of Drivers and Profits



Fatigue is a physiological state that forces the brain to prioritize survival over demanding cognitive functions

A physiological state, not a choice



The only cause of fatigue is insufficient sleep

A

True

B

False

Alertness Has Supply and Demand



Supply Factors

- Internal individual susceptibility
 - Circadian rhythm, amount of sleep, time of day, time awake, stimulants, other drugs, health, genes, mood



Demand Factors

- Task related
 - Time on task, task complexity, task monotony
- Environmental
 - Road conditions, weather, stress (heat, noise, vibration), vehicle design, social interaction, other stimulation

Alertness fails when demand outruns supply



In truck and bus crash statistics, driver fatigue is

A

The number 1 cause

B

**Not a significant
cause**

C

Underrepresented

Crash Causation



87% driver related

FMCSA LARGE TRUCK CRASH CAUSATION STUDY



Non-Performance

Driver fell asleep, was disabled by heart attack or seizure or physically impaired for another reason



Recognition

The driver was inattentive, distracted by something inside or outside the vehicle or failed to observe the situation adequately for some other reason



Decision

Driver was driving too fast for conditions, misjudged the speed of other vehicles or followed other vehicles too closely



Performance

Driver panicked, overcompensated or exercised poor directional control

Crash Causation Associated Factors



14%

INADEQUATE
SURVEILLANCE

13%

FATIGUE

10%

FELT UNDER WORK
PRESSURE FROM
CARRIER

9%

INATTENTION

8%

EXTERNAL
DISTRACTION

54%

TOTAL

Crashes where diminished vigilance was
involved



FMCSA Large Truck Crash Causation Study

30 to 40 percent

OF ALL CMV CRASHES HAVE DRIVER FATIGUE AS A CONTRIBUTING FACTOR



The Safety Board believes that the incidence of driver fatigue is underrepresented in FARS in general and in FARS specifically with regard to CMV drivers



NTSB Report: Factors That Affect Fatigue In Heavy Truck Accidents

[Volume 1: Analysis](#)

[Volume 2: Case Summaries](#)

CMV Driving Worsens Fatigue



Tight schedule to get enough sleep



Changing work schedules



Limited time for rest and naps



Sleep disruptions



Limited opportunities for exercise



Extended work hours and commuting



Work and sleep periods conflict with circadian rhythm



Unfamiliar and uncomfortable sleep locations



Difficulty finding nutritious food on the road



Personal, work and environmental stressors

Fatigue Crash Characteristics



Usually single-vehicle



Road departure



Driver alone



Often on monotonous roads



Most in early morning,
between 2 and 7 am



Usually serious crashes

Fatigue Management Program

Fatigue Management Program



Safety Culture

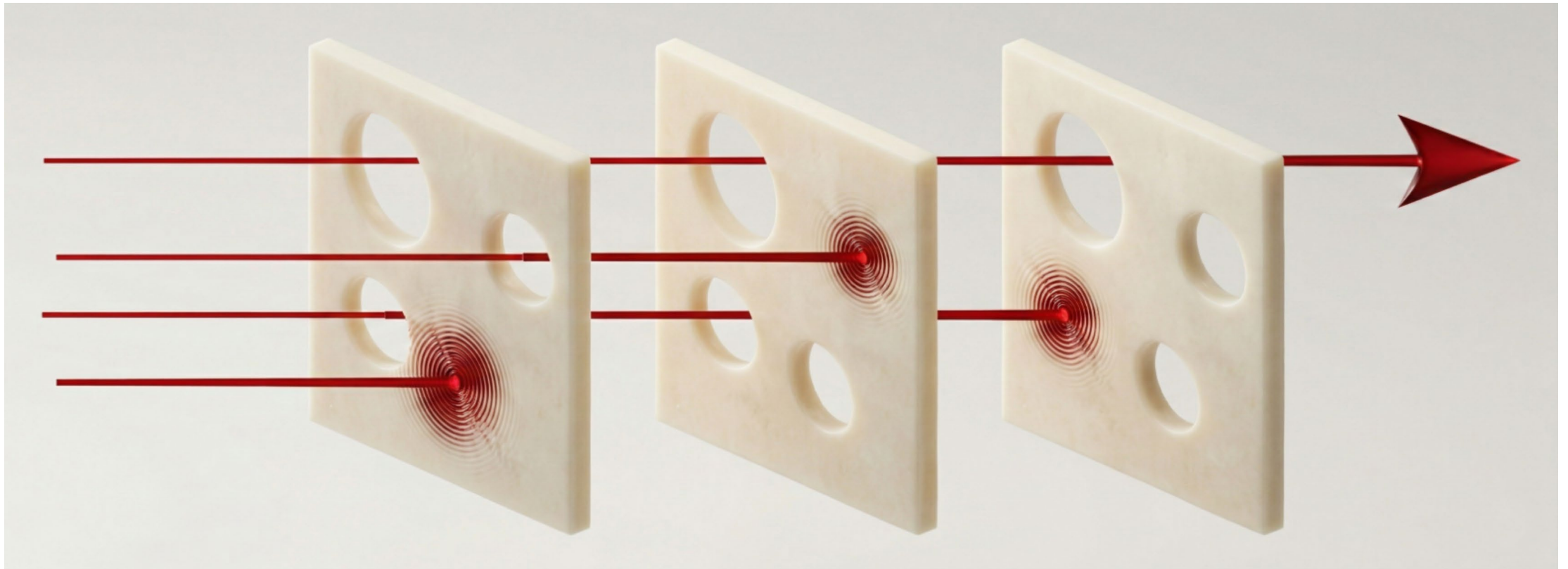
- Education
- Training
- Continuous communications – including partnerships



Fatigue Risk Management System

- Operations
- Identify risks with processes and controls
 - Predictive, proactive, reactive
 - Sound scheduling, sleep disorders management program, fatigue detection technologies
- Risk assessment
- Measures and countermeasures
- Evaluation

The Swiss Cheese Model



Layers of controls in depth — a crash needs every layer to line up

Obstructive Sleep Apnea

Fatigue Susceptibility



Sleep Deprivation

- Sleep-related behaviors
- Sleep hygiene



Individual Differences

- Genetic variations
- Health and fitness



Medical Conditions

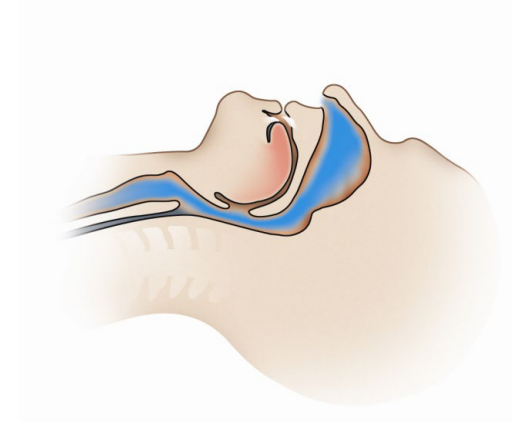
- Medications
- Sleep disorders
 - Insomnia, narcolepsy, restless leg syndrome, sleepwalking, abnormal circadian rhythms, obstructive sleep apnea (OSA)

Obstructive Sleep Apnea



What OSA Is

- Apnea = stoppage of breathing lasting 10+ seconds
- OSA = breathing stops repeatedly during sleep due to closures of the upper airway
- Apnea rate per hour
 - <5 = normal
 - >5 = OSA
- OSA severity (mild, moderate, severe) based on rate
- Some people with severe OSA can have 100 per hour



Warning Signs and OSA Risk



Sleep Disorder Symptoms

- Excessive daytime sleepiness (EDS), extremes in ability to go to sleep



OSA Warning Signs

- Reduced performance, loud and irregular snoring especially with gasping, high blood pressure, diabetes



OSA Higher Risk

- Obese individuals, male, 45+ years old, large neck size, recessed chin, small jaw, large overbite, family history

OSA Health and Safety Implications



Health Implications

- Metabolic syndrome
 - Non-alcoholic fatty liver disease, diabetes, cardiovascular disease, hypertension, lipid abnormalities, polycystic ovarian cancer, dementia
- Diminished quality of life
- Clinical depression
- Decreased sex drive and performance



Safety Implications

- EDS – asleep at the wheel
- Decline in cognitive function
- Impaired driving performance
- Decreased reaction time
- No braking: serious crashes
 - More fatalities, more costly

Screening for OSA

METHODS — PHYSICAL EXAMINATION AND HISTORY



Physical Examination

- >30 BMI
- > 15.5/17 neck circumference
- >36/40 waist circumference
- Craniofacial features (receding chin, large tongue, small airway or mallampati score)
- Micrognathia or retrognathia

History

- Family, metabolic disease, age 45 or older, male or postmenopausal female, untreated hypertension, type 2 diabetes, untreated hypothyroidism, loud snoring, witness apneas, stroke, coronary or artery disease

Screening Criteria

RECOMMENDATION



Drivers who meet the following criteria should be required to undergo OSA testing

- ✓ Categorized as high risk for OSA according to the Berlin Questionnaire, OR
- ✓ BMI ≥ 40 kg/m², OR
- ✓ Judged at risk for OSA from clinical physical examination evaluation OR
- ✓ Admitted fatigue or sleeping during wakeful period OR
- ✓ Involved in a sleep-related CMV crash



Laboratory Polysomnography (PSG)

- Gold standard
- Brain (EEG), heart, airflow, O2 saturation, body movement
- Apnea Hypopnea Index (AHI)

AHI SEVERITY

- | | |
|-------------------|----------------|
| ● Mild | 5-15 per hour |
| ● Moderate | 15-30 per hour |
| ● Severe | >30 per hour |



Home Sleep Apnea Test (HST/HSAT)

- Only appropriate for evaluation in high-risk populations without significant medical problems
- Chain of custody must be secured
- Validated against PSG
- Objectively records oxygen saturation, nasal pressure, and sleep/wake time for a minimum of 5 hours



Positive Airway Pressure (PAP) Devices

- Continuous, automatic, bi-level
- Effective when used properly and consistently



Dental and Oral Appliances

- Only for mild or moderate, not for severe OSA
- Monitoring compliance can be a challenge



Surgery

- Primarily for severe obstructive anatomy
- Secondarily when PAP is not tolerable or adequate

Treatment

LIFESTYLE HABITS



NAFMP Module 3 and Driver Series Webinars on Keys to Wellness



Manage metabolic disease



Avoid alcohol and sedatives



5 keys to wellness: Positive relationships, exercise, positive behaviors, sleep hygiene, nutrition

1. NTSB Investigation of Collision of Motorcoach with Combination Vehicles Parked Along Exit

Facts

1:48 A.M. • JULY 12, 2023 • HIGHLAND, ILLINOIS



At 1:48 a.m. July 12 2023, a motorcoach carrying 21 people veered off Interstate 70 near Highland, Illinois, colliding with three parked combination vehicles



Three passengers died

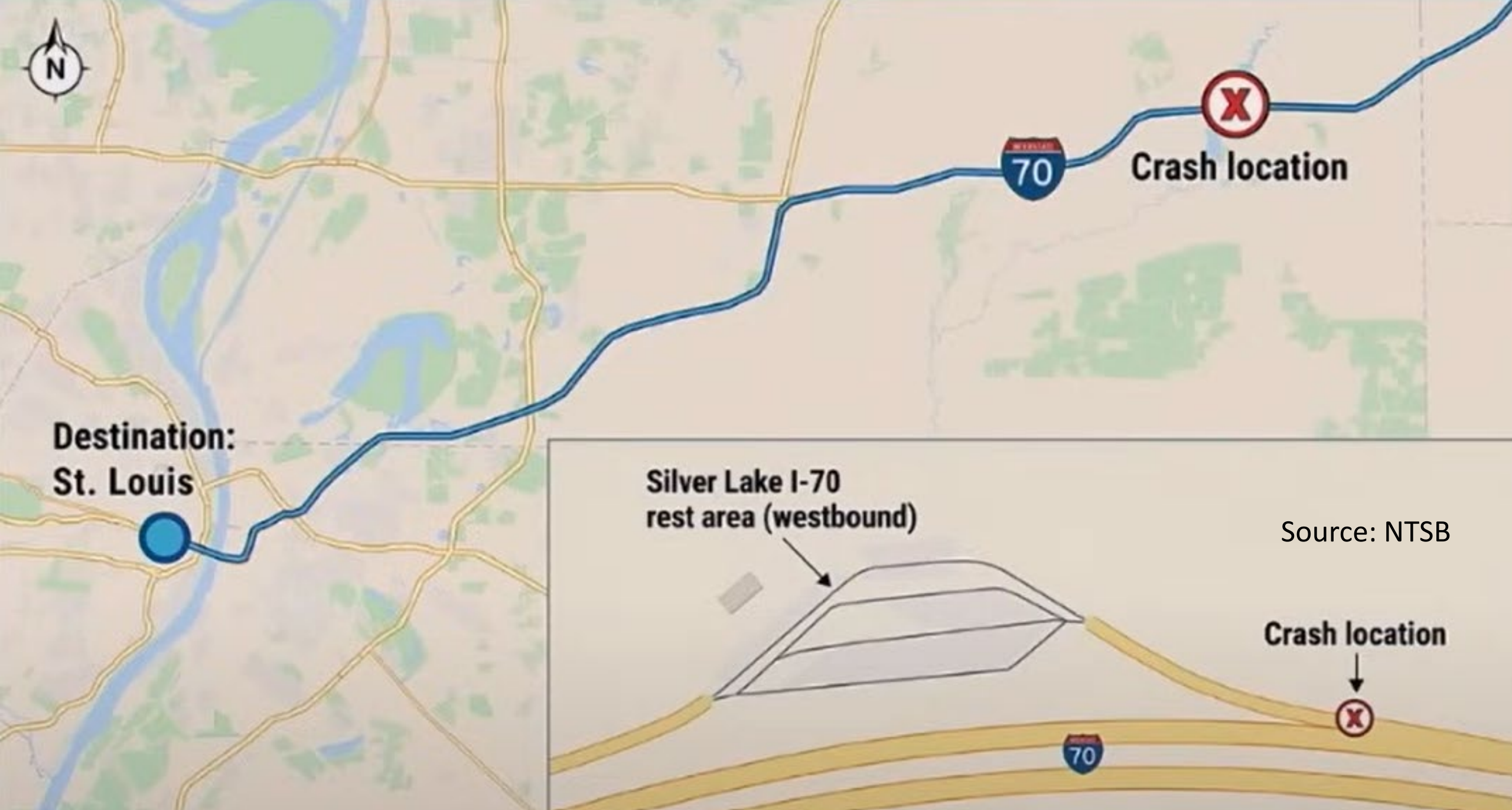


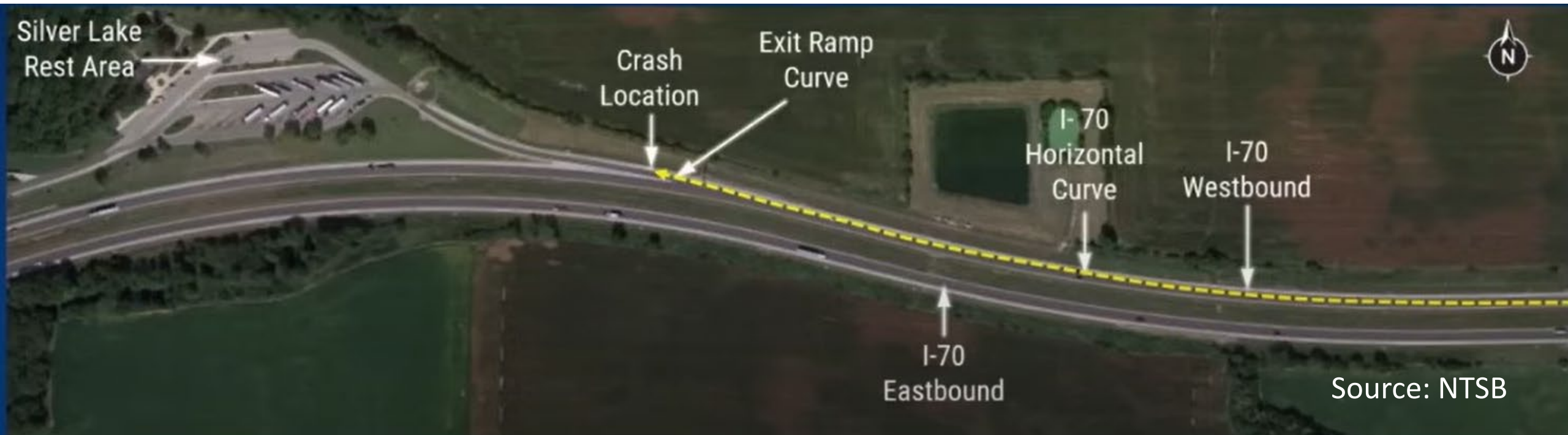
The driver and 11 other passengers sustained injuries of varying severity



Source: NTSB

<https://www.nts.gov/investigations/Pages/HWY23MH015.aspx>









Ruling Out Other Causes



Vehicle defects



Weather and roads



Roadway design



Cell phone use



Drugs and alcohol



Sudden incapacitation



Acute incapacitation excluded — chronic conditions still count

Vehicle Path Analysis



60 mph

RECORDED SPEED

No braking until the last
second

- 1 First curve negotiated
- 2 Second curve missed
- 3 Straight onto the exit ramp
- 4 Drifting, with no evasive action

Source: electronic data and roadway evidence

Passenger Testimony



**Repeated lane
departures**



**Rumble strips
struck repeatedly**



**Driver appearing to
fall asleep**



Multiple witnesses — the same account, for hours

Schedule

Source: NTSB

Date	Central Daylight Time																							
	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
Wednesday, June 14, 2023																								
Thursday, June 15, 2023																								
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Saturday, July 8, 2023																								
Sunday, July 9, 2023																								
Monday, July 10, 2023																								
Tuesday, July 11, 2023																								
Wednesday, July 12, 2023																								

Legend

On-duty

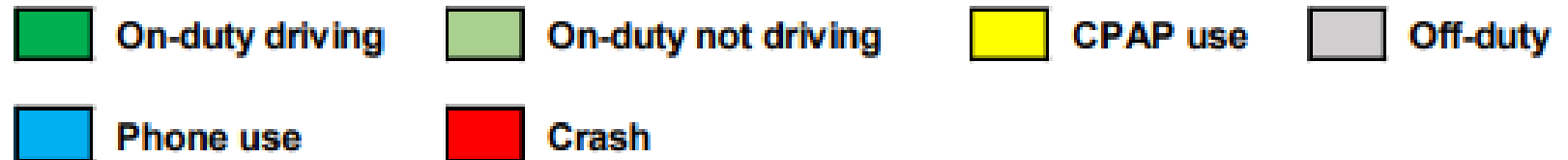
Day off

Reconstructed Schedule



Source: NTSB Date	Central Daylight Time																							
	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
Sunday, July 9, 2023	CPAP use	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty	Off-duty
Monday, July 10, 2023	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use
Tuesday, July 11, 2023	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use
Wednesday, July 12, 2023	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use	CPAP use

Legend



Work–Rest and Circadian



17 hours

AWAKE AT THE TIME OF THE CRASH



1:48 a.m.

INSIDE THE CIRCADIAN LOW



Variable shift schedule



Rest facilities went unused



Sleep opportunity is not sleep obtained

Medical Risk Factors



Sleep apnea

Fragments sleep even
when treated



Obesity

Drives sleep-disordered
breathing



Diabetes

Disrupts sleep and
daytime alertness



Each one raises fatigue risk on monotonous night driving

Convergence of Evidence



- ✓ Alternatives excluded
- ✓ Path of an unaware driver
- ✓ Hours of witnessed drift
- ✓ 17 hours awake at 1:48 a.m.
- ✓ Elevated medical risk



CONVERGENT FINDING

Driver fatigue

Too little sleep, at the worst hour, in a driver already at risk

Exclusion narrows the field — convergence carries the finding

2. Combination Vehicle Rollover, Fire and Interstate 95 Overpass Collapse

Facts

6:17 A.M. • JUNE 11, 2023 • PHILADELPHIA, PENNSYLVANIA



At 6:17 a.m. June 11 2023, a truck-tractor with a tank trailer carrying 8,500 gallons of gasoline crashed while exiting northbound I-95 in Philadelphia, Pennsylvania



The driver lost control on a curved exit ramp, causing the truck to overturn and strike a concrete barrier



The resulting fire destroyed the truck, caused the collapse of northbound I-95 lanes and fatally injured the truck driver

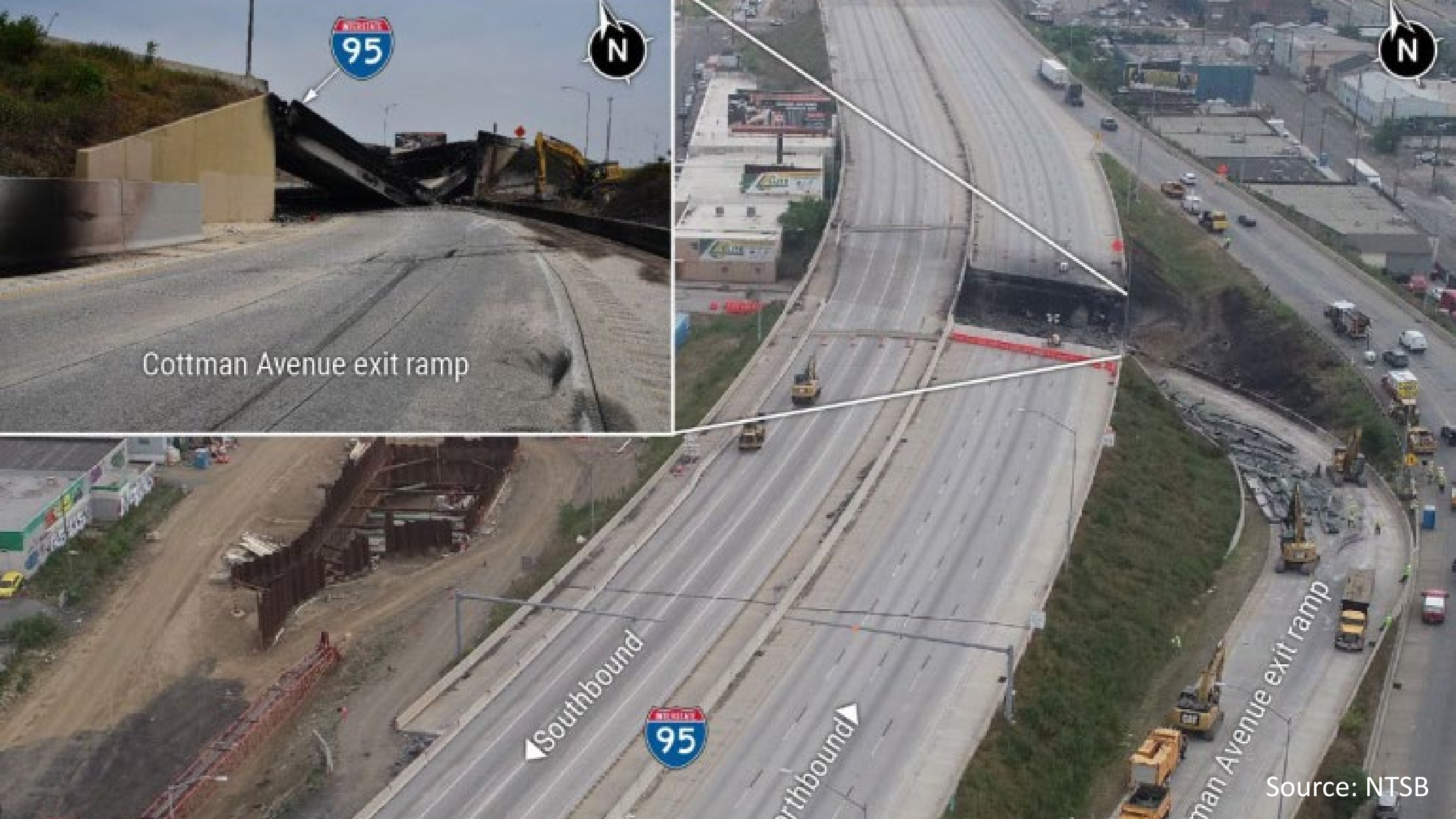


Source: NTSB

<https://www.nts.gov/investigations/Pages/HWY23FH014.aspx>



Cottman Avenue exit ramp



Source: NTSB

Reconstructed Schedule



Source: NTSB Date	Eastern Daylight Time																							
	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
Thursday, June 8, 2023	Phone use			Phone use	Phone use		Phone use	Phone use	Phone use	Phone use	Phone use	Phone use				Phone use			Phone use					
Friday, June 9, 2023									Phone use			Phone use	Phone use	Phone use	Phone use		Phone use							
Saturday, June 10, 2023									Phone use		Phone use		Phone use	Phone use	Phone use	Phone use						Phone use		
Sunday, June 11, 2023	On-duty						Crash																	

Legend



On-duty



Off-duty



Phone use



Crash

Night Shift Work Schedule



10 p.m. to 8 a.m.



THE DRIVER'S REGULAR SHIFT



Sleep required out of sync with the body clock



Night hours linked to more fatigue-related crashes

Cell Phone Record Analysis



**8 a.m. to 6
p.m.**

CALLS AND TEXTS

Logged on his days off

1

Reverted to a daytime schedule

2

Body clock reset every week

3

No steady rhythm for quality sleep



Days off undid the night-shift adaptation

Loss of Vehicle Control



**Advisory speed not
heeded**



**Speed and path
reconstructed**



**Control lost on the
ramp**



No alert response to a posted warning

Video Evidence Review



Surveillance footage during fuel loading



Open manhole cover left unsecured



Driver standing right beside it



Escaping air plainly audible

Toxicological Testing



Diphenhydramine

SEDATING OVER-THE-COUNTER ANTIHISTAMINE



Found in cavity blood and liver tissue



Tested by the FAA Forensic Sciences Laboratory



Causes drowsiness and cognitive slowing

Postmortem levels cannot determine impairment at the moment of the crash

Convergence of Evidence



✓ Night shift against the body clock

✓ Daytime activity on days off

✓ Advisory speed missed

✓ Safety task neglected on video

✓ Sedating antihistamine present



CONVERGENT FINDING

Driver fatigue

A body clock never allowed to settle, with a sedating drug on board

Any one finding is suggestive — together they point one way

3. Box Truck Centerline Crossover Collision with Bus

Facts

6 A.M. • JAN. 28, 2023 • LOUISVILLE, NEW YORK



At 6 a.m. Jan. 28 2023, a bus and a box truck collided head-on on New York State Route 37 in Louisville, New York



The truck crossed the centerline striking the bus, which was transporting workers to a construction site



This crash resulted in six fatalities, two serious injuries and five minor injuries among the bus passengers, along with minor injuries to the bus driver and serious injuries to the truck driver



Source: NTSB

<https://www.nts.gov/investigations/Pages/HWY23FH005.aspx>



Source: NTSB

Truck Approach



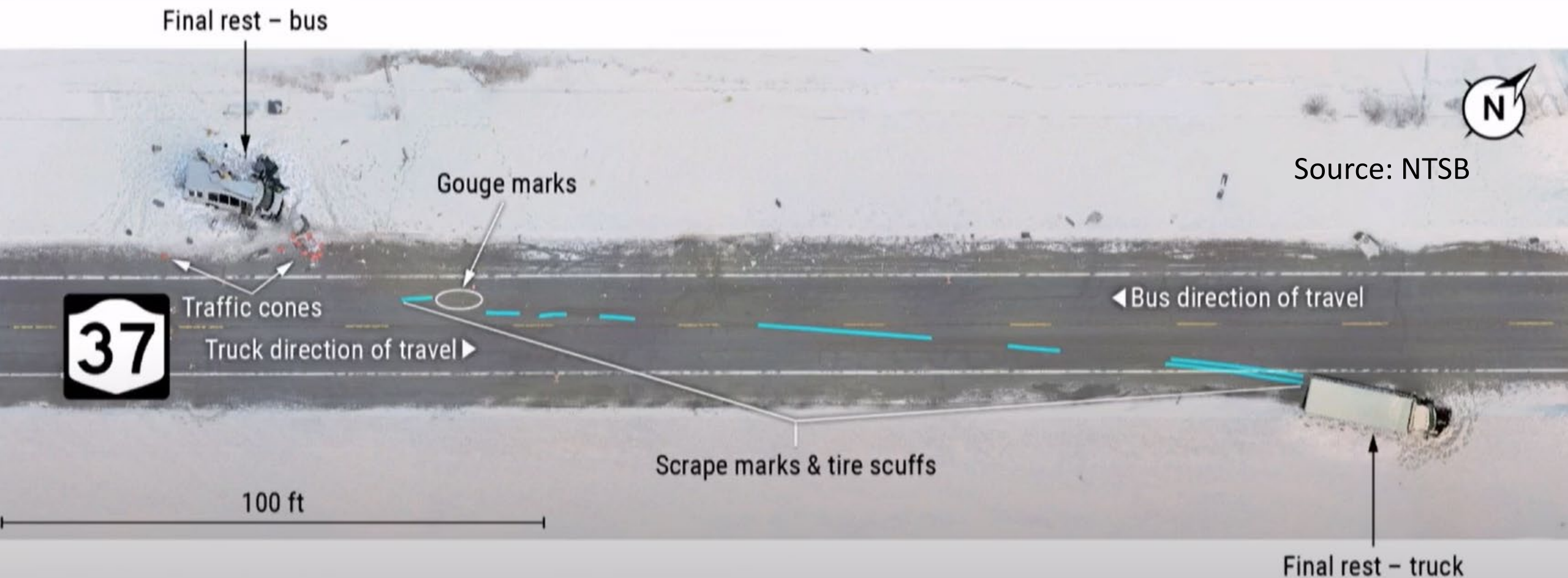
Bus Approach



State Route 37



Source: NTSB





Source: NTSB

Schedule



Source: NTSB

Date

Eastern Time

AM PM

12:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00

Wednesday, January 25

Thursday, January 26

Friday, January 27

Saturday, January 28

Crash

Legend

Off-duty

On-duty

Phone use

Delivery stops

Driver Sleep Interviews



1 a.m. to 11:30 a.m.



REPORTED SHIFT, FIVE DAYS A WEEK



Sleep attempted in split shifts



Afternoon and evening, never one block

Cell Phone Data Analysis



72 hours

BEFORE THE CRASH

Personal and work
phones

1

Forensic download from both devices

2

Activity inside the reported sleep windows

3

Rest broken up, never continuous



Phone use ran through the hours set aside for sleep

Hours of Service Review



Paper trip sheets

Handwritten record of each duty day



App timestamps

Digital times from the company app



Two independent records of the same duty hours

Sleep Opportunity Assessment



5 hours or less

UNINTERRUPTED SLEEP OPPORTUNITY EACH DAY



Statements, schedule, and phone data combined



Three days running before the crash



Poor sleep quality and cognitive deficits

Circadian Rhythm Analysis



About 6 a.m.

TIME OF THE CRASH



A circadian low point for alertness



Body temperature and hormones at their lowest



Fatigue rises as vigilance falls

Night work had already pushed the body clock out of step

Convergence of Evidence



- ✓ Night shift starting at 1 a.m.
- ✓ Sleep taken in split shifts
- ✓ Phone use in sleep windows
- ✓ 5 hours or less of opportunity
- ✓ Crash at a circadian low



CONVERGENT FINDING

Driver fatigue

Too little sleep, broken into pieces, at the worst hour of the day

No single record proves it — the set does

4. Rear-End Collision between Combination Vehicle and Medium-Size Bus

Facts

1:36 A.M. • DEC. 16, 2022 • WILLIAMSBURG, VIRGINIA



At 1:36 a.m. Dec. 16 2022, a truck-tractor with a semitrailer crashed into the rear of a slower-moving bus on Interstate 64 near Williamsburg, Virginia



The truck, traveling between 65 and 70 mph with cruise control, did not brake before impact, while the bus was moving at 20 to 25 mph



The collision resulted in the deaths of three bus occupants, serious injuries to nine bus occupants and the truck driver, and minor injuries to 11 bus occupants



Source: NTSB

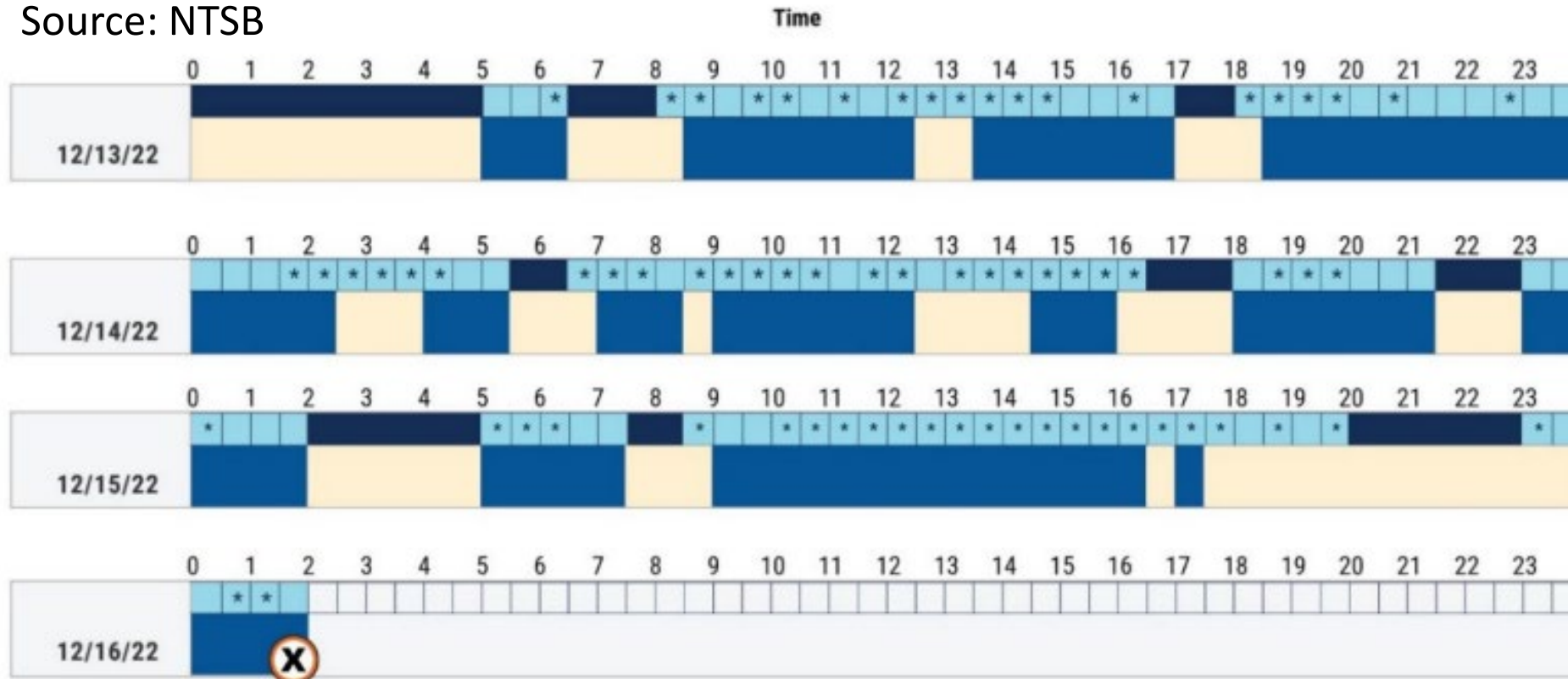
<https://www.nts.gov/investigations/Pages/HWY23MH004.aspx>



Source: NTSB

Schedule

Source: NTSB



Key

* = cell activity in period

■ = driver activity

■ = sleeper berth

■ = sleep opportunity

■ = awake

Source: NTSB

ⓧ = CRASH

Sleep Opportunity Estimate



1 to 5 hours

EACH REST PERIOD

Never consecutive

1

Off-duty logs set against phone activity

2

Rest scattered across the final three days

3

Chronic sleep debt built up



Logged rest was not sleep obtained

Video and ECM Analysis



9 times



CROSSED THE RIGHT SHOULDER LINE

3 minutes



THE WINDOW BEFORE IMPACT



No evasive steering

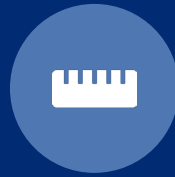


No active braking before the bus

Hazard Perception Calculation



285 feet



WHEN AN ALERT DRIVER SEES IT

5 seconds



TIME AVAILABLE TO REACT



The bus ahead was lit and visible



Ample time to brake or steer

An alert driver would have seen it and responded

Circadian Rhythm Evaluation



1:36 a.m.

TIME OF THE CRASH



A circadian low point for performance



Sleepiness rises as capability falls



Set against an already irregular schedule

Irregular hours left no rhythm to fall back on

Toxicology Testing



Postcrash blood testing



No alcohol detected



No other drugs detected



Substance impairment excluded — fatigue remains

Convergence of Evidence



- ✓ 75 hours on duty in six days
- ✓ Rest scattered, 1 to 5 hours
- ✓ Nine lane departures in 3 minutes
- ✓ No braking, no steering
- ✓ Crash at a circadian low
- ✓ Alcohol and drugs ruled out



CONVERGENT FINDING

Driver fatigue

Deep sleep debt, hidden by
falsified logs, at the worst hour of
the night

Every other explanation tested and set aside

5. Multivehicle Collision Involving a Milk Tank Combination Vehicle and Stopped Traffic Queue

Facts

10:07 P.M. · JUNE 9, 2021 · PHOENIX, ARIZONA



At 10:07 p.m. June 9 2021, a truck-tractor with a tank trailer crashed into a queue of stopped passenger vehicles on SR-202 in Phoenix, Arizona



Traveling at 62-64 mph without slowing or steering, the truck initiated a chain-reaction collision involving six other vehicles



The crash resulted in four fatalities and 11 injuries among passenger vehicle occupants, with the truck-tractor and one car consumed by fire



Source: NTSB

<https://www.nts.gov/investigations/Pages/HWY21MH008.aspx>



1 mile

**LAW ENFORCEMENT
AT PRIEST
EXPECT TO STOP**

Dynamic Message Sign



202

Crash location

143

Priest Drive

202

Dynamic Message Sign



Source: NTSB



Source: NTSB



Source: NTSB



Source: NTSB



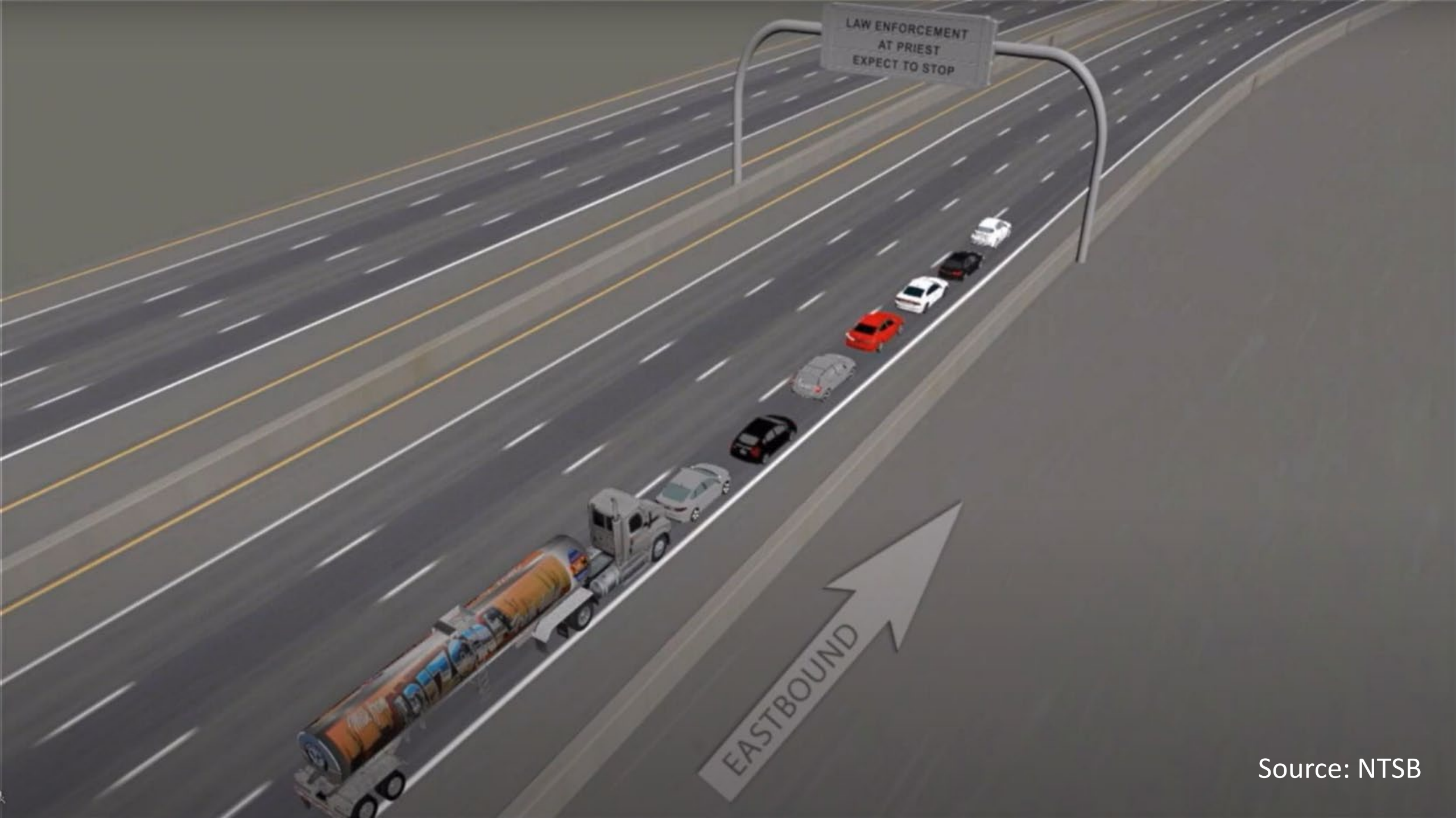
Source: NTSB



TIME -0.25

62 MPH 100 km/h

Source: NTSB



Source: NTSB



Fatally injured: 4 persons
Hospitalized: 11 persons

Source: NTSB



Source: NTSB

Video and Vehicle Data



62 to 64 mph



SPEED INTO THE QUEUE

8 seconds



BRAKE LIGHTS FULLY VISIBLE



Adjacent lanes braking 5.5 seconds out



No steering and no braking before impact

Every cue was there to be seen

Inward-Facing Camera



8 seconds facing forward

THE FULL RUN-UP TO IMPACT



Hands in his lap and on the wheel



No phone and no overt secondary task



Looking straight at the hazard

Toxicology and Medical



Postcrash testing and medical records



No alcohol or drugs



No medical condition



Impairment and medical emergency both excluded

Schedule



Source: NTSB

Mountain Standard Time

Date

12:00 a.m.

1:00

2:00

3:00

4:00

5:00

6:00

7:00

8:00

9:00

10:00

11:00

12:00 p.m.

1:00

2:00

3:00

4:00

5:00

6:00

7:00

8:00

9:00

10:00

11:00

Sunday, June 6

Monday, June 7

Tuesday, June 8

Wednesday, June 9

Legend:



On-duty



Off-duty
(Sleep Opportunity)



Off-duty
(Not Sleeping)



Commute



Phone use
outside on-duty times



Crash

Work Hours Reconstruction



12 to 14 hour shifts

ROUTINELY WORKED AND UNDERREPORTED



Timesheets checked against five other records



Hours severely underreported



Company on-duty limits regularly broken

Sleep Opportunity Assessment



8 hrs

THREE DAYS BEFORE

6 hrs

TWO DAYS BEFORE

4.5 hrs

THE DAY BEFORE

3–4 hrs

DAY OF THE CRASH



Maximum opportunity, not sleep obtained



Commute time taken out of the rest window

Three days of shrinking rest before the crash

Inattention Blindness



Looking without seeing

WHAT THE EVIDENCE POINTS TO



Unimpaired and not distracted



Eyes on a hazard in plain view



No avoidance maneuver attempted

Long hours and short sleep are what remains

Convergence of Evidence



- ✓ Hazard visible for 8 seconds
- ✓ No braking, no steering
- ✓ Impairment and illness excluded
- ✓ Not distracted on camera
- ✓ Shifts of 12 to 14 hours
- ✓ Sleep down to 4.5 hours



CONVERGENT FINDING

Driver fatigue

Inattention blindness brought on by long hours and restricted sleep

The only explanation the evidence leaves standing

6. Multivehicle Crash in a Queue of Slowed and Stopped Traffic

Facts

6:45 A.M. • JUNE 12, 2020 • ARLINGTON, WISCONSIN



At 6:45 a.m. June 12 2020, a truck-tractor with a semitrailer struck the end of a slowed and stopped traffic queue on Interstate 39 near Arlington, Wisconsin, which had formed due to prior collisions



This initiated an eight-vehicle crash that resulted in four fatalities and three serious injuries



Source: NTSB

<https://www.nts.gov/investigations/Pages/HWY20FH006.aspx>

Peterbilt
truck-tractor

Mack truck

Freightliner
truck-tractor

VW sedan

Kia SUV

Source: NTSB



Video and Environment



70 mph



SPEED INTO THE QUEUE

Quarter mile



UNOBSTRUCTED VIEW AHEAD



Clear weather and advance warning signs



No steering and no braking before impact

Nothing in the environment hid the hazard

Mechanical and Distraction



Truck inspection and phone records



No mechanical faults



Phone idle for 54 minutes



Vehicle failure and phone distraction both excluded

An attention lapse

WHAT THE MEDICAL EVIDENCE LEAVES



Autopsy inconsistent with a cardiac event



Video inconsistent with sudden collapse



Postcrash breathing rules out carbon monoxide

No medical emergency explains the failure to react

Work Hours and Sleep



4.5 hours awake



AT THE TIME OF THE CRASH

6 hrs 15 min



MAXIMUM SLEEP OPPORTUNITY



Fifth consecutive workday



Early morning start each day

Less than optimal rest, five days running

Witness Interviews



A loud snorer



**Really rundown
lately**



**Tired and low on
energy**



His wife described the symptoms before anyone tested for them

Sleep Apnea Risk Evaluation



BMI 48

SEVERE OBESITY

18 in

NECK CIRCUMFERENCE

Age 55

MALE



Smoking, high blood pressure, and diabetes



Sleep study ordered in January, never done

Recertified in March with the risk unresolved

Convergence of Evidence



- ✓ Hazard in view for a quarter mile
- ✓ No braking, no steering at 70 mph
- ✓ Mechanical and phone ruled out
- ✓ Cardiac event ruled out
- ✓ Fifth day on an early start
- ✓ Severe untreated apnea risk



CONVERGENT FINDING

Driver fatigue

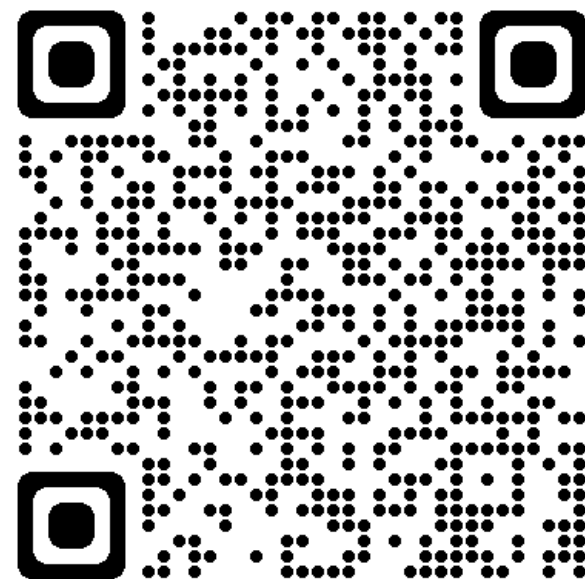
An attention lapse in a driver with significant untreated sleep apnea

Everything else tested and set aside

NAFMP Free Resources



nafmp.org



NAFMP Website Free Resources



Tools

- FMP Template
- Implementation Manual
- ROI Calculator



Courses

- eLearning Platform
- PowerPoints with and without audio
- For carrier's executives, safety managers, dispatchers, instructors, drivers, driver's families, shippers and receivers



Webinars, Info Sessions and Articles

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Podcast

- The NAFMP Pod
- Available from eight platforms



Events

- Download individual event
- Subscribe to Calendar of future events

Questions



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