NTSB National Transportation Safety Board

Opportunities to Enhance Motorcoach Safety: An NTSB Perspective

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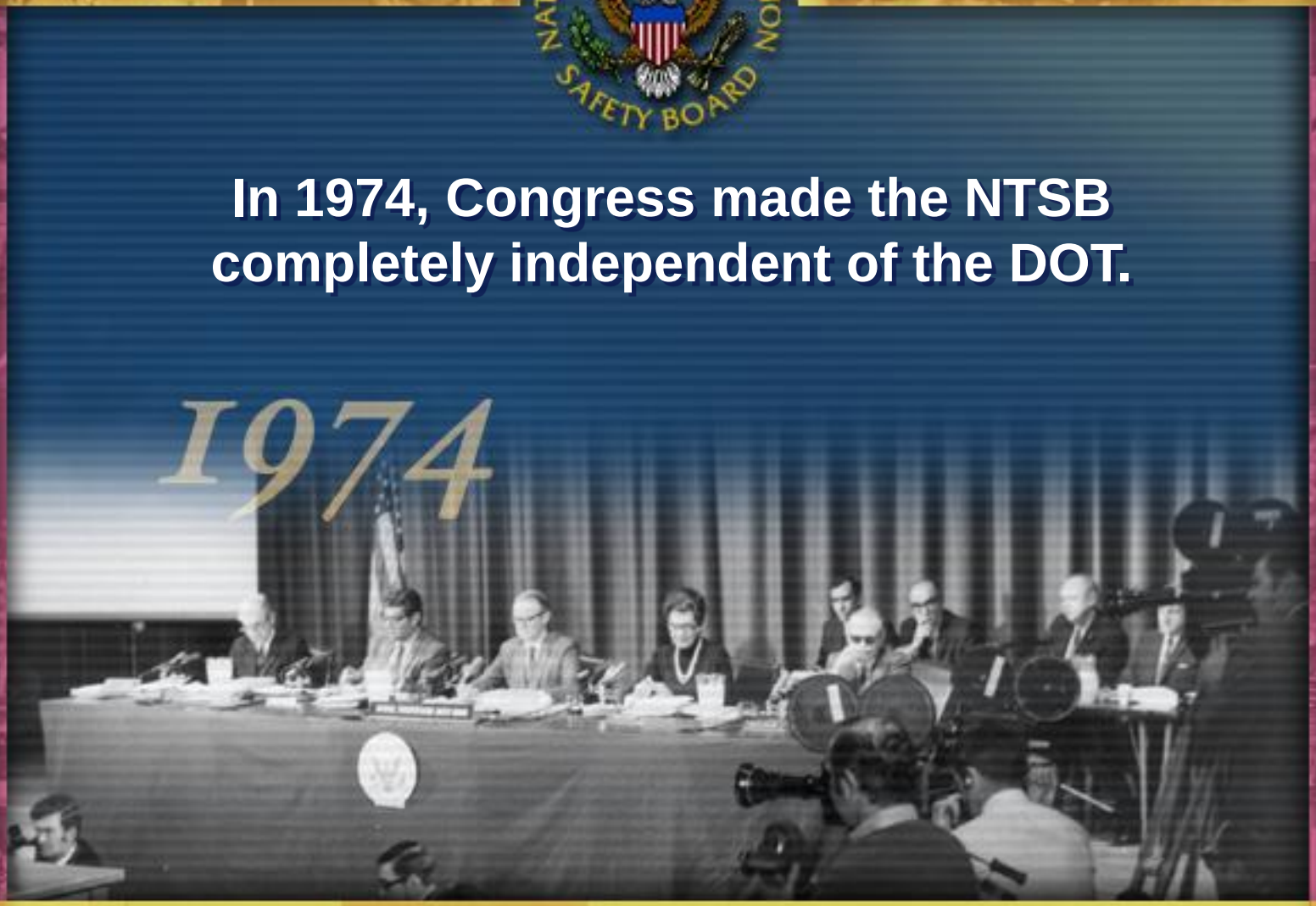
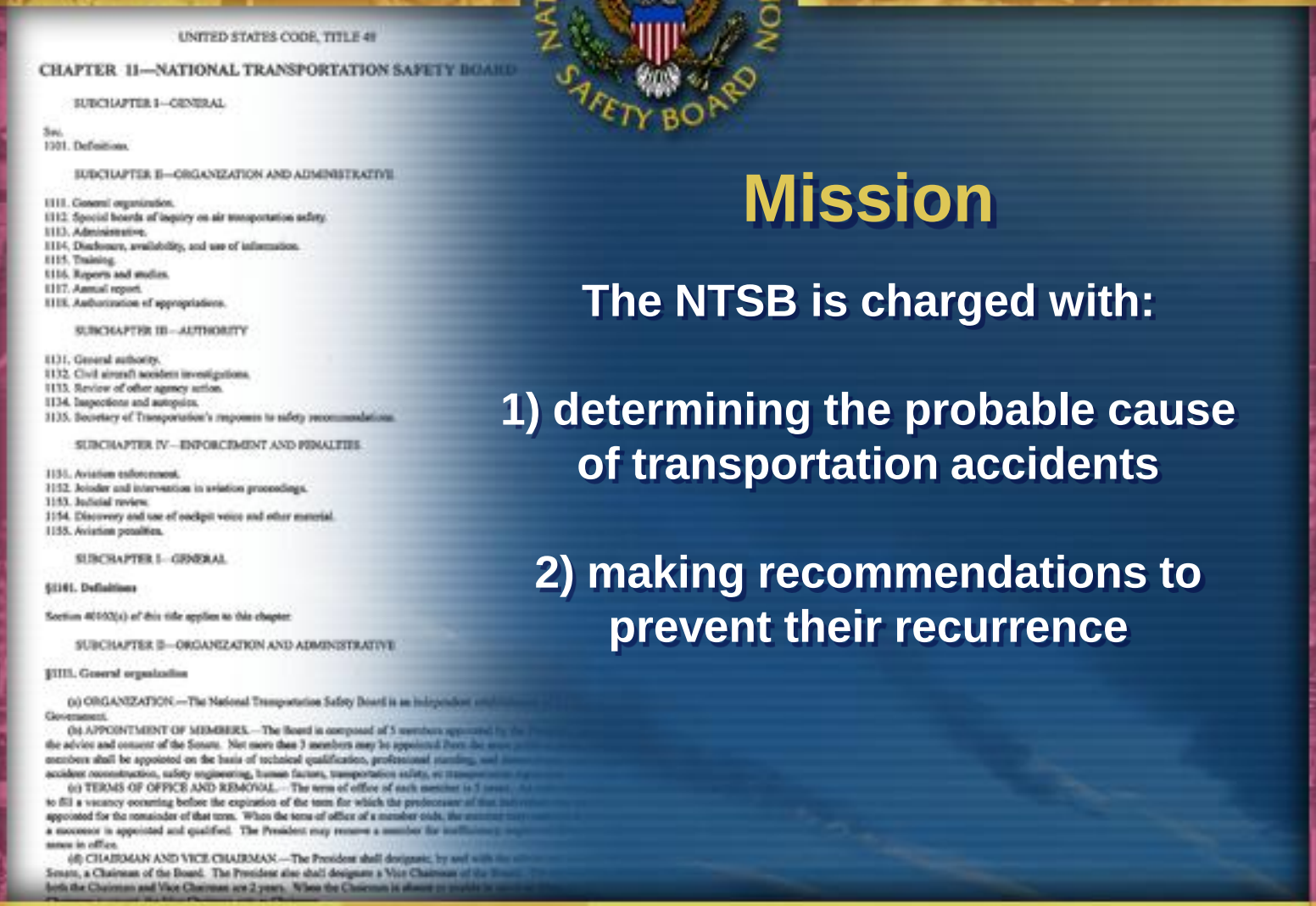
In 1967, the Congress created an independent NTSB within the newly formed Department of Transportation (DOT); expanded the NTSB's authority to include all modes of transportation.

In 1974, Congress made the NTSB completely independent of the DOT.





UNITED STATES CODE, TITLE 49

CHAPTER 11—NATIONAL TRANSPORTATION SAFETY BOARD

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SUBCHAPTER I—GENERAL

§1101. Definitions

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

SUBCHAPTER II—ORGANIZATION AND ADMINISTRATIVE

§1111. General organization

(a) ORGANIZATION.—The National Transportation Safety Board is an independent

Government.

(b) APPOINTMENT OF MEMBERS.—The Board is composed of 5 members appointed by the

the advice and consent of the Senate. Not more than 3 members may be appointed from the same

members shall be appointed on the basis of technical qualification, professional standing, and

accident reconstruction, safety engineering, human factors, transportation safety, or

(c) TERMS OF OFFICE AND REMOVAL.—The term of office of each member is 5 years.

to fill a vacancy occurring before the expiration of the term for which the predecessor of that

appointed for the remainder of that term. When the term of office of a member ends, the

a successor is appointed and qualified. The President may remove a member for inefficiency,

terms in office.

(d) CHAIRMAN AND VICE CHAIRMAN.—The President shall designate, by and with the

Senate, a Chairman of the Board. The President also shall designate a Vice Chairman of the Board.

both the Chairman and Vice Chairman are 2 years. When the Chairman is absent or unable to

Mission

The NTSB is charged with:

1) determining the probable cause of transportation accidents

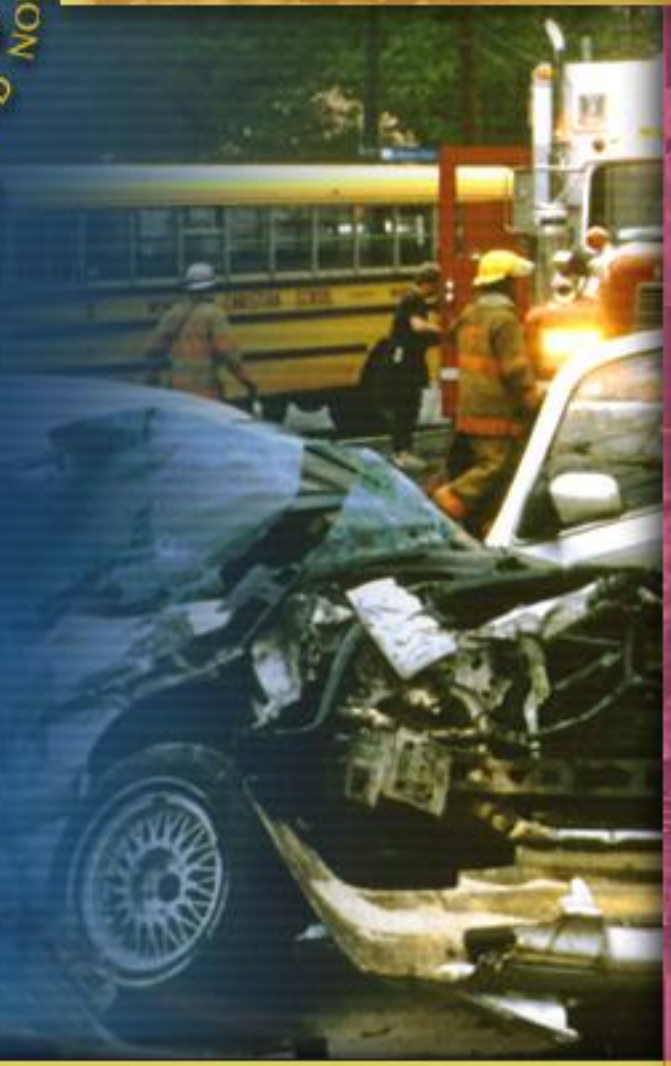
2) making recommendations to prevent their recurrence

The NTSB is Responsible for Investigating:

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

Major product:
safety recommendations

Moral compass and
industry conscience



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

Opportunities to Enhance Motorcoach Safety: An NTSB Perspective

- Driver fatigue/Sleep apnea
- Crashworthiness/Occupant protection
- Crash avoidance technologies

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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

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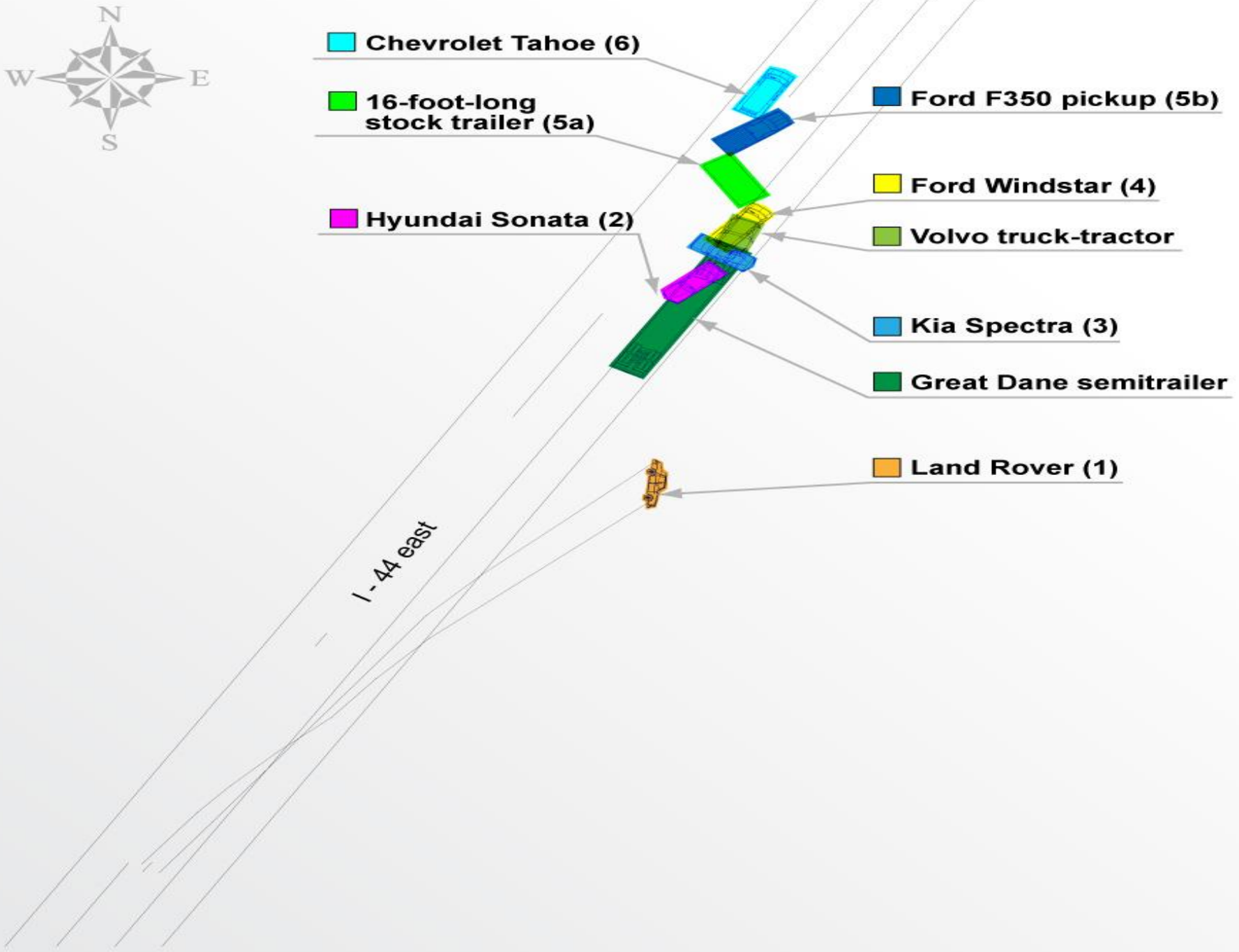
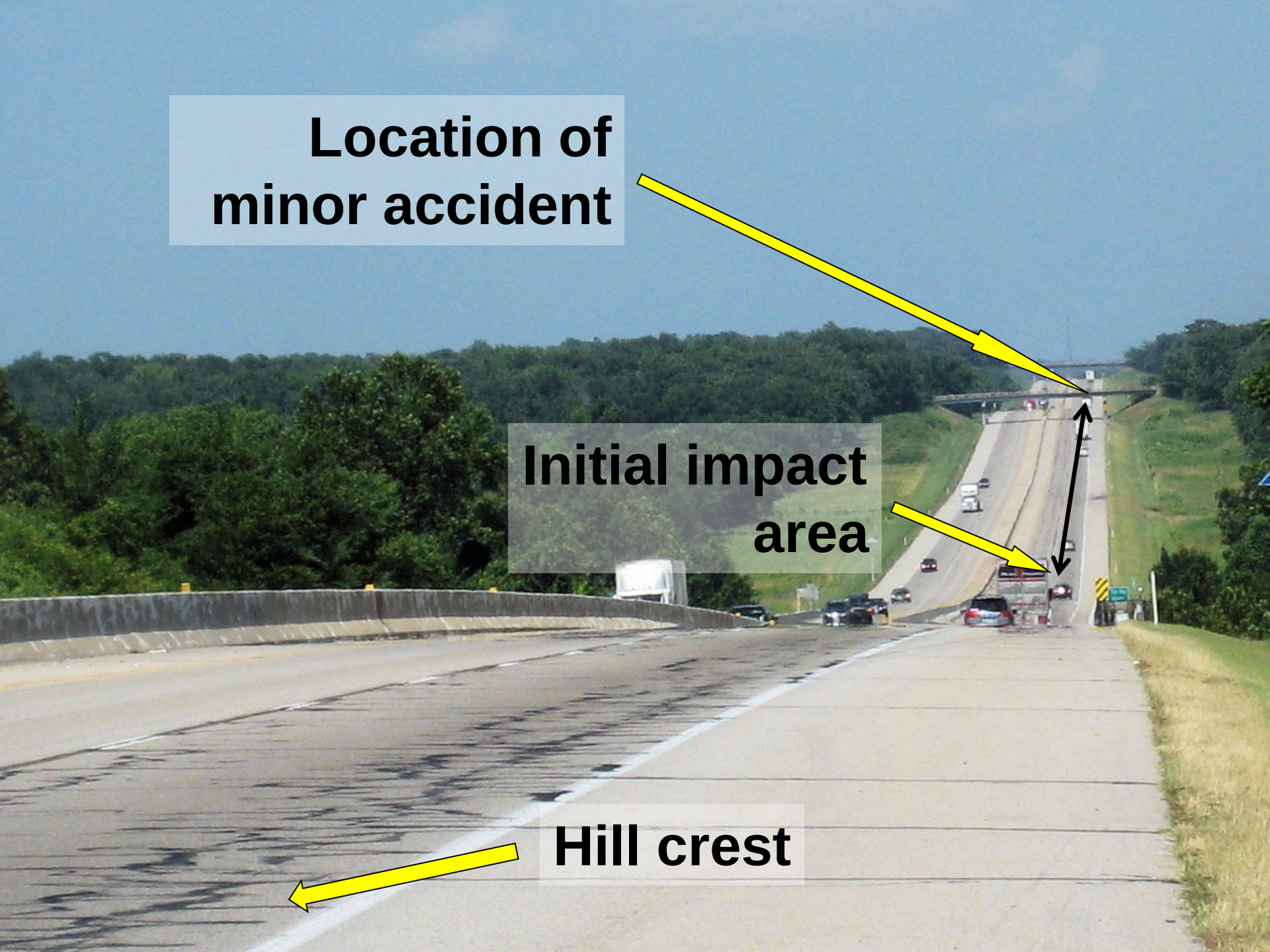
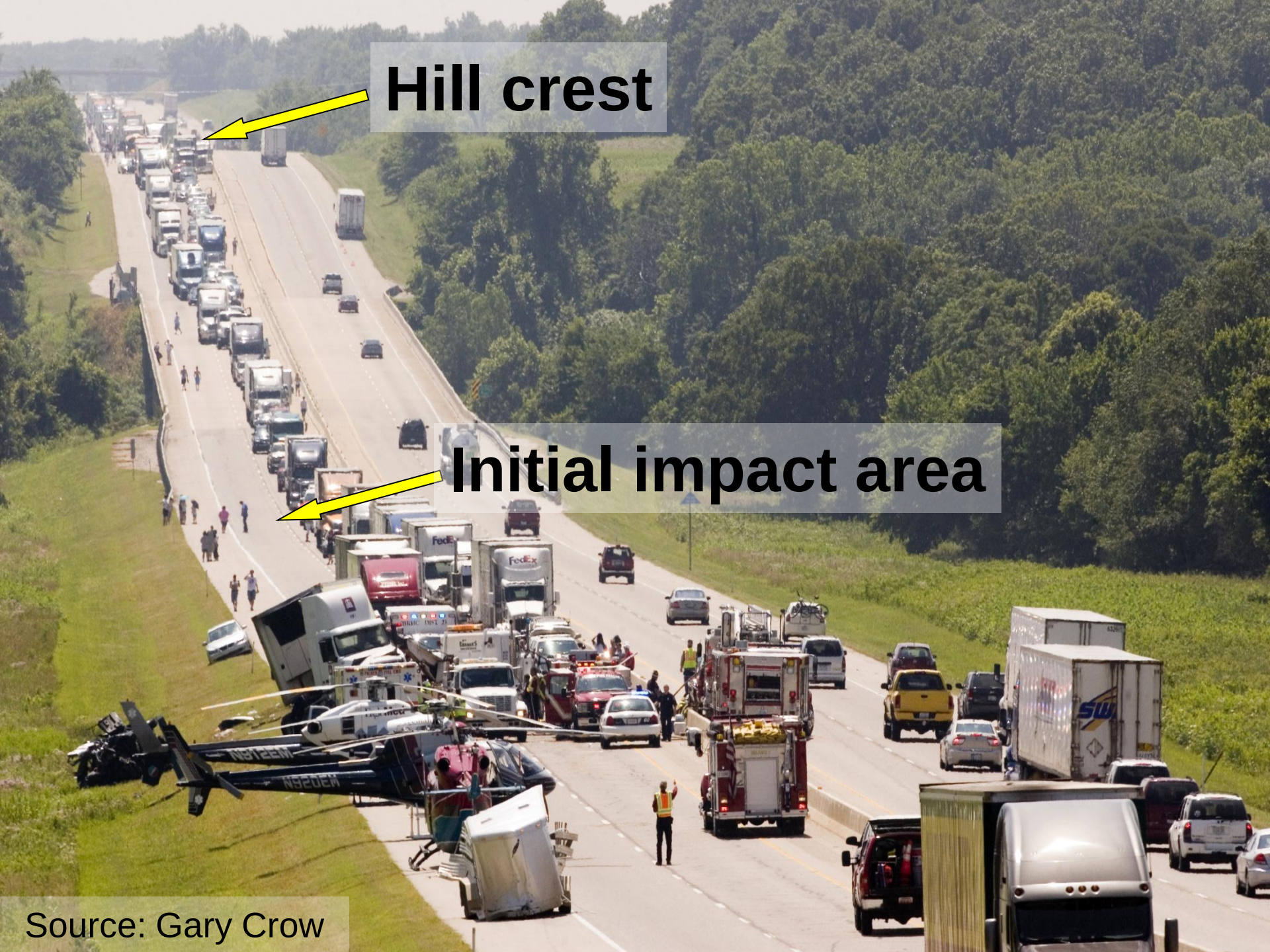
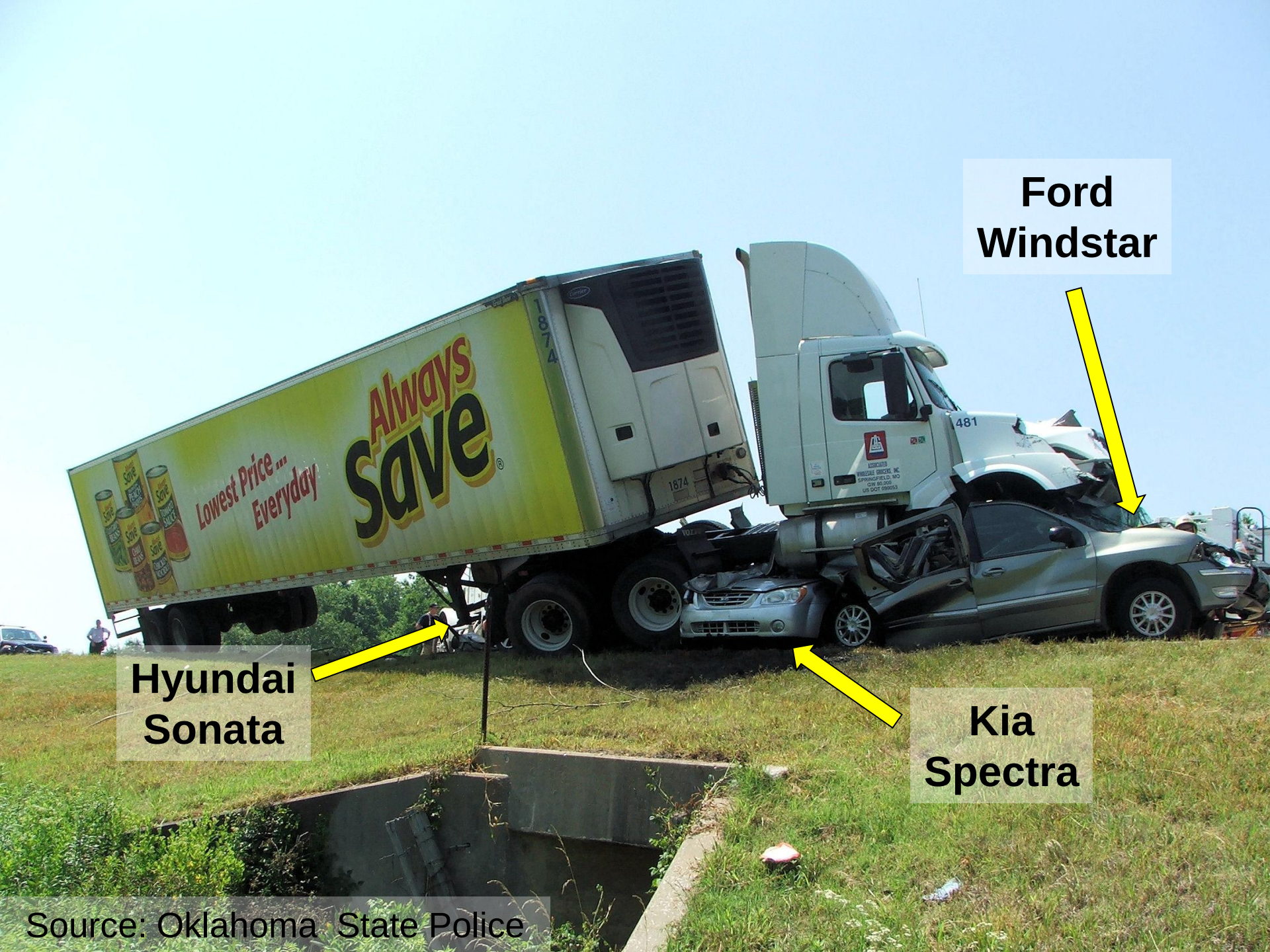

N
W
E
S
Chevrolet Tahoe (6)
16-foot-long stock trailer (5a)
Hyundai Sonata (2)
Ford F350 pickup (5b)
Ford Windstar (4)
Volvo truck-tractor
Kia Spectra (3)
Great Dane semitrailer
Land Rover (1)
I - 44 east


Location of minor accident
Initial impact area
Hill crest



Source: Gary Crow



Source: Oklahoma State Police

Fatalities/Injuries

- Passenger Vehicle Occupants
  - 10 fatalities
  - 3 serious injuries
  - 2 minor injuries
  - 5 no injuries
- Truck Driver
  - Seriously injured

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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

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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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NTSB Fatigue Investigations/Studies

- 30 highway accident investigations
- 2 Safety Studies
  - Fatigue, Alcohol, Other Drugs and Medical Factors in Fatal-To-The Driver Heavy Truck Crashes (31% fatigue; > drugs and alcohol)
  - Factors that Affect Fatigue in Heavy Truck Accidents (last sleep duration, total sleep in 24 hrs, split sleep)

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NTSB Recommendations

- MOST WANTED since 1990
- 150+ fatigue recommendations
- 60+ in highway

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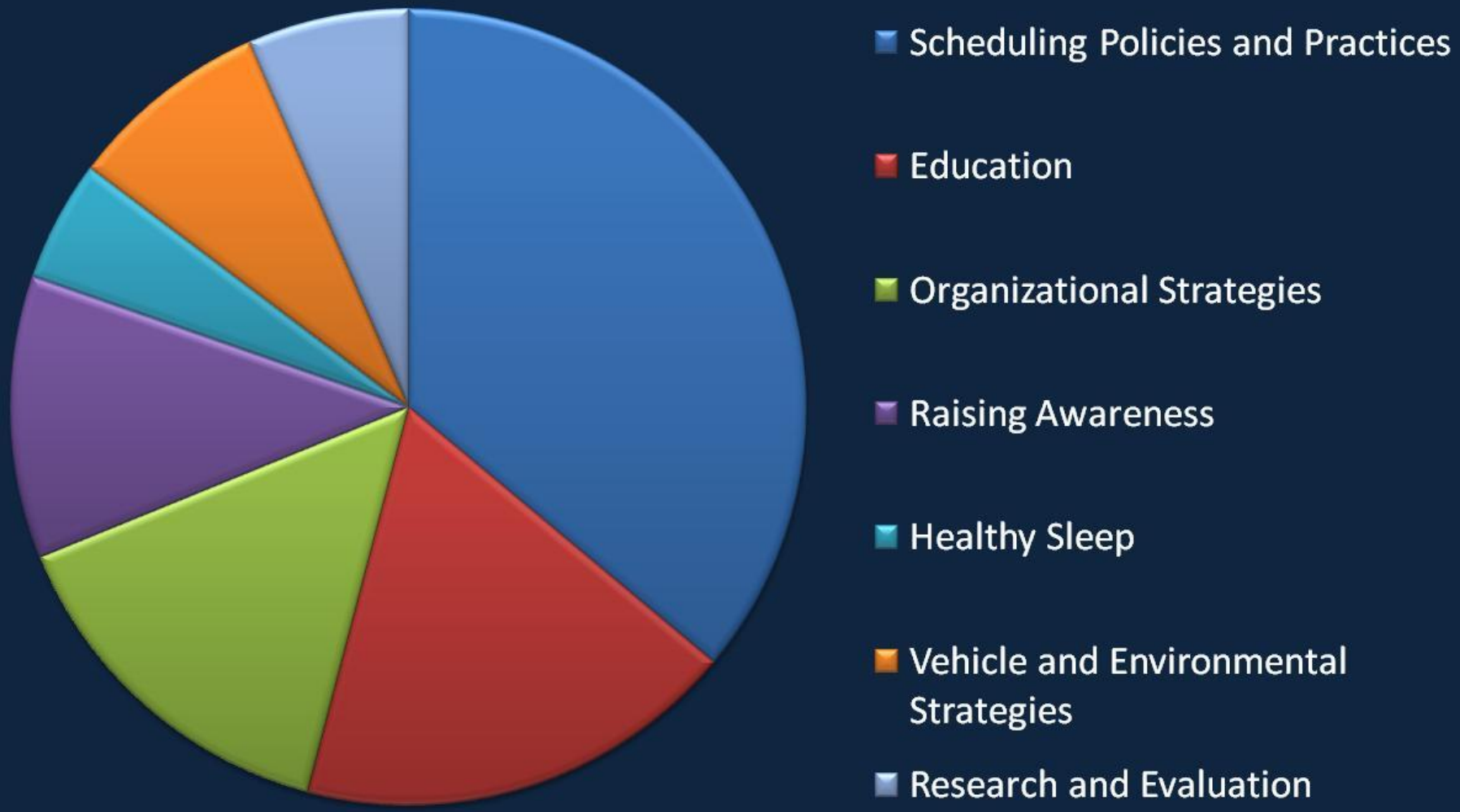
Highway Fatigue Recommendations



Scheduling Policies and Practices

- Day sleep, night drive, ~ 4 am WOCL

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Scheduling Policies and Practices

- Establish scientifically based hours of service regulations
- When possible, address:
  - schedule inversion
  - day sleep/night work
  - rotating schedules
  - extended duty days
  - opportunity for 8 hrs uninterrupted sleep

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Education

- Education vs. awareness
- Foundation for any fatigue efforts
- Address broad/applied content:
  - how fatigue affects performance
  - how to minimize fatigue risks
  - countermeasures to combat fatigue
  - policies to support tired drivers

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Organizational Strategies

- Improve drivers' rest facilities
- Review logbook violations (driver safety assessments)
- Non-punitive fatigue call-in policy
- Provide a backup driver when needed

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Healthy Sleep

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

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Sleep Apnea

- Regular breathing pauses during sleep
- Last longer than 10 seconds, up to minutes
- At least 5 per hour, can have 100’s per night
- Significant effects on heart and lungs
- Frequent awakenings to breathe, return to sleep
- Chief complaint is excessive daytime sleepiness
- Daytime physical signs and symptoms
- Affected individual often unaware, bed partner identifies

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Sleep Apnea is a Health Risk

Individuals with sleep apnea have more:

- hypertension
- cardiac arrhythmias
- stroke
- cognitive deficits
- mood disturbances

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Sleep Apnea is a Safety Risk

- can be > 6 times increased risk for crash
- can be > 7 times increased risk for multiple crashes
- SA performance = .06 - .08 BAC

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Healthy Sleep

- Disseminate guidance for identifying and treating obstructive sleep apnea
- Ensure drivers with apnea are effectively treated before granting unrestricted medical certification
- Have a written contingency plan to accommodate drivers impaired by fatigue or illness

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Response to Recommendations

- Response (2/1/2010)
  - 2008 MRB recommendation (screening for BMI>30)
  - Rulemaking considered for sleep disorders
  - Medical Examiner Handbook info (May 2010)
  - Meeting on OSA in commercial drivers (May 2010)
  - Revised exam form (estimated September 2010)
  - Best Practices Guide (for examiners, companies)

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Vehicle and Environmental Factors

- Rumble strips
- In-vehicle technologies to reduce fatigue related accidents
  - EOBRs
  - Lane detection systems
  - Collision avoidance systems

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Fatigue Management Programs

- Comprehensive approach
- Multiple components
- Science based
- Continuously evaluated and updated
- Complements HOS regulations

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Fatigue Management Program

- North American Fatigue Management Program (NAFMP)
  - (FMCSA, Transport Canada, carriers, many others)
- Three initial projects:
  - improved sleep/wake behavior
  - less absenteeism
  - fewer critical events
  - high prevalence of sleep apnea
- Phase IV (2 year target for completion)
  - industry-wide availability
  - scalable (small to large carriers)
  - web-based
- Industries moving to required FMP's

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Crashworthiness/ Occupant Protection

Dolan Springs, AZ (Jan. 30, 2009)

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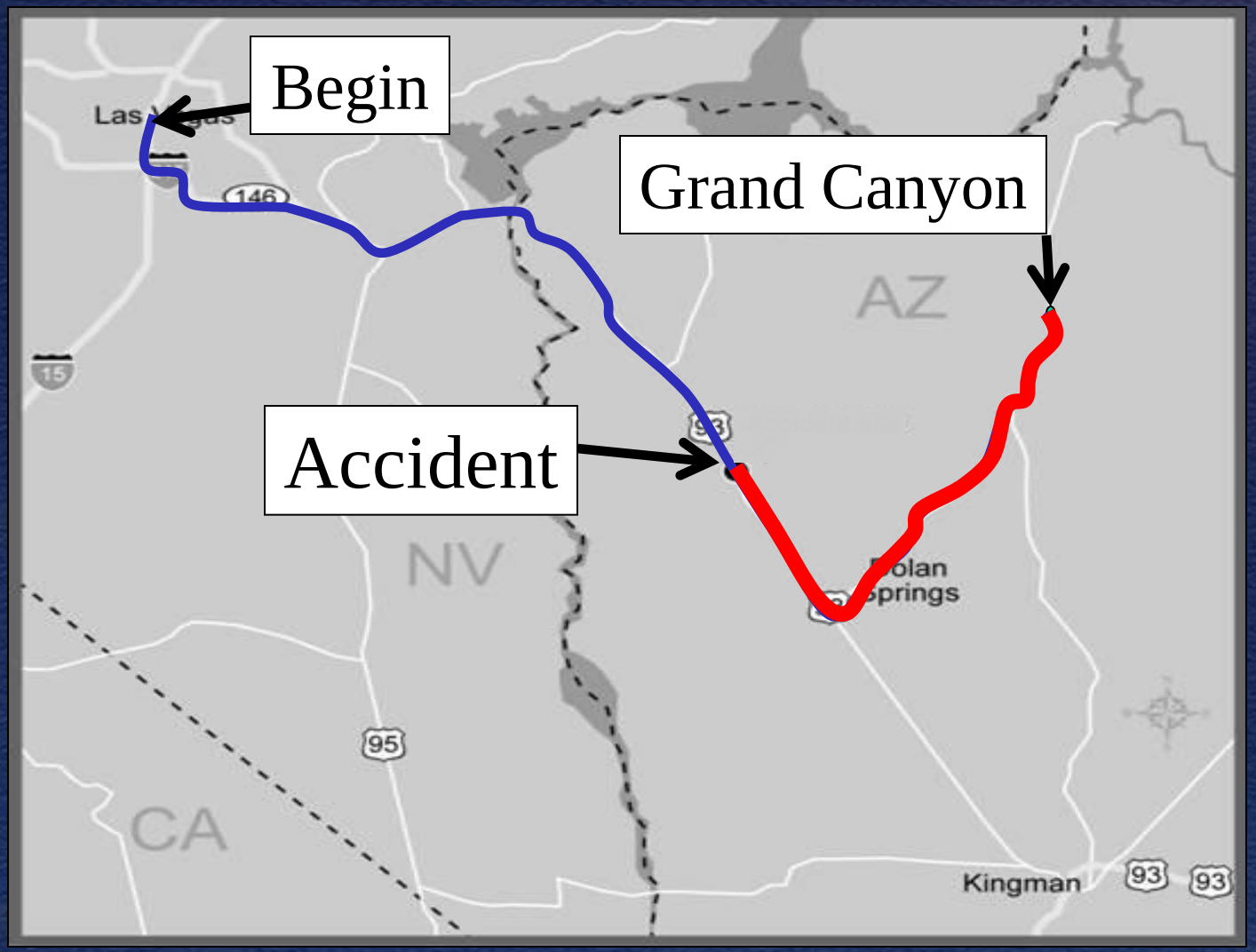
Accident Trip



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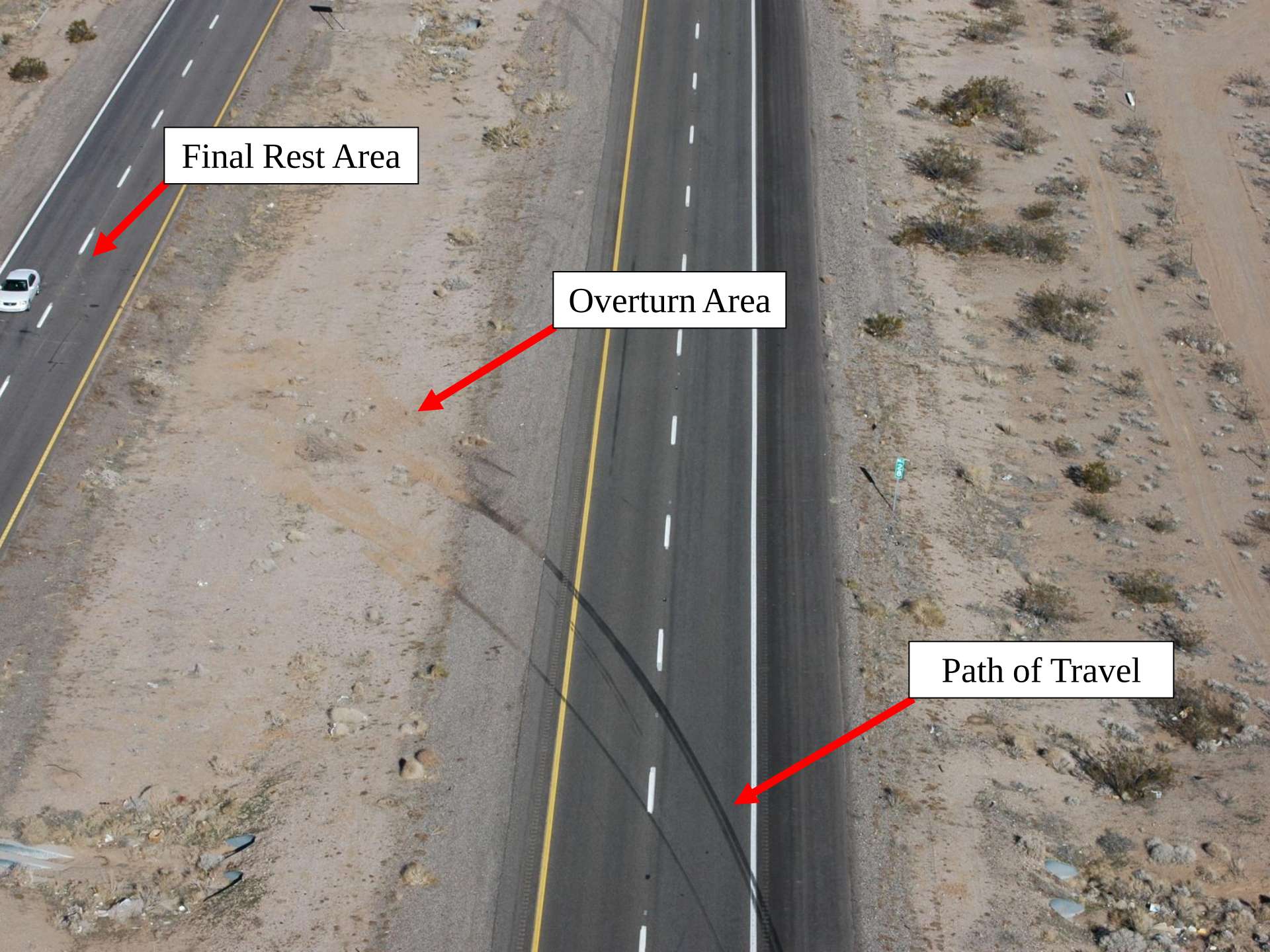
Right Shoulder
R V
PARK
HERE !
ONLY


Final Rest Area
Overturn Area
Path of Travel


DW TOUR

- 17 passengers; 7 fatalities; others: minor – serious injuries

Bus Crashworthiness Issues

- Roof strength
- Passenger retention

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Exterior Deformation

- Front fenders, hood, skirts, front roof, loading door
- 9/10 windows broken
- Minimal roof damage

Crashworthiness

- roof crush minimal; 15 passengers ejected

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Crashworthiness

- Lake Placid, Florida (Feb., 2010)

- 180 degree roll; 8 passengers ejected; 3 fatalities

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NTSB Most Wanted List (2000)

- *H-99-47 (NHTSA): Issued November 2, 1999*
  Status: Open—Unacceptable Response
  In 2 years, develop performance standards for motorcoach occupant protection systems that account for frontal impact collisions, side impact collisions, rear impact collisions, and rollovers.

- *H-99-50 (NHTSA): Issued November 2, 1999*
  Status: Open—Unacceptable Response
  In 2 years, develop performance standards for motorcoach roof strength that provide maximum survival space for all seating positions and that take into account current typical motorcoach window dimensions

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Motorcoach Safety Action Plan

U.S. Department of Transportation

Motorcoach Safety Action Plan

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Motorcoaches vs. smaller buses

- Cutaway buses: 10,200 – 13,600 (2009)
- Motorcoaches: 1,600 (2009)
- Growing trend: high revenues, lower retail cost (vs. motorcoach), passenger capacity
- Economic downturn: smaller groups, traveling shorter distances

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NTSB Recommendation: Enhanced Occupant Protection

To NHTSA:

In your rulemaking to improve motorcoach roof strength, occupant protection, and window glazing standards, include all buses with a gross vehicle weight rating above 10,000 pounds, other than school buses. (H-10-3)

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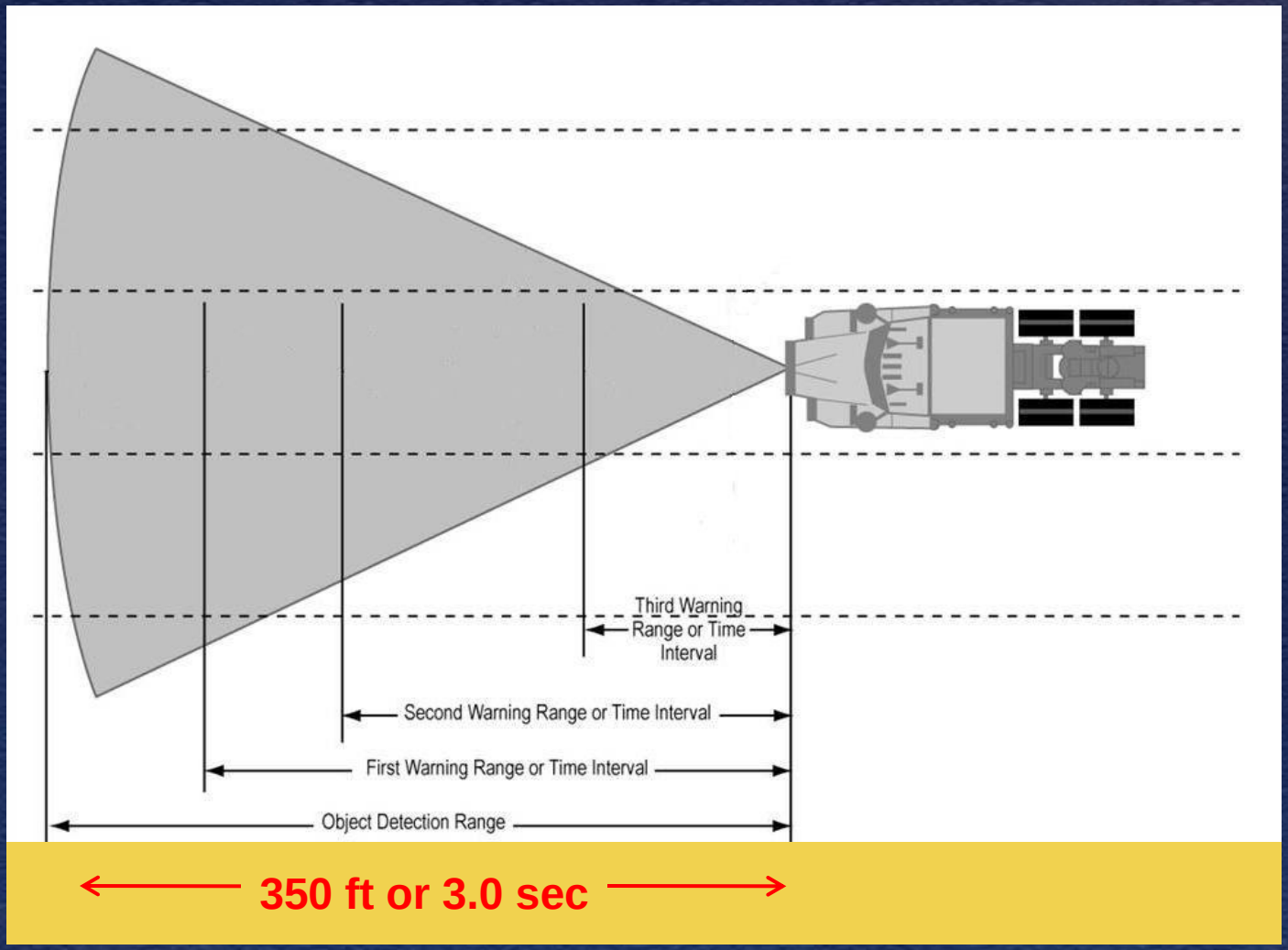
Crash Avoidance Technologies

Forward Collision Warning



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Forward Collision Warning

- Adaptive cruise control/active braking
- $1,000 - $2,000 OEM/aftermarket option
- FCWS + ACC = greater benefits
- No federal regulations for collision warning systems
- Government/Industry Research (FCWS)
  - 21% rear-end crash reduction
  - would prevent: 4,700 crashes/yr
    2,500 injuries/yr
    96 fatalities/year

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NTSB and FCWS

- First collision warning recommendation in 1995
- 2001 special investigation, 9 accidents (1999-2000), 20 fatalities and 181 injuries; recommendations made
- Since 2001, investigated 11 more accidents, 45 fatalities and 190 injuries (rear end/head on)
- FCWS on NTSB Most Wanted List (2007)

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Stability Control Systems

- Required on all passenger vehicles by the 2012 model year
- Two types: roll and yaw stability control
- Implementation in passenger vehicles estimated to save 5,300-9,600 lives/yr
- Implementation estimated to prevent 156,000 – 238,000 injuries/yr

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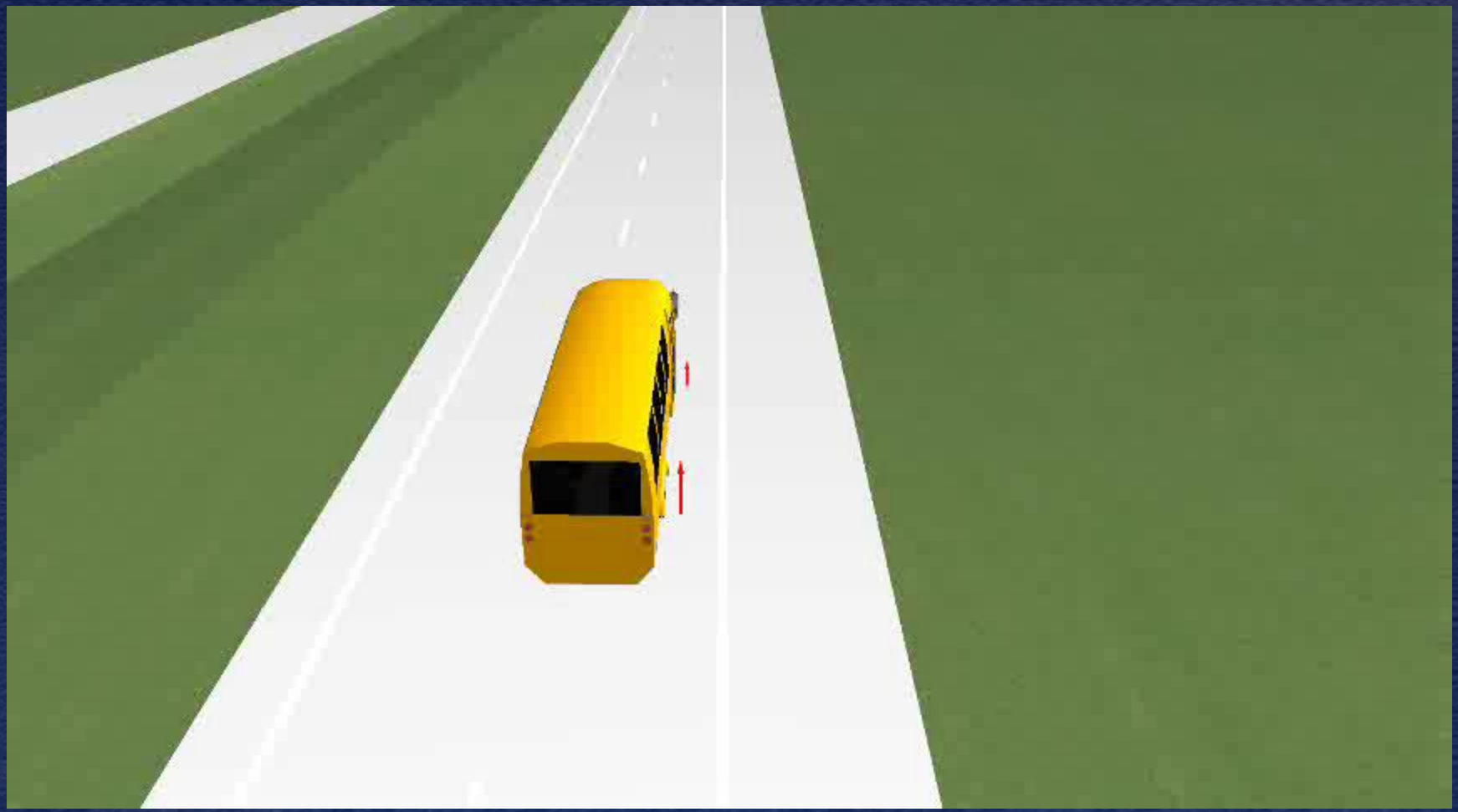
Stability Control vs No Stability Control



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Continued Needs and Efforts

- DOT currently researching benefits of stability control for heavy trucks and motorcoaches
- Research does not currently include all bus types (cutaway buses; 26,000 GVWR)
- Will benefits extend to large commercial vehicles?
- Development of systems and performance standards for cutaway buses lagging

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