

Backover and Non-Crash Events Special Crash Investigations

Protecting Children in and Around Cars Lifesavers 2008

April 13, 2008

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National Highway Traffic Safety Administration

Overview Of Presentation

- **Overview of Special Crash Investigations**
- **Backover and Non-Crash Events Activities**
 - ◆ **Data Collection**
 - ◆ **Investigations Breakdown**
 - ◆ **Example SCI Cases**
 - ◆ **Accessing the Data**

Objective

- **The Special Crash Investigations unit is collecting detailed data on backover and non-crash events, in support of the agency's efforts for backover and non-crash incident mitigation**
 - **Began data collection in October 2006**
 - **Published cases on the NHTSA Web site in September 2007**

Overview of SCI

- **Examines safety impact of rapidly changing technologies**
- **Provide the agency with early detection of alleged or potential vehicle defects**
- **Types of cases investigated include:**
 - **Certified advanced-air-bag cases**
 - **School bus crashworthiness investigations**
 - **Vehicles with adaptive vehicle controls**
 - **Not-in-transport cases**
 - **Other vehicle safety issues as requested by the agency**

SCI Backover and Non-Crash Case Types

- **Seeking incidents in the following areas:**
 - **Backover**
 - **Backing light passenger vehicle strikes a person from the rear or approaching from the side**
 - **Focus is on children**
 - **Power-window entrapment**
 - **Child strangled in a power window closing**
 - **Hyper/Hypothermia**
 - **Leaving children in cold/hot vehicles**
 - **Trunk entrapment**
 - **Children getting locked in vehicle trunks**
 - **Rollaway**
 - **Vehicle slips out of gear and injures a nonoccupant**
 - **Carbon monoxide poisoning**
 - **Others as identified**

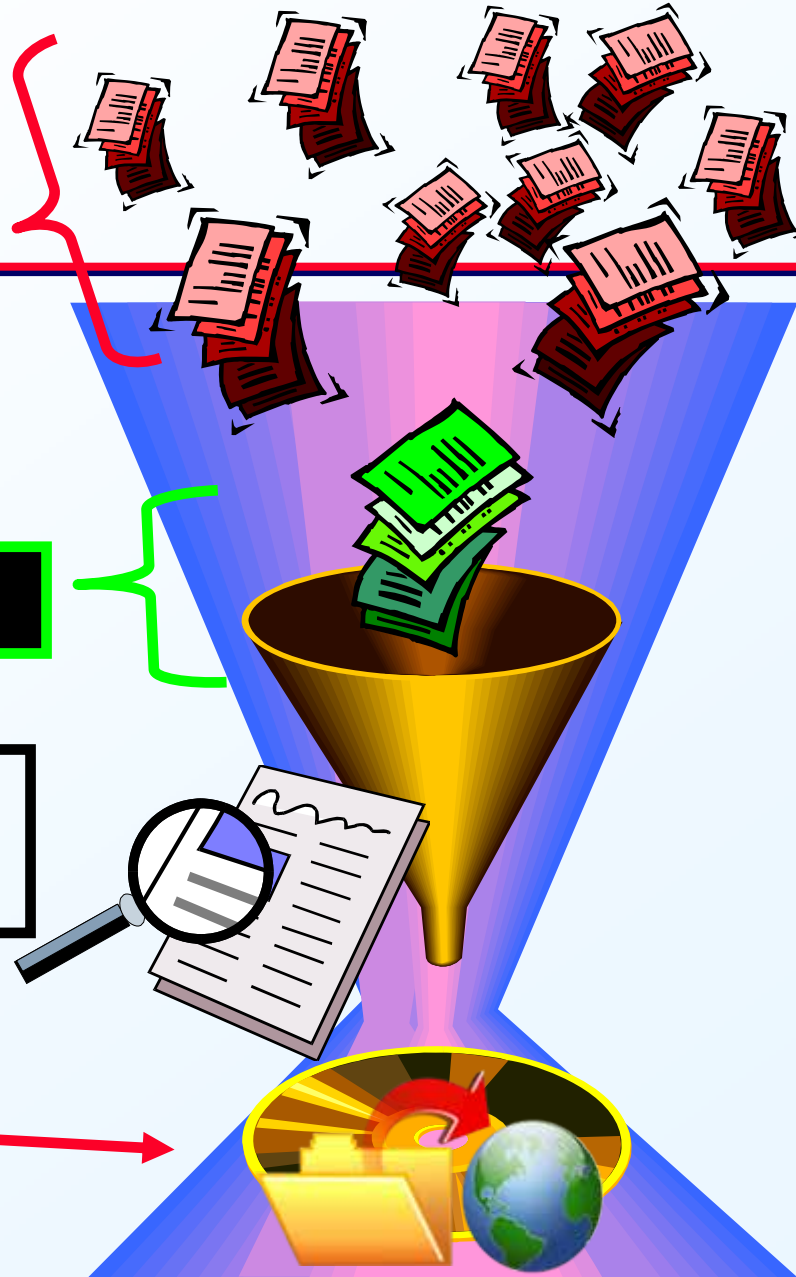
SCI Screening

Notifications

Incidents Pursue

**Initiated
Investigations**

Cases Finalized and Published



SCI Screening and Status

As of March 31, 2008

**Notifications From
Network of Sources**



Everything

Filter out: Heavy trucks,
front over, etc.

446

Incidents Pursued



Filter for: Cooperation,
availability of components,
etc.

164

**Initiated
Investigations**



Contact, travel, secure
evidence/documents , etc.

64

**Cases Finalized and
Published**



Reviewed by NHTSA ...
AND published to Web

46

Investigations Breakdown

- **Of the 64 Cases:**

- **Backover** **50**
- **Hyperthermia** **7**
- **Power Window Entrapment** **3**
- **Trunk Entrapment** **2**
- **Rollaway** **2**

Backover Breakdown

Vehicles Involved

- **50 backover cases comprising:**

- **17 Passenger Cars**



- **23 Sport Utility Vehicles or Vans**



- **10 Pickup Trucks**



Backover Breakdown

Ages

- **Of the 50 Backover Cases:**

- **Involved children** **45***

• < 1	1
• 1 - 3	31
• 4 - 8	12
• 9 - 13	1

- **People > 13** **7**

* Two cases involved more than two children

- **Note: The focus of the backover cases is children; however, some adults are included if seriously injured or the presence of an OEM (or post-OEM) backing or parking aid**

Backover Breakdown

Severity

- **Of the 50 Backover Cases:**

- **Fatal Outcome 27**
- **Non-Fatal 25**
(moderate to severe injuries)

Note: two cases each involved two children each – one fatal and one non-fatal

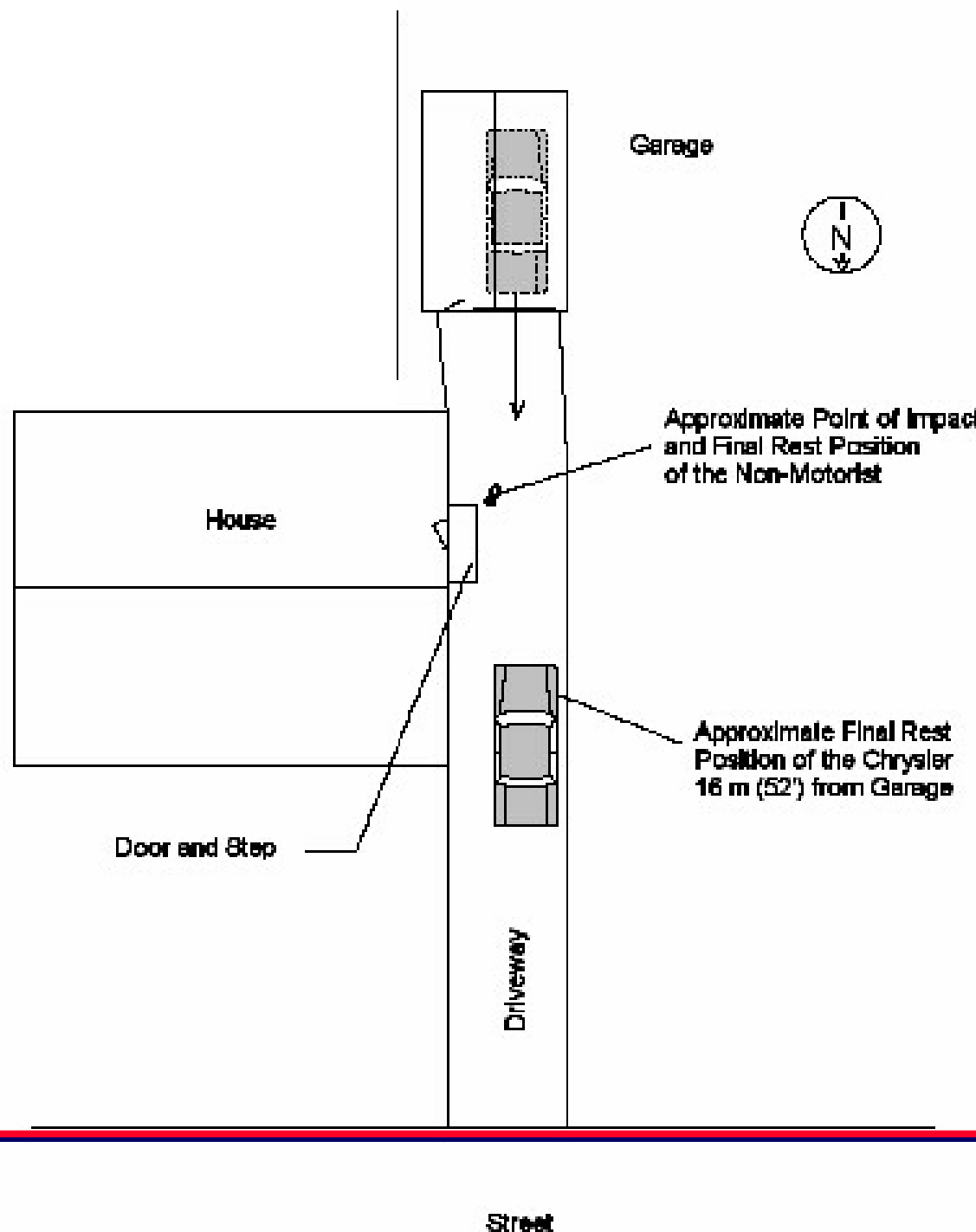
Backover Breakdown

Victim Path

- **Of the 50 Backover Cases:**
 - **14 are approaching from right or left of vehicle**
 - **11 are stationary (or close to stationary) behind the vehicle**
 - **Example: playing behind the vehicle, etc.**
 - **17 unknown path**
 - **Children who could not be interviewed**
 - **No witnesses**
 - **No physical evidence**
 - **Awaiting data**
 - **10 others**
 - **Examples: riding in hatch, running up to vehicle from behind and fell**

Example 1 Backover Crash Schematic

- 2007 Chrysler 300C
- Fatal 18-month-old female
- Driver backed out of garage past house
- 18-month-old exited house, down steps, and into path of backing vehicle



Example 1 - Backover Crash Scene



View toward garage



View from garage

Example 1 - Backover Crash Vehicle Summary

- 2007 Chrysler 300C
(New - 291 miles)
- Side rear windows and
backlight with aftermarket
mirror tint film
- Tint prevented viewing
from exterior into vehicle
but provided deep tint view
from interior to exterior



Example 1 - Backover Crash Summary

- Clear morning, daylight hours, private driveway
- Driver (mother of child) went to detached garage to back out vehicle onto driveway
 - Too difficult to place child in child seat while car in garage due to narrow garage
- All windows in vehicle closed and CD player set on low volume
- Child left in house alone, exited house, down steps and into path of vehicle

Example 1 - Backover Crash Summary

- Rear left bumper struck and knocked child down
- Left rear tire then ran over child
- Left front tire then ran over child
- Driver was not aware she ran over child



- Vehicle traveled 33 ft. after crash
- Driver stopped and exited vehicle and then saw child laying on ground in front of vehicle

Example 1 - Backover Crash Summary

- Driver:

- 23-year-old female
- 64 inches tall
- Not interviewed

- 18-month-old female

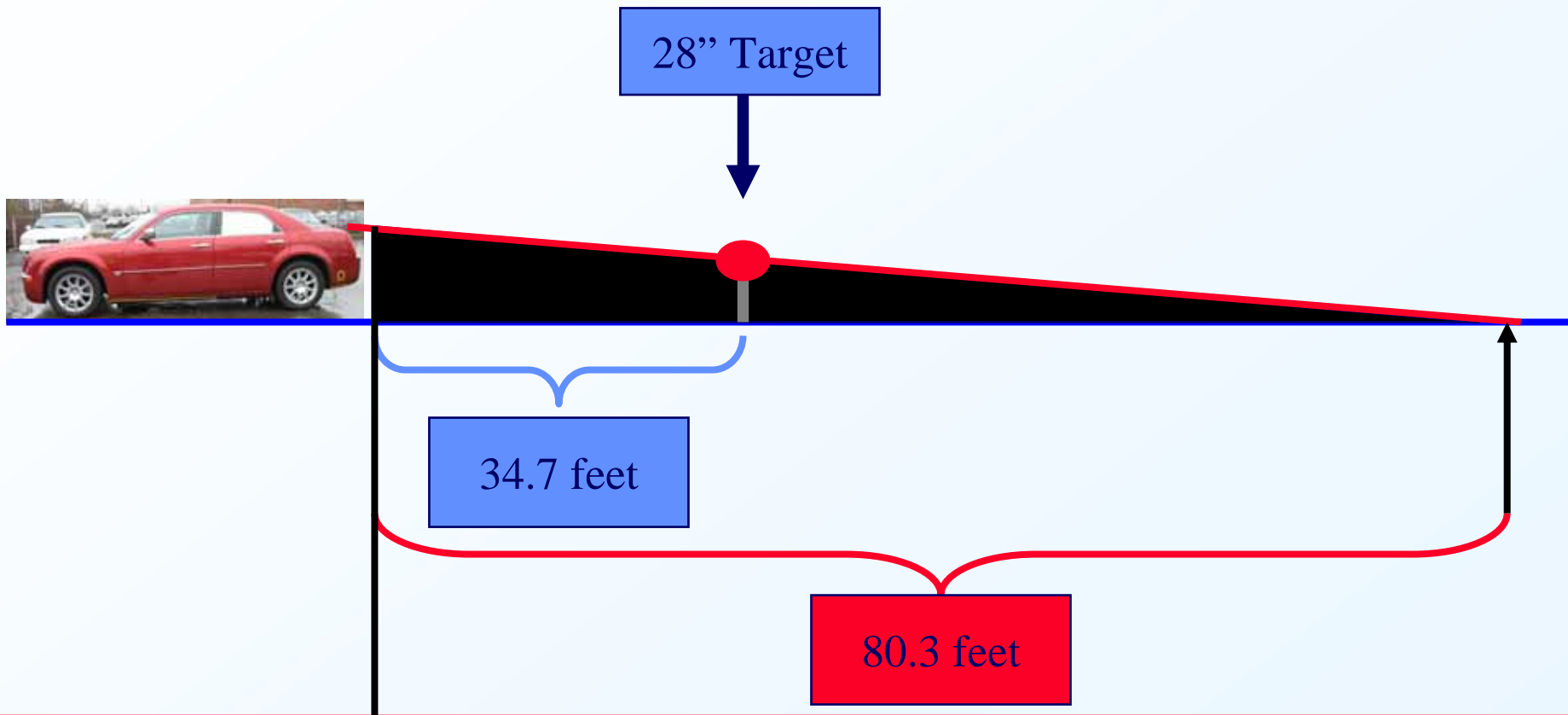
- 24 inches tall
- 24 pounds
- Expired 4 hours post-crash
- Autopsy indicated severe liver laceration as cause
- No external or soft tissue injuries identified

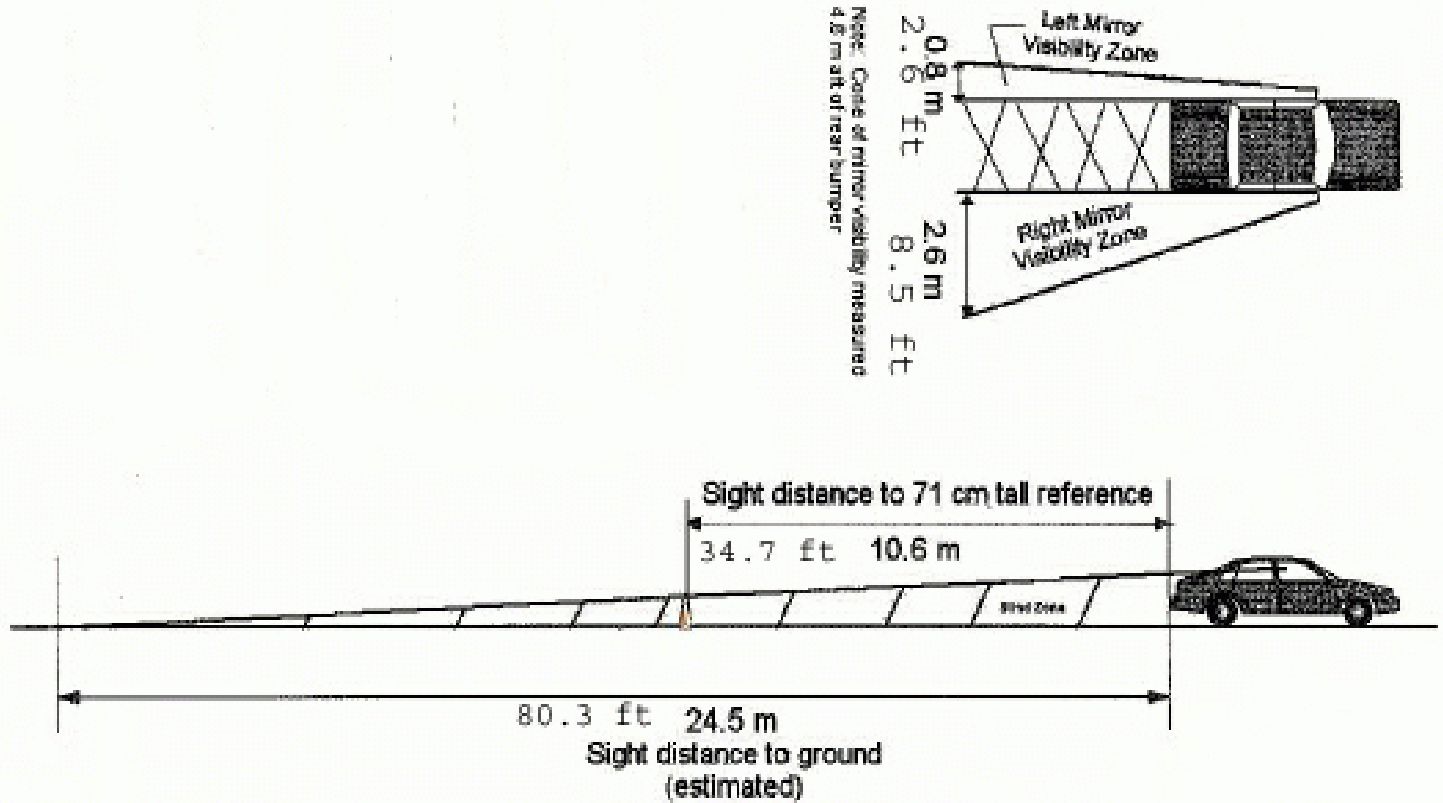
Important Notes:

- Top of trunk deck is 43” from ground
- Steps were ~20 feet from garage
- Reference measurements indicate 34.7 feet would be needed to see a 28” target through rear window

Example 1 Backover Crash Rear Visibility

- (Graphic Not To Scale)





Example 2 Backover Incident

Remote Level Investigation - Summary

- 1996 Chevrolet pickup
- Daycare parking lot
- 31-year-old male driver picking up daughter
- Another driver entered to left and was picking up her four children



Example 2 Backover Incident Remote Level Investigation - Summary

- As this driver exited the facility the subject boy was reportedly in the pickup truck on left side of this vehicle
- Other driver was securing another child in safety seat
- 4-y/o male exited vehicle and knelt down to play in a mud puddle 5 feet behind subject vehicle



Example 2 Backover Incident

Remote Level Investigation - Summary

- Driver backed out of lot, heard a bump, thought it was the pavement/driveway edge
- Continued maneuver, saw child to left front next to mud puddle
- Police unsure which tire ran over child
- No identifiable marks on pickup truck



Example 2 Backover Incident Remote Level Investigation - Visibility

- Exemplar 1996 Chevrolet pickup used
- Six-foot-tall surrogate driver used
- Centerline rear visibility 24.6 feet behind centerline to 28" tall target
- Child was approximately 5 feet behind bumper of pickup



Example 3

Hyperthermia Incident - Summary

- 2002 BMW M5 four door
- Springtime
- Remote level investigation
- Parking lot of office park area
- 15-month-old child left in vehicle ~ 8 hours – fatal
- Minimal shade



Example 3

Hyperthermia Incident - Summary

Environment

- **Eight o'clock hour:**
 - Clear, 58° F
 - Calm winds
- **Three o'clock hour:**
 - Partly cloudy 89° F
 - Breeze <8 mph

Vehicle

- **2002 BMW M5 four-door**
- **Black interior**
- **Aftermarket tint on side windows and backlight**
- **Sunroof was OEM tint**
- **Equipped with BMW's integrated theft deterrent package**
 - **Package included a roof mounted interior motion detector**

Example 3

Hyperthermia Incident - Timeline

- 1. Four children in car
(15 months -12 years)**
- 2. Dropped three at school**
- 3. Driver intended to drop
15-month-old at day care**
- 4. Unsure if this is normal
routine**
- 5. Conference call at 0830 for
driver at office**
- 6. Parked at ~0830, closed
windows, locked vehicle
(setting alarm system)**
- 7. 15-month-old remained in
vehicle strapped in CSS**
- 8. Child activated motion
alarm 4 times over course
of day**
- 9. Driver turned it off
remotely each time**
- 10. At 1520 departed office
discovered unresponsive
child in car**
- 11. EMS called, child
pronounced**

Example 3

Hyperthermia Incident - Summary

Thermal Imaging

- Max ambient temperature during incident was 89° F
- Fire dept. opened door (and vented) for an unknown period of time
 - Thermal imaging indicated interior temp as 142° F

Security System

- Police download data from security system's computer
- Downloaded data indicated the alarm activated five times
 - Four by the child
 - One by police technician at scene to verify system operation
 - System does not time stamp activations

Example 4

Backover Crash Diagram

Driveway Slope

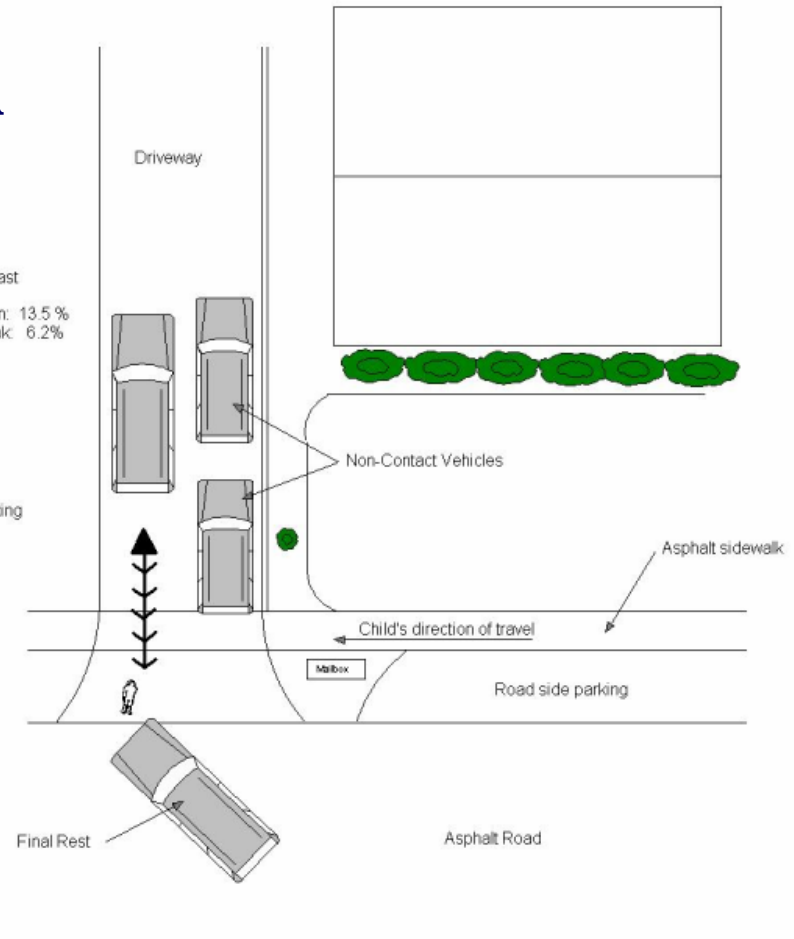
 Positive to the East

Grade at Initiation: 13.5 %

 Grade at Sidewalk: 6.2%

Cadillac backing

 eastbound



CRASH SCHEMATIC

 CA06-028

2005 Cadillac Escalade



Example 4 Backover Crash Summary

- 2005 Cadillac Escalade
- Residential area
- Backing out of driveway
- 7-year-old male on sidewalk
“skipping” home from
school
- Fatal injuries



Example 4 Backover Crash Scene

- Driveway slope 13.5%
- Visibility obstruction (parked vehicle)
- Slope of driveway decreases visibility behind vehicle



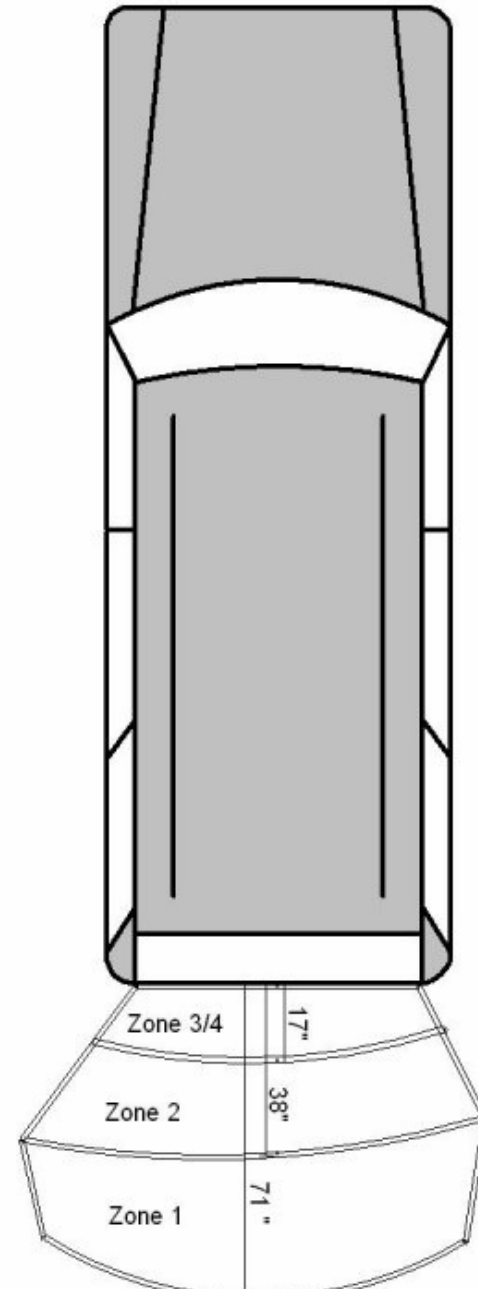
Example 4 Backover Crash Vehicle

Evidence



Example 4 Backover Crash Vehicle

- Vehicle equipped with Ultrasonic Rear Parking Assist (URPA)
- SCI documented range of system
- Turned off prior to incident



Example 4 Backover Crash Visibility

- Pedestrian 46” tall
- Base of backlight 54”

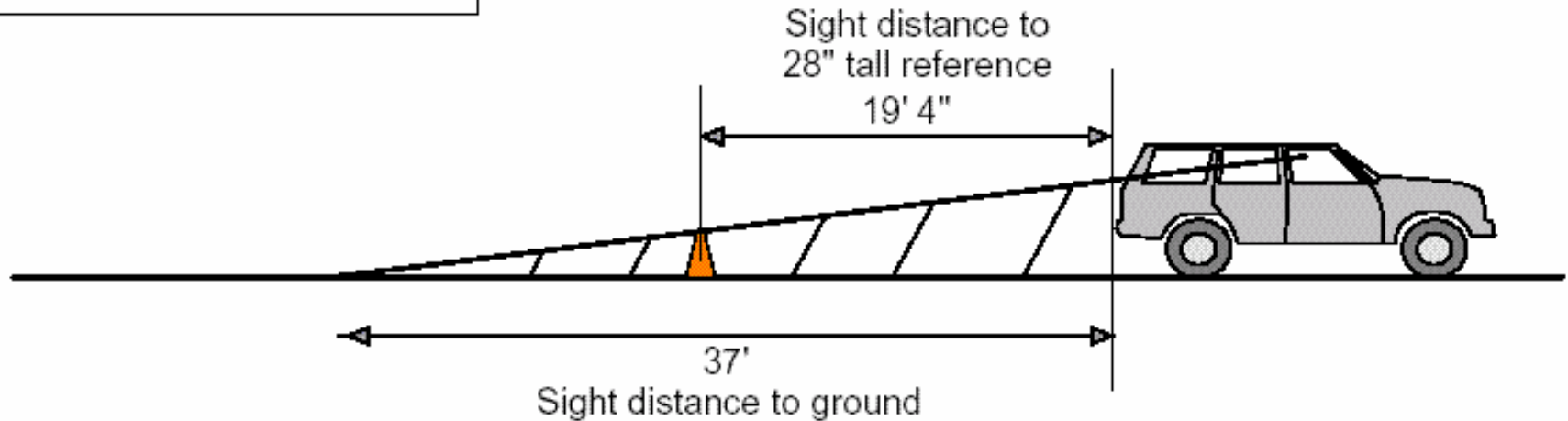
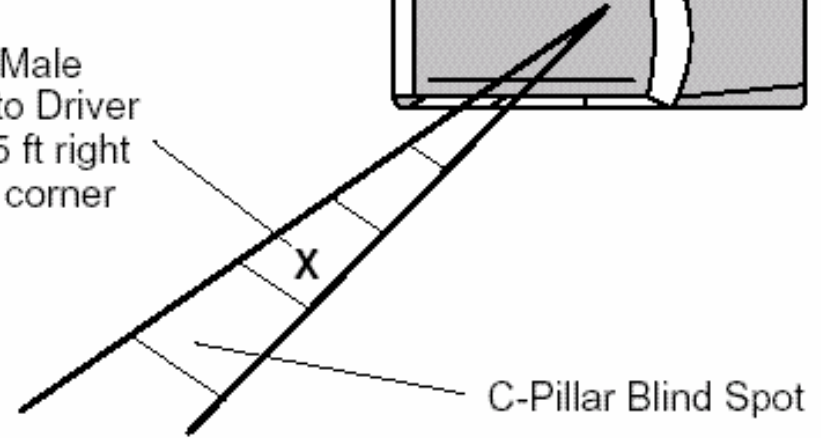
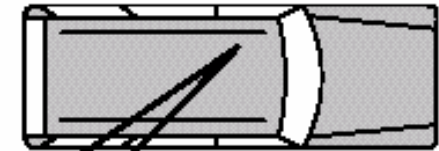


Example 4 Backover Crash Visibility

Nominal Visibility Diagram
CA06-028

2005 Cadillac Escalade
Driver: 68 in tall

6 ft / 220 lb Male
Not Visible to Driver
3.6 ft aft, 8.5 ft right
of right rear corner



Example 5

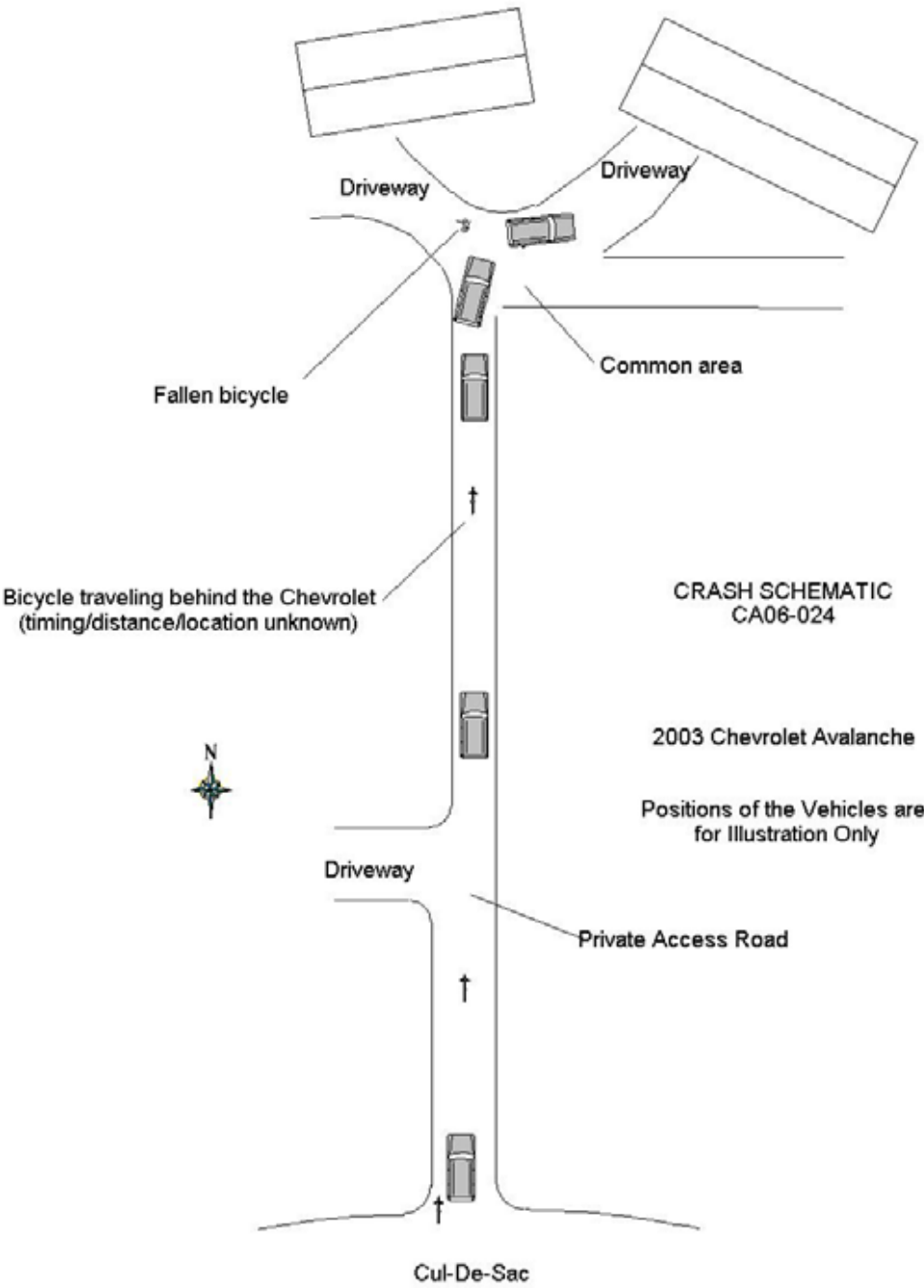
Backover Crash

Summary

- 2003 Chevrolet Avalanche
- Driver stopped at end of private road to retrieve mail and refuse container
- Spoke with a neighbor and then proceeded up the drive
- Six-year-old male on bike present (son of neighbor)
- Serious injuries to a child (bicycle helmet in use)
- Refuse container pulled alongside the vehicle with his left hand



Example 5 Backover Crash Schematic



Example 5

Backover Crash

Summary

- Deposited the refuse container in the common area and turned the vehicle to the right
- Drove forward ~ 28' and stopped the vehicle
- Child entered common area, lost control of bike and fell
- Driver shifted to reverse, checked his mirrors and started to back into his driveway



Example 5 Backover Crash Summary

- The child was located approx. 12' behind the centerline of the vehicle
- The child was on ground still straddling the bike
- Driver used the left mirror while backing to reference the tire relationship to driveway edge



Example 5 Backover Crash Summary

- Driver heard something, stopped and exited his vehicle
- Child was under vehicle situated toward the right rear wheel
- Child suffered skull fracture, orbital fracture and facial abrasions
- Bicycle helmet was also fractured during crash

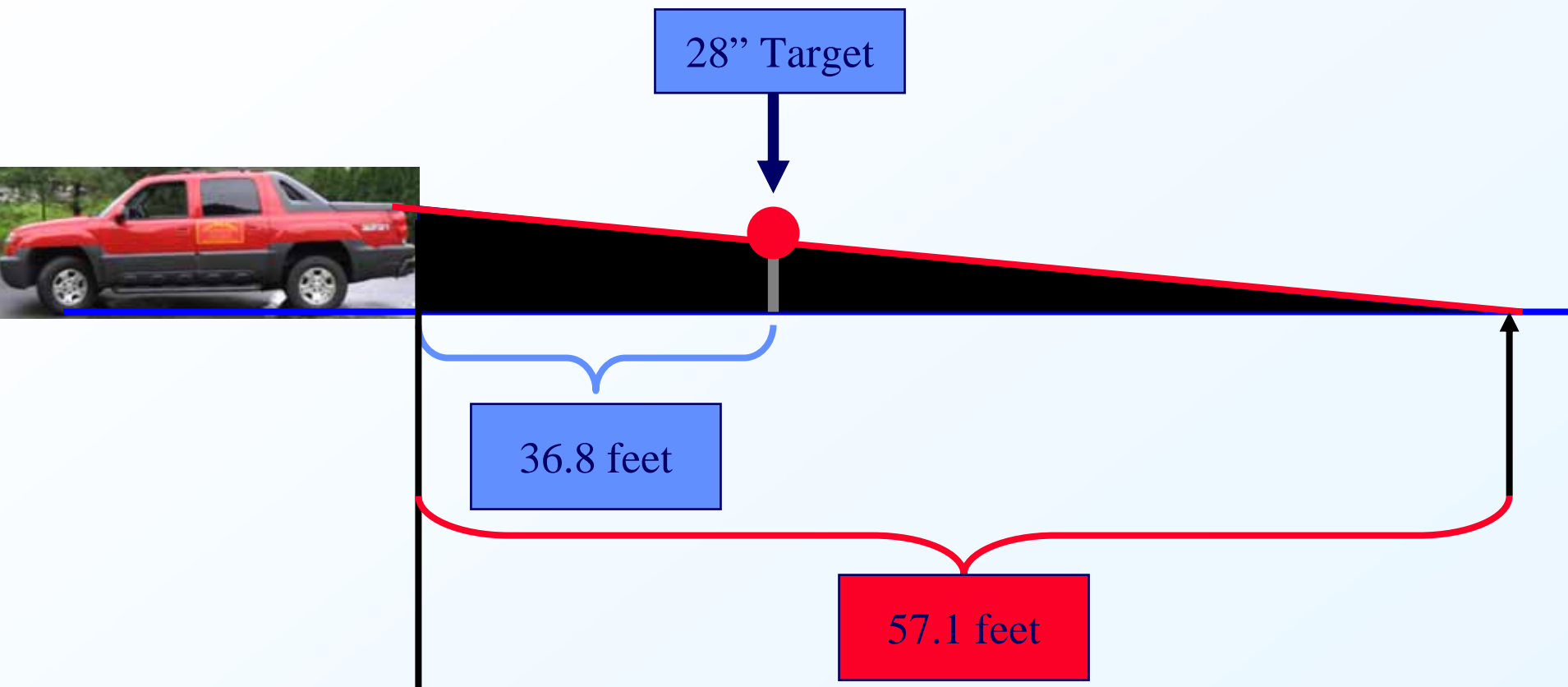


From rear to front of Vehicle



Example 5 Backover Crash Rear Visibility

- (Graphic Not To Scale)



Example 5 Backover Crash Summary

- When the child fell on bike, he was approximately 12 feet behind vehicle on ground
- Scene, vehicle, and driver measurements indicate that the driver needed 36.8 feet to see a 28" tall target directly behind the vehicle





What's New: ★ Consumer Advisory: NHTSA Warns Ford, Lincoln and Mercury Owners of Fire Hazards

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Top Stories

Transportation Secretary Peters Announces New Five Star Rating System for Car Seats



A new five star government rating system will grade child safety seats on how easy they are to properly install, and will help guide parents and caregivers in choosing the right car seat to keep their children safe, U.S. Transportation Secretary Mary E. Peters announced Jan. 30.

- [View the New Ratings and Other Information on the Ease of Use Information Page](#)

Sec. Peters Catches Bus to School, Proposes New Safety Rules for School Buses



DOT Secretary Mary E. Peters buckled up and rode with children in a school bus to Morrisville Elementary School near Raleigh, where she announced a new federal proposal to make school buses safer by requiring higher seat backs and setting new seat belt standards for the nation's 474,000 school buses.

- [Press Release](#)
- [Notice for Proposed Rulemaking \(NPRM\)](#)

What's New, Latest Updates and Features on Our Site

- ▶ **Click It or Ticket Mobilization Planner - Coming Soon!**
- ▶ **March 14:** 2008 Comparison of Insurance Costs
- ▶ Feb. 4: NHTSA Fiscal Year 2009 Budget Overview (PDF)
- ▶ Feb. 4: NHTSA Fiscal Year 2009 Budget in Brief
- ▶ Feb. 4: NHTSA Fiscal Year 2009 Budget Estimates (PDF)
- ▶ Jan. 13: NHTSA Releases 2007 NHTSA Recall and Repair Cost, Child Seat and Seat

Share the Road 2008 Motorcycle Awareness Planner

File A Complaint
If you think there is a safety-related problem with your vehicle or child seat

safercar.gov
★★★★★

How Safe is Your Car?
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[Crash & Rollover Ratings](#)
[Recall Information](#)

StopImpairedDriving.org
Information and resources to fight drunk and drugged driving

4 Steps For Kids
How to keep your littlest passengers safe



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The NEW National Center for Statistics and Analysis website!

The link below will help in making the adjustment to our new format. It explains where the features you remember can be found now.

► **Navigating Our New Pages**



Crash Research, Traffic Records & Driver Register, Regulatory Evaluation & Analysis, Sharing Information

Share the Road 2008
Motorcycle Awareness Planner

File A Complaint
If you think there is a safety-related problem with your vehicle or child seat

More On The Web

► **Traffic Records Coordinating Committee**

Related Links

- **FARS, State Data Systems, CODES**
- **FARS, NASS, NMVCCS, SCI**
- **FARS Web-Based Encyclopedia**
- **NCSA Publications, Documentation & Manuals (CATS)**



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NASS Case Viewers

Use the links at right to access individual case information or to select and review scanned paper cases.

Not In Traffic Surveillance (NITS)

Not in Traffic Surveillance incidents can fall into a variety of categories, some are crashes (which occur in private driveways) and some are incidents (occupant getting caught in a power window, hyper/hypothermia, etc.). The SCI program is actively pursuing NITS crashes from its network of sources to provide in-depth information on the particulars of the incident or crash.

▶ [Current NITS Case Totals \(PDF\)](#)

Related Links





- ▶ [NASS/CDS EDR Reports \(2000-2005\) \(FTP Server\)](#)
- ▶ [NASS/CDS Case Viewer - XML Viewer \(2004-2005 Data\)](#)
- ▶ [NASS/CDS Case Viewer \(1997-2006 Data\)](#)
- ▶ [NASS/CDS Case Viewer - Preliminary Cases \(2007 Data\)](#)
- ▶ [NASS/CDS Scanned Paper Cases](#)
- ▶ [NASS Pedestrian Case Viewer](#)
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More On The Web

- ▶ [Not In Traffic Surveillance \(NITS\) Case Viewer](#)

Accessing SCI Technical Reports

<http://www-nass.nhtsa.dot.gov/BIN/logon.exe/airmislogon>

Address  <http://www-nass.nhtsa.dot.gov/BIN/logon.exe/airmislogon>  Go  Links 



Special Crash Investigations Filters

NHTSA is authorized by congress (Volume 489, United States Code Chapter 301 Motor Vehicle Safety, Section 30166, 30168 and Volume 23, Section 403) to collect information on motor vehicle crashes to aid in the development, implementation and evaluation of motor vehicle and highway safety countermeasures. The law requires the Agency to protect the privacy of individuals involved in crashes investigated. Agency procedure for release, accuracy and security of research data collected under the SCI program prohibit the dissemination of any information collected, assembled, derived or computed until all conditions of data gathering and reporting, case completeness, quality control and privacy have been completed. The cases available through the SCI web query system have met these conditions.

SINGLE CASE SELECTION

Case Number

MULTIPLE CASE SELECTION BASED ON FILTER CRITERIA

<div style="background-color: #003366; color: white; padding: 2px;">CASE TYPE</div> <p>Type <input type="text" value="<All>"/></p>	<div style="background-color: #003366; color: white; padding: 2px;">CRASH</div> <p>Year <input type="text" value="<All>"/></p> <p>Month <input type="text" value="<All>"/></p> <p>State <input type="text" value="<All>"/></p> <p>Mortality <input type="text" value="<All>"/></p>
<div style="background-color: #003366; color: white; padding: 2px;">VEHICLE</div> <p>Make <input type="text" value="<All>"/></p> <p>Model Year From <input type="text" value="<All>"/> To <input type="text" value="<All>"/></p>	<div style="background-color: #003366; color: white; padding: 2px;">OCCUPANT</div> <p>Role <input type="text" value="<All>"/></p> <p>Sex <input type="text" value="<All>"/></p> <p>Age <input type="text" value="<All>"/></p> <p>Height <input type="text" value="<All>"/></p>

Accessing SCI Technical Reports

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SINGLE CASE SELECTION

Case Number

MULTIPLE CASE SELECTION BASED ON FILTER CRITERIA

CASE TYPE

Type

- NITS - Backover
- NITS - CO Poisoning
- NITS - Hyper/Hypothermia
- NITS - Other

VEHICLE

Make

Model Year

- NITS - Power Window
- NITS - Roll Away
- NITS - Trunk Entrapment
- Other
- Other Government Partners

CRASH

Year

State

Month

Mortality

OCCUPANT

Role

Sex

Age

Height

Accessing SCI Technical Reports

<http://www-nass.nhtsa.dot.gov/BIN/logon.exe/airmislogon>

CASES FROM THE SPECIAL CRASH INVESTIGATION PROGRAM											
CASE REPORT STATUS ¹	CRASH DATE	ST	AGE	HT	WT	BELT USE	VEHICLE	CHANGE IN VELOCITY	PRE- IMPACT BRAKING	INJURY	INJURY SOURCE
	INVEST DATE		SEX	(IN)	(LB)			(MPH)			
CA06024 ECASE Available Technical Report	10/2006	VA	49 YR	72	209	Manual Belts not Used	2003 CHEVROLET AVALANCHE	E <6	Unknown	<No rank 1 injuries>	<No rank 1 injuries>
	10/2006		M								
CA06028 ECASE Fatal: Available Technical Report	11/2006	NY	39 YR	Unk	Unk	Unknown if Manual Belts used	2005 CADILLAC ESCALADE ESV	E minor	No	<No rank 1 injuries>	<No rank 1 injuries>
	12/2006		F								
DS06032 ECASE Fatal: Available Technical Report	3/2006	WA	22 YR	62	119	Unknown if Manual Belts used	1990 CHEVROLET C, K, R, V-SERIES PICKUP	E <6	No	Skull fracture NFS	Other exterior surface or tires (specify)
	12/2006		F								
CA07002 ECASE Fatal: Available Technical Report	12/2006	FL	49 YR	64	249	Manual Belts Used	2006 GMC C, K, R, V-SERIES PICKUP	E minor	Unknown	Closed head injury/blunt head trauma/traumatic brain injury NFS	Other exterior surface or tires (specify)
	1/2007		F								
DS07002 ECASE	10/2006	47					1992 CHEVROLET	E minor	Unknown	Head Crush	Other exterior surface or

Summary

- SCI will continue to investigate and provide detailed information on a cross-section of backover and non-crash incidents.
- NCSA will continue to work with States/jurisdictions to obtain non-crash data notifications