INDIANA UNIVERSITY
TRANSPORTATION RESEARCH CENTER
School of Public and Environmental Affairs
222 West Second Street
Bloomington, Indiana 47403-1501
(812) 855-3908 Fax: (812) 855-3537

ON-SITE NOT IN TRAFFIC SURVEILLANCE BACK OVER INVESTIGATION

CASE NUMBER - IN07028
LOCATION - TEXAS
VEHICLE - 2003 FORD EXPEDITION EDDIE BAUER
INCIDENT DATE - July 2007

Submitted:

January 11, 2008
Revised March 3, 2008

Contract Number: DTNH22-07-C-00044

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
National Center for Statistics and Analysis
Washington, D.C. 20590-0003

DISCLAIMERS

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no responsibility for the contents or use thereof.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the National Highway Traffic Safety Administration.

The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

Technical Report Documentation Page

1. *Report No.* IN07028	2. *Government Accession No.*	3. *Recipient's Catalog No.*	
4. *Title and Subtitle* On-Site Not In Traffic Surveillance Back Over Investigation Vehicle - 2003 Ford Expedition Eddie Bauer Location - Texas		5. *Report Date:* January 11, 2008 6. *Performing Organization Code*	
7. *Author(s)* Special Crash Investigations Team #2		8. *Performing Organization Report No.*	
9. *Performing Organization Name and Address* Transportation Research Center Indiana University 222 West Second Street Bloomington, Indiana 47403-1501		10. *Work Unit No. (TRAIS)* 11. *Contract or Grant No.* DTNH22-07-C-00044	
12. *Sponsoring Agency Name and Address* U.S. Department of Transportation (NVS-411) National Highway Traffic Safety Administration National Center for Statistics and Analysis Washington, D.C. 20590-0003		13. *Type of Report and Period Covered* Technical Report Incident Date: July 2007 14. *Sponsoring Agency Code*	
15. *Supplementary Notes* On-site not in traffic surveillance back over investigation involving a pedestrian and a 2003 Ford Expedition Eddie Bauer equipped with the manufacturer's ultrasonic Reverse Sensing System.			
16. *Abstract* This report covers an on-site not in traffic surveillance back over investigation involving a pedestrian and 2003 Ford Expedition Eddie Bauer equipped with the manufacturer's ultrasonic Reverse Sensing System. This incident is of special interest because the Ford was equipped with a Reverse Sensing System and the driver backed into a pedestrian (43-year-old, male) who sustained police-reported "C" (possible) injuries as a result of the incident. The Ford was parked facing north in the parking lot of a large retail business. The driver stated he exited the business, approached the Ford from the front right, entered the vehicle, and prepared to back out of the parking space. Meanwhile, the pedestrian was walking toward the business from the back left of the Ford and crossed the path of the Ford as the driver backed up. The driver reported that the Ford's Reverse Sensing System beeped rapidly three times. The pedestrian was then impacted by the back of the Ford and knocked to the ground. The driver stated he never saw the pedestrian. The pedestrian was transported by ambulance to a hospital. This contractor determined that the Ford's Reverse Sensing System's detection zone for a test subject 180 centimeters (71 inches) tall and weighing 93 kilograms (205 pounds) extended approximately 0.6 meters (~ 2.0 feet) rearward of the Ford's back bumper. The system did not detect the test subject rearward of that point. In addition, a visibility study indicated that if the pedestrian was in the roadway behind the Ford at the approximate middle of the vehicle as the pedestrian had stated to police, then it would have been possible for the Ford's driver to see the pedestrian as he looked out of the backlight.			
17. *Key Words* Back Over Reverse Sensing System Motor Vehicle Traffic Crash Injury Severity		18. *Distribution Statement* General Public	
19 *Security Classif. (of this report)* Unclassified	20. *Security Classif. (of this page)* Unclassified	21. *No. of Pages* 20	22. *Price* $8,200

Form DOT 1700.7 (8-72) Reproduction of completed page authorized

TABLE OF CONTENTS IN07028

BACKGROUND IN07028

This incident was brought to NHTSA's attention on or before August 7, 2007 by NASS CDS/GES sampling activities. This incident involved a 2003 Ford Expedition and a pedestrian. The incident occurred on July 2007, at 9:30 a.m., in Texas and was investigated by the applicable city police department. The police completed a "Texas Peace Officer's Crash Report" and submitted a copy of the report to the state. This incident is of special interest because the Ford was equipped with a Reverse Sensing System and the driver backed into a pedestrian (43-year-old, male) who sustained police-reported "C" (possible) injuries as a result of the incident. This contractor inspected the scene and Ford Expedition, and interviewed the Ford's driver on August 21, 2007. This contractor also interviewed the investigating police officer on September 13, 2007. Attempts to contact the pedestrian were unsuccessful. This report is based on the police crash report, scene and vehicle inspections, an interview with the Ford's driver and an interview with the investigating police officer.

SUMMARY

The Ford Expedition was equipped with the manufacturer's ultrasonic Reverse Sensing System. The Ford was parked facing north in the parking lot of a large retail business. The driver stated he exited the business and approached the Ford from the front right, entered the driver's door, started the engine, looked at an item he had just bought, put on his safety belt, checked his rearview and side view mirrors and then looked out of the backlight and backed up. Meanwhile, the pedestrian (43-year-old, male) was walking toward the business from the back left of the Ford and crossed the path of the Ford as the driver backed up. The driver reported that the Ford's Reverse Sensing System beeped rapidly three times. The pedestrian was then impacted by the back of the Ford and knocked to the ground. The driver stated he never saw the pedestrian. The pedestrian sustained a police reported "C" (possible) injury and was transported by ambulance to a local hospital. The nature and extent of his injuries is not known. This contractor determined that the Ford's Reverse Sensing System's detection zone for a test subject 180 centimeters (71 inches) tall and weighing 93 kilograms (205 pounds) extended approximately 0.6 meters (~2.0 feet) rearward of the Ford's back bumper. The system did not detect the test subject rearward of that point. In addition, the visibility study indicated that if the pedestrian was in the roadway behind the Ford at the approximate middle of the vehicle as the pedestrian had stated to police, then it would have been possible for the Ford's driver to see the pedestrian as he looked out of the backlight.

Figure 1: Overview of crash scene, left arrow shows driver reported parked location of back of Ford, right arrow shows driver reported position of back of Ford following crash

CRASH CIRCUMSTANCES

Crash Environment: The Ford was parked facing north in the parking lot of a large retail business (**Figure 1**). The parking lot was located on the west side of the building. The parking lot contained numerous rows of parking spaces and

access roadways. The parking spaces were nominally 2.7 meters (8.9 feet) in width. The access roadways were nominally 7.2 meters (23.6 feet) in width. The parking spaces were oriented north/south and the access roadways were oriented east/west. At the time of the incident the light condition was daylight, the atmospheric condition was clear, and the roadway pavement was dry, level concrete. The site of the incident was suburban commercial. The Ford's driver (55-year-old, male) accompanied the SCI investigator to the incident scene. The driver showed the SCI investigator the location of the incident, described the sequence of events and pointed out the parked and final rest positions of the Ford as well as the final rest position of the pedestrian. See the Scene Diagram at end of this report.

Pre-Crash: The Ford's driver stated that he was in the business and had purchased an item. He exited the building and walked west to the Ford, which was parked in the fifth parking space from the building (**Figure 1** above). The driver indicated that the back of his vehicle extended approximately 1 meter (~3 feet) into the access roadway because the vehicle that was parked in the parking space in front of him extended into his parking space. In addition, a vehicle was parked on each side of the Ford. The driver indicated that he approached his vehicle from the front right and entered through the driver's door. The driver stated he started the engine, then took the item that he had just purchased out of the package and briefly examined it. He put on his safety belt, checked his rearview and side view mirrors and then looked out of the backlight prior to backing up. He stated he saw no one in the access roadway behind his vehicle. He stated he only saw a man standing by the driver's door of a vehicle parked across the access roadway behind him, and the man was looking at the Ford. The driver stated he then began to back up while looking over his right shoulder out of the backlight. He stated he still saw no one behind his vehicle. The driver estimated the elapsed time between entering the Ford and beginning to back up was in a range of 60 to 90 seconds. The driver's intent was to back the Ford counterclockwise into the access roadway and then proceed forward (west) out of the parking lot. Meanwhile, according to the police crash report, the pedestrian had exited his vehicle, which was parked in the parking lot in an unknown location west of the Ford, and was approaching the path of the Ford from the left.

Crash: The police crash report narrative indicated that the driver stated he began to back out of his parking space and heard three quick beeps from the Ford's Reverse Sensing System (the Ford owner's manual indicated the rate of warning tone increases when the backing vehicle gets close to an object). The driver stated he did not see the pedestrian at any time. He indicated he stopped and got out of his vehicle to see what caused the reverse sensing system to activate and that's when he saw the pedestrian on the ground. The driver stated to this contractor he did not see or feel an impact. The investigating police officer indicated to this contractor that the Ford's driver then pulled his vehicle back toward it's parked position but did not pull all the way into the parking space. The police crash report narrative indicated the pedestrian stated he was at the middle of the back end of the Ford when the driver backed out at a high rate of speed, and was struck by the middle portion of the back of the Ford. The crash report narrative also indicated that the investigating officer observed no evidence of an impact to the back of the Ford. There were no measurements provided on the police crash diagram of the positions of the Ford or pedestrian. Due to conflicting information provided by the driver to this contractor and reported in the police crash report, this contractor was unable to determine an estimate of the impact speed,

the distance the Ford backed to impact, and the distance the Ford traveled from impact to final rest. However, the investigating police officer stated to this contractor that the final positions of the Ford and the pedestrian reported to this contractor by the Ford's driver and shown in **Figure 2** were consistent with what the officer observed when he arrived on the scene. The distance between the back of the Ford and the pedestrian shown in **Figure 2** was 5.1 meters (16.7 feet)

Figure 2: View north to driver reported final rest position of pedestrian (right arrow) and back of Ford (left arrow)

Post-Crash: The police crash report indicated that the investigating officer arrived on the scene 10 minutes following the incident. The pedestrian sustained a police reported "C" (possible) injury and was transported by ambulance to a local hospital. No specific injury information was available. The pedestrian's treatment status is unknown.

Figure 3: Overview of front of Ford Expedition

CASE VEHICLE

The 2003 Ford Expedition Eddie Bauer (**Figures 3** and **4**) was a rear wheel drive, four-door sport utility vehicle (VIN: 1FMRU17W43L------) equipped with a 4.6L, V8 engine; automatic transmission, tinted side windows, tinted backlight, and an ultrasonic Reverse Sensing System (RSS). The Ford was equipped with no after market equipment except a replacement convex right side view mirror. The Ford's recommended tire size was P265/70R17, and the vehicle was equipped with tires of this size. The Ford's specified wheelbase was 302 centimeters (119 inches). The specified rear overhang was 122 centimeters (48 inches) and the specified overall length was 523 centimeters (205.8 inches). The distance from the ground to the bottom of the back bumper was measured as 50 centimeters (19.7 inches). The distance from the ground to the beltline was measured as 123 centimeters (48.4 inches). The distance from the ground to the bottom of the backlight was 130 centimeters (51.2 inches). The distance from the ground to

Figure 4: Overview of back of Ford Expedition; arrows show location of sensors for Reverse Sensing System

each of the two RSS sensors (**Figure 4** above) was 63 centimeters (24.8 inches). Each sensor was located approximately 20 centimeters (~8 inches) inboard of each back bumper corner (**Figure 4** above and **Figure 5**.

Figure 5: Closeup of reverse sensor near back right bumper corner, scale in tenths of meter, end of scale on ground

The pages from a 2003 Ford Expedition owner's manual describing the RSS are presented at the end of this report. The owner's manual indicated that the RSS is activated when the gear selector is placed in reverse and the ignition is on. The RSS is designed to detect obstacles up to 2 meters (~6 feet) from the rear bumper, with decreased coverage area at the outer corners of the bumper. The RSS was described only as an aid in detecting generally large and fixed objects.

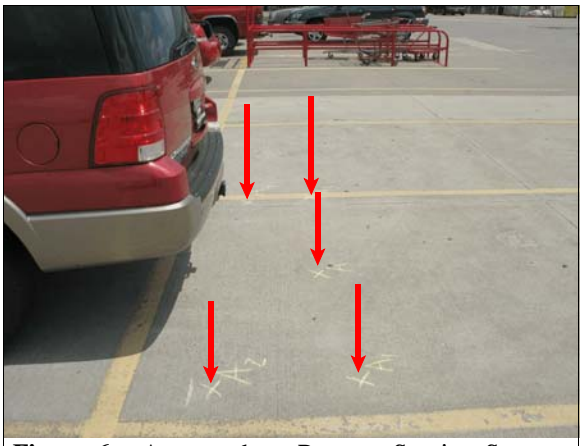


Figure 6: Arrows show Reverse Sensing System detection points for a test subject 180 centimeters (71 inches) tall and weighing 93 kilograms (205 pounds); the sensing system did not detect the test subject beyond these points

This contractor conducted tests to determine the detection zone for a test subject of the approximate size as the pedestrian [i.e., adult male, 178 centimeters (70 inches) tall and weighing 102 kilograms (225 pounds)]. The test subject was an adult male 180 centimeters (71 inches) tall and weighing 93 kilograms (205 pounds). The testing, as described in the following paragraph, determined that the detection zone for a person of this size extended only approximately 0.6 meters (~2.0 feet) rearward of the Ford's back bumper (**Figure 6**). The sensing system did not detect the test subject beyond this distance. Refer to the Reverse Sensing System Detection Zone diagram at the end of this report for a complete representation of the detection points determined by this contractor's testing.

The dimensions of the detection zone were determined by the SCI investigator approaching the back of the vehicle very slowly from each corner as well as along the approximate centerline while the driver sat in the driver's seat with his foot on the brake and the transmission in reverse. The driver honked the horn when the warning sounded and the SCI investigator marked and measured each location. The SCI investigator also approached each back corner from the side until the warning sounded and noted those positions as well. The driver reported that in each instance when the warning sounded, it would beep rapidly. At no time did it beep slowly when the test subject was detected. The driver reported that his experience with the reverse sensing system was only with large objects such as a vehicle. He estimated that the depth of the detection zone for such objects was approximately 1.8 to 2.4 meters (~6 to 8 feet). The driver indicated he was familiar with the RSS, how it worked and the purpose of the warning.

There was no evidence of pedestrian contact to the back or undercarriage of the Ford and insufficient information to identify the specific impact location on the back of the Ford. Therefore, a partial Collision Deformation Classification (CDC) was assigned as: **06-B99N-1** (**180** degrees). The Ford was driven from the scene.

CASE VEHICLE DRIVER

The Ford's driver was a White (Hispanic) 55-year-old male. The driver's height was 178 centimeters (70 inches) and his weight was 82 kilograms (180 pounds). The driver indicated he drives the Ford every day. He indicated that he drives in the parking lot where the incident occurred several times a month. The driver did not have a vision deficiency and was not wearing sunglasses at the time of the incident.

CASE VEHICLE VISIBILITY STUDY

A visibility study was conducted during the Ford inspection in order to determine the nominal blind zone behind the Ford as well as the nominal visibility zone of the rearview mirror and the left side view mirror. The right side view mirror was not assessed. The pedestrian had approached the vehicle from the left. The Ford's driver assisted the SCI investigator in making the visibility observations. The driver's eye height was measured as he sat in the driver's seat and was determined to be 156 centimeters (61.4 inches) above the ground. The driver had his seat track adjusted to between the middle and rearmost positions, which was the normal adjustment for the driver. Please see the Nominal Visibility Diagram at the end of this report when reading the following discussion.

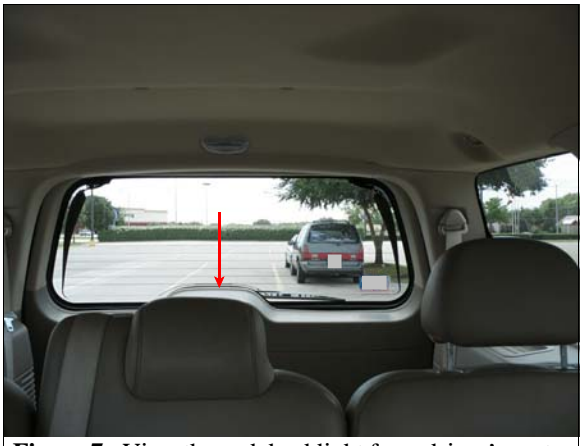


Figure 7: View through backlight from driver's seat, arrow shows rear wiper motor housing, arrow also indicates approximate area behind vehicle where pedestrian said he was located when driver backed up

Figure 8: View through rearview mirror from driver's seat

The initial observations were made with the Ford's driver looking over his right shoulder through the backlight (**Figure 7**). The target was moved rearward from the back of the vehicle along the vehicle's approximate centerline until the target came into the driver's view. The target had to be moved rearward from the Ford's back bumper 5.1 meters (16.7 feet) before the top of the target came into the driver's view. When the target was moved 2.6 meters (8.5 feet) right of the Ford's centerline, it became obstructed by the

right D-pillar. The target became visible once again through the right rear window when it was moved an additional 1.5 meters (4.9 feet) to the right. When the target was moved to the left of the centerline 1.6 meters, it became obstructed by the left D-pillar and was no longer visible to the driver because it was not natural for him to turn his head any further to the right. The rear wiper housing (**Figure 7** above) formed a raised contour at the bottom center of the backlight, which extended the depth of the blind zone in a small area behind the wiper housing. The depth of the blind zone behind the wiper housing was not assessed.

The driver was then asked to view through the rearview mirror (**Figure 8** above). Again, the target was moved rearward from the back of the vehicle along the approximate centerline until it came into the driver's view. The target had to be moved rearward from the Ford's back bumper 5.9 meters (19.4 feet) before the top of the target came into the driver's view. At this point, if the target was moved to the right, it was immediately obstructed by the rear wiper motor housing. The target had to be moved 0.7 meters (2.3 feet) to the right to become visible on the right side of the wiper motor housing. When the target was moved an additional 1.1 meters (3.6 feet) to the right of the centerline, it became obstructed by the back right head restraint and was not visible again to the driver when moved further to the right. When the target was moved to the left of the centerline 1.3 meters (4.3 feet), it became obstructed by the back left head restraint and was not be visible again to the driver when moved further to the left.

The left side view mirror was assessed by placing the target at the back left bumper corner of the Ford and moving it forward until the driver reported he could no longer see it in the mirror. The target was moved forward from the back left bumper corner only 0.4 meter (1.3 feet) where it went out of the mirror's field of view. The target was returned to the back left bumper corner and moved to the left 1.3 meters (4.3 feet) where it went out of the mirror's field of view and the driver could no longer see it.

The visibility study indicated that if the pedestrian was in the roadway behind the Ford at the approximate middle of the vehicle as the pedestrian had stated to police, then it would have been possible for the Ford's driver to see the pedestrian as the driver looked out of the backlight. The upper portion of the pedestrian's body would have extended above the blind zone behind the Ford. The distance from the ground to the bottom of the Ford's backlight was measured as 130 centimeters (51 inches) while the pedestrian was reportedly 178 centimeters (70 inches) tall indicating that the upper part of his body would have been visible through the backlight. See **Figure 7** above.

PEDESTRIAN

The pedestrian [43-year-old, White (unknown if Hispanic) male; 178 centimeters and 102 kilograms (70 inches, 225 pounds)] was reportedly wearing khaki pants, an unknown color t-shirt, and unknown color sneakers. The pedestrian sustained a police reported "C" injury and was transported by ambulance to a hospital. The pedestrian's injuries and level of treatment are not known. There was no information on the police crash report regarding the pedestrian's specific injury and treatment status.

IN07028

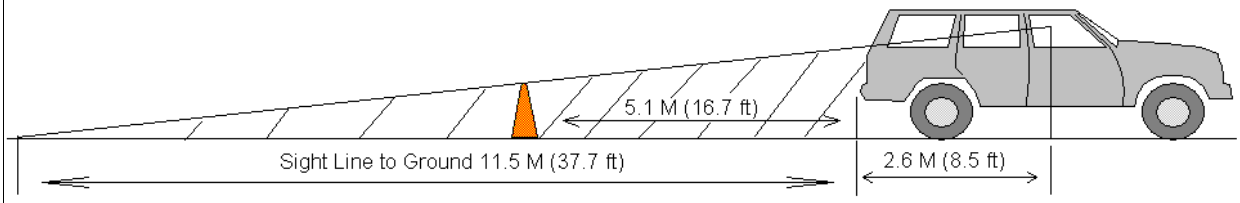
Nominal Visibility Diagram
Case Vehicle = 2003 Ford Expedition

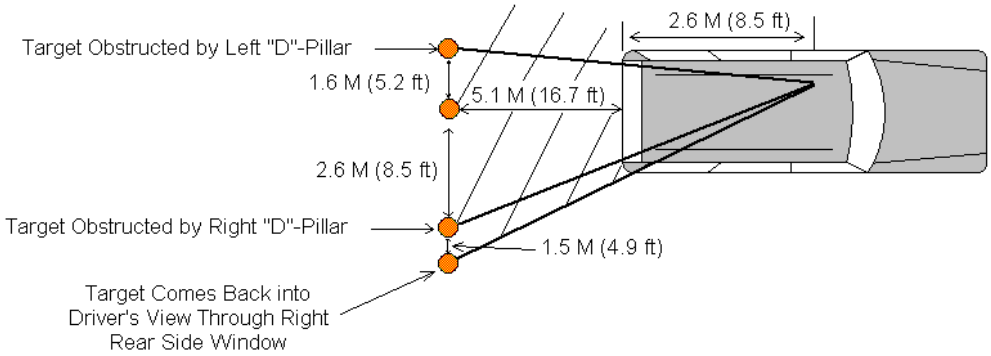
Driver's Eye Height From Ground = 156 cm (61.4 in)

= Ford's Blind Zones

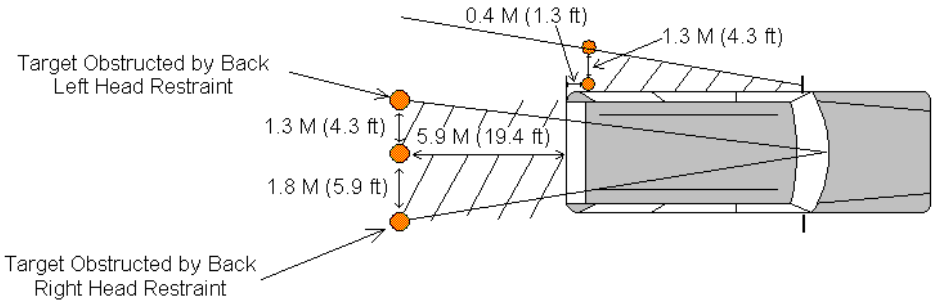
= 71 cm (28 in) High Target

1. Distance Back of Ford
To Point a 71 cm (28 in) High Reference Target
Comes Into Driver's View as He Looks Over Right Shoulder Out of Backlight





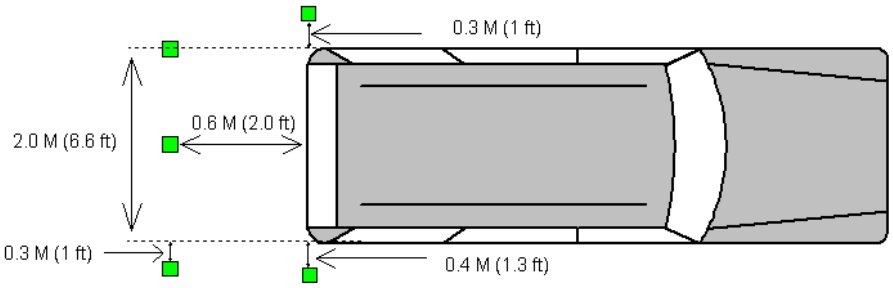
2. Rearview Mirror and Left Side View Mirror Blind Zones



IN07028

2003 Ford Expedition's Reverse Sensing System Detection Zone

= Reverse Sensing System's Points of Detection for 180 cm (71 in) 93 kg (205 lb) Test Subject (Note: The reverse sensing system did not detect the test subject beyond the detection points indicated on the diagram)



REVERSE SENSING SYSTEM (IF EQUIPPED)

The RSS sounds a tone to warn the driver of obstacles near the rear bumper when R (Reverse) is selected. The RSS will assist the driver in detecting certain objects while:

- the vehicle is moving toward a stationary object at a speed of 5 km/h (3 mph) or less.
- the vehicle is in R (Reverse) but not moving backward (the brake pedal is depressed or the parking brake is applied), and a moving object is approaching the rear of the vehicle at a speed of 5 km/h (3 mph) or less.
- the vehicle is moving in reverse at a speed of less than 5 km/h (3 mph) and a moving object is approaching the rear of the vehicle at a speed of less than 5 km/h (3 mph).

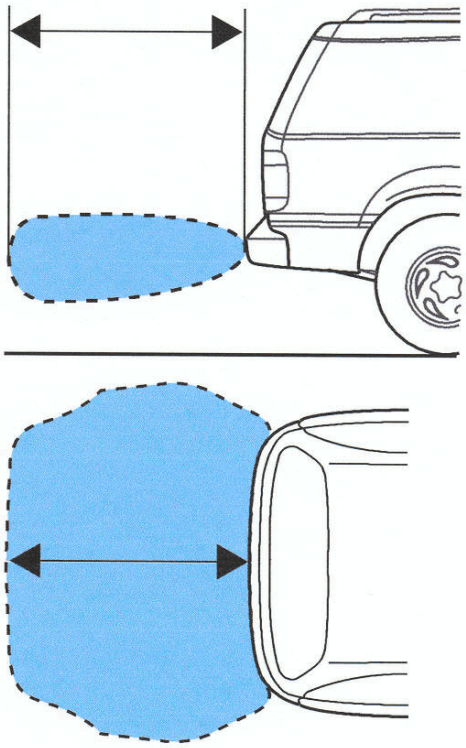
The RSS is not effective at speeds greater than 5 km/h (3 mph) and may not detect certain angular or moving objects.

To help avoid personal injury, please read and understand the limitations of the reverse sensing system as contained in this section. Reverse sensing is only an aid for some (generally large and fixed) objects when moving in reverse on a flat surface at "parking speeds". Inclement weather may also affect the function of the RSS; this may include reduced performance or a false activation.

To help avoid personal injury, always use caution when in R (Reverse) and when using the RSS.

This system is not designed to prevent contact with small or moving objects. The system is designed to provide a warning to assist the driver in detecting large stationary objects to avoid damaging the vehicle. The system may not detect smaller objects, particularly those close to the ground.

Driving



The RSS detects obstacles up to 2 meters (6 ft.) from the rear bumper with a decreased coverage area at the outer corners of the bumper, (refer to the figures for approximate zone coverage areas). As you move closer to the obstacle, the rate of the tone increases. When the obstacle is less than 25.0 cm (10 in.) away, the tone will sound continuously. If the RSS detects a stationary or receding object further than 25.0 cm (10 in.) from the side of the vehicle, the tone will sound for only three seconds. Once the system detects an object approaching, the tone will sound again.

Whenever a warning is received, the radio volume will be lowered to a volume that will allow the tones to be heard. The radio volume will return to the previous level after the warning goes away.

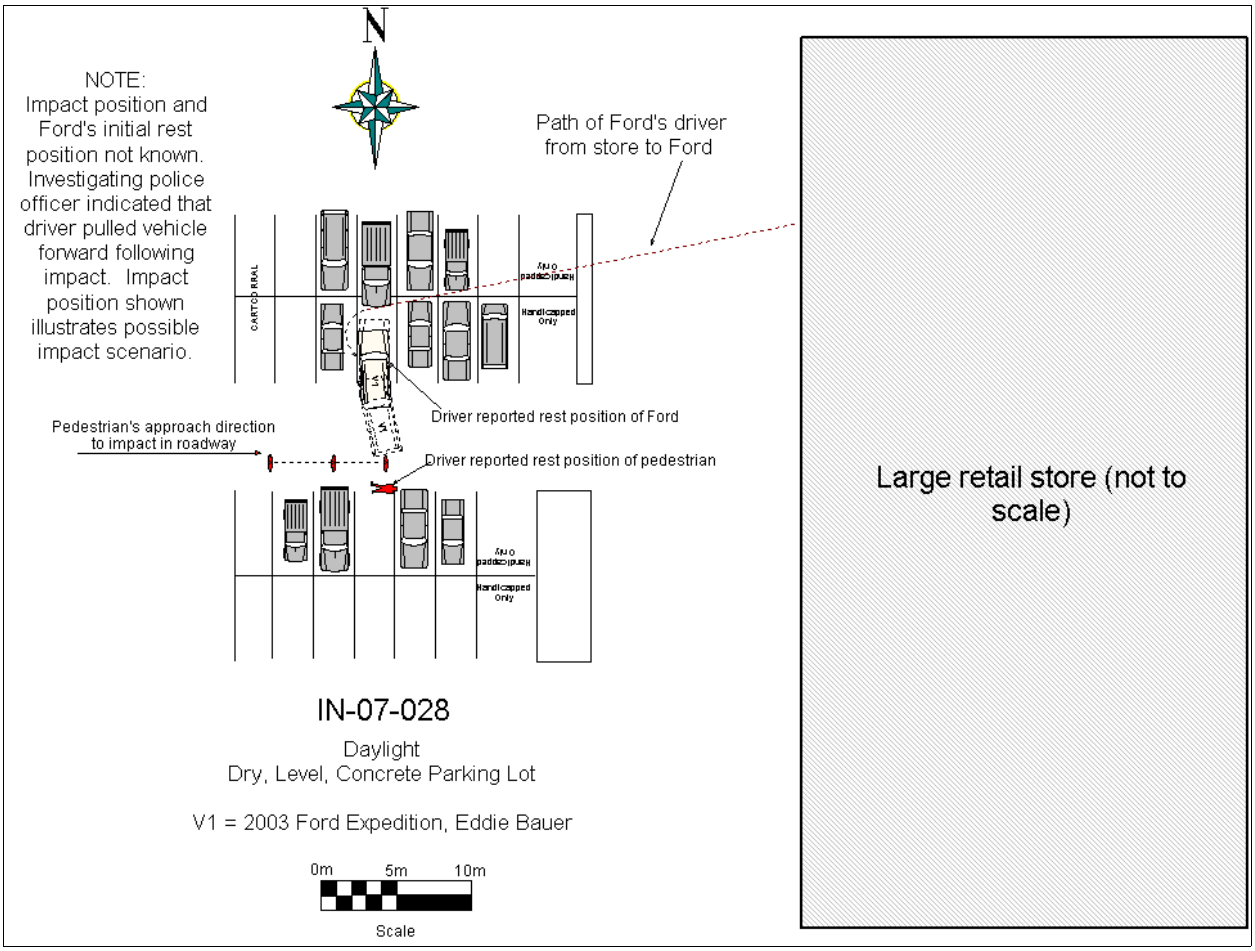
The system is automatically enabled when the gear selector is placed in R (Reverse) and the ignition is ON. The RSS control in the message center allows the driver to disable the system only when the ignition is ON and the gear selector in R (Reverse).

Keep the RSS sensors (located on the rear bumper/fascia) free from snow, ice and large accumulations of dirt (do not clean the sensors with sharp objects). If the sensors are covered, it will affect the accuracy of the RSS.

If your vehicle sustains damage to the rear bumper/fascia, leaving it misaligned or bent, the sensing zone may be altered causing inaccurate measurement of obstacles or false alarms.

CONTROL TRAC FOUR-WHEEL DRIVE (4X4) OPERATION (IF EQUIPPED)

For important information regarding safe operation of this type of vehicle, see **Preparing to drive your vehicle** in this chapter.


N
NOTE:
Impact position and Ford's initial rest position not known. Investigating police officer indicated that driver pulled vehicle forward following impact. Impact position shown illustrates possible impact scenario.
Path of Ford's driver from store to Ford
Driver reported rest position of Ford
Pedestrian's approach direction to impact in roadway
Driver reported rest position of pedestrian
Large retail store (not to scale)
IN-07-028
Daylight
Dry, Level, Concrete Parking Lot
V1 = 2003 Ford Expedition, Eddie Bauer
0m
5m
10m
Scale

Not Applicable ☐

Reset Values

Print Forms

U.S. Department of Transportation
National Highway Traffic Safety Administration

SCENE FORM

Special Crash Investigations
Not In Traffic Surveillance

1. Case Number

I N 0 7 0 2 8

IDENTIFICATION

2. Date of Crash 0 7 / x x / 0 7

3. Time of Crash 0 9 3 0

Code reported military time of crash.

NOTE: Midnight = 2400
Unknown = 9999

AMBIENT CONDITIONS

4. Light Conditions

- ◉ Daylight
- ○ Dark
- ○ Dark but lighted
- ○ Dawn
- ○ Dusk
- ○ Unknown

5. Atmospheric Conditions
(*Select all that apply)*

- ◉ Clear-No adverse conditions
- ○ Cloudy
- ○ Rain
- ○ Snow
- ○ Fog, Smog, Smoke
- ○ Sleet, Hail (freezing rain or drizzle)
- ○ Blowing Snow
- ○ Severe Crosswinds
- ○ Blowing Sand, Soil, Dirt
- ○ Other (specify):_____
- ○ Unknown

6. Temperature

- ○ Below 0 degrees Celsius (Below 32 F)
- ○ 1-10 degrees Celsius (33-50 F)
- ○ >10-24 degrees Celsius (51-75 F)
- ◉ Over 24 degrees Celsius (Over 75 F)
- ○ Unknown

SCENE INFORMATION

7. Type of area in which crash occurred
(*Select all that apply)*

- ○ Single family residential
- ○ Row houses/townhouses
- ○ Multi family housing
- ◉ Commercial
- ○ Industrial
- ○ Rural
- ○ Unknown

8. Driver exterior sightline obstructions
(*Select all that apply)*

- ○ None
- ◉ Other vehicles
- ○ Building
- ○ Trees
- ○ Shrubbery
- ○ Other (specify)_____
- ○ Utility poles
- ○ Signs
- ○ Glare
- ○ Unknown
- ○ No driver present

9. Crash location

- ○ Driveway
- ◉ Parking Lot
- ○ Sidewalk
- ○ Alley
- ○ Intersection of driveway and sidewalk
- ○ Road / street
- ○ Roadside / shoulder
- ○ Other (specify)_____
- ○ Unknown

10. Non motorist sightline obstructions
(*Select all that apply)*

- ◉ None
- ○ Other vehicles
- ○ Building
- ○ Trees
- ○ Shrubbery
- ○ Utility poles
- ○ Signs
- ○ Glare
- ○ Other (specify) _____
- ○ Unknown

11. Grade at parked position + / - 0 0 0 %

12. Estimated distance from parked position to impact

9 9 9 . 9 m

13. Estimated speed at impact 9 9 9 kmph

14. Grade at impact +/ - 0 0 0 %

15. Estimated distance from impact to vehicle final rest

9 9 9 . 9 m

Unknown = 999 Reference Items 11,12, 13, 14, 15

Not Applicable ☐

Reset Values

U.S. Department of Transportation
National Highway Traffic Safety Administration

VEHICLE FORM

Special Crash Investigations
Not In Traffic Surveillance

1. Case Number I N 0 7 0 2 8

VEHICLE IDENTIFICATION

2. VIN 1 F M R U 1 7 W 4 3 L X X X X X X

3. Model Year 2 0 0 3

4. Vehicle Make (specify): Ford

5. Vehicle Model (specify): Expedition, Eddie Bauer

GLAZING

Location	Presence (check)	Status (select)	Clarity (select)	Tint (check)	Glazing Obstructions (specify if present)
Windshield	☑	☑ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☐	
LF	☑	☐ Fixed / ☐ Closed / ☑ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☑	
RF	☑	☐ Fixed / ☑ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☑	
2nd Left	☑	☐ Fixed / ☑ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☑	
2nd Right	☑	☐ Fixed / ☑ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☑	
3rd Left	☑	☑ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☑	
3rd Right	☑	☑ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☑	
Backlight	☑	☑ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☑ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☑	
Left Backlight	☐	☐ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☐ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☐	
Right Backlight	☐	☐ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☐ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☐	
Roof	☐	☐ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☐ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☐	
Other (specify)	☐	☐ Fixed / ☐ Closed / ☐ Open / ☐ Partially Open / ☐ Unknown	☐ Clear / ☐ Hazy / ☐ Very Dirty / ☐ Unknown	☐	

TIRE DATA

6. Vehicle Manufacturer Recommended Tire Size P265/70R17

7. LF Tire Size P265/70R17

8. LR Tire Size P265/70R17

9. RF Tire Size P265/70R17

10. RR Tire Size P265/70R17

Seats / Head Restraint Data

Seat Position	Seat Type (Select from below)	Head Restraint (Check if available)	Head Restraint Adjustment (select)	NOTES:
Front Left	1	☑	☐ ☐ ☑ Full Down / Mid / Full Up	Integral Head Restraint
Front Middle	0	☐	☐ ☐ ☐ Full Down / Mid / Full Up	
Front Right	1	☑	☐ ☐ ☑ Full Down / Mid / Full Up	Integral Head Restraint
2nd Left	7	☑	☐ ☐ ☑ Full Down / Mid / Full Up	
2nd Middle	7	☑	☑ ☐ ☐ Full Down / Mid / Full Up	
2nd Right	7	☑	☑ ☐ ☐ Full Down / Mid / Full Up	
3rd Left	5	☐	☐ ☐ ☐ Full Down / Mid / Full Up	Driver stated he always kept 3rd row seat folded down
3rd Middle	5	☐	☐ ☐ ☐ Full Down / Mid / Full Up	
3rd Right	5	☐	☐ ☐ ☐ Full Down / Mid / Full Up	

Seat Type codes:

0 = No seat or seat folded down
1 = Bucket
2 = Bucket w/ folding back
3 = Bench
4 = Bench with folding back cushions
5 = Bench w/ folding back
6 = Split bench w/ separate back cushions
7 = Split bench w/ separate folding back
8 = Pedestal (i.e. column supported)
9 = Box mounted (i.e. van type)
10= Other seat type (specify)
99= Unknown seat type

VEHICLE MEASUREMENTS

Clearance Heights		Measurements (all from ground, and in centimeters	NOTES
Beltline		123	
Top of trunk/tailgate		130	To bottom of backlight
Bottom of bumper		50	
Trailer hitch (if applicable)		49	
Undercarriage			
	Sway bar	N/A	
	Axle		Axle not measured, it was above suspension components
	Differential	24	
	Other (specify): _____	17	Bottom of shock, 26 to suspension arm near differential
Sensor Height (if equipped)		63	
Camera Height (if equipped)		N/A	

Not Applicable ☐

Reset Values

U.S. Department of Transportation
National Highway Traffic Safety Administration

Back Up / Parking Aid Form

Special Crash Investigations
Not In Traffic Surveillance

1. Case Number

I N 0 7 0 2 8

PARKING AID PRESENCE

2. Type of backing/parking aid present

- ○ OEM camera
- ◉ OEM ultrasonic/radar sensor
- ○ OEM combination camera-ultrasonic/radar sensor
- ○ OEM Fresnel lens
- ○ OEM interior mirrors
- ○ Aftermarket camera
- ○ Aftermarket ultrasonic/radar sensor
- ○ Aftermarket combination camera-ultrasonic radar sensor
- ○ Aftermarket Fresnel lens
- ○ Aftermarket interior mirrors
- ○ Other (specify): _____

CAMERA INFORMATION

Specify field of view measurements on diagram

3. System make/model

None

4. Video monitor type

- ◉ None present
- ○ LCD (color)
- ○ CRT (black & white)
- ○ Unknown

5. Video display size *(Diagonal)* N/A cm

6. Camera location

- ◉ None present
- ○ Bumper
- ○ License plate
- ○ Tailgate/Hatch/Trunk
- ○ Other (specify): _____

7. Video image quality under scene lighting conditions

- ◉ None present
- ○ Good
- ○ Average
- ○ Poor (specify): _____
- ○ Unknown

8. Was the camera functioning properly

- ◉ None present
- ○ Yes
- ○ No, poor image quality due to glare
- ○ No, poor image quality due to atmospheric conditions
- ○ No, camera turned off
- ○ No, camera inoperable
- ○ Unknown

ULTRASONIC/RADAR SENSOR

Specify object detection range on diagram

9. System make/model

Ford OEM ultrasonic sensor

10. Auditory warning illumination

- ○ No sensor present
- ○ Yes
- ◉ No
- ○ Unknown

11. Number of sensors 2

12. Sensor locations *(Select all that apply)*

- ○ No sensor present
- ◉ Left bumper
- ○ Center bumper
- ◉ Right bumper
- ○ License plate area
- ○ Tailgate/Hatch/Trunk

13. Was warning system functioning properly

- ○ No sensor present
- ◉ Yes, system alerted driver
- ○ No, system did not alert driver
- ○ No, system turned off
- ○ No, system inoperable
- ○ Unknown

14. Did driver react to warning

- ○ No sensor present
- ◉ Yes
- ○ No
- ○ Unknown

15. Did driver report common false warnings

- ○ No sensor present
- ○ Yes
- ◉ No
- ○ Unknown

No Driver Present ☐

Reset Values

U.S. Department of Transportation
National Highway Traffic Safety Administration

DRIVER FORM

Special Crash Investigations
Not In Traffic Surveillance

1. Case Number

I N 0 7 0 2 8

DRIVER PROFILE

2. Driver's Age 5 5
   99 = Unknown

3. Driver's Sex
   - ◉ Male
   - ○ Female
   - ○ Unknown

4. Driver's Height 1 7 8 cm
   999 = Unknown

5. Driver's Weight 0 8 2 kg
   999 = Unknown

6. Driver eyewear worn
   (Select all that apply)
   - ◉ None
   - ○ Eyeglasses
   - ○ Sunglasses
   - ○ Contacts
   - ○ Unknown

7. Driver vision deficiency condition
   (Select all that apply)
   - ◉ None
   - ○ Near sighted
   - ○ Far sighted
   - ○ Astigmatism
   - ○ Other (specify) _____
   - ○ Unknown

8. Non motorist's relationship to driver
   - ◉ No relationship
   - ○ Child
   - ○ Grandchild
   - ○ Sibling
   - ○ Neighbor
   - ○ Friend
   - ○ Other (specify): _____
   - ○ Unknown

DRIVER ACTIONS

9. Driver approach to vehicle for entry
   - ○ From left front
   - ○ From left
   - ○ From left rear
   - ◉ From right rear
   - ○ From right front
   - ○ Circled vehicle
   - ○ Return trip (backing into driveway/lot)
   - ○ Other (specify): _____
   - ○ N/A
   - ○ Unknown

10. Driver entry interruption
    (Select all that apply)
    - ◉ Direct trip from building to vehicle
    - ○ Loaded items into vehicle
    - ○ Spoke with family
    - ○ Spoke with neighbors
    - ○ Spoke with contacted nonmotorist
    - ○ Return trip (backing into driveway/lot)
    - ○ Other (specify): _____
    - ○ N/A
    - ○ Unknown

11. Purpose of backing
    - ◉ Leaving parking space in parking lot
    - ○ Backing onto roadway from driveway
    - ○ Entering parking space in parking lot
    - ○ Backing into driveway from roadway
    - ○ Other (specify): _____
    - ○ N/A
    - ○ Unknown

12. Where was driver going
    Description:

    Returning home

13. Driver in a hurry
    - ○ Yes
    - ◉ No
    - ○ N/A
    - ○ Unknown

14. How did driver check behind (rear area of vehicle) after vehicle entry
    (Select all that apply)
    - ○ Did not look
    - ◉ Checked mirrors
    - ◉ Turned right and looked back
    - ○ Turned left and looked back
    - ○ Viewed Camera
    - ○ Listened for auditory/visual warning from system
    - ○ Other (specify): _____
    - ○ N/A
    - ○ Unknown

15. Estimated time between vehicle entry and start of backing
    - ○ 0-10 Seconds
    - ○ 11-30 Seconds
    - ○ 31-60 Seconds
    - ◉ Over 60 Seconds
    - ○ N/A
    - ○ Unknown

16. What direction was the driver looking during backing maneuver
(Select all that apply)

- ○ Straight ahead
- ○ Right
- ○ Left
- ◉ Rearward
- ○ At object inside the car
- ○ At mirrors
- ○ Other (specify): _____
- ○ N/A
- ○ Unknown

17. Was the driver distracted during back up maneuver
(Select all that apply)

- ◉ No non-driving activities

External

- ○ Looking at other vehicles
- ○ Looking at other non motorist
- ○ Looking at intended turn destination
- ○ External focus, not specified
- ○ Other external focus (specify): _____

Internal

- ○ Looking at other occupant
- ○ Talking to passenger
- ○ Dialing phone
- ○ Talking on phone
- ○ Listening to radio/cd/portable playback device
- ○ Adjusting radio/cd player
- ○ Adjusting climate controls
- ○ Using a device/controls integral to vehicle (specify): _____
- ○ Reading/adjusting navigation system
- ○ Eating or drinking
- ○ Smoking related
- ○ Retrieving fallen object (specify): _____
- ○ Internal focus, not specified
- ○ Focused on other internal object (specify): _____
- ○ N/A
- ○ Unknown

18. Driver avoidance actions prior to impact
(Select all that apply)

- ◉ None
- ○ Braking
- ○ Steering left
- ○ Steering right
- ○ Accelerating
- ○ Other (specify): _____
- ○ N/A
- ○ Unknown

19. Did driver see struck non motorist prior to impact
(Select all that apply)

- ◉ No, never saw non motorist
- ○ Saw non motorist prior to entering vehicle
- ○ Saw non motorist after entering vehicle
- ○ Other (specify): _____
- ○ N/A ○ Unknown

20. Est time between start of backing and impact

- ○ <2 or = 1 second
- ○ 2-5 seconds
- ○ 6-10 seconds
- ○ > 10 seconds
- ○ N/A ◉ Unknown

21. Driver interior sightline obstructions
(Select all that apply)

- ◉ Pillar
- ○ Headrest
- ○ Cargo
- ○ Other occupant
- ○ Other (specify) _____
- ○ Unknown
- ○ None

22. Recent experience driving this vehicle

- ◉ More than 10 times the last three months
- ○ 6-10 times the last three months
- ○ 2-5 times the last three months
- ○ Less than 2 times the last three months
- ○ First time driving this vehicle
- ○ N/A
- ○ Unknown

23. Frequency of driving in this parking lot/driveway

- ○ Daily
- ○ Weekly
- ◉ Several times a month
- ○ Monthly
- ○ Rarely
- ○ First time in lot/driveway
- ○ N/A ○ Unknown

24. Driver Impairment
(Select all that apply)

- ◉ No drugs or alcohol present
- ○ Alcohol present (specify BAC): _____
- ○ Drugs present (specify):_____
- ○ Unknown

25. Source of alcohol/drug results

- ○ Police reported
- ○ Medical record
- ○ Other (specify)_____
- ◉ Not Tested
- ○ Unknown if tested

Not Applicable ☐

U.S. Department of Transportation
National Highway Traffic Safety Administration

Non Motorist Form

Reset Values

Special Crash Investigations
Not In Traffic Surveillance

1. Case Number
I N 0 7 0 2 8

NON-MOTORIST PROFILE

2. Non-motorist's Age — 4 3 ○ Months ◉ Years
99 = Unknown

3. Non-motorist's Sex
◉ Male
○ Female
○ Unknown

4. Non-motorist's Height — 1 7 8 cm
999 = Unknown

5. Non-motorist's Weight — 1 0 2 kg
999 = Unknown

6. Medical outcome
○ Not injured
○ ER only
○ Hospitalized 1-4 days
○ Hospitalized 5 days or more
○ Treatment later
○ Fatal
◉ Unknown

7. Source of most severe injury
○ Bumper
○ Tire
○ Undercarriage
○ Other Specify:_____
○ Ground
○ N/A
◉ Unknown

8. Non-motorist impairment
(Select all that apply)
○ No drugs or alcohol present
○ Positive for alcohol (specify BAC): _____
○ Positive for drugs (specify): _____
◉ Unknown

9. Source of alcohol/drug results
○ Police reported
○ Medical Report
○ Other (specify) _____
◉ Not Tested
○ Unknown if tested

NON-MOTORIST ACTIONS

10. Non-motorist attitude
◉ Standing
○ Bending at waist
○ Sitting
○ Crouching
○ Kneeling
○ On skates/skateboard
○ On bike/scooter
○ Other (specify)_____
○ Unknown

11. Non-motorist motion
○ Not moving
○ Walking slowly
○ Walking rapidly
○ Running or jogging
○ Skipping/Hopping/Jumping
○ Falling/Stumbling/Rising
○ On skates/skateboard
○ On bike/scooter
○ Other (specify): _____
◉ Unknown

12. Non-motorist approach relative to rear of vehicle
○ Stationary
◉ From left
○ From right
○ From behind
○ Other (specify): _____
○ Unknown

13. Non-motorist first avoidance action
○ No avoidance actions
○ Stopped
○ Accelerated pace
○ Ran away (along vehicle path)
○ Jumped
○ Turned away from vehicle
○ Turned toward vehicle and braced
○ Dove or fell away from vehicle
○ Other (specify): _____
◉ Unknown

14. Non-motorist primary focus of attention
○ Striking vehicle
○ Play object
○ Person
○ Surrounding traffic
○ Animal
○ Handheld electronic (phone, MP3 player, etc.)
○ Other Object (specify) _____
◉ Unknown

15. Were any other Non-motorists present?
(*Select all that apply)*
○ Alone
◉ One adult present
○ One other child present
○ Multiple adults present
○ Multiple children present
○ Unknown

NON MOTORIST CLOTHING

NOTES:

- Specify Color, Fabric and Texture/Weight for outermost layer only
- Indicate "*NONE*" if applicable
- Available codes:

Colors		***Fabrics***	***Textures***	***Weights***
Black	Charcoal gray	Natural	Soft	Heavy
Lt gray/silver	Brown	Synthetic	Slick	Medium
Gold/tan	Purple	Blend	Coarse	Light
Dark blue	Light blue			
Dark green	Light green			
Maroon	Red			
Orange	Yellow			
White	Other (specify)			
Pink				

	Clothing	Color	Fabric	Texture	Weight
HEADWEAR	Hat				
	Helmet				
	Hood				
	Other (specify): _____				
UPPER BODY	Short Sleeve	Unknown	Unknown	Unknown	Unknown
	Long Sleeve				
	Light Jacket				
	Heavy Jacket				
	Other (Specify): _____				
LOWER BODY	Shorts				
	Pants	Brown	Unknown	Unknown	Unknown
	Shoes	Unknown	Unknown	Unknown	Unknown
	Other (specify): _____				