Not in Traffic Surveillance Back Over Investigation / Vehicle to Non-Motorist
Dynamic Science, Inc. / Case Number: DS08006
2004 Volvo XC90
California
October 2007

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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

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15. Supplemental Notes

16. Abstract

This single vehicle incident occurred in October 2007 at 1002 hours. The subject vehicle was a 2004 Volvo XC90 sport utility vehicle that was being driven by a 41-year-old female. The son of the driver, a 3-year-old male, was seated in the second row right seat. The Volvo was equipped with a rear parking assistance system that consisted of four ultrasound rear bumper mounted sensors linked to the in-vehicle audio system. This incident took place in a strip mall parking lot. The Volvo was parked in a parking stall facing west. The driver was intending to back out of the stall. The 82-year-old male non-motorist had been dropped off in the parking lot by a friend. He was walking towards his doctor's office. He was walking with the assistance of a cane. As the driver began backing, her son asked her to look at a toy. As she looked at the toy, she heard a signal from the parking system. She stated that she stopped the vehicle at this point. She looked at the rear view mirror and at both side mirrors and did not see anything. The non-motorist had either been struck by the Volvo and had fallen down, or had tried to avoid the backing vehicle and had fallen down. In any event, the non-motorist was on the ground at this time. After the driver looked in her mirrors after stopping, and not seeing anything, she resumed backing the vehicle. There was a constant signal from the parking system at this time and the non-motorist was in the driver's blind zone. A witness to the incident ran over to the Volvo and struck the back window while telling the driver to stop. The driver stopped the Volvo. The non-motorist was partially under the Volvo. He sustained a small laceration under his right eye and abrasions to his right palm.

17. Key Words	18. Distribution Statement
Not In Traffic Surveillance (NITS), injury, back over, sensor, parking aid, non-motorist	

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Dynamic Science, Inc.
Crash Investigation
Case Number: DS08006
TABLE OF CONTENTS

Background

This single vehicle incident occurred in October 2007 at 1002 hours. The subject vehicle was a 2004 Volvo XC90 sport utility vehicle that was being driven by a 41-year-old female (**Figure 1**). The Volvo was equipped with a rear parking assistance system that consisted of four ultrasound rear bumper mounted sensors linked to the in-vehicle sound system. This incident took place in a strip mall parking lot. The driver of the Volvo entered the vehicle from the left side. The driver's child was in the right rear seat. The Volvo was parked in a parking stall facing west. The driver was intending to back out of the stall. The 82-year-old male non-motorist had been dropped off in the parking lot by a friend. He was walking towards his doctor's office. He was walking with the assistance of a cane. As the driver began backing, her son asked her to look at a toy. As she looked at the toy, she heard a signal from the parking system. She stated that she stopped the vehicle at this point. She looked at the rear view mirror and at both side mirrors and did not see anything. The non-motorist had either been struck by the Volvo and had fallen down, or had tried to avoid the backing vehicle and had fallen down. The driver and at least one witness believe the latter to be the case. The non-motorist stated that he had been knocked down by the vehicle. In any event, the non-motorist was on the ground at this time. After the driver looked in her mirrors after stopping, and not seeing anything, she resumed backing the vehicle. There was a constant signal from the parking system at this time and the non-motorist was in the driver's blind zone. The non-motorist was likely in contact at some point with the vehicle. A witness to the incident ran over to the Volvo and struck the back window while telling the driver to stop. The driver stopped the Volvo. The non-motorist was partially under the Volvo. He sustained a small laceration under his right eye and abrasions to his right palm. He was assisted at the scene by the witnesses. He was then transported to a local hospital for treatment.

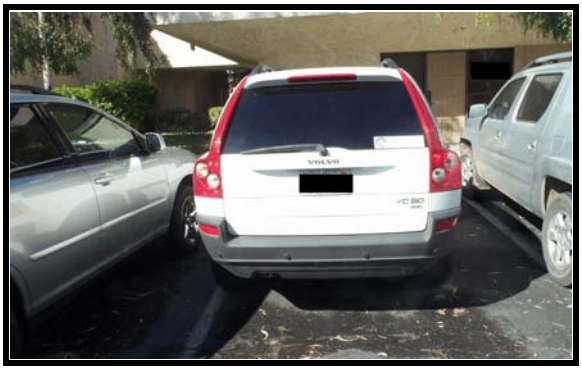


Figure 1. 2004 Volvo XC90 at area of impact (looking west)

This remote Not In Traffic Surveillance (NITS) Back Over Investigation was initiated in response to an email notification about an 82-year-old male injured in a back over incident. NHTSA had been notified by the local NASS team. DSI was notified of the incident on January 10, 2008. The police report was included in the notification. Efforts were undertaken to contact the driver. The driver was contacted and interviewed on February 25, 2008. The case vehicle had been sold by the driver. DSI was assigned the case on February 26, 2008. The non-motorist was interviewed on April 28, 2008.

The police on-scene photographs were requested and obtained. The incident site was local to the SCI team and was inspected in person despite the remote status of the case.

SUMMARY

Incident Site

This incident took place in a parking lot adjacent to a number of commercial buildings **(Figure 2**).

The parking lot is configured with parking stalls along the west side of the lot, the east side of the lot, and on the south side of the lot. All the stalls are marked by painted white lines. The lines are generally 5.5 m (18.0 ft) long and are marked 2.7 m (9.0 ft) apart. There is a -4% grade in the eastern direction for vehicles parked to the west. The grade decreases to -3.1% as one moves eastward. The parking lot is of asphalt construction with concrete gutter strips for drainage. There is no posted speed limit. The weather was clear and the parking lot was dry. The temperature at the nearest reporting station was 18 degrees C (64 degrees F). The Volvo was parked in the third stall from the left on the row of parking stalls to the west. It was parked between two other sport utility vehicles (**Figure 3**).

Figure 2. Overview of incident site (looking east)

Figure 3. Volvo XC90 in parking stall (police photo)

Pre-Crash

The 41-year-old female driver of the Volvo entered the vehicle from the left side. The driver's child was in the right rear seat. The Volvo was parked facing west. Based on the police photos, the Volvo was parked between an unknown year Lexus RX on the left and an unknown year Nissan Xterra on the right. The driver intended to back out of the stall. She indicated that she checked both side mirrors and the rear view mirror before backing. The 82-year-old male non-motorist had been dropped off in the parking lot by a friend to the south of the Volvo. He was approaching from the left side of the Volvo. He was walking northwest towards his doctor's office and was walking with the assistance of a cane. As the driver began backing, her son asked her to look at a toy. As she looked at the toy, she heard an intermittent signal from the parking system. The non-motorist would have been standing upright at this time. The driver stated that she stopped the vehicle at this point. She looked at the rear view mirror and at both side mirrors and did not see anything. The non-motorist stated that he had been struck by the vehicle and had fallen down. The driver and at least one witness stated that the non-motorist had fallen down while avoiding the Volvo. Based on the witness statement and the intermittent parking aid signal, it is this investigator's opinion that the non-motorist had fallen down while avoiding the Volvo. Regardless, the non-motorist was on the ground when the driver stopped the vehicle after hearing the intermittent signal.

Crash

After the driver looked in her mirrors after stopping, and not seeing anything, she resumed backing

the vehicle. There was a constant signal from the parking system at this time. A witness to the incident ran over to the Volvo and struck the back window with her hand while telling the driver to stop.

Post Crash

The driver stopped the Volvo. The non-motorist was partially under the Volvo. He sustained a small laceration under his right eye and abrasions to his right palm. He was assisted at the scene by the witnesses. He was then transported to a local hospital for treatment.

Figure 4. Area of impact (north). Arrow shows path of XC90.

Vehicle Data - 2004 Volvo XC90

The 2004 Volvo XC90 was identified by the Vehicle Identification Number (VIN): YV1CZ59H241XXXXXX. The Volvo is four-door sport utility vehicle that was equipped with a 2.5 liter, five-cylinder engine, automatic transmission, traction control, and all wheel drive. There were no indications of a tire damage.

The seating in the Volvo was configured with front bucket seats with adjustable head restraints, 40/20/40 split bench seats with adjustable head restraints in the second row, and a bench seat with adjustable head restraints in the third row.

Parking Aids/Sensors

The Volvo was equipped with a rear parking assistance system that consisted of four ultrasound rear bumper mounted sensors linked to the in-vehicle sound system (**Figure 5**). The system is automatically activated when the reverse gear is selected. When the system is active, the audio system's volume is reduced and an intermittent signal is audible from the audio system's speakers. The signals begin at a distance of approximately 1.5 m (5.0 ft) from an object/person, etc. At a distance of approximately 30.0 cm (12.0 in), the signal will become constant. There are four sensors mounted horizontally along the rear bumper. The sensors are mounted 59.0 cm (23.2 in) above the ground. The driver had owned the vehicle for four years and was familiar with the parking assistance system. The system was active at the time of the incident. Based on the driver's statements, it appears that the system performed as designed. The driver was initially notified of the non-motorist with an intermittent signal. After stopping and looking in her rear view mirrors, she continued backing and the system responded with a constant signal as she got closer to the non-motorist.

Figure 5. Rear parking assistance system sensors (subject vehicle)

Vehicle Dimensions

Dimensions obtained from Canadian vehicle specifications and an exemplar vehicle. Seated eye height was estimated using a surrogate driver seated at the height of the case vehicle driver. Eye position forward was estimated using the position of the surrogate driver with the seat in the middle track position.

Ground to belt line:	124 cm (48.8in)
Ground to top of trunk/tailgate:	124 cm (48.8 in)
Ground to top of rear bumper:	66 cm (25.9 in)
Ground to bottom of rear bumper:	41 cm (16.1 in)
Surrogate driver's seated eye height from seat bottom:	72 cm (28.4 in)
Surrogate driver's seated eye height from ground:	148 cm (58.3 in)
Overall vehicle height:	174 cm (68.5 in)
Overall vehicle width:	190 cm (74.8 in)
Overall vehicle length:	480 cm (189.0 in)
Rear overhang:	104 cm (40.9 in)
Track width:	162 cm (63.8 in)
Longitudinal distance between rear most projection and front door latch pillar:	230 cm (90.6 in)
Distance from estimated eye position to tailgate:	253 cm (9.6 in)

Vehicle Sight Distances

A visibility study was conducted in order to determine the nominal blind zone behind the vehicle as well as the nominal blind zone of both side view mirrors. Measurements were taken using an exemplar Volvo XC90 four-door sport utility vehicle. The standard 71.0 cm (28.0 in) high target was used to obtain the measurements. The measurements were taken on a paved level surface.

The driver's seated eye height when measured from the seat bottom was 72.0 cm (28.3 in) and when measured from the ground was 1.48 m (4.86 ft). The SCI investigator was able to duplicate the driver's seated eye height by measuring his own eye height from the seat bottom.

The initial set of measurements were taken as if the driver were looking over his right shoulder through the backlight. The target was moved rearward from the rear bumper along the Volvo's centerline until it became visible to the investigator. The point at which the target became visible to the investigator measured 7.16 m (23.50 ft) rearward of the rear bumper. This measurement was used as the point of origin for two sets of lateral measurements which were then taken. Measurements taken laterally to the left and right would result in a visibility zone that could be viewed through the backlight. Two sets of lateral measurements were taken due to the presence of second row head restraints which blocked the investigator's rearward vision. The first set of lateral measurements were taken from the vehicle's center line to the far left and right sides of the backlight. The second set of lateral measurements were taken from the vehicle's center line to the left and right head restraints. There was insufficient space behind the exemplar vehicle to determine at which distance the roadway surface would become visible to the driver when looking though the backlight.

Another set of measurements were taken to simulate the driver using the rear view mirror to look through the backlight. The target was moved rearward from the rear bumper along the Volvo's centerline until it became visible to the investigator. The point at which the target became visible to the investigator measured 6.71 m (22.00 ft) rearward of the rear bumper. This measurement was used as the point of origin for a set of lateral measurements which were then taken. Measurements taken laterally to the left and right would result in a visibility zone that could be viewed through the backlight.

Since the SCI investigator was using an exemplar vehicle, he adjusted the side mirrors appropriately for the driver's seated eye height. With the SCI investigator seated, the side views were examined. The target was placed at the right side of the rear bumper. The target was moved from the side of the vehicle laterally to the right until the target became visible through the right side view mirror. The target was then moved laterally to the right to the point where the target was no longer visible. These measurements resulted in a visibility zone which could be viewed through the side view mirror. This process was repeated on the left side of the vehicle. The area between the left and right

Figure 6. View of sticker on subject vehicle's backlight

visibility zones resulted in a blind zone. Directly behind the rear bumper, the blind zone measured 1.85 m (6.07 ft) in width. The overall width of the vehicle was 1.90 m (6.23 ft). The target was then placed at 6.40 m (21.00 ft) rearward of the rear bumper. Lateral measurements were taken to the left and right at the points at which the investigator could view the target through the side view mirrors. The area between the two visible points resulted in a blind zone. At 6.40 m (21.00 ft) rearward of the rear bumper, the blind zone was approximately 2.09 m (6.86 ft) in width. The target was then moved further to the left and right until it could no longer be viewed through the rear view mirrors. The areas to the left and right in which the target could be viewed resulted in side view visibility zones.

For the involved subject vehicle, vision to the right was blocked somewhat by a small sticker affixed to the lower right backlight (**Figure 6**).

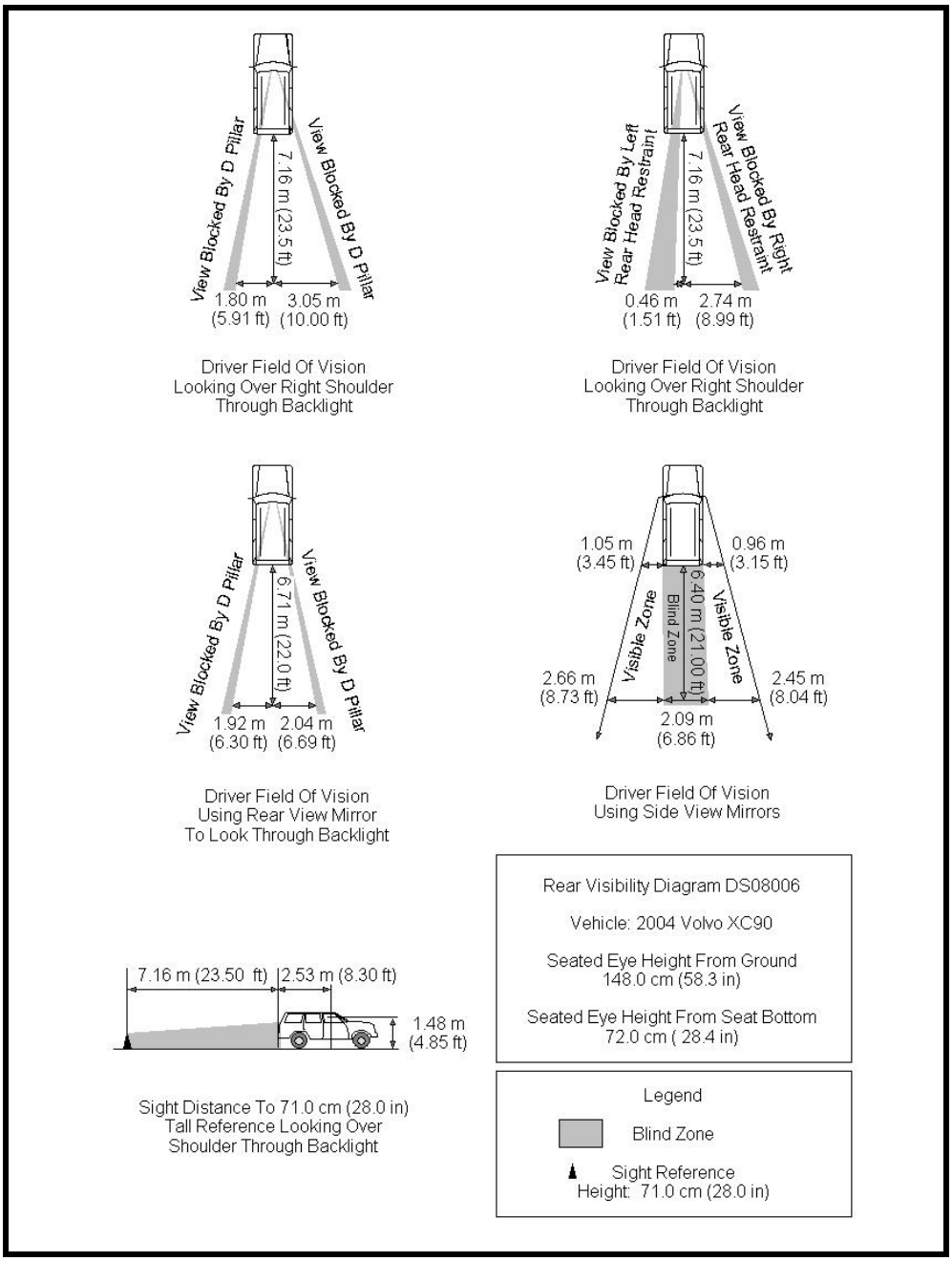


Figure 7. Nominal visibility diagram (exemplar vehicle)

Figure 8. Driver's view to right rear (exemplar vehicle)

Figure 9. Driver's view down vehicle centerline (exemplar vehicle)

Figure 10. View through left side view mirror (exemplar vehicle)

Figure 11. View through right side view mirror (exemplar vehicle)

Vehicle Damage

Exterior Damage - 2004 Volvo XC90

There was no exterior damage to the vehicle from this incident. There were several gouge marks to the rear bumper, but these do not appear to be related to this incident.

Figure 12. Gouges located on rear bumper

Interior Damage - 2004 Volvo XC90

There was no interior damage.

Occupant Demographics

Driver

Age/Sex:	41/Female	3/Male
Height:	173 cm (68 in)	91 cm (36 in)
Weight:	61 kg (135 lbs)	14 kg (30 lbs)
Seat track position:	Middle	N/A
Manual restraint use:	Lap and shoulder belt available, used.	Lap and shoulder belt available, used with child safety seat.
Usage source:	Interviewee	Interviewee
Eyewear:	None	None
Type of medical treatment:	None	None

Non-Motorist Demographics

Age/Sex:	82/Male
Height:	183 cm (72 in)
Weight:	73 kg (160 lbs)
Eyewear:	Glasses worn
Type of medical treatment:	Transported and released

INJURIES

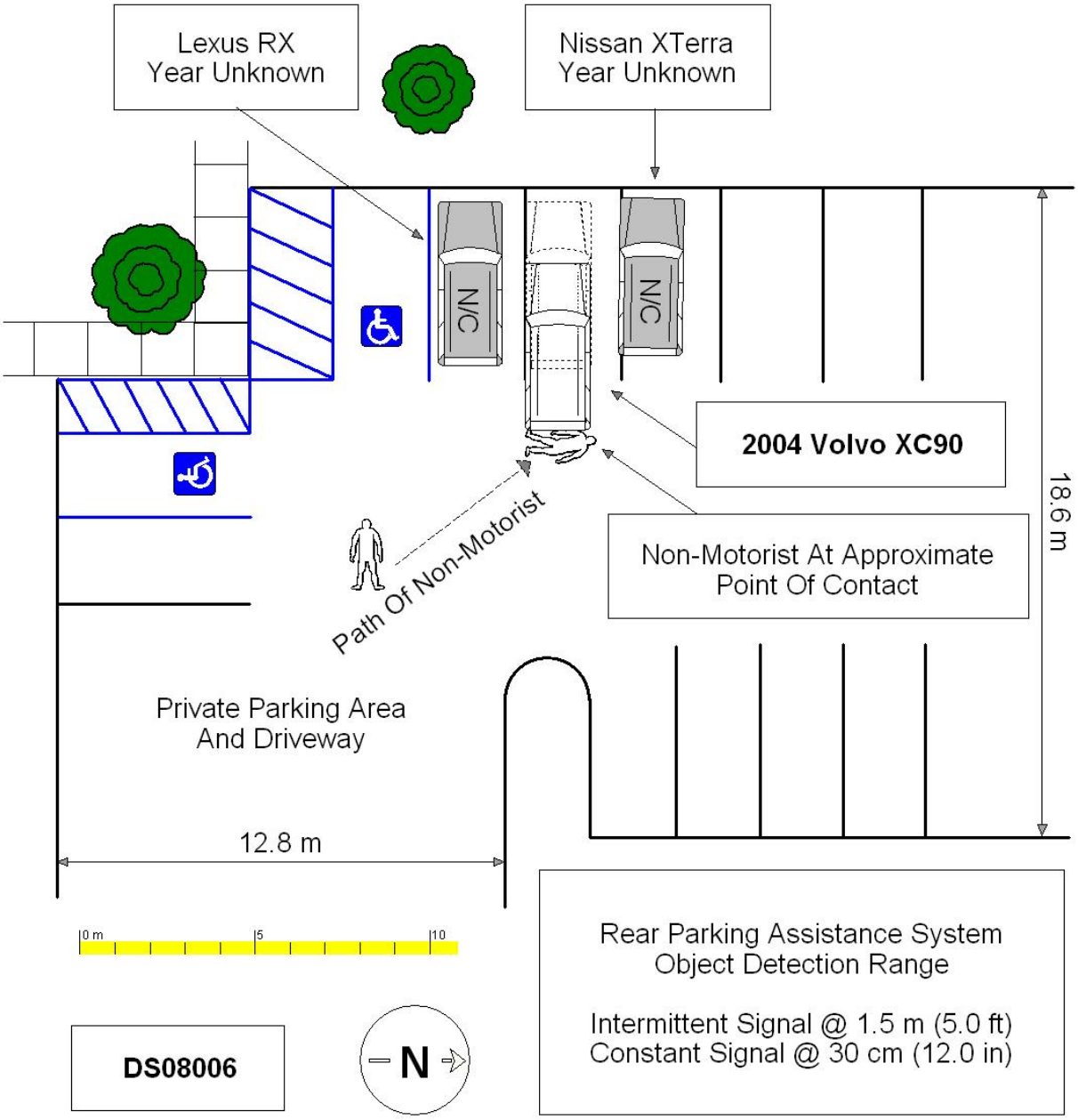
Driver: Not injured.

Second row right occupant: Not injured.

Non Motorist: Injuries obtained from interviewee and police report.

Injury	OIC Code	Injury Mechanism	Confidence Level
Laceration, under right eye	290600.1,1	Unknown	Unknown
Abrasions, right palm	790202.1,1	Ground	Certain

Attachment 1. Scene Diagram



Attachment 2. Data Forms

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

D S 0 8 0 0 6

IDENTIFICATION

2. Date of Crash 1 0 / X X / 0 7

3. Time of Crash 1 0 0 2

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 4 %

12. Estimated distance from parked position to impact

0 0 1 . 8 m

13. Estimated speed at impact 0 0 3 kmph

14. Grade at impact (+/ -) - 0 3 %

15. Estimated distance from impact to vehicle final rest

0 0 1 . 0 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 D S 0 8 0 0 6

VEHICLE IDENTIFICATION

2. VIN Y V 1 C Z 5 9 H 2 4 1 X X X X X X

3. Model Year 2 0 0 4

4. Vehicle Make (specify): VOLVO

5. Vehicle Model (specify): XC90 SUV

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	☑	sticker, lwr right
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 225/70R16

7. LF Tire Size Unknown

8. LR Tire Size Unknown

9. RF Tire Size Unknown

10. RR Tire Size Unknown

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	Presence based on exemplar vehicle
Front Middle	0	☐	☐ ☐ ☐ Full Down / Mid / Full Up	
Front Right	1	☑	☐ ☐ ☐ Full Down / Mid / Full Up	
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	99	☐	☐ ☐ ☐ Full Down / Mid / Full Up	
3rd Middle	99	☐	☐ ☐ ☐ Full Down / Mid / Full Up	
3rd Right	99	☐	☐ ☐ ☐ 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		124	
Top of trunk/tailgate		124	
Bottom of bumper		41	
Trailer hitch (if applicable)		N/A	
Undercarriage			
	Sway bar	N/A	
	Axle	N/A	
	Differential	N/A	
	Other (specify): _____	N/A	
Sensor Height (if equipped)		59	
Camera Height (if equipped)		N/A	

Not Applicable ☐

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National Highway Traffic Safety Administration

Back Up / Parking Aid Form

Special Crash Investigations
Not In Traffic Surveillance

1. Case Number

D S 0 8 0 0 6

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 _____ cm
(Diagonal)

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

oem

10. Auditory warning illumination

- ☐ No sensor present
- ☑ Yes
- ☐ No
- ☐ Unknown

11. Number of sensors 4

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

D S 0 8 0 0 6

DRIVER PROFILE

2. Driver's Age 4 1
   99 = Unknown

3. Driver's Sex
   - ☐ Male
   - ☉ Female
   - ☐ Unknown

4. Driver's Height 1 7 3 cm
   999 = Unknown

5. Driver's Weight 0 6 1 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:

    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) Sticker _____
- ☐ 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
D S 0 8 0 0 6

NON-MOTORIST PROFILE

2. Non-motorist's Age — 8 2 ☐ Months ◉ Years
99 = Unknown

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

4. Non-motorist's Height — 1 8 3 cm
999 = Unknown

5. Non-motorist's Weight — 0 7 3 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				
	Long Sleeve	Unknown	Unknown	Unknown	Light
	Light Jacket				
	Heavy Jacket				
	Other (Specify): _____				
LOWER BODY	Shorts				
	Pants	Brown	Unknown	Unknown	Medium
	Shoes				
	Other (specify): _____				