

Remote Not-In-Traffic Surveillance Power Window Entrapment Investigation
Dynamic Science, Inc. (DSI), Case Number DS08035
2001 Ford Windstar
California
September 2008

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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.

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<p>16. Abstract</p> <p>This remote investigation focused on the circumstances surrounding the death of a 3-year-old male who was left unattended in a 2001 Ford Windstar. The incident occurred at approximately 2000 hours in September 2008. The subject vehicle was driven to the incident site by an adult male, who was the father of the child. The driver parked and exited the vehicle, then walked to a public telephone leaving the child unattended.</p> <p>The child was unrestrained in the vehicle and was playing in the front seats. The child's head became entrapped between the glazing and frame of the front row right window. The father's attention returned to the vehicle and he observed the child entrapped in the power window. He returned to the vehicle and removed the child from the vehicle and observed that he was not breathing. The child was driven in the subject vehicle to a local fire station, and then was transported to a medical center, where he was pronounced deceased by an attending physician. The cause of death was determined to be asphyxia due to neck compression.</p>			
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**Dynamic Science, Inc.
Crash Investigation
Case Number: DS08035**

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BACKGROUND

This remote investigation focused on the circumstances surrounding the death of a 3-year-old male who was left unattended in a 2001 Ford Windstar. The incident occurred at approximately 2000 hours in September 2008. The subject vehicle was driven to the incident site by an adult male, who was the father of the child. The driver parked and exited the vehicle, then walked to a public telephone leaving the child unattended.

The child was unrestrained in the vehicle and was playing in the front seats. The child's head became entrapped between the glazing and frame of the front row right power window. The father's attention returned to the vehicle and he observed the child entrapped in the power window. He returned to the vehicle and removed the child from the vehicle and observed that he was not breathing. The child was driven in the subject vehicle to a local fire station, and then was transported to a medical center, where he was pronounced deceased by an attending physician. The cause of death was determined to be asphyxia due to neck compression.

This incident was investigated and reported by the city police department. The type of record was "Death Investigation". The report was forwarded to other state and county agencies such as the courts and the Department of Children and Family Services because criminal charges were filed against the father of the child.

This Remote Not-In-Traffic Surveillance (NiTS) Power Window Entrapment Investigation was initiated by the National Highway Traffic Safety Administration (NHTSA) in response to an internet news article. The article stated that a 3-year-old child was trapped in the power window of a van, transported to a hospital while unconscious, and declared deceased a short time later. The NHTSA provided DSI notification of this incident on September 16, 2008. DSI obtained a copy of the police incident report on October 8, 2008, and the case was assigned on October 10, 2008. The incident was investigated by the local police department as a child endangerment/death investigation. A Suspected Child Abuse Report was generated by responding emergency personnel, and was submitted to the county Department of Children and Family Services. DSI requested the police investigative report and on-scene photographs. At the time of this report, the information has not been released due to on-going legal activities. The following information was obtained from the police incident report, internet news articles, and an exemplar vehicle.

SUMMARY

Incident Site

This incident occurred near a four-leg intersection at approximately 2000 hours. The subject vehicle was facing north and parked at the west curb of the northbound lanes near the southeast corner of the intersection. The roadway and surrounding area were level and dry. The nearest reporting station recorded a temperature of 19 degrees C (66 degrees F) at 1953 hours. The weather was cloudy and conditions were dark with street lamps illuminated. A satellite image of the incident site is included in this report as Attachment 1.

Pre-Incident

The incident occurred at a curbside parking space near a four-leg intersection. The vehicle was reported in an internet news article to have been parked on the north/south roadway near an intersecting east/west roadway. The subject vehicle had been driven to the incident site by an adult male who was the decedent's father. The driver stated in the police report that he stopped at the location to use a public telephone that was located at the intersection's southeast corner. A news article reported the subject vehicle was parked approximately 4.6 m (15 ft) from the telephone. The driver turned off the vehicle's engine but left the ignition key in the dash with the accessory power switch and the radio on. The driver exited the vehicle and began to use the public telephone. He stated to police that while using the phone he observed the 3-year-old child jumping on the front row seats of the subject vehicle. It was therefore concluded that the child was unrestrained at the time of the incident. At that time the front row right window was down. The driver then turned his attention back to his phone call for a short time.

Incident

The father returned his attention to the subject vehicle and observed the child's neck was entrapped between the glazing and the window frame of the front row right side window. The driver reported to police that when he returned to the vehicle, the child was motionless and drooling saliva from his mouth. The driver attempted to open the front right door but it was locked and the key was in the vehicle ignition. After numerous attempts, he was able to lower the window glazing by forcing it down with his hands. After pulling the window down a sufficient distance he reached into the vehicle and unlocked and opened the door.

Post-Incident

The driver freed the child's neck from the window and attempted to administer cardiopulmonary resuscitation (CPR). The driver then drove the child in the subject vehicle approximately 4.8 km (3.0 mi) to a fire station. He arrived at the fire station at 2011 hours and paramedics attempted to resuscitate the child. At 2016 hours rescue personnel transported the child and arrived at 2024 hours at a local medical center. An attending physician began treatment and observed the child had no pulse and was not breathing. The child's physical appearance revealed that he was cyanotic¹, his eyes were fixed and dilated, and he had sustained a horizontally oriented scratch mark to his left neck. The doctor pronounced the decedent dead at 2054 hours.

It is probable that in the driver's absence the child placed his head outside the window and activated the window with a knee. For the 50th percentile of males 2.0 - 3.5 years of age, the measured distance from the foot to the sternum is 72 cm (28.3 in) and from the sternum to the knee is 50 cm

¹Relating to blueness or lividness of the skin, as from imperfectly oxygenated blood, Dictionary.com

(19.7 in).² With the child's knee on the armrest and power window switch, his neck would have been approximately 37 cm (14.6 in) above the bottom of the window frame and 14 cm (5.5 in) below the top of the window frame.

The county coroner's office was contacted and the following information was obtained from the coroner's investigation:

- The cause of death was asphyxia
- The injury mechanism was neck compression
- The mode was accidental death

Vehicle Data

The subject vehicle of this investigation was a 2001 Ford Windstar minivan. The Vehicle Identification Number (VIN) was unknown. Standard features included power windows and power door locks with the master control switch panel located at the forward aspect of the driver's door armrest. The vehicle had no lockout feature on the driver's door to prevent passengers from operating the windows.

Non-Motorist Data

Age/Sex:	3 Years/Male
Height:	91 cm (36 in)
Weight:	14 kg (31 lb)
Seat type:	Box-mounted (van type)
Seat track position:	Unknown
Manual restraint usage:	Lap and shoulder safety belt not used
Usage source:	Police report
Type of medical treatment:	Transported by ground, pronounced deceased at a medical center

The child was wearing black pants and shoes, a red shirt, and gray sweatshirt.

²Anthropometry of Infants, Children and Youths To Age 18 For Product Safety Design, SAE International SP-450, p. 317.

Non-Motorist Injuries

<u>Injury</u>	<u>OIC Code</u>	<u>Injury Mechanism</u>	<u>Confidence Level</u>
Abrasion, left neck	390202.1,2	Window glazing including window frame	Certain

Power Window Switch Configuration

The front row right side power window switch control panel was mounted on the forward aspect of the armrest in a near horizontal position (**Figure 1**). The switch panel consisted of a rocker-style switch that was marked with up and down arrows. This vehicle was not equipped with a lockout feature to prevent passengers from operating the windows. The front right power window switch was positioned on top of the door armrest, just forward of the door midpoint and 13 cm (5.1 in) below the bottom of the window frame. The side door glazing measured 78 cm (30.7 in) in width at the base and 51 cm (20.1 in) in height. The rear door panel was configured with an armrest that extended the full length of the door panel. The arm rest was approximately 13 cm (5.1 in) below the level of the side window frame. The door handle was integrated into the door panel and was above the power window button and arm rest.



Figure 1. 2001 Ford Windstar exemplar vehicle showing power window switch location

Power Window Closing Force Test

An exemplar 2001 Ford Windstar was tested to determine the closing force of the front row right power window (**Figure 2**). The test used a spring scale that had a maximum weight capacity of 34 kg (75 lb). The scale attached to the window glazing and the closing force was measured. With the engine off, a peak closing force of 107 newtons (N) (24 lb) was recorded and with the engine on, a peak closing force of 133 N (30 lb) was recorded.

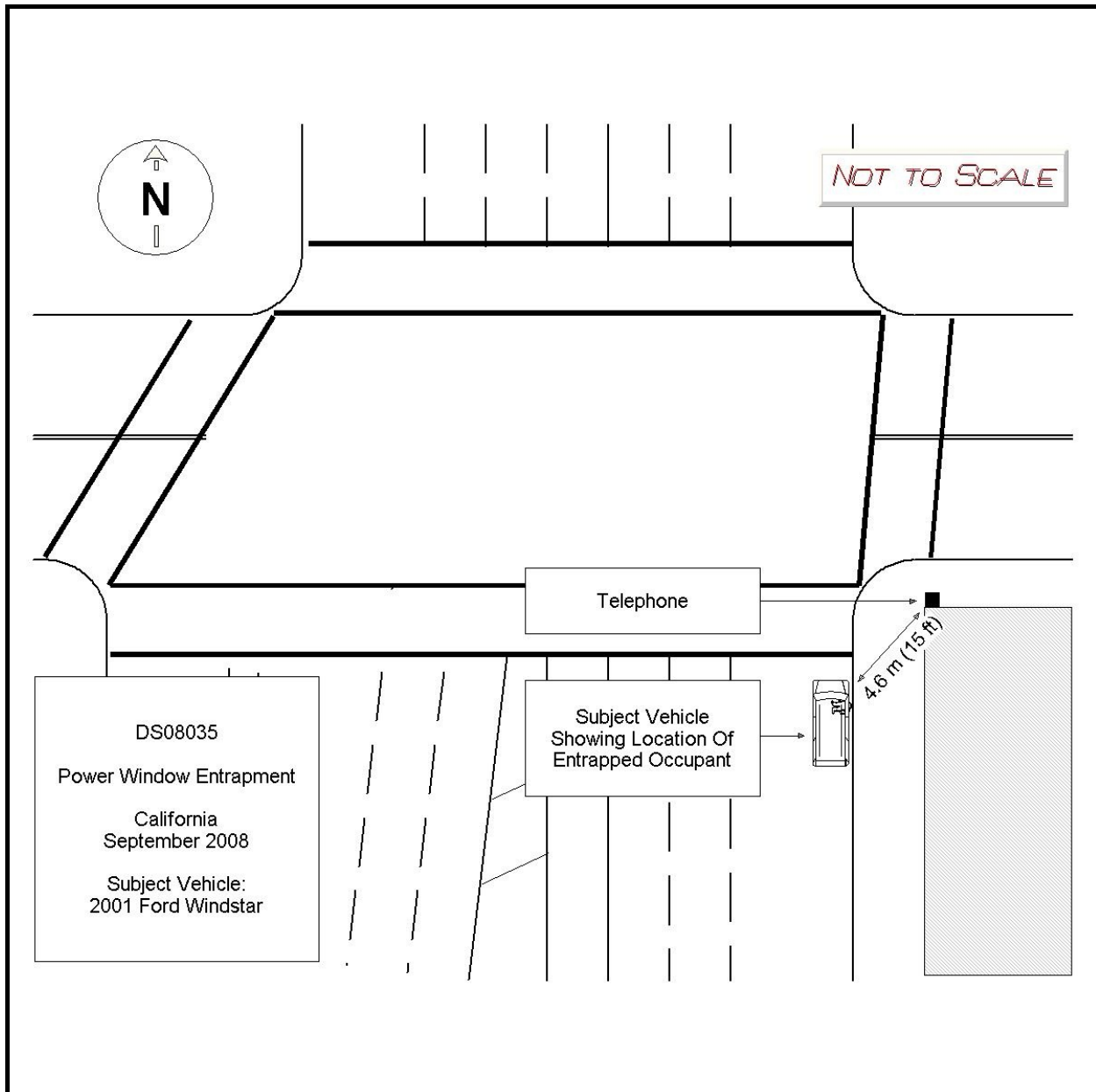


Figure 2. 2001 Ford Windstar exemplar vehicle showing window used for closing force test

Attachment 1. Satellite Image



Attachment 2. Scene Diagram



Attachment 3. Data Forms



1. Case Number

IDENTIFICATION

2. Date of Crash ____ / ____ / ____

3. Time of Crash _____
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
- Shrubby
- 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
- Shrubby
- Utility poles
- Signs
- Glare
- Other (specify) _____
- Unknown

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

12. Estimated distance from parked position to impact
_____ . _____ m

13. Estimated speed at impact _____ +/- _____ kmph

14. Grade at impact _____ +/- _____ %

15. Estimated distance from impact to vehicle final rest
_____ . _____ m

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



VEHICLE FORM

1. Case Number _____

VEHICLE IDENTIFICATION

2. VIN _____

3. Model Year _____

4. Vehicle Make (specify): _____

5. Vehicle Model (specify): _____

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	Clear / Hazy / Very Dirty		
RF		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
2 nd Left		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
2 nd Right		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
3 rd Left		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
3 rd Right		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
Backlight		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
Left Backlight		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
Right Backlight		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
Roof		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		
Other (specify)		Fixed / Closed / Open / Partially Open	Clear / Hazy / Very Dirty		

TIRE DATA

6. Vehicle Manufacturer Recommended Tire Size _____

7. LF Tire Size _____

9. RF Tire Size _____

8. LR Tire Size _____

10. RR Tire Size _____

Seats / Head Restraint Data

Seat Position	Seat Type (Select from below)	Head Restraint (Check if available)	Head Restraint Adjustment (select)	NOTES:
Front Left			Full Down / Mid / Full Up	
Front Middle			Full Down / Mid / Full Up	
Front Right			Full Down / Mid / Full Up	
2 nd Left			Full Down / Mid / Full Up	
2 nd Middle			Full Down / Mid / Full Up	
2 nd Right			Full Down / Mid / Full Up	
3 rd Left			Full Down / Mid / Full Up	
3 rd Middle			Full Down / Mid / Full Up	
3 rd Right			Full Down / Mid / Full Up	

Seat Type codes:

- | | |
|---|--------------------------------------|
| 0 = No seat or seat folded down | 8 = Pedestal (i.e. column supported) |
| 1 = Bucket | 9 = Box mounted (i.e. van type) |
| 2 = Bucket w/ folding back | 10= Other seat type (specify) |
| 3 = Bench | 99= Unknown seat type |
| 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 | |

VEHICLE MEASUREMENTS

Clearance Heights	Measurements (all from ground, and in centimeters)	NOTES
Beltline		
Top of trunk/tailgate		
Bottom of bumper		
Trailer hitch (if applicable)		
Undercarriage		
Sway bar		
Axle		
Differential		
Other (specify):		
Sensor Height (if equipped)		
Camera Height (if equipped)		



1. Case Number

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

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

10. Auditory warning illumination

- No sensor present
- Yes
- No
- Unknown

11. Number of sensors _____

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



DRIVER FORM

1. Case Number

DRIVER PROFILE

2. Driver's Age _____
99 = Unknown

3. Driver's Sex Male
 Female
 Unknown

4. Driver's Height _____ cm
999 = Unknown

5. Driver's Weight _____ 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:

13. Driver in a hurry

Yes N/A
 No Unknown
 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 Over 60 Seconds
 11-30 Seconds N/A
 31-60 Seconds 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



Non Motorist Form

1. Case Number

NON-MOTORIST PROFILE

2. Non-motorist's Age _____ Months
_____ Years
99 = Unknown

3. Non-motorist's Sex
 Male
 Female
 Unknown

4. Non-motorist's Height _____ cm
999 = Unknown

5. Non-motorist's Weight _____ 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:

	<u>Colors</u>		<u>Fabrics</u>		<u>Textures</u>		<u>Weights</u>
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)						

	Clothing	Color	Fabric	Texture	Weight
H E A D W E A R	Hat				
	Helmet				
	Hood				
	Other (specify): _____				
U P P E R B O D Y	Short Sleeve				
	Long Sleeve				
	Light Jacket				
	Heavy Jacket				
	Other (Specify): _____				
L O W E R B O D Y	Shorts				
	Pants				
	Shoes				
	Other (specify): _____				