

On-scene Passenger Air Bag Related Child Fatality Investigation
Vehicle vs Vehicle vs Vehicle–Angle-Broadside Type Collision
Dynamic Science, Inc. / Case Number: DS98012
1995 Ford Aspire 2-door Hatchback
Utah
March 1998

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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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16. Abstract This was a three vehicle broadside type collision which occurred at a four leg intersection in the state of Utah in March, 1998 at 1427 hours. The intersection is controlled by standard tri-signals and the posted speed limit for all roadways is 40 km/h (25 mph). The weather was cloudy, but there were no unusual conditions. The case vehicle, a 1995 Ford Aspire 2-door hatchback driven by a 25-year-old female, was southbound in the middle lane approaching the intersection. There were two additional occupants in the case vehicle. The front right seat was occupied by an unrestrained 4-year-old female child (20.4 kg-45 lbs). The 2 nd left seat position was occupied by a 2-year-old male child (91.4 cm-36 in./16.3 kg-36 lbs) that was seated in a forward facing Evenflo Ultara convertible child seat. The child seat was not anchored by the vehicle's lap and shoulder belts and the child seat's harness was not used to secure the child. The other vehicle, a 1987 Dodge Caravan Van driven by a restrained 37-year-old female, was westbound in the far lane at a police reported 40 km/h (25 mph) and attempting to cross through the intersection. There were three additional occupants in the Dodge. The 2 nd left seat was occupied by an unrestrained 15-year-old male. The 2 nd right seat was occupied by an unrestrained 14-year-old male. The 3 rd right seat was occupied by a restrained 14-year-old male. The third vehicle, a 1993 Pontiac Sunbird 4-door, driven by a restrained 24-year-old female, was eastbound and stopped in the middle of the intersection attempting a left turn to head north. The traffic signal was green for east and westbound traffic. The driver of the case vehicle stated to police that her attention was focused on the right front occupant who was having a temper tantrum because something had not been bought for her. The driver of the case vehicle further stated to the police that she never saw the red traffic signal, all she heard was a bang as the left front of the case vehicle struck the Dodge. At impact, both air bags in the case vehicle deployed. After impact, the case vehicle rotated clockwise and the Dodge rotated counterclockwise and the rear left side of the case vehicle side slapped the middle right side of the Dodge. The Dodge continued moving forward and the front of the Dodge struck the front of the third vehicle. The case vehicle was towed from the scene, and sustained moderate damage to the front left bumper corner. A CDC of 11FLEE1 was assigned to the damage, with maximum crush at C2 of 9 cm (3.5 in). The damage only portion of WinSmash 1.2.1 calculated a total delta v of 17.1 km/h (10.6 mph), a longitudinal delta v of -16.1 km/h (-10.0 mph), and a latitudinal delta v of 5.9 km/h (3.6 mph). Police photographs were obtained and a CDC was estimated. The Dodge sustained moderate damage to the front right side. A CDC of 02RFEE2 was assigned to the damage. The damage only portion of WinSmash 1.2.1 calculated a total delta v of 11.1 km/h (6.9 mph), a longitudinal delta v of -5.5 km/h (-3.4 mph), and a latitudinal delta v of -9.6 km/h (-5.9 mph). The results fit the collision model and appear reasonable for the case vehicle. The case vehicle also sustained minor damage to the rear right fender from the second impact-sideslap with the Dodge. The 4-year-old female child in the case vehicle was seated in a cloth covered bucket seat with a folding back. The seat was adjusted between the middle and rear most track position. The seat back was in an upright position. The 4-year-old was not wearing the available lap/shoulder restraints. Her exact posture is not known. There was no pre-impact braking and on impact with the Dodge, the 4-year-old moved forward and to the left. The front right air bag deployed and contacted the 4-year-old on the anterior part of her neck and she sustained abrasions (AIS 1) and contusions (AIS 1). After impact with the Dodge, the case vehicle rotated clockwise ninety degrees; essentially rotating underneath the 4-year-old so that the front right door/window was behind her. The 4-year-old was then propelled rearwards striking the front right window with the back of her head disintegrating the glass, resulting in a 5 cm (2 in.) laceration (AIS 1) to the posterior scalp. She also sustained a cerebral edema (AIS 5), a right subdural hematoma and hemorrhage (AIS 5), a fractured right parietal bone (AIS 2), and a concussion (AIS 2). These injuries are consistent with striking a stiff surface and are believed to have been caused by striking a combination of the right window glass, frame and sill areas. She also sustained a periportal edema to her liver (AIS 2), and a pulmonary edema (AIS 4); the exact source of these injuries is unknown. She appears to have aspirated something she was eating or drinking, a soda container was found on the floor and this appear to have been smeared on the front right windshield area. The 4-year-old then fell forward onto the front right air bag and the driver indicated that the 4-year-old came to rest on the floor under the front dashboard area unconscious. The 4-year-old was initially treated at the scene by fire department EMS, and they indicate her Glasgow Coma Score as 5 and her Revised Trauma Score as 6. The EMS transported the 4-year-old via ground ambulance to a local hospital and the emergency room records indicate that she was triage at 1440 hours. The local hospital decided to transport the 4-year-old to a trauma center due to the severe nature of her injuries. At 1515 hours a life flight helicopter arrived at the local hospital and transported the 4-year-old. Medical records indicate that the 4-year-old was initially treated in the emergency room and then admitted to the pediatric intensive care unit at approximately 1700 hours. Her Glasgow Coma Score was 4. She expired at 2102 hours of the same day. An autopsy was not performed but medical records were obtained and the above injuries were obtained from the medical records. The death certificate attributes the death to "severe traumatic brain injury."					
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**Dynamic Science, Inc.
Accident Investigation
Case Number: DS98012**

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BACKGROUND:

Description: This case was initiated in response to a report of fatal injuries sustained by a 4-year-old female child as a result of the deployment and interaction with a front right passenger air bag. This case was conducted as an on-scene investigation. This collision was reported to the Utah Department of Transportation (UDOT) by the investigating police department, the UDOT then notified NHTSA. Dynamic Science, Inc. was notified on March 31, 1998 via fax at 1402 hours. All field work was completed on April 6, 1998.

Investigation Type: On-scene

Crash Location: Utah

Crash Date: March, 1998

Notification Date: March 31, 1998

Field Work Completed: April 6, 1998

SUMMARY:

This was a three vehicle broadside type collision which occurred at a four leg intersection in the state of Utah in March, 1998 at 1427 hours. The north and southbound roadways are divided, two way, straight and level, dry, asphalt roadways. The northbound roadway consist of a right turn lane, two travel lanes, and a left turn lane. The southbound roadway consists of two travel lanes and a left turn lane. The east and westbound roadways are divided, two way, straight and level, dry, asphalt roadways. The eastbound roadway consists of a single travel lane and a left turn lane. The westbound roadway consist of a single travel lane, and a left turn lane. The intersection is controlled by standard tri-signals and the posted speed limit for all roadways is 40 km/h (25 mph). The weather was cloudy, but there were no unusual conditions.



Figure 1. Direction of travel towards impact (south) case vehicle.

The case vehicle, a 1995 Ford Aspire 2-door hatchback driven by a 25-year-old female, was traveling southbound in the middle lane approaching the intersection. There were two additional occupants in the case vehicle. The front right seat was occupied by an unrestrained 4-year-old female child (20.4 kg-45 lbs). The 2nd row left seat position was occupied by a 2-year-old male child (91.4 cm-36 in./16.3 kg-36 lbs) that was seated in a forward facing Evenflo Ultara convertible child seat. The child seat was not anchored by the vehicle's lap and shoulder belts and the child seat's harness was not used to secure the child.

The other vehicle, a 1987 Dodge Caravan Van driven by a restrained 37-year-old female, was traveling westbound in the far lane at a police reported speed of 40 km/h (25 mph) and attempting to cross through the intersection. There were three additional occupants in the Dodge. The 2nd left seat was occupied by an unrestrained 15-year-old male. The 2nd right seat was occupied by an unrestrained 14-year-old male. The 3rd right seat was occupied by a restrained 14-year-old male.

The third vehicle, a 1993 Pontiac Sunbird 4-door, driven by a restrained 24-year-old female, was eastbound and stopped in the middle of the intersection attempting a left turn to head north.

The case vehicle was traveling southbound in the far left lane approaching the intersection. The Dodge was traveling westbound and approaching the intersection at 40 km/h (25 mph). The third vehicle was traveling eastbound and was stopped in the middle of the intersection, attempting a turn left to head north. The traffic signal was green for east and westbound traffic. The driver of the case vehicle stated to police that her attention was focused on the right front occupant who was having a temper tantrum because something had not been bought for her. The driver of the case vehicle further stated to the police that she never saw the red traffic signal, all she heard was a bang as the left front of the case vehicle struck the Dodge.



Figure 2. Rest positions, looking east.

At impact, both air bags in the case vehicle deployed. After impact, the case vehicle rotated clockwise and the Dodge rotated counterclockwise and the rear left side of the case vehicle side slapped the middle right side of the Dodge. The Dodge continued moving forward and the front of the Dodge struck the front of the third vehicle.

The case vehicle was towed from the scene, and sustained moderate damage to the front left bumper corner. A CDC of 11FLEE1 was assigned to the damage, with maximum crush at C2 of 9 cm (3.5 in). The damage only portion of WinSmash 1.2.1 calculated a total delta v of 17.1 km/h (10.6 mph), a longitudinal delta v of -16.1 km/h (-10.0 mph), and a latitudinal delta v of 5.9 km/h (3.6 mph). Police photographs were obtained and a CDC was estimated. The Dodge sustained moderate damage to the front right side. A CDC of 02RFEE2 was assigned to the damage. The damage only portion of WinSmash 1.2.1 calculated a total delta v of 11.1 km/h (6.9 mph), a longitudinal delta v of -5.5 km/h (-3.4 mph), and a latitudinal delta v of -



Figure 3. Exterior damage to case vehicle.

9.6 km/h (-5.9 mph). The results fit the collision model and appear reasonable for the case vehicle. The case vehicle also sustained minor damage to the rear right fender from the second impact-sideslap with the Dodge.

The Dodge and the third vehicle was retained by the owners/drivers, and driven from the scene.

The police were notified of the collision at 1428 hours and arrived at the scene at 1429 hours. The fire department's EMS unit was called at 1428 hours and arrived at the scene at 1431 hours. First aid was administered to injured parties by ambulance personnel. The ambulance left the scene at 1437 hours and arrived at the hospital at 1445 hours.

The driver of the case vehicle was seated in a cloth covered bucket seat with a folding back. The seat was adjusted between the forward most and middle track position. The seat back was in an upright position. The driver of the case vehicle was not wearing the available lap/shoulder restraints. She did not report any injuries to the police.

The 4-year-old female child in the case vehicle was seated in a cloth covered bucket seat with a folding back. The seat was adjusted between the middle and rear most track position. The seat back was in an upright position. The 4-year-old was not wearing the available lap/shoulder restraints. Her exact posture is not known. There was no pre-impact braking and on impact with the Dodge, the 4-year-old moved forward and to the left. The front right air bag deployed and contacted the 4-year-old on the anterior part of her neck and she sustained abrasions (AIS 1) and contusions (AIS 1). After impact with the Dodge, the case vehicle rotated clockwise ninety degrees; essentially rotating underneath the 4-year-old so that the front right door/window was behind her. The 4-year-old was then propelled rearwards striking the front right window with the back of her head disintegrating the glass, resulting in a 5 cm (2 in.) laceration (AIS 1) to the posterior scalp. She also sustained a cerebral edema (AIS 5), a right subdural hematoma and hemorrhage (AIS 5), a fractured right parietal bone (AIS 2), and a concussion (AIS 2). These injuries are consistent with striking a stiff surface and are believed to have been caused by striking a combination of the



Figure 4. Exterior damage to other vehicle.



Figure 5. Case vehicle driver's area.

right window glass, frame and sill areas. She also sustained a periportal edema to her liver (AIS 2), and a pulmonary edema (AIS 4); the exact source of these injuries is unknown. She appears to have aspirated something she was eating or drinking; a soda container was found on the floor and this appear to have been smeared on the front right windshield area. The 4-year-old then fell forward onto the front right air bag and the driver indicated that the 4-year-old came to rest on the floor under the front dashboard area unconscious. The 4-year-old was initially treated at the scene by fire department EMS, and they indicate her Glasgow Coma Score (GCS) as 5 and her Revised Trauma Score as 6. The EMS transported her via ground ambulance to a local hospital and the emergency room records indicate that she was triaged at 1440 hours. The local hospital decided to transport her to a trauma center due to the severe nature of her injuries. At 1515 hours a life flight helicopter arrived at the local hospital and transported her. Medical records indicate that she was initially treated in the emergency room and then admitted to the pediatric intensive care unit at approximately 1700 hours. Her GCS was 4. She expired at 2102 hours of the same day. An autopsy was not performed but medical records were obtained and the above injuries were obtained from the medical records. The death certificate attributes the death to “severe traumatic brain injury”.



Figure 6. Case vehicle's front right passenger's air bag.

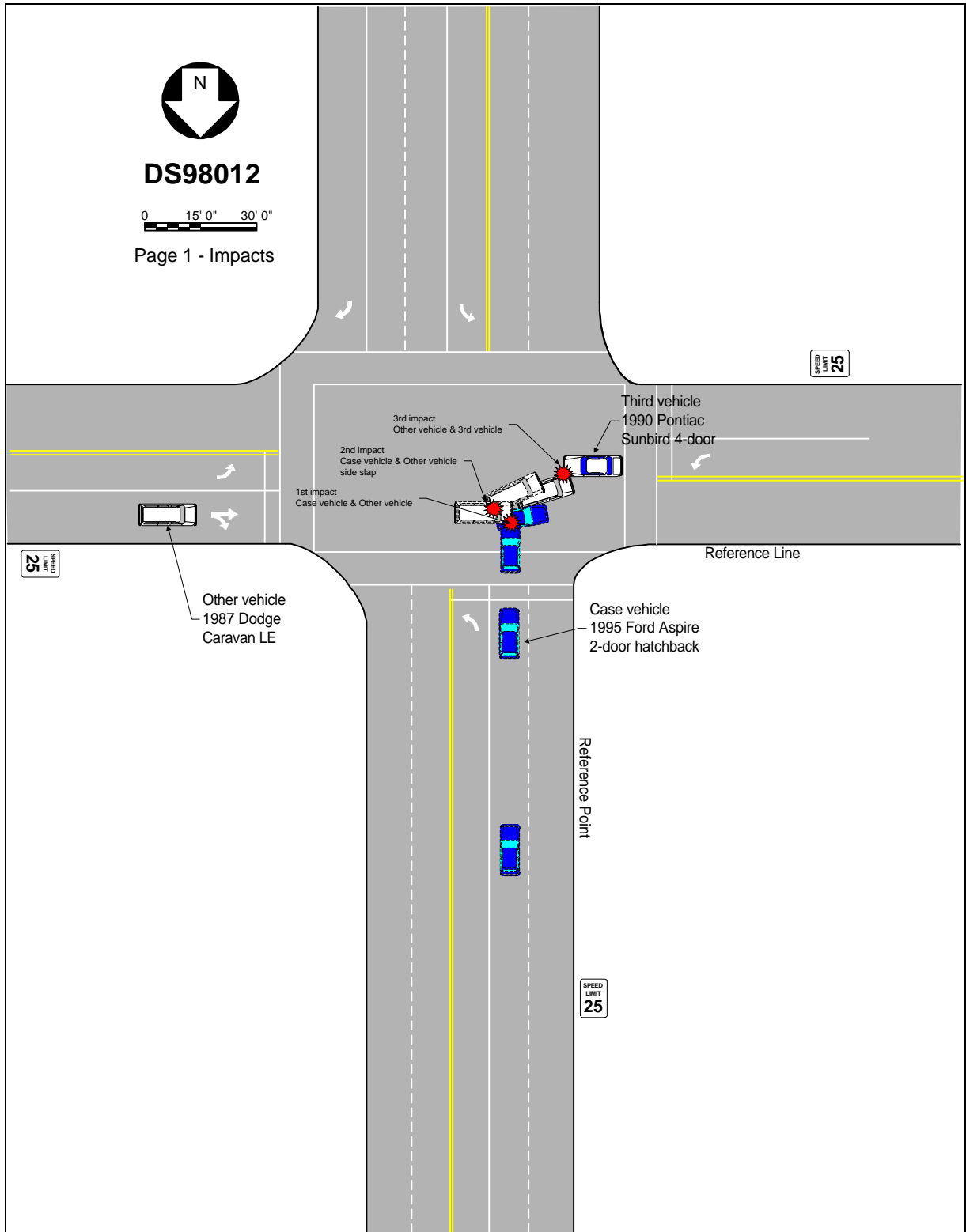
The 2-year-old male occupant in the case vehicle was in a forward facing Evenflo Ultra convertible child safety seat, but the child seat was not anchored by the available lap/shoulder restraints and the child seat harness was not available/used. The child seat harness is integrated onto the swinging shield, and the shield was in an up position and pinned there by the case vehicle's hatch. The 2-year-old sustained bruises (AIS 1) and abrasion (AIS 1) to his torso as a result of being thrown forward on impact and striking the front right seat back. He was transported via ground ambulance to a local hospital where he was treated and released.



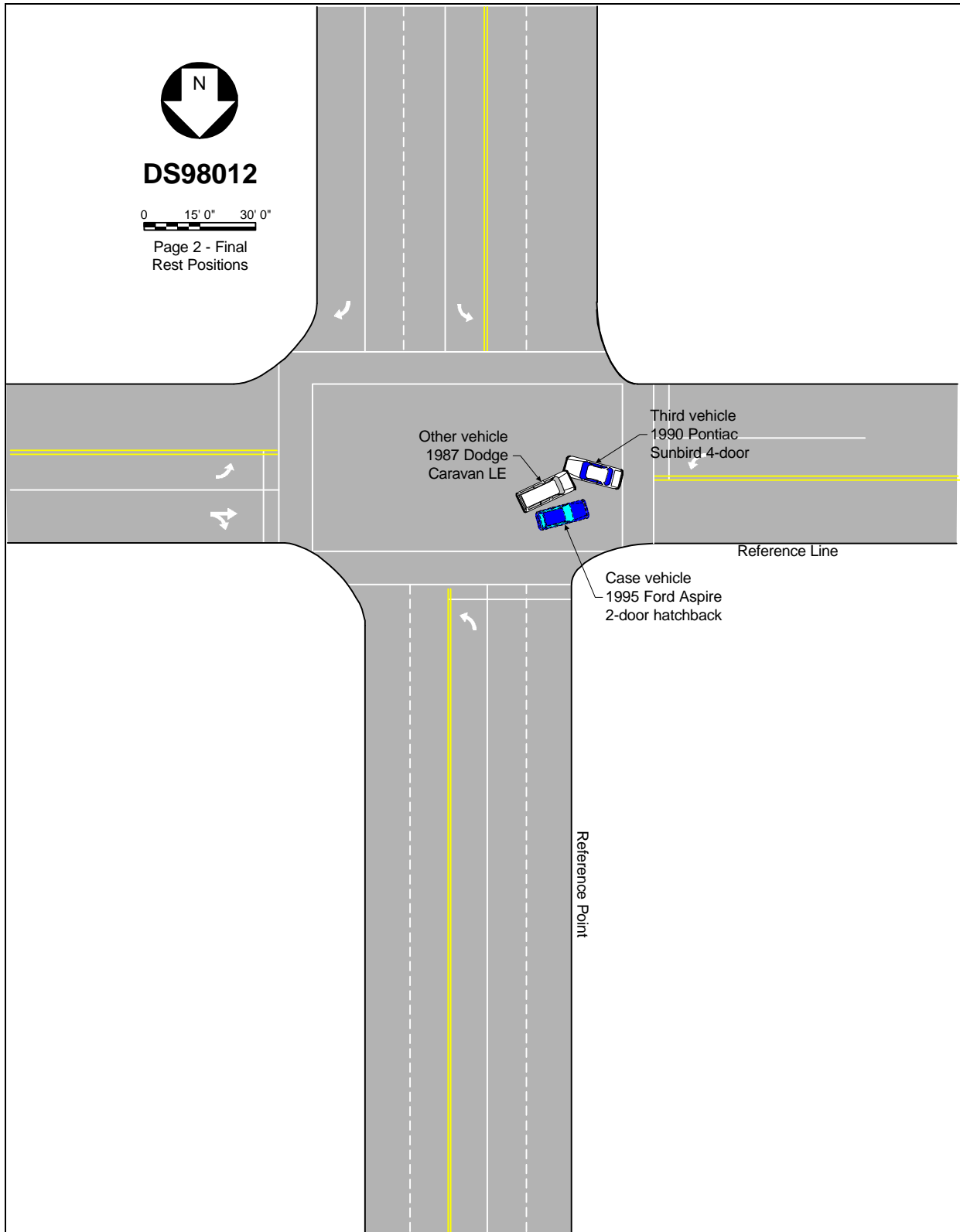
Figure 7. Case vehicle-child seat.

None of the drivers or occupants of the other two involved vehicles reported any injuries to the police.

Scene Diagram - Impacts



Scene Diagram - Final Rest Positions



COLLISION MEASUREMENTS

Case Number DS98012

COLLISION MEASUREMENTS						
Reference point:	Prolongation of west edge of north-south road					
Reference line:	Prolongation of north edge of east-west road					
Data Point	Distance and Direction from RP			Distance and Direction from RL		
	ft	m	d	ft	m	d
Impact area 1 - Case vehicle vs Other vehicle Dodge	16.8	5.1	E	5.6	1.7	S
Impact area 3 - Other vehicle Dodge vs 3 rd vehicle	2.3	0.7	E	19.6	6	S
Finale rest positions						
Case vehicle RF tire	2.8	0.9	W	6.4	2	S
Case vehicle RR tire	4.9	1.5	E	4.4	1.3	S
		0			0	
Other vehicle RF tire	0.5	0.2	E	13.7	4.2	S
Other vehicle RR tire	10.2	3.1	E	9.3	2.8	S
3 rd vehicle RF tire	1.8	0.5	W	23.3	7.1	S
3 rd vehicle RR tire	11.3	3.4	W	20.7	6.3	S

DETAILED INFORMATION**Vehicles**Case Vehicle

Description:	1995 Ford Aspire -door Hatchback	
VIN:	KNJLT05H8S6XXXXX8	
Odometer:	11,397 km (7,082 miles)	
Engine:	I4 1.3 L	
Reported Defects:	None noted	
Cargo:	Child seat, booster seat, child stroller-estimated at 45 lbs.	
Damage Description:	Moderate damage to front bumper, hood and grille areas, both front fenders and rear left fender.	
CDC:	Impact 1 (vs. right front side Dodge) - 11FLEE1 Impact 2 (vs right rear side Dodge) - 09LBEW2	
Delta V (Impact 1-highest delta v):	Total	17.1 km/h (10.6 mph)
	Longitudinal	-16.1 km/h (-10.0 mph)
	Latitudinal	5.9 km/h (3.6 mph)
	Energy	20,091 joules (14,827 ft-lbs)



Figure 10. Case vehicle exterior damage.

The case vehicle is equipped with a driver's and front right passenger air bags that deployed as a result of the first impact with the Dodge. The driver's air bag is housed in the steering wheel hub, and the dual module cover flaps opened in a typical H-configuration at the designated tear points. The driver's air bag was circular and measured 55 cm (21.7 in.) in diameter. It had two tethers, two rear vent ports, and eight vertical folds. It had a 7 cm (2.8 in.) long lipstick transfer on the mid right area of the air bag, and there were blood spots on the upper right quadrant. There was a burned area on the upper left quadrant of the driver's air bag. The front right passenger's air bag is mid-mounted and housed within the instrument panel, and the single module cover flap opened in an upward fashion at the designated tear points. The front right passenger's air bag measured 38 cm (15 in.) by 61 cm (24 in.). It was not tethered and had two rear vent ports. There was blood all about the face of the air bag.

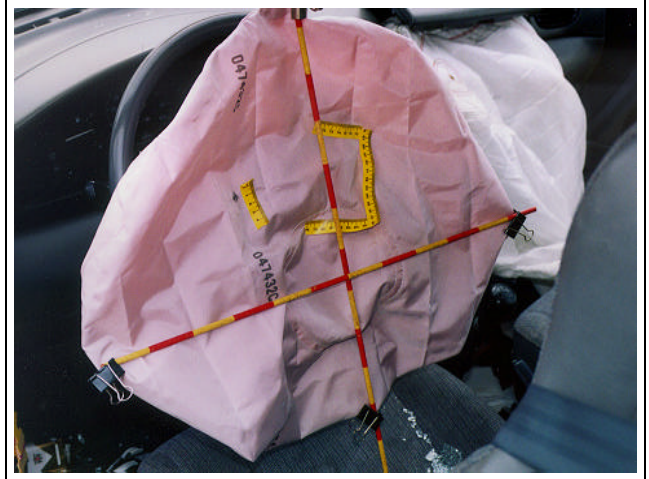


Figure 11. Case vehicle driver's air bag.



Figure 12. Front right passenger's air bag.

Other Vehicle Dodge

Description:	1987 Dodge Caravan
VIN:	2B4FK51C6HRXXXXXX
Odometer:	Unknown
Engine:	2.2L
Reported Defects:	None noted
Cargo:	None
Damage Description:	Moderate damage to its front right side, rear right fender, and front bumper. Police report indicated approximately \$3,000.00 worth of damage.
CDC:	Impact 1 (vs. front case vehicle) - 02RFEE2 Impact 2 (vs. left side case vehicle) - 03RZEW1 Impact 3 (vs. 3 rd vehicle) - 12FLEW1
Delta V (Impact 1 highest delta v):	Total 11.1 km/h (6.9 mph) Longitudinal -5.5 km/h (-3.4 mph) Latitudinal -9.6 km/h (-5.9 mph) Energy 5,012 joules (3,698 ft-lbs)



Figure 13. Exterior damage to other vehicle.

Third Vehicle Pontiac

Description: 1993 Pontiac Sunbird
VIN: 1G2JC54H5P7XXXXXX
Odometer: Unknown
Engine: 2.0L L4 MFI
Reported Defects: None noted
Cargo: Unknown
Damage Description: Police photos indicate damage to the left front, and the police report indicates approximately \$1,200.00 worth of damage.
CDC: Impact 3 - Unknown
Delta V:
Total Unknown
Longitudinal Unknown
Latitudinal Unknown
Energy Unknown
Unknown



Figure 14. 3rd vehicle.

Occupants

<u>Case Vehicle</u>	Occupant 1	Occupant 2
Age/Sex:	25/Female	4/Female
Seated Position:	Front left	Front right
Seat Type:	Cloth covered bucket seat	Cloth covered bucket seat
Height:	Unknown	Unknown
Weight:	Unknown	20.4 kg (45 lbs) - per ER record
Occupation:	Unknown	School age
Pre-existing Medical Condition:	Unknown	None noted
Alcohol/Drug Involvement:	Not tested	NA
Driving Experience:	9 years	NA
Body Posture:	Assumed normal, upright. Indicated to police she was speaking to front right occupant.	Unknown, driver indicated child was in a temper tantrum
Hand Position:	Unknown, assumed both on steering wheel.	Unknown
Foot Position:	Right foot on accelerator pedal, left foot on floorboard	Unknown
Restraint Usage:	Lap and shoulder belts <u>not</u> used	Lap and shoulder <u>not</u> used
Air bag:	Steering wheel hub driver's air bag present and deployed as a result of impact	Mid-mounted in instrument panel deployed as a result of impact

Occupants

<u>Case Vehicle (cont...)</u>	Occupant 3
Age/Sex:	2/Male
Seated Position:	2 nd left seat
Seat Type:	Cloth covered bench with folding back. Seated in a forward facing convertible child seat. Child seat not anchored by vehicle lap and shoulder belts. Child seat harness <u>not</u> available\used, inoperative.
Child Seat:	Evenflo Utara Convertible model # 235386P2, serial # 23586P2072194, manufactured date July 21, 1994
Height:	91.4 cm (36 in.) - per ER record
Weight:	16.3 kg (36 lbs) - per ER record
Occupation:	NA
Pre-existing Medical Condition:	None per ER record
Alcohol/Drug Involvement:	NA
Driving Experience:	NA
Body Posture:	Assumed normal, upright. Indicated to police she was speaking to front right occupant.
Hand Position:	Unknown
Foot Position:	Unknown
Restraint Usage:	Lap and shoulder belts <u>not</u> used
Air bag:	None available

<u>Other Vehicle Dodge</u>	Occupant 1	Occupant 2
Age/Sex:	37/Female	15/Male
Seated Position:	Front left	2 nd left seat
Seat Type:	Unknown	Unknown
Height:	Unknown	Unknown
Weight:	Unknown	Unknown
Occupation:	Unknown	School age
Pre-existing Medical Condition:	None noted	None noted
Alcohol/Drug Involvement:	Not tested	NA
Driving Experience:	21 years	NA
Body Posture:	Unknown, assumed normal, upright	Unknown, assumed normal, upright
Hand Position:	Unknown, assumed both on steering wheel	Unknown
Foot Position:	Unknown, assumed right foot on accelerator pedal and left foot on floor board	Unknown
Restraint Usage:	Lap and shoulder belts used—per police report	Police report indicates belts not used
Air bag:	Not equipped	Not equipped

<u>Other Vehicle Dodge (cont...)</u>	Occupant 3	Occupant 4
Age/Sex:	14/Male	14/Male
Seated Position:	2 nd right seat	3 rd right seat
Seat Type:	Unknown	Unknown
Height:	Unknown	Unknown
Weight:	Unknown	Unknown
Occupation:	School age	School age
Pre-existing Medical Condition:	None noted	None noted
Alcohol/Drug Involvement:	NA	NA
Driving Experience:	NA	NA
Body Posture:	Unknown, assumed normal, upright	Unknown, assumed normal, upright.
Hand Position:	Unknown	Unknown
Foot Position:	Unknown	Unknown
Restraint Usage:	Police report indicates belts not used	Lap belt used per police report
Air bag:	Not equipped	Not equipped

<u>Third Vehicle Pontiac</u>	Occupant 1
Age/Sex:	24/Female
Seated Position:	Front left
Seat Type:	Unknown
Height:	Unknown
Weight:	Unknown
Occupation:	Unknown
Pre-existing Medical Condition:	None noted
Alcohol/Drug Involvement:	Not tested
Driving Experience:	8 years
Body Posture:	Unknown, assumed normal, upright
Hand Position:	Unknown, assumed both on steering wheel
Foot Position:	Assumed right foot on brake pedal
Restraint Usage:	Lap and shoulder belts used—per police report NASS Coding Manual indicates passive restraints
Air bag:	Not equipped

Injuries and Injury Mechanisms

Case Vehicle

	<u>INJURY</u>	<u>OIC CODE</u>	<u>ICD-9</u>	<u>SOURCE</u>
Driver:	Not injured			
Front right occupant:	Cerebral edema with herniation of the brain with basilar and fourth ventricle obliterated	140666.5, 1	348.5	Combination right window glass, frame and sill areas
	Right subdural hematoma with swelling on the right side greater than the left and a shift. Subdural hemorrhage in the right posterior temporal area ascends along the right parietal lobe.	140654.5, 3	432.1	Combination right window glass, frame and sill areas
	Pulmonary edema-contusion	441410.4, 3	518.4	Unknown
	Fracture of right parietal bone	150402.2, 1	800.25	Combination right window glass, frame and sill areas
	Concussion	161000.2, 0	850.4	Combination right window glass, frame and sill areas
	Liver periportal edema	541810.2, 1	864.01	Unknown
	5 cm (2 in.) laceration to posterior scalp	190602.1, 6	873.0	Front right window glass
	Severe contusion and abrasions to the front of the neck	390402.1, 5 390202.1, 5	920.0 910.0	Air bag
2 nd seat left occupant:	Cervical strain	640278.1, 6	847.0	Front right seat back

Contusions and abrasions to torso	490402.1, 9 490202.1, 9	922.0 911.0	Front right seat back
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Other Vehicle Dodge

INJURY

Driver:	No injuries reported to police
2 nd seat left	No injuries reported to police
2 nd seat right	No injuries reported to police
3 rd seat right	No injuries reported to police

3rd Vehicle Pontiac

Driver:	No injuries reported to police
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Occupant Kinematics

The 4-year-old female child (front right occupant) in the case vehicle was seated in a cloth covered bucket seat with a folding back. The seat was adjusted between the middle and rear most track position. The seat back was in an upright position. The 4-year-old was not wearing the available lap/shoulder restraints. Her exact posture is not known. There was no pre-impact braking and on impact with the Dodge, the 4-year-old moved forward and to the left. The front right air bag deployed and contacted the 4-year-old on the anterior part of her neck and she sustained abrasions (AIS 1) and contusions (AIS 1). After impact with the Dodge, the case vehicle rotated clockwise ninety degrees; essentially rotating underneath the 4-year-old so that the front right door/window was behind her. The 4-year-old was then propelled rearwards striking the front right window with the back of her head disintegrating the glass, resulting in a 5 cm (2 in.) laceration (AIS 1) to the posterior scalp. She also sustained a cerebral edema (AIS 5), a right subdural hematoma and hemorrhage (AIS 5), a fractured right parietal bone (AIS 2), and a concussion (AIS 2). These injuries are consistent with striking a stiff surface and are believed to have been caused by striking a combination of the right window glass, frame and sill areas. She also sustained a periportal edema to her liver (AIS 2), and a pulmonary edema (AIS 4); the exact source of these injuries is unknown. She appears to have aspirated something she was eating or drinking, a soda container was found on the floor and this appear to have been smeared on the front right windshield area. The 4-year-old then fell forward onto the front right air bag and the driver indicated that she came to rest on the floor under the front dashboard area and unconscious.