

**TRANSPORTATION SCIENCES
CRASH RESEARCH**

CALSPAN OPERATION OF VERIDIAN
BUFFALO, NEW YORK 14225

CALSPAN ON-SITE AIR BAG DEPLOYMENT INVESTIGATION

NASS CDS CASE NO. 1998-05-050A

VEHICLE #1 - 1995 MITSUBISHI ECLIPSE RS

LOCATION - STATE OF PENNSYLVANIA

CRASH DATE - APRIL, 1998

Contract No. DTNH22-94-D-07058

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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 are 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>15. <i>Supplementary Notes</i> On-site investigation of a dual air bag deployment crash that resulted in fatal injuries to the right front occupant.</p>			
<p>16. <i>Abstract</i></p> <p>This crash which involved a 1995 Mitsubishi Eclipse (Vehicle #1) equipped with dual front air bags occurred during the early evening hours in the month of April, 1998. The 27 year old female driver was taking her son to his father's residence when her vehicle departed the right side of the roadway and struck a stone wall with the frontal plane. This impact resulted in a Collision Deformation Classification (CDC) code of 12-FDEW-2. A speed reconstruction using the WinSMASH algorithm indicated Vehicle #1 sustained a delta V of 29.1 km/h (18.1 mph) which was sufficient to actuate the Supplemental Restraint System (SRS).</p> <p>The 6 year old child, who was 116.8 cm (46.0") tall and weighed 23.6 kg (52.0 lbs.), was restrained by the lap portion of the manual lap and torso belt. He moved forward and loaded the lap belt as the result of pre-impact braking and vehicle vaulting. The expanding front right air bag contacted his head and facial area which resulted in abrasions of the forehead and nose (AIS-1), diffuse subdural hemorrhage (AIS-5), subarachnoid hemorrhage (AIS-3), cerebral edema (AIS-3), and bilateral optic nerve hemorrhage (AIS-1). He was propelled rearward and contacted the seat back support which resulted in a hyperextension of T1/T2 (AIS-1) and soft tissue hemorrhage of both perinepheric areas. He was initially transported to a trauma unit, but shortly there after was transferred to a pediatric trauma unit. His brain function was evaluated with results from test proving positive for brain death. Life support was discontinued and the child expired.</p> <p>Driver #1, who was 154.9 cm (61.0") tall and weighed 44.5 kg (98 lbs.), was using the lap and shoulder belt at the time of the crash. She sustained a laceration of the lip and soreness of the body which was attributed to contact with the front left driver air bag. She exited the vehicle and opened the right front door to attend to her son who was not moving. She released his lap belt and heard him moan. She attempted to remove him from the vehicle, but remember someone telling her not to move an injured person. She ran to a nearby residence and sought help. The resident was a fire chief and immediately summoned emergency personnel and provided initial first aid to the child.</p>			
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CALSPAN AIR BAG DEPLOYMENT INVESTIGATION
NASS CDS CASE NO. 1998-05-050A
VEHICLE #1 - 1995 MITSUBISHI ECLIPSE RS
STATE OF PENNSYLVANIA
APRIL, 1998

BACKGROUND

The Field Operations Branch (FOB), Crash Investigation Division (CID) of the National Highway Traffic Safety Administration (NHTSA) was notified by the National Transportation Safety Board (NTSB) of a single vehicle crash where a child in the right front seat reportedly suffered fatal injuries by the deploying front right air bag. The Calspan Team was notified by the FOB of the crash and directed to conduct an on-site investigation which began the same day of notification. The Calspan Reconstructionist assigned to the case was conducting another SCI investigation in the State of Pennsylvania at the time of notification. Upon completion of that investigation, the investigator arrived on-site the following day. The police department held the vehicle in secured storage pending this investigation. An NTSB investigator was present during the vehicle inspection.

This crash was originally assigned an SCI case number (CA98-26), but was later rebadged as NASS CDS case 05-050A after it was randomly selected in the NASS sampling process.

SUMMARY

This crash which involved a 1995 Mitsubishi Eclipse (Vehicle #1) equipped with dual front air bags occurred during the early evening hours in the month of April, 1998. The 27 year old female driver was taking her son to his father's residence when her vehicle departed the right side of the roadway and struck a stone wall with the frontal plane. The dual front air bags deployed resulting in fatal injuries to the 6 year old male right front occupant.

Prior to the crash, Vehicle #2 was traveling westbound in the right lane of a four lane, undivided, level, wet asphalt, arterial roadway which curved to the left with a negative superelevation of 6.1 percent (3.5 degrees). The posted speed limit was 56 km/h (35 mph). It was raining extremely hard where visibility of the lane lines was described by the driver as "hard to see".

As Driver #1 was traveling in the right lane, a vehicle in front of her slowed to initiate a right turn at an intersection. The driver remembered slowing, changed lanes to the left, and was in the process of returning to the right lane when the right side tires interacted with a pool of water that had formed in a depression in the center of the right lane. The vehicle was subsequently redirected to the right and departed the right roadway edge. It crossed the 1.2 m (3.4') wide asphalt shoulder, traversed a 13 degree cross slope lawn at a height of 21.6 cm (8.5"), vaulted for a distance of 5.2 m (17.0') before landing on a paved driveway surface, and traveled 2.1 m (7.0') prior to the impact with the stone wall. The wall measured 154.9 cm (61.0") laterally, 144.8 cm (57") vertically, and 30.5 cm (12.0") deep.

During the pre-impact trajectory, the driver attempted to regain control of the vehicle by applying full brakes and steering to the left. This was evident by the right side tire sliding gouges in the grass embankment (**refer to Figure 1**).



Figure 1- Trajectory of Vehicle #1
30 m (100 prior to the POI)



Figure 2- View of the stone wall
struck by the front of Vehicle #1

The frontal plane of Vehicle #1 contacted the stone wall (**refer to Figure 2**) resulting in a Collision Deformation Classification (CDC) code of 12-FDEW-2 (**refer to Figures 3-5**). A speed reconstruction using the WinSMASH algorithm indicated Vehicle #1 sustained a delta V of 29.1 km/h (18.1 mph) which was sufficient to actuate the Supplemental Restraint System (SRS). The vehicle came to the final rest position (FRP) against the wall.

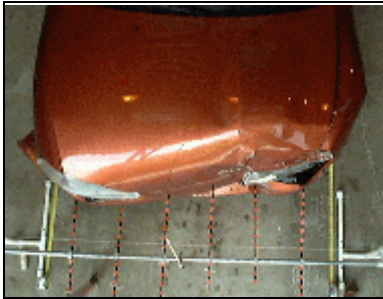


Figure 3- Overhead view of the
frontal damage to Vehicle #1

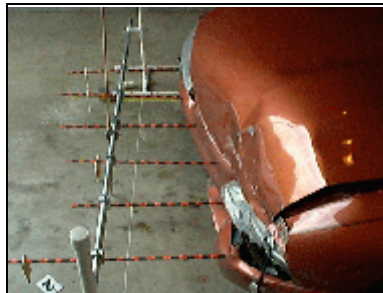


Figure 4- Lateral view of the frontal
plane showing the extent of crush



Figure 5- Left front corner view of
Vehicle #1

Driver #1, who was 154.9 cm (61.0") tall and weighed 44.5 kg (98 lbs.), was using the lap and shoulder belt at the time of the crash. She sustained a laceration of the lip and soreness of the body. She exited the vehicle and opened the right front door to attend to her son who was not moving. She released his lap belt and heard him moan. She attempted to remove him from the vehicle, but remember someone telling her not to move an injured person.

The driver began to scream and ran to a nearby residence to summon help. The owner of the house, a volunteer fire chief, heard her screams and responded by calling for rescue on his two way radio. He then ran to the vehicle to provide first aid for the child. He estimated the elapse time from the time of first hearing the driver's screams and his arrival at the vehicle was approximated 1.5 minutes.

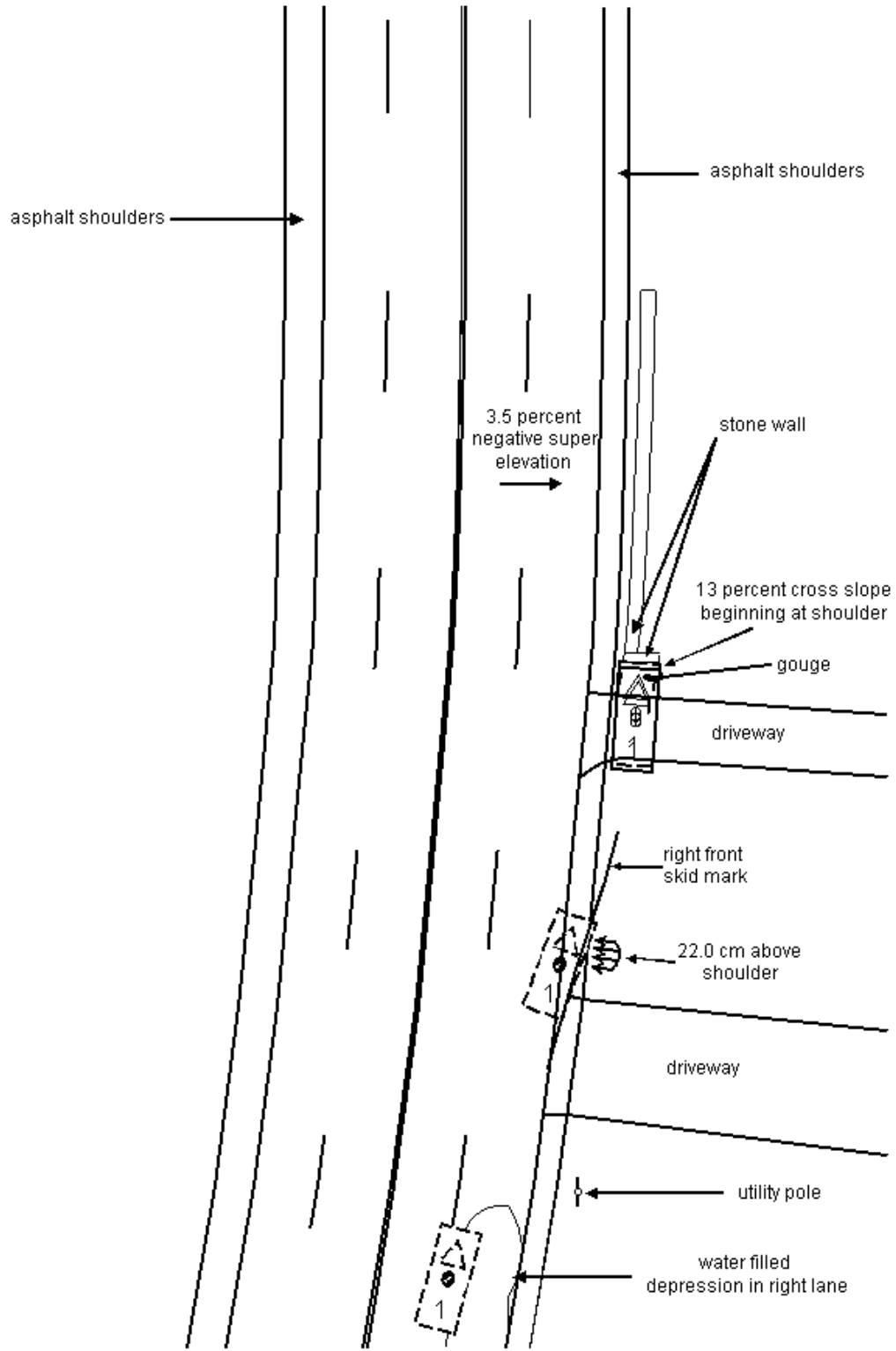
Upon arriving at the vehicle, the fire chief found the child unrestrained with his buttocks on the seat against the seat back support and his upper torso leaning inboard over the center console area. He felt for fractures of the head and upper spinal column with none noted. The child at that time exhibited labor breathing and rapid eye lid movement.

Rescue responded and arrived within five to ten minutes of notification. Their initial assessment of the child's condition indicated a systolic blood pressure of 125, but the child had a weak pulse and his eyes were fully dilated. The child was placed on a backboard and transported via ambulance to a nearby trauma center which was approximately ten minutes from the scene. While en route, the child went into cardiac arrest and was subsequently resuscitated.

The trauma center evaluated the child and within ten minutes determined that more specialized care was needed to treat his injuries. The child was subsequently transferred to a pediatric trauma center where he was placed on life support.

The following day a brain death test indicated that the child's brain was no longer functioning. He was removed from life support which resulted in cessation of life. An autopsy was performed which indicated that the child sustained brain injuries, facial abrasions, optic nerve trauma (attributed to contact with the expanding front right air bag), spinal column hyperextension and soft tissue hemorrhage of both perinephric areas (contact with the seat back support).

CA1998-05-050A
Scene Schematic



SCALE
1 cm = 2.5 m

VEHICLE DATA

Exterior - 1995 Mitsubishi Eclipse

The 1995 Mitsubishi Eclipse was equipped with a dual front Supplemental Restraint System (SRS) which deployed as the result of the impact with the stone wall. Exterior damage to the vehicle involved the front bumper, the hood, left front fender, and left head light assembly. The maximum crush of 36.2 cm (14.25") was located 36.8 cm (14.5") left of the vehicle centerline. The vehicle was not equipped with an ABS braking system. The frontal crush profile is listed in the following table:

Frontal Crush Profile	C ₁ = 26.0 cm (10.25")	C ₂ = 35.6 cm (14.0")	C ₃ = 30.5 cm (12.0")
	C ₄ = 24.1 cm (9.5")	C ₅ = 15.2 cm (6.0")	C ₆ = 14.0 cm (5.5")

The driver purchased the vehicle in May, 1997 with 57,900 km (36,000 miles) on the odometer. The odometer reading at the time of the crash was 113,230 km (70,360 miles). The driver indicated that the vehicle was not involved in any other crash during her ownership and was not serviced for air bag related repairs.

CDC: 12-FDEW-2

Interior - 1995 Mitsubishi Eclipse

Interior vehicle damage to the 1995 Mitsubishi Eclipse was attributed to occupant contacts and the deployment of the Supplemental Restraint System (SRS). The left lower instrument panel exhibited a 19.1 mm (1.5") diameter light color scuff mark which was attributed to contact by the left knee of the driver during the crash. It was located 22.6 cm 57.2 cm (22.5") left of the vehicle centerline. The steering column shear capsules were not displaced during the crash.

The front left air bag module cover opened along the designated tear point. The surface of the module flaps did not reveal any occupant contact evidence related to the deployment sequence. The tethered air bag, however, exhibited red color lipstick and peach color mascara transfers in the upper left quadrant which was attributed to contact by the driver's facial area during the crash.

The left front seat was in a forward position which was located 4.4 cm (1.75") rearward from full forward over a seat adjustment range of 23.5 cm (9.25"). The seat back support was reclined to the full rearward position due to rescue efforts related to extrication of the right front occupant.

The rearview mirror was rotated in a clockwise direction and exhibited a heavy abrasion of the black vinyl surface along the right lower corner. A small fragment of the black vinyl housing was found on the surface of the map/courtesy light bracket located 21.6 cm (8.5") rearward from windshield header and 6.1 cm (2.4") right of the vehicle centerline. The rotational movement and abraded surface were attributed to contact with the expanding front right air bag.

The roof head liner fabric sustained a small indentation scuff mark which resulted from rotation of the rearview mirror. It measured 12.7 mm (0.5") in diameter and was located 5.1 cm (2.0") right of the vehicle centerline.

There were light swipe marks on the windshield forward of the front right air bag module which were related to contact by the opening action of the air bag module cover flap. There was no occupant contact evidence visible on the mid mount air bag module cover.

The sunvisor fabric along the leading edge (edge closest to the windshield) was abraded along the entire edge which measured 26.7 cm (10.5") in length. This abraded surface was attributed to contact by the expanding air bag.

The untethered front right air bag had dot like transfer artifacts on the bottom surface of the air bag in an area which measured 3.8 cm (1.5"). This was attributed to contact with the child's facial area during the air bag expansion sequence..

The right roof side rail exhibited a light color 1.9 cm (0.75") diameter transfer mark which was located 18.4 cm (7.25") rear of the windshield header. A brown color dot artifact was located 7.0 cm (2.75") rearward of the light color transfer mark. These marks may have been the result of contact by the child's head area while being propelled rearward by the deploying air bag.

The right front window crank handle was fractured and separated from the door mounting area as the result of contact by the right side of the child during his rearward trajectory following the crash. The crank handle was oriented in a two o'clock position at the time of contact as noted by the vertical impression of the crank handle in the vinyl door surface. The arm rest in the right door panel above the window crank handle exhibited minor abrasion of the vinyl surface which was attributed to contact by the child.

The right front seat was adjusted in the center position which measured 12.7 cm (5.0") rear of the full forward position and 12.1 cm (4.75") forward of the full rear position. This placed the leading edge of the seat cushion 10.2 cm (4.0") rearward from the vertical surface of the instrument panel and 25.4 cm (10.0") above the floor pan. The longitudinal dimension of the seat cushion measured 49.5 cm (19.5") with a designed incline of 25 degrees. The seat back support was located 74.9 cm (29.5") rear of the leading edge of the air bag module flap at a height of 45.7 cm (18.0") above the junction with the seat cushion. The seat back support angle measured 28 degrees rearward from vertical.

The lap portion of the right front three point continuous loop lap and shoulder belt was abraded over a 5.1 cm (2.0") area which included a linear abrasion along the edge of the belt and a 12.7 mm (0.5") circular abrasion in the center of the belt. The abraded pattern along the edge began 2.5 cm (1.0") from the stop button in the belt webbing and the circular abraded pattern was located 5.1 cm (2.0") from the stop button. The abrasions were attributed to the interaction of the child's clothes while loading the restraint belt during the crash sequence.

The fabric of the right front seat head restraint was abraded in the top front area with small black hair fibers embedded in the fabric. This was attributed to contact by the posterior aspect of the child's head and

neck during his rebound trajectory. The abrasion measured 19.1 cm (7.5") laterally and 3.8 cm (1.5") vertically. The vertical face of the head restraint measured 17.8 cm (7.0"). The head restraint was adjusted upward 1.3 cm (0.5) from the full down position. The distance from the top of the head restraint to the seat cushion was 76.2 cm (30.0").

There was a bodily fluid transfer mark on outboard aspect of the right front seat back support which was attributed to contact by the child's head after the vehicle came to the final rest position. It formed a rectangular pattern which measured 2.5 cm (1.0") vertically and 12.7 cm (5.0") laterally. This mark was attributed to the driver's attempt to remove the child from the vehicle.

SPEED RECONSTRUCTION

The damage and trajectory algorithm routines of the WinSMASH speed reconstruction program were utilized to determine impact speed and delta V. The results appeared reasonable and are contained in the following table:

WinSMASH Speed Reconstruction	1995 Mitsubishi Eclipse
Impact speed	31.9 km/h (19.8 mph)
Total delta V	29.1 km/h (18.1 mph)
Longitudinal delta V	-29.1 km/h (-18.1 mph)
Lateral delta V	0 km/h
Energy	43,070 joules (31,767 ft-lb)
Barrier equivalent speed	29.1 km/h (18.1 mph)

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

Front Left Driver Air Bag

The Supplemental Restraint System (SRS) in the 1995 Mitsubishi Eclipse was designed with dual front air bags. The impact with the stone wall was sufficient to actuate the SRS deployment sequence. The front left module cover opened in the prescribed "H" pattern. There were no apparent occupant contact points on the cover surface.

The front left air bag had four tethers and two vent ports which measured 3.2 cm (1.25") in diameter and were located 5.1 cm (2.0") apart. The air bag measured 69.9 cm (27.5") in diameter with the tether stitched circle measuring 16.5 cm (6.5") in diameter. There were two faint red transfer marks on the surface of the air bag in the left upper quadrant which were attributed to contact with the driver's lips during the crash. The red imprints were located 7.6 cm (3.0") left of the air bag vertical centerline and 8.9 cm (3.5") above the

air bag horizontal centerline. The pattern of the artifact indicated that the air bag was fully expanded at the time of contact by the driver's facial area.

Adjacent to the red transfer was a peach color transfer mark which was attributed to facial mascara. The peach color mascara began 7.6 cm (3.0") above the air bag horizontal centerline and 8.9 cm (3.5") left of the vertical centerline and ended 8.9 cm (3.5") left of the vertical centerline and 8.9 cm (3.5") above the horizontal centerline.

Front Right Passenger Air Bag

The front right air bag module was a mid mount design which incorporated a single flap that opened upward toward the windshield. The air bag module cover measured 35.6 cm (14.0") laterally and 22.9 cm (9.0") longitudinally. The left side of the module was located 19.1 cm (7.5") right of the vehicle centerline. The vinyl flap did not reveal any evidence of occupant contact during the deployment sequence (**refer to Figure 7**).

The front right air bag was nontethered and contained two 6.4 cm (2.5") diameter vent ports on both the inboard and outboard side surfaces and located 45.7 cm (18.0") below the inflator unit. The air bag material was a white color nylon and constructed of a course fabric weave. The adhesive backed air bag identification label separated from air bag during deployment and was found on the right front seat cushion . The identification number was:

T1CU313H20123
2000687E

The longitudinal excursion of the front right air bag measured 73.7 cm (29.0") from the air bag module cover opening (**refer to Figure 8**). The right front seat was adjusted in the center position which measured 12.7 cm (5.0") rear of the full forward position and 12.1 cm (4.75") forward of the full rear position. The seat back support in this position was located 74.9 cm (29.5") rearward from the air bag module cover measured at a height of 45.7 cm (18.0") above the junction of the seat cushion.



Figure 7- View of the front right air bag module cover



Figure 8- Lateral view of the front right air bag showing extent of excursion

The bottom surface of the front right air bag exhibited dot like transfer artifacts in an area which measured 3.8 cm (1.5") in diameter. These artifacts were attributed to contact with the boy's facial area during

the air bag expansion event. This area was located 45.7 cm (18.0") below the inflator unit and 12.7 cm (5.0") inboard from the right seam edge.

INJURY DATA

The lap belt restrained child occupant, who was 116.8 cm (46.0") tall and weighed 23.6 kg (52.0 lbs.), moved forward and loaded the lap belt as the result of pre-impact braking and vehicle vaulting. The expanding right front air bag contacted the child's head and facial area which resulted in abrasions of the forehead and nose, diffuse subdural hemorrhage, subarachnoid hemorrhage, cerebral edema, and bilateral optic nerve hemorrhage. He then contacted the seat back support which resulted in a hyperextension of T1/T2 and peritoneal hemorrhage. Refer to the following table for a listing of the injuries identified in a preliminary autopsy report, the respective AIS-90 injury code, and correlating injury source.

INJURY	AIS-90	INJURY SOURCE
1. Diffuse subdural hemorrhage with 70 ml of clotted blood	140656.59	Front right air bag
2,3. Diffuse subarachnoid hemorrhage primarily covering superolateral convexities of both cerebral hemispheres	140648.31 140648.32	Front right air bag
4. Diffuse cerebral edema	140668.39	Front right air bag
5. Unconscious on admission with neurological deficit, GCS = 3, pupils fixed and dilated	160804.40	Front right air bag
6,7. Bilateral optic nerve hemorrhage	230299.11 230299.12	Front right air bag
<i>Supplemental discussion: (autopsy) Examinations of both eye globes, along with optic nerve, under the intact orbital plates reveal bilateral optic nerve hemorrhage and some hemorrhage in the superficial posterior muscle of the eye sockets. The right eye shows subdural hemorrhages along the nerve, minimal choroidal hemorrhages and focal extensive scleral hemorrhages. The left eye contains retinal hemorrhages as well as subarachnoid and subdural hemorrhage along the nerve.</i>		
8. Abrasions of the right forehead, three transverse abrasions 0.6 cm - 2.5 cm	290202.17	Front right air bag
9. Abrasion of the nose, tip of nose exhibited two linear longitudinal 6.4 mm abrasions	290202.14	Front right air bag
10. Laceration of the right upper lip	290600.18	Front right air bag

INJURY	AIS-90	INJURY SOURCE
11. Contusion of the left chest	490402.12	Front right air bag (interaction with the plastic sword as a consequence of the air bag expansion)
12. Pulmonary contusion of the left lung	441406.32	Front right air bag (interaction with the plastic sword as a consequence of the air bag expansion)
13. Fracture separation across T1 and T2 (intact underlying spinal cord), hemorrhage in the spinal canal with focal softening	650416.27	Right front seat back support
14. Hemorrhage in soft tissue of posterior neck covering fracture area of T1 from T2 vertebrae	390402.16	Right front seat back support
15. Small focal hemorrhage in both perinephric soft tissue	Not codeable	Right front seat back support

The child was removed from the vehicle by rescue personnel and transported via ambulance to a local trauma center where his condition was diagnosed as grave. While en route to the trauma center, the child experienced cardiac arrest and was successfully resuscitated. Within nine minutes of arrival at the trauma center, the trauma team made a decision to transfer the child to a trauma unit specializing in pediatric trauma. The child was subsequently transported to this unit where he was placed on life support. The following day a brain death test was administered which demonstrated a lack of brain activity. Life support was discontinued and the child was pronounced deceased 28 hours after the crash.

Driver #1, who was 154.9 cm (61.0") tall and weighed 44.5 kg (98.0 lbs), sustained minor injuries in the crash. She complained of a swollen jaw on the left side, laceration of the lip (contact with front left air bag), marks on the right knee (knee bolster), back pain, and intermittent visual light spot disorder (i.e., "sees stars"). She was wearing corrective lenses at the time of the crash, but was unable to locate her glasses at final rest.

OCCUPANT KINEMATICS

Right Front Occupant

The driver and her six year old son had an active evening which included attendance at the circus and dinner afterwards. She had purchased a 0.9 m (3.0') bright yellow color plastic sword for him at the circus which he was holding while sitting in the right front seat (**refer to Figure 9**). The child being right handed held the sword



Figure 9- View of the sword held by the child at the time of the crash

laterally across his body with his right hand grasping the handle portion and the point directed inboard toward the driver.

The driver indicated that the child was seated with his buttocks placed back in the seat with his back against the seat back support. She described his feet position, however, as being toward the floor with his knee bent over the leading edge of the seat cushion. Given his physical height of 116.8 cm (46.0") and the seat cushion longitudinal dimension of 49.5 cm (19.5"), it appeared likely that the child's lower torso was forward on the seat cushion in order to accommodate his comparatively short femur length [estimated at 28-30 cm (11-12")]. The child was wearing a light weight dark blue nylon rain jacket, tan jeans, short sleeve shirt, and sneakers. He was not wearing glasses or a hat.

The driver was not sure if the child had latched the restraint belt prior to the crash, however, she remembered removing it after the crash. Abrasion marks on the lap portion of the three point continuous loop restraint belt system supported the fact that the child was using the restraint system at the time of the crash. Due to the lack of corresponding physical evidence on the torso belt, the small stature of the child, and the full up position of the adjustable D-ring, it was presumed the child had placed the torso behind his back for comfort reasons.

During pre-impact braking and left steer avoidance action by the driver, the child's body moved forward and to the right. The lap belt which was spooled out to accommodate the child's forward seating position on the seat cushion limited the forward movement of his pelvis. As the vehicle traversed the embankment and subsequent vault, the child's buttocks and upper legs became vertically separated from the seat cushion. During the vehicle driveway contact sequence, the child's body landed on the seat cushion in a bottoming motion with a subsequent upward forward rebounding motion.

During the ensuing impact sequence with the stone wall, the SRS actuated and the expanding front right air bag contacted the child's head and chest area while he was in an elevated position. The expansion of the air bag against the child's head resulted in minor abrasions of his right forehead and nose, diffuse subdural hemorrhage, subarachnoid hemorrhage, cerebral edema, and bilateral optic nerve hemorrhage. The air bag contacted the plastic sword (as noted by the abraded surface on the sword) which then contacted the child's chest resulting in a contusion of the left chest and a pulmonary contusion of the left lung.

The child was propelled rearward and to the right where his right lower torso contacted the right front window crank handle and adjacent door panel. This was evident from the fractured crank handle and abraded surrounding door surface.

The child continued rearward with his back and shoulders contacting the seat back support. This contact resulted in focal soft tissue hemorrhage of both perinephric. The child's head and neck continued over the top of the head restraint which resulted in the fracture separation across T1 and T2 with an overlying soft tissue hemorrhage. The fabric along the front top surface of the head restraint was abraded and contained small black hair fibers embedded in the fabric which was attributed to this contact mechanism. The child slid down the seat back support and came to rest with his buttocks on the seat cushion against the seat back support and his upper torso leaning inboard over the center console.

The driver exited her vehicle and opened the right front door where she reportedly removed his restraint belt. She attempted to remove the child from the vehicle by rotating his upper torso toward her as noted by the rectangular shape bodily fluid transfer on the front outboard area of the seat back support. While moving the child, he reportedly moaned once which alarmed the driver. She placed him back over the console area and subsequently sought assistance at a nearby residence.

Driver

The driver had the seat adjusted in a near full forward position prior to the crash. She was wearing the three point manual lap and torso belt. Prior to the crash, the driver indicated that the water in the roadway pulled her vehicle to the right. As she departed the right side of the roadway, she attempted to correct the redirection by applying full brakes and steering left. As she approached the stone wall she was aware that a crash would occur and that the possibility that there may be some injury.

During the impact sequence, her body moved forward and her left knee contacted the knee bolster resulting in soft tissue injury. Her upper torso contacted the deployed air bag which resulted in a laceration of the lip. This was correlated with the red lipstick transfer mark noted in the upper left quadrant of the air bag.

She rebounded in her seat where she came to final rest. She released her restraint belt and exited the vehicle under her own power. She walked around the rear of the vehicle and opened the right front door to provide assistance to her son seat in the right front seat.