

On Site Child Safety Seat / Vehicle To Object Investigation
Dynamic Science, Inc. (DSI), Case Number DS08004
1998 Mitsubishi Montero Sport
California
January 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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16. Abstract <p>This on site investigation focused on an occupant who was seated in a child safety seat that was installed in the second row of a 1998 Mitsubishi Montero Sport. The Mitsubishi was involved in a single vehicle crash with a steel utility pole. This crash occurred at 0957 hours in January 2008. The crash occurred off-road on the southeast corner of an intersection. The Mitsubishi was being driven by a restrained 27-year-old female, and the first row right seat was occupied by a restrained 27-year-old male. The second row right seat was occupied by a 23-month-old female who was seated in a Cosco/Dorel High Back Booster Seat. The Mitsubishi was exiting a state highway on an exit ramp and drove off the left side of the roadway. The Mitsubishi crossed a paved shoulder and traveled over a raised concrete curb. The vehicle traveled offroad and contacted a fence. After driving through the fence, the right side of the vehicle contacted a steel utility pole. The Mitsubishi then traveled a short distance further before impacting a sign post and reentering the roadway. The vehicle came to rest facing north in a northbound lane.</p>					
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Background

This on site investigation focused on a child safety seat that was installed in the second row of a 1998 Mitsubishi Montero Sport (**Figure 1**). The Mitsubishi was involved in a single vehicle crash with a metal utility pole. The crash occurred off-road on the southeast corner of an intersection. The Mitsubishi was being driven by a restrained 27-year-old female, and the first row right seat was occupied by a restrained 27-year-old male. The second row right seat was occupied by a 23-month-old female who was seated in a Cosco/Dorel High Back Booster Seat. The Mitsubishi was exiting a state highway on an exit ramp and drove off the left side of the roadway. The Mitsubishi crossed a paved shoulder and traveled over a raised concrete curb. The vehicle continued traveling over unpaved ground and knocked down a chain link fence with its front end. After driving through the fence, the vehicle contacted a steel utility pole with its right side. The Mitsubishi then traveled a short distance further before impacting a sign post and reentering the roadway. The vehicle came to rest facing north in a northbound lane.



Figure 1. 1998 Mitsubishi Montero Sport

This child safety seat investigation was initiated by DSI in response to an online news article that stated that two occupants of a Mitsubishi Montero died of injuries sustained in a single vehicle crash. One of the decedents was a 23-month-old child who was seated in a child safety seat (CSS). On January 14, 2008, DSI was instructed to locate the subject vehicle and child safety seat. On January 14, 2008, DSI obtained a copy of the preliminary police report. The Mitsubishi had been placed on a police hold at a local tow facility. The CSS was being held by local law enforcement. On February 1, 2008, DSI obtained permission to inspect the vehicle and the CSS. The CSS was inspected on February 2, 2008. The Mitsubishi was inspected on March 10, 2008, and the crash scene was inspected on March 18, 2008.

Summary

Crash Site

This single vehicle crash occurred at 0957 hours in January 2008. The crash occurred off-road near the intersection of a highway exit ramp and the adjoining roadway (**Figure 2**). The intersection consisted of an east to west highway exit ramp that led to a north/south roadway. The speed limit for the exit ramp was 64 km/h (40 mph). The exit ramp was configured with a single lane that expanded to two lanes near the intersection. Initially, the exit ramp was characterized by a gentle right curve. At 64 meters (210 feet) from the intersection, the roadway straightened and expanded to two lanes. The curved section was paved with asphalt; the straight section was concrete. At the intersection, the first lane from the right was a right turn only lane; the second lane from the right was a left turn only lane. The lanes were separated by a solid stripe pattern which led to the intersection.

The lane widths for the exit ramp were 3.6 m (11.9 ft) for the right turn lane and 3.7 m (12.2 ft) for the left turn lane. There were paved shoulders on each edge of the exit ramp. The north and south roadway edges were configured with raised concrete curbs which measured 16 cm (6.3 in) in height. Adjacent to the roadway on each side was generally level ground with vegetation.

The exit ramp ran northwest, and intersected the north/south roadway at an angle of 104 degrees from due north. The intersection was controlled by tri-color signal lights for all travel lanes. The north/south roadway consisted of three northbound lanes and two southbound lanes, with a raised concrete divider separating northbound and southbound traffic. The crash occurred during daylight hours. The weather was clear and winds were calm.



Figure 2. Approach view, exit ramp

Pre Crash

The 1998 Mitsubishi Montero was being driven by a restrained 27-year-old female. There were two additional passengers. The first row right seat was occupied by a restrained 27-year-old male. The second row right was occupied by a 23-month-old female child seated in a Cosco/Dorel forward facing CSS. The Mitsubishi had exited the westbound highway and was traveling northwest on the exit ramp.

Crash

The 1998 Mitsubishi Montero was traveling northwest on the exit ramp. On the straight, concrete section of the exit ramp, the driver of the Mitsubishi lost control of the vehicle. Tire marks observed at the scene indicated the Mitsubishi initiated a left side roadway departure 42.2 m (138.6 ft) east of the intersection (**Figure 3**). At 40.5 m (132.8 ft) east of the intersection, the Mitsubishi traveled over the curb and onto the unpaved ground on the southeast corner of the intersection. The Mitsubishi traveled off the roadway for a distance of 27.1 m (88.9 ft) and contacted a chain link fence which stood approximately 1.5 m (5.0 ft) high (**Figure 4**) The front left bumper of the Mitsubishi sustained minor contact damage as a result of the impact. The Mitsubishi then traveled another 8.5 m (28.0 ft) where the right side of the Mitsubishi contacted a steel utility pole (**Figure 5**). The Mitsubishi began a clockwise rotation and traveled a short distance



Figure 3. Scene, left roadside departure

before striking one post of a two-posted street sign with its left side. The sign was knocked down. The Mitsubishi continued rotating until it came to rest facing north in the northbound lanes of the intersecting roadway.

Post Crash

According to the on-line news article, the 27-year-old female driver of the Mitsubishi was arrested on suspicion of driving under the influence of drugs. She was transported to a local hospital with non-life-threatening injuries, and was admitted overnight for observation.

The 27-year-old male occupant seated in the front right died at the scene as a result of his injuries. The cause of death was reportedly multiple blunt force injuries.

The 23-month-old female occupant seated in the second row died at the scene as a result of her injuries. The cause of death was reportedly multiple blunt force head and extremity injuries.

The 1998 Mitsubishi Montero was towed from the scene due to damage. It was placed on police hold, and was later declared to be a total loss by the insurance company.

Vehicle Data - 1998 Mitsubishi Montero Sport

The 1998 Mitsubishi Montero was identified by the Vehicle Identification Number (VIN): JA4LS31P0WPxxxxxx. The date of manufacture was June 1997. The mileage was unavailable due to the electronic odometer and absence of power to the vehicle. The Mitsubishi was equipped with a 3.0 liter, 6-cylinder engine, a 4-speed automatic transmission, rear wheel drive, and disc brakes. The vehicle manufacturer's recommended tire size was 265/70R15, and the recommended tire pressure was 179 kPa (26 psi). The Mitsubishi was configured with four Michelin LTX M/S tires, size 30 x 9.50R15LT. The tire manufacturer's maximum tire pressure was 345 kPa (50 psi). The specific tire information was as follows:



Figure 4. Point of impact with fence



Figure 5. Point of impact with steel utility pole

Position	Measured Pressure	Measured Tread Depth	Restricted	Damage
LF	290 kPa (42 psi)	6 mm (8/32 in)	No	None
LR	262 kPa (38 psi)	6 mm (7/32 in)	No	None
RR	262 kPa (38 psi)	6 mm (7/32 in)	No	None
RF	290 kPa (42 psi)	6 mm (7/32 in)	No	None

The first row seating in the Mitsubishi was configured with fabric-covered bucket seats and adjustable head restraints for the two outboard seating positions. The second row seating was configured with a fabric-covered split bench seat with folding backs and adjustable head restraints for the two outboard seating positions. The third row seats were folded down in the stowed position.

Vehicle Damage

Exterior Damage - 1998 Mitsubishi Montero Sport

There were three events during the crash sequence. The first event was a front end impact with a chain link fence (**Figure 6**). The fence impact was a low Delta V event; the fence posts were bent and the fence yielded as the vehicle continued to travel forward. The direct damage began at the left front bumper corner and extended 160 cm (63.0 in) to the right front bumper corner. Much of the direct damage was limited to surface scratches and chipped paint. There was denting to the front left bumper, the left front headlamp was broken, and there was minor denting to the left front of the hood. The field L for the frontal impact began at the left front bumper corner and extended 49 cm (19.3 in) to the right. There was no crush to the front bumper. The Collision Deformation Classification (CDC) for the first impact was 12FDEW1.



Figure 6. Frontal view showing damage from fence impact

The second event was a right side impact with a steel utility pole (**Figure 7**). The pole measured 62 cm (24.4 in) in diameter and 194 cm (77.2 in) in circumference. At the base of the pole, there was a concrete skirt that measured 15 cm (5.9 in) in height and 94 cm (37.0 in) in diameter.

Inspection of the steel pole revealed contact evidence which included paint transfers, tire marks, scrapes and gouges. Inspection of the concrete base revealed contact evidence which included gouge marks and chipped areas of concrete.

The pole impact resulted in moderate crush to the right side of the vehicle. There was direct damage to the A, B and C pillars, the right side doors, the sill, and the roof rail. The roof was buckled. The direct damage to the right side began at the right rear bumper corner and extended 405 cm (159.4 in) to the right front bumper corner. The Field L began 20 cm (7.9 in) rearward of the rear axle, extended forward 293 cm (115.4 in) and ended 8 cm (3.2 in) forward of the front axle. The CDC for the second impact was 01RDAW3. Stands were set using the vehicle half-width method. Six crush measurements were taken at mid-door level as follows: C1 = 0 cm, C2 = 9 cm (3.5 in), C3 = 31 cm (12.2 in), C4 = 18 cm (7.1 in), C5 = 9 cm (3.5 in), C6 = 0 cm. Maximum crush at mid-door level was located between C2 and C3, 74 cm (29.1 in) forward of the rear axle, and measured 38 cm (15 in).

The Barrier algorithm of the WinSmash program computed a total delta V of 26 km/h (16.0 mph), based on the Mitsubishi's right side crush profile.

The longitudinal and lateral components were -20 km/h (-12.0 mph) and -17 km/h (-11.0 mph), respectively.

The third event was a left side impact with a wooden sign post (**Figure 8**). The direct damage began 20 cm (7.9 in) forward of the left rear bumper corner and extended 45 cm (17.7 in) forward. The vertical measurement of the damage began at bumper level and extended 90 cm (35.4 in) up the D pillar. The CDC for the second impact was 10LBAW2.



Figure 7. Right side view showing damage from utility pole impact

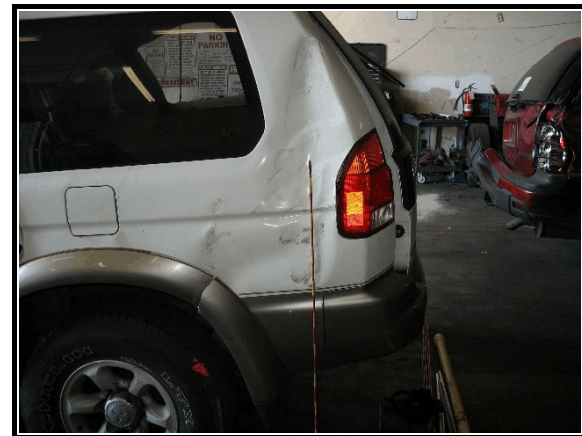


Figure 8. Left side view showing damage from sign post impact

Interior Damage - 1998 Mitsubishi Montero Sport

The 1998 Mitsubishi Montero sustained moderate interior damage as a result of passenger compartment intrusion. The windshield was out of place and holed. All the right side glazing was disintegrated. There was hinge damage to the right side doors and the front row right door panel was displaced from the vehicle. There was lateral intrusion to the middle seat positions of the front and second rows. The front row seats intruded longitudinally into the second row, and deformed and displaced the seat cushion (**Figures 9-10**).



Figure 9. Second row intrusion, seat deformation



Figure 10. First and second row intrusions

The specific passenger compartment intrusions were as follows:

Row	Position	Intruded Component	Magnitude of Intrusion	Direction
2	Left	Front seat back	55 cm (21.7 in)	Longitudinal
2	Right	Front seat back	43 cm (16.9 in)	Longitudinal
1	Right	Roof side rail	42 cm (16.5 in)	Lateral
1	Right	A-pillar	42 cm (16.5 in)	Lateral
2	Right	B-pillar	42 cm (16.5 in)	Lateral
2	Right	Roof side rail	42 cm (16.5 in)	Lateral
1	Right	Door - Undetermined Location	26 cm (10.2 in)	Lateral
2	Right	Seat cushion	24 cm (9.5 in)	Vertical

1	Right	Instrument panel	18 cm (7.1 in)	Lateral
1	Middle	Roof side rail	18 cm (7.1 in)	Lateral
2	Right	C-pillar	16 cm (6.3 in)	Lateral
2	Middle	B-pillar	15 cm (5.9 in)	Lateral
2	Middle	Roof side rail	13 cm (5.1 in)	Lateral
1	Right	Floor pan	12 cm (4.7 in)	Vertical
2	Right	Roof	11 cm (4.3 in)	Vertical
1	Middle	A-pillar	3 cm (1.2 in)	Lateral

Manual Restraint Systems - 1998 Mitsubishi Montero Sport

The Mitsubishi was equipped with 3-point manual lap and shoulder safety belts for the front and second row outboard seating positions. The second row center seat was equipped with a manual lap belt. The lap and shoulder belts were equipped with sliding latch plates; the lap belt was equipped with a locking latch plate. The front row safety belts were equipped with adjustable anchorages that were each adjusted to the full up position. The second row safety belts were not equipped with adjustable anchorages.



Figure 11. Front row right safety belt

The driver's safety belt was equipped with an emergency locking retractor (ELR). The latch plate exhibited scratches that indicated historical usage. The belt webbing and latch plate were examined and no evidence of occupant loading of the belt restraint was found.

The front row right passenger safety belt was configured with a switchable ELR/automatic locking retractor (ALR). The D-ring was adjusted to the full up position. The right B-pillar had been cut above the D-ring by rescue personnel. The safety belt webbing was unspooled from the retractor (**Figure 11**). The belt webbing was slack and the retractor was in an unknown mode. The lower B-pillar was deformed as a result of the pole impact and it was probable that the retractor mechanism was compromised. The belt webbing and latch plate were examined and no evidence of occupant loading of the belt restraint was found. The latch plate exhibited scratches that indicated historical usage.

The second row outboard safety belts were equipped with switchable ELR/ALR retractors. The right side lap and shoulder belt was used to secure a Cosco Dorel High Back Booster CSS. The buckle was located under the seat cushion, which was deformed from intrusion. The safety belt buckle was

fractured and the plastic cover was displaced from the belt. It is possible the buckle cover was fractured due to contact with the CSS shell. The buckle was in close proximity to the left aspect of the shell and the shell was displaced to the left during the utility pole impact. The belt was found partially unspooled from the retractor and would not fully retract. The switchable retractor was in an unknown mode. There was contact damage to the right C-pillar and it was possible that either the retractor mechanism was compromised or deformity of the C-pillar prevented movement of the retractor.

The belt webbing and latch plate were examined. The latch plate exhibited scratches that indicated historical usage. The belt webbing did not exhibit evidence of occupant loading. There were deposits of tissue and body fluid located intermittently on the webbing that began at the stop button and extended approximately 25 cm (10.0 in) upward. There were also deposits of human tissue on the latch plate. The third row seats were in the stowed position and the safety belts were not examined.

Supplemental Restraint Systems - 1998 Mitsubishi Montero Sport

The 1998 Mitsubishi Montero was equipped with front row air bags for the left and right occupants. The air bags deployed as a result of the impact with the utility pole (**Figure 12**).

The driver's air bag deployed from the center of the steering wheel hub through a single module cover flap. The flap measured 12 cm (4.7 in) in height and 17 cm (6.7 in) in width. The deployed driver's air bag measured 50 cm (19.7 in) in diameter in its deflated state. There were two vent ports, one on either side near the top cover flap. There were a few small deposits of suspected dried blood on the front of the bag.



Figure 12. First row frontal air bags

The front right passenger's air bag deployed from a top-mount module with a rectangular cover flap that was hinged at the forward aspect. The flap measured 15 cm (5.9 in) in height and 32 cm (12.6 in) in width. The air bag measured 46 cm (18.1 in) across the seams. There were deposits of suspected dried blood on the front of the bag.

Child Safety Seat

The second row right occupant was a 23-month-old female who was restrained in a forward facing CSS. The seat was a Cosco/Dorel High Back Booster Seat. The model number was 22-208-PEP and the date of manufacture was April 1, 2004. The seat was equipped with a 5-point harness and shoulder belt positioners. The harness was used to secure the child within the seat. The autopsy for this occupant revealed left and right side chest abrasions. There were two sets of slots for the

harness shoulder straps; the straps were routed through the upper slots (**Figure 13**). The plastic grommet for the upper right slot was displaced from the slot and had slid down to the retainer clip. The grommet from the lower center slot on the seat cushion was also displaced from the slot.

The vehicle's 3-point manual lap and shoulder belt was used to secure the CSS to the vehicle. The safety belt was routed through the forward facing belt path in the back of the seat shell. The safety belt buckle was possibly fractured during the crash due to contact with the CSS shell.

The CSS shell exhibited a large area of scuffing on the headrest. There was crazing along the top edge of the shell and on the right side. The damage was a result of intrusion during the pole impact. The child was decapitated during the impact and there was a considerable amount of dried body tissue on the right side of the CSS cover, contiguous to the headrest. There were traces of dried body tissue and fluid on the harness straps and retainer clip.



Figure 13. Cosco/Dorel High Back Booster Seat

The CSS was equipped with Lower Anchors and Tethers for Children (LATCH) hardware. The LATCH components were not used in the installation of the child seat. The seat was equipped with a locking clip, that was found stowed on the back of the seat shell. The locking clip was not used in the installation of the seat.

Occupant Demographics

	Driver	Occupant 2
Age/Sex:	27/Female	27/Male
Seated Position:	Front left	Front right
Seat Type:	Bucket	Bucket
Height:	170 cm (67 in)	198 cm (78 cm)
Weight:	63 kg (138 lbs)	83 kg (184 lbs)
Alcohol/Drug Involvement:	Drugs detected	Drugs detected
Body Posture:	Unknown	Unknown
Hand Position:	Unknown	Unknown

Foot Position:	Unknown	Unknown
Restraint Usage:	Lap and shoulder belt used	Lap and shoulder belt used
Air bag:	Steering wheel mounted frontal air bag deployed	Front right passenger frontal air bag deployed
Type of Medical Treatment:	Transported and released	Pronounced dead at scene.
	Occupant 3	
Age/Sex:	23 months/Female	
Seated Position:	Second row right	
Seat Type:	Split bench with folding back	
Height:	84 cm (33 in)	
Weight:	11 kg (24 lbs)	
Body Posture:	Unknown	
Hand Position:	Unknown	
Foot Position:	Unknown	
Restraint Usage:	Lap and shoulder belt with child safety seat	
Type of Medical Treatment:	Pronounced dead at scene.	

Occupant Injuries

Driver: Injuries obtained from police report.

The driver complained of neck, back, hip, and left shoulder pain, and reportedly sustained bleeding of the abdomen.

Front Right Occupant: Injuries obtained from autopsy report.

<u>Injury</u>	<u>OIC Code</u>	<u>Injury Source</u>	<u>Confidence Level</u>
Multiple 1.2 cm (0.5 in) contusions to right side of chest	490402.1,1	Door panel, right rear upper quadrant	Probable
Fracture, right forearm with 15 x 8 cm (6 x 3 in) gaping laceration	751900.2,1	Unknown	Unknown

Fracture, right femur, closed, at midpoint	851814.3,1	Door panel, right rear upper quadrant	Probable
Face, multiple gaping lacerations	290604.2,0	Utility pole	Probable
Right forehead. Gaping 15 x 1.2 cm (3 x 0.5 in) laceration	290604.2,7	Utility pole	Probable
Ecchymosis, right and left eyelids	297402.1,1 297402.1,2	Utility pole	Probable
Contusion, right temple	290402.1,1	Utility pole	Probable
Right cheek and jaw, multiple contusions	290402.1,1	Utility pole	Probable
Right cheek and jaw, multiple abrasions	290202.1,1	Utility pole	Probable
Chin, 3.8 cm (1.5 in) laceration	290602.1,8	Utility pole	Probable
Nasal fracture	251000.1,4	Utility pole	Probable
Contusion, right inferior frontal lobes of brain	140602.3,1	Utility pole	Probable
Right and left temporal bone fractures	150400.2,1 150400.2,2	Utility pole	Probable
Right posterior/lateral rib fractures, ribs 2-10 (posterior), ribs 4-7 (lateral) with hemothorax	450232.4,1	Door panel, right rear upper quadrant	Probable
Lung contusions, bilateral	441410.4,3	Door panel, right rear upper quadrant	Probable
Right lower leg, multiple contusions	890402.1,1	Door panel, right rear lower quadrant	Probable
Laceration, 2 cm (0.8 in), right thigh	890602.1.1	Door panel, right rear lower quadrant	Probable
Fracture, right hand	752500.2,1	Utility pole	Unknown
Lip contusions	290402.1,8	Utility pole	Probable
Hemorrhage of the right parietal and temporal regions, scalp	190402.1,1	Utility pole	Probable
Subarachnoid hemorrhage	140684.3,9	Utility pole	Probable

Second Row Right Occupant: Injuries obtained from autopsy report.

<u>Injury</u>	<u>OIC Code</u>	<u>Injury Source</u>	<u>Confidence Level</u>
Decapitation, at level of C2, spinal cord severed	311000.6,0	Roof side rail	Certain
Fracture, nasal bridge and septum	251000.1,4	Roof side rail	Certain
Scalp laceration, 25 x 5 cm (10 x 2 in), extends from right jaw, upward above right earlobe, and downward to the right occipital region.	190604.2,1	Roof side rail	Certain
Multiple lip contusions	290402.1,8	Roof side rail	Certain
Laceration, 12.7 x 7.6 cm (5 x 3 in), left side of neck	390604.2,2	Roof side rail	Certain
Linear abrasions, left side of face	290600.1,2	Roof side rail	Certain
Anterior chest, 2.5 x3.8 (1 x 1.5 in) contusions, bilateral	490402.1,3	Child safety seat harness	Probable
C5 fracture	650216.2,6	Roof side rail	Probable
Contusion, 7.6 x 5 cm (3 x 2 in) , right thigh	890402.1,1	Door panel, right rear lower quadrant	Possible
Bilateral closed femur fractures	851800.3,1 851800.3,2	Seat back	Probable
Skull fractures, right and left temporal region	150400.2,1 150400.2,2	Roof side rail	Certain
Lung contusion NFS	441402.3,9	Door panel, right rear upper quadrant	Possible

Occupant Kinematics - 1998 Mitsubishi Montero Sport**Driver Kinematics**

The 27-year-old female driver was seated in an unknown posture and was restrained by the 3-point manual lap and shoulder belt. The driver had reportedly fallen asleep prior to the roadside departure. It is probable that the driver had one or both hands on the steering wheel and her right foot on the accelerator. The vehicle departed the roadway and traveled over a concrete curb onto level ground,

then contacted a chain link fence. At impact with the steel utility pole, the frontal air bags deployed, and the Mitsubishi rotated sharply clockwise. The driver was displaced sharply to the right and front in response to the 2 o'clock direction of force, and she loaded the safety belt. She possibly contacted the frontal air bag; dried blood was observed on the air bag at the time of the vehicle inspection. As the vehicle rotated clockwise, the driver was displaced to the right. She possibly contacted the center console, which intruded laterally right and deformed the driver's seat cushion. The vehicle contacted a wooden sign post, traveled off the curb, and reentered the roadway. The vehicle came to final rest in the northbound lane of the north/south roadway. The driver reportedly exited the vehicle under her own power. An on-scene witness reported to police that the driver fell down twice, and then stayed on the ground until medical personnel arrived. The police report described her injuries as moderate, and indicated that she was suspected of being under the influence of drugs.

First Row Right Occupant Kinematics

A 27-year-old male occupant was seated in an unknown posture and was restrained by the 3-point manual lap and shoulder belt. During the roadway departure and fence impact, the right occupant remained in his seated position. The right side of the vehicle contacted a steel utility pole. At impact with the utility pole, the occupant was displaced to the right in response to the 2 o'clock direction of force. The right side door panel, roof side rail and A-pillar intruded laterally and integrity was lost at the side window glazing, allowing the right front occupant to strike the utility pole. The passenger seat back moved to the full back position. He sustained severe injuries to his head, right arm, torso, and right leg. His head injuries included multiple skull fractures, contusions to the brain, multiple hemorrhages, and gaping facial lacerations. Injuries to the torso included multiple rib fractures, bilateral lung contusions and chest contusions. Injuries to the extremities included fractures of the right forearm right hand, and right femur. The cause of death was reportedly multiple blunt force trauma injuries. The occupant was pronounced dead at the scene and removed from the scene by attending personnel.

Second Row Right Occupant Kinematics

The 23-month-old female child was seated within a Cosco/Dorel High Back Booster CSS, that was secured to the vehicle seat with the 3-point manual lap and shoulder belt. The child was restrained within the CSS by the 5-point harness. During the roadway departure and the fence impact, the child remained in her child safety seat. The right side of the vehicle contacted a steel utility pole resulting in significant intrusion of the right roof rail into the second row right passenger compartment. The first row right seat back was displaced into the second row right compartment. The second row right seat cushion was deformed and out of place. The passenger contacted the intruding right roof rail, was decapitated, and sustained a severed spinal cord. She loaded the child seat harness, and sustained bilateral chest contusions and a lung contusion. She contacted the intruding right door panel, and sustained a large contusion to her right thigh. The child's legs contacted the intruding seat back, which resulted in bilateral femur fractures. She was pronounced dead at the scene and removed from the vehicle by attending personnel.

Attachment 1. Scene Diagram

