TRANSPORTATION SCIENCES
CRASH RESEARCH SECTION

Calspan Corporation
Buffalo, New York 14225

CALSPAN FRONT RIGHT AIR BAG DEPLOYMENT/CHILD FATALITY INVESTIGATION

CALSPAN CASE NO. CA97-047

SUBJECT VEHICLE - 1996 PLYMOUTH NEON

LOCATION - STATE OF NORTH CAROLINA

CRASH DATE - NOVEMBER, 1997

Contract No. DTNH22-94-D-07058

Prepared for:

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National Highway Traffic Safety Administration
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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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An on-site investigation of a three vehicle front-to-rear type impact configuration which involved the frontal plane of a 1996 Plymouth Neon, the back and front planes of a 1996 Toyota Tacoma pick-up truck, and the back plane of a 1993 Pontiac Grand Am. The impact resulted in the deployment of the Plymouth's front left and front right air bags. A three year old unrestrained female passenger, positioned on the lap of the right front adult seated passenger, sustained fatal injuries as a result of air bag deployment.

16. *Abstract*

This on-site investigation focused on the deployment of the front left and front right air bag system of a 1996 Plymouth Neon, 4-door sedan, and the subsequent fatality of an unrestrained three year old female seated on the lap of the right front seated passenger. The front of the Neon impacted the back plane of a 1996 Toyota Tacoma, 4x2 pick-up truck, in a front-to-rear type impact configuration. This impact initiated the deployment sequence of the front left and front right air bag system of the Neon. The pick-up truck was subsequently displaced forward and impacted its right front bumper with the back plane of a 1993 Pontiac Grand Am SE, 4-door sedan. The Grand Am was stopped in front of the pick-up truck waiting to initiate a left turn. The driver of the Neon removed the three year old child from the vehicle, noticed that she was not breathing, and stopped a passing vehicle to transport the child to the local emergency rescue team located approximately 0.40 kilometer (0.25 mile) west of the crash scene. The child was then transferred to a hospital where she expired approximately 30 minutes post-crash. The child sustained medically reported injuries which included a C3/C4 anterior subluxation (AIS-2), herniation of the brain stem (AIS-5), anterior neck contusions (AIS-1) and abrasions (AIS-1), and right face contusions (AIS-1) which resulted from contact by the deploying front right air bag. Right arm contusions (AIS-1) were resultant of contact with the front right module cover flap and right dorsal hand lacerations (AIS-1) and hematoma (AIS-1) were attributed to contact with the right aspect of the Neon's windshield. Contusions over the pleural surface of the lungs (AIS-4) were attributed to compression of the child's chest between the right front seated adult passenger and the deployed air bag. The unrestrained male driver of the Neon sustained bilateral forearm abrasions (AIS-1) and epistaxis (nose bleed). The unrestrained right front seated female passenger of the Neon sustained a fractured right wrist (AIS-1) and a right cheek laceration (AIS-1). Occupants in the pick-up truck and Grand Am were not injured as a result of the crash.

17. Key Words 1996 Plymouth Neon, Driver and passenger air bag deployment, Front left and front right air bags, Child fatality, Lap seated child, Cervical cord injury, AIS-4, AIS-5		*18. Distribution Statement* General Public	
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Background

Figure 1. On-scene image of the involved vehicles' final rest position.

This on-site investigation focused on the deployment of the front left and front right air bag system of a 1996 Plymouth Neon, 4-door sedan, and the subsequent fatality of an unrestrained three year old female seated on the lap of the right front seated passenger. The front of the Neon impacted the back plane of a 1996 Toyota Tacoma, 4x2 pick-up truck, in a front-to-rear type impact configuration. This impact initiated the deployment sequence of the front left and front right air bag system of the Neon. The pick-up truck was subsequently displaced forward and impacted its right front bumper with the back plane of a 1993 Pontiac Grand Am SE, 4-door sedan. The Grand Am was stopped in front of the pick-up truck waiting to initiate a left turn. **Figure 1** identifies the on-scene final rest position of, and damage to the Neon and the Tacoma. The driver of the Neon removed the three year old child from the vehicle, noticed that she was not breathing, and stopped a passing vehicle to transport the child to the local emergency rescue team located approximately 0.40 kilometer (0.25 mile) west of the crash scene. The child was then transferred to a hospital where she expired approximately 30 minutes post-crash. The child sustained medically reported injuries which included a C3/C4 anterior subluxation (AIS-2), herniation of the brain stem (AIS-5), anterior neck contusions (AIS-1) and abrasions (AIS-1), and right face contusions (AIS-1) which resulted from contact by the deploying front right air bag. Right arm contusions (AIS-1) were resultant of contact with the front right module cover flap and right dorsal hand lacerations (AIS-1) and hematoma (AIS-1) were attributed to contact with the right aspect of the Neon's windshield. Contusions over the pleural surface of the lungs (AIS-4) were attributed to compression of the child's chest between the right front seated adult passenger and the deployed air bag. The unrestrained male driver of the Neon sustained bilateral forearm abrasions (AIS-1) and epistaxis (nose bleed). The unrestrained right front seated female passenger of the Neon sustained a fractured right wrist (AIS-1) and a right cheek laceration (AIS-1). Occupants in the pick-up truck and Grand Am were not injured as a result of the crash.

The Chief of Police at the investigating police agency notified NHTSA of this crash on Monday, November 17, 1997. NHTSA subsequently forwarded the crash to the Special Crash Investigation Team at Calspan and an on-site investigation was initiated on November 18th.. Cooperation and assistance was obtained from the local police department that investigated the crash.

Summary

The crash occurred during the evening hours on a suburban east/westbound two-lane asphalt roadway with a posted speed limit of 56 km/h (35 mph). The level roadway was wet due to rainy conditions at the time of the crash and viewing conditions were reported as fair by the investigating police officer. The south shoulder of the roadway was bordered by a deteriorating concrete curb which had a maximum height of 15.2 cm (6.0 in), a grass berm, sidewalk and fence. The north shoulder of the roadway was bordered by grass and a drainage ditch. **Figure 2** identifies the crash scene and the initial direction of travel for the Neon.

Figure 2. View of the Neon's direction of travel and the crash scene.

The 1996 Plymouth Neon, 4-door sedan (2.0 L, 4 cylinder), was identified by vehicle identification number (V.I.N.) 3P3ES47C6TT (production sequence omitted). The odometer read 53,630 kilometers (33,320 miles) at the time of inspection. The Neon was equipped with a Supplemental Restraint System (SRS) that consisted of a front left and front right air bag system. Three-point manual belt systems were available for the four outboard seated positions. The front outboard belt systems were equipped with manual height adjusters and a lap belt was available for the center rear seated position. The Neon was not equipped with an anti-lock braking system (ABS).

The 1996 Toyota Tacoma, 4x2, regular cab pick-up truck was identified by vehicle identification number (V.I.N.) 4TANL4246TZ (production sequence omitted). It was equipped with a front left air bag system and 3-point manual lap and shoulder belt systems with manual height adjusters for the two outboard seated positions. A manual lap belt was available for the center seated position. The pick-up truck was also equipped with a 4-speed automatic transmission and cap for the 188 cm (74 in) cargo box. This vehicle was occupied by a 22 year old male driver, an 11 year old male seated in the center front position, and a 20 year old female positioned in the right front seated position. The Police Crash Report (PCR) indicated that all of the occupants of the pick-up truck were restrained by their respective belt systems and that no injuries were sustained as a result of the crash.

The 1993 Pontiac Grand Am SE, 4-door sedan (2.3 L, 4 cylinder) was identified by vehicle identification number (V.I.N.) 1G2NE5433PC (production sequence omitted). It was occupied by a 37 year old female driver who was police reported as restrained by a 3-point automatic belt system and not injured during the crash sequence.

Crash Events

Pre-Crash

Pre-crash, the driver of the Neon, the female right front seated passenger, and the three year old child were transporting meals to their residence from a local fast food restaurant. The driver was familiar with the roadway and traveled it daily. The Neon traveled eastbound on the two-lane wet roadway during dark and rainy conditions and exited a right curve in the road. The vehicle inspection revealed that the Neon's windshield wipers were in a delayed mode at the time of the crash. The pick-up truck was stopped behind the Grand Am in the eastbound lane ahead of the approaching Neon. The Grand Am was waiting for westbound traffic to pass to initiate a left turn onto an intersecting two-lane roadway. The driver of the Neon initiated evasive actions to the impending impact by applying the brakes, which locked the front wheels, and steering right. Pre-impact physical evidence at the scene consisted of a right front skid mark which measured 8.5 meters (28.0 feet) and a 9.4 meter (31.0 feet) left front skid mark.

Crash

The frontal area of the Neon impacted and underrode the right rear bumper area of the Toyota pick-up truck in an off-set type impact configuration. This impact resulted in the deployment of the Neon's air bag system. Despite the underriding damage pattern sustained by the Neon, the Barrier Equivalent application of WinSMASH was used to calculate the total delta V for the Neon at 15.1 km/h (9.4 mph). The total delta V for the Toyota pick-up truck was not calculated due to the overriding type damage sustained by the vehicle and its post-manufactured rear bumper. Estimated delta V based on these circumstances and the crush sustained by the vehicle was 14.5-21.0 km/h (9.0-13.0 mph). The pick-up truck was displaced forward due to its initial impact with the Neon and contacted its front right bumper with the rear of the Grand Am. ROLDMISS (the missing vehicle algorithm of Win SMASH) calculated the pick-up truck's total delta V for this impact at 10.0 km/h (6.2 mph) and the total delta V for the Grand Am at 11.3 km/h (7.0 mph).

Post-Crash

The Neon traveled an additional 1.4 meters (4.6 feet) to its final rest position. Skid to stop analysis was calculated for the post-impact travel speed of the Neon at 14.2 km/h (8.8 mph). The Toyota traveled an additional 3.5 meters (11.4 feet) post impact to its final rest position. The vehicles came to rest in their original travel lane facing east. The Plymouth Neon and Toyota Tacoma were towed from the scene of the crash due to damage. The Grand Am was driven from the scene by the driver.

Exterior Vehicle Damage

The impact to the Plymouth Neon generated direct contact damage that began at the front left bumper corner and fender area and extended 120 cm (47 in) right. Underriding damage was located on the center aspect of the hood face that consisted of blue paint transfers and longitudinal abrasions. Maximum crush was located at the radiator support level with a value 13 cm (5 in) and measured 26.8 cm (10.5 in) right of the left front bumper corner. Crush Values are reported in **Table 1**. The damage resulted in an 12 o'clock direction of force and a Collision Deformation Classification (CDC) of 12-FYMW-1. Damage sustained by the Neon is identified in **Figures 3 and 4**.

Figure 3. Frontal damage sustained by the Plymouth Neon.

Figure 4. Identification of upper radiator support damage.

Table 1. 1996 Plymouth Neon's Frontal Plane Crush Measurements

Plane of Impact	Field L	C1	C2	C3	C4	C5	C6
Upper radiator support	134.0 cm (52.8 in)	2.5 cm (1.0 in)	13.0 cm (5.1 in)	12.5 cm (4.9 in)	6.0 cm (2.4 in)	No residual crush	No residual crush

The initial impact to the Toyota Tacoma pick-up truck generated direct contact damage that began at the rear right bumper corner and extended 65 cm (26 in) left. The rear bumper was displaced under the tailgate and bed of the pick-up truck. Maximum crush value at bumper level was approximately 62.0 cm (24.4 in) located 57.2 cm (22.5 in) left of the rear right bumper corner. Rear bumper crush measurements are reported in **Table 2**. The rear aspect of the right side quarter panel sustained 1.5 cm (0.6 in) of crush. The damage resulted in a 6 o'clock direction of force and a CDC of 06-BZLW-3. Damage to the Tacoma is identified in **Figure 5**.

Figure 5. Damage sustained by the rear plane of the Toyota pick-up truck.

The second impact to the pick-up truck generated direct contact damage that began at the front right bumper corner and extended 47 cm (19 in) left. Maximum crush value was measured at 13.5 cm (5.3 in) located 30.0 cm (11.8 in) left of the right front bumper corner. The damage resulted in a 12 o'clock direction of force and a CDC of 12-FRLW-1. Crush measurements for the frontal plane of the Tacoma are reported in **Table 2.**

Table 2. Crush Measurements for the Rear and Front Planes of the Toyota Tacoma

Plane of Impact	Field L	C1	C2	C3	C4	C5	C6
Back Bumper	143.0 cm (56.3 in)	14.0 cm (5.5 in)	30.0 cm (11.8 in)	47.0 cm (18.5 in)	62.0 cm (24.4 in)	55.5 cm (21.9 in)	44.5 cm (17.5 in)
Front Bumper	150 cm (59 in)	No residual crush	2.0 cm (0.8 in)	4.5 cm (1.8 in)	4.5 cm (1.8 in)	13.5 cm (5.3 in)	9.5 cm (3.7 in)

Interior Vehicle Damage

The Neon's interior damage was resultant of occupant contact and air bag deployment during the crash sequence. The moderate severity crash did not produce intrusion of interior components. Two cm (1 in) of separation was measured between the mid instrument panel and the knee bolster/glove compartment door area and a separation was also noted between the upper instrument panel and the mid instrument panel area. This separation spanned the left to right instrument panel sectors and resulted from deployment of the front right air bag. The panels were not dislodged. Deformation to the upper instrument panel component resulted in separation of the right vent louver from this component.

The posterior aspect of the steering wheel hub was equipped with plastic covers at the 3 and 9 o'clock positions. They were designed to house vehicle cruise control switches and some of their electronics. Although the case vehicle was not equipped with cruise control, the plastic covers were still available. The cover on an exemplar vehicle displayed the part number: 23199 223 5 4565347, and a white sticker was adhered to the cover which listed the identification: 4793490. The plastic covers were dislodged from the steering hub when the front left air bag of the Neon deployed. **Figure 6** identifies the left side plastic cover which dislodged when the front left air bag deployed.

Figure 6. Dislodged plastic cover in position.

A skin oil transfer was located on the top aspect of the left side instrument panel. This transfer likely resulted from pre-impact bracing actions by the left hand of the Neon's driver. A windshield glazing fracture was located above and left of the steering wheel's hub. This fracture resulted from contact with the driver's dorsal left hand when the deploying air bag displaced his hand from the upper instrument panel area to the windshield. The rear-view mirror was canted to the left and evidenced a skin oil transfer on the right aspect of the glazing. The mirror

appeared to have been contacted by the driver of the Neon when his right hand was displaced from the steering wheel rim when the air bag deployed.

A windshield glazing fracture was located 16.0 cm (6.3 in) left of the right A-pillar and 45.0 cm (17.7 in) below the windshield header. The spiderweb fracture was surrounded by an heavy skin oil transfer which extended to the windshield header. This fracture resulted from contact with the adult right front passenger's dorsal right hand and the dorsal right hand of the child female right front seated passenger. Several scattered small abrasions were noted to the lower aspect of the glove compartment door from probable contact with the lower aspect of the front right child seated passenger. **Figure 7** identifies the front right passenger compartment area and the fractured windshield.

Figure 7. Overall view of the front right passenger compartment of the Neon and the fractured windshield.

Residue from a fast food restaurant's paper cup was located on the windshield, windshield header, right roof side rail, right side window glazing, and roof of the Neon. The beverage that was apparently in the cup at the time of crash and air bag deployment had been sprayed within the vehicle when the air bag deployed.

Automatic Restraint System

The front left air bag module was housed in the steering wheel hub. The module cover flap was a single flap with "NEON" embossed on its center aspect and the acronym SRS and word "AIRBAG" were molded into the lower center aspect of the module cover flap. The flap had a measured height of 17.0 cm (6.7 in) and a maximum measured width of 23.0 cm (9.1 in). The upper module cover flap was flanked by vertical extensions which displayed the following alphanumeric code:

TLODT353520316
P04664209 0OO75SCB

The module cover flap did not sustain damage from the crash or occupant contact. The touch pad for the Neon's horn was located between the inside of the module cover flap and a pliable vinyl reinforcement. The air bag was equipped with two vent ports at the 1 and 11 o'clock positions and was secured by two tethers at the 6 and 12 o'clock positions. The measured diameter of the deflated air bag was 61.0 cm (24.0 in). Damage to the air bag consisted of bilateral grey vinyl transfers in the lower left and lower right quadrants of the air bag's face. The transfer to the lower left quadrant of the bag began 7.0 cm (2.8 in) left of center and 7.0 cm (2.8 in) below center. Maximum height of the transfer was measured at 11.0 cm (4.3 in) and maximum width at 19.0 cm (7.5 in). The vinyl transfer located on the lower right quadrant of the air bag began 7.0 cm (2.8 in) right of center and 7.0 cm (2.8 in) below center. The vinyl transfer measured

8.0 cm (3.1 in) in width and 17.0 cm (6.7 in) in height. The steering column was not compressed and the shear capsules did not move as a result of possible loading by the driver of the vehicle.

The front right air bag module was top-mounted in the right instrument panel area. The module cover flap had a measured height of 15.0 cm (5.9 in) and width of 34.5 cm (13.6 in). The acronym SRS and the word "AIRBAG" were molded in the lower right aspect of the module cover flap. The module cover flap did not sustain crash damage, however, a right hand transfer was evident on the center right aspect of the flap. This was resultant of the adult passenger's right hand as she attempted to brace during the pre-crash sequence. Figure 7 identifies the front right passenger compartment area of the Neon. The right front air bag was equipped with four tethers, two were located at the top seam of the air bag on the right and left aspects and two were located at the bottom seam of the air bag also attached to the right and left side. One vent port was located at the 12 o'clock position. The deflated air bag had a seam to seam measured height of 34 cm (13.4 in). Rearward excursion of the front right air bag was 41 cm (16 in) from the leading edge of the instrument panel. The rearward excursion point was 32.0 cm (12.6 in) from the right front seat back in the mid to full back track position. This was the position of the seat track at crash. **Figure 8** identifies the right lateral view of the deployed front right air bag and passenger compartment of the Neon.

Figure 8. Right lateral view of the deployed front right air bag of the Neon and the passenger compartment.

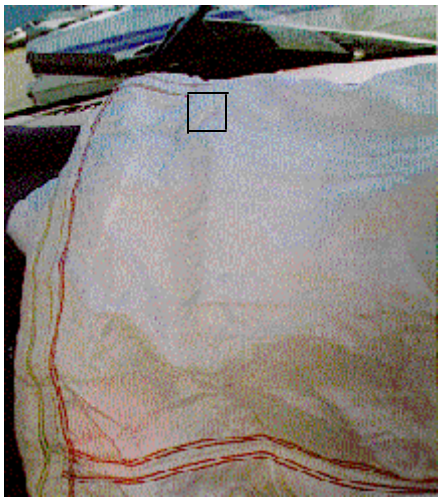


Figure 9. Highlighted pink fiber transfer in the upper left quadrant of the front left air bag's face.

A pink fabric transfer was located on the upper left quadrant of the air bag. The transfer measured 4.5 cm (1.8 in) laterally and its left most aspect was located 6.0 cm (2.4 in) below the top seam and 9.5 cm (3.7 in) right of the left seam. The transfer resulted from contact with the child front right passenger's pajamas top at the time of the crash. **Figure 9** identifies the fabric transfer to the upper left quadrant of the air bag's face. Grey vinyl transfers, longitudinal in orientation, were evidenced on the top aspect of the air bag. The transfers resulted from the restricted deployment path of the front right air bag due to forward position of

the front right passengers. A label was adhered to the tyvek sheath which separated the air bag from the module cover flap. The label displayed the identification:

ASSEMBLED IN MEXICO
WC23344I14040
P/N 2000707K

Driver Demographics

The driver of the Plymouth Neon was a 31 year old male with an approximate height of 175 cm (69 in) and weight of 66 kgs (145 lbs). He was not restrained by the available 3-point manual lap and shoulder belt. Belt webbing stretching, regular use patterns, and D-ring transfers were not evident. The driver and the PCR indicated that the 3-point belt system was not used during this crash. The D-ring was located in the full-down position at the time of crash. The left front seat back was reclined at 20 degrees, and the seat track was adjusted 12.5 cm (5 in) rearward of the full forward position and 8 cm (3.1 in) forward of the full rearward track position.

Driver Injuries

Injury	Injury Severity (AIS-90)	Injury Mechanism
Right anterior forearm abrasion	Minor (790202.1,1)	Front left air bag
Left anterior forearm abrasions	Minor (790202.1,2)	Front left air bag
Epistasis (nose bleed)	N/A (not AIS codeable)	Front left air bag

Driver Kinematics

The driver's left hand was displaced from the steering wheel rim to the upper aspect of the left side instrument panel due to pre-impact braking actions. This was evidenced by a skin oil transfer. At impact, the front left air bag deployed and displaced the driver's left hand from the steering wheel area which resulted in anterior right and left forearm abrasions (AIS-1). His left hand was subsequently displaced to the left side windshield where a fracture was located. The driver also sustained epistaxis (nose bleed) that was a result of contact to the driver side air bag. He did not receive medical treatment for his injuries.

Adult Right Front Passenger Demographics

The right front seated passenger was a 30 year old female with a height of 160 cm (63 in) and unknown weight. She was not restrained by the available 3-point manual lap and shoulder belt as evidenced by lack of belt webbing stretching, regular use patterns, and D-ring transfers. In addition, a beverage that had sprayed the interior of the Neon at impact and during deployment of the passenger side air bag was not

evident on the belt webbing. The Police Crash Report (PCR) and the driver of the Neon reported that the right front passenger was not restrained by the belt system during this crash. The D-ring was located in the full-down position at the time of crash. The seat back was reclined at 20 degrees, and the seat track was positioned 16 cm (6 in) rear of the full forward position and 6.5 cm (3 in) forward of the full rear position.

Adult Right Front Passenger Injuries

Injury	Injury Severity (AIS-1)	Injury Mechanism
Right wrist fracture	Moderate (751800.2,1)	Windshield
Right cheek laceration	Minor (290602.1,1)	Front right child passenger

Adult Front Right Passenger Kinematics

The pre-impact braking action of the Neon displaced the adult front right passenger in a forward position while the female child passenger was positioned on her lap. She placed her right hand on the right aspect of the front right air bag module cover flap, around the right side of the child, in an attempt to brace for the impending crash. The 12 o'clock direction of force further displaced the adult passenger in a forward position. The air bag module cover flap opened to deploy the air bag and displaced the right hand of the adult passenger from the module cover flap to the right aspect of the windshield. A glazing fracture and skin oil transfers were evident from contact with the right hand and forearm of the passenger. This contact resulted in a right wrist fracture (AIS-1). The child passenger's right dorsal hand, which was imbedded with windshield glazing fragments, probably contacted the adult passenger's face post-air bag deployment. This resulted in a right cheek laceration (AIS-1).

Child Front Right Passenger Demographics

The three year old child positioned on the right front passenger's (mother) lap had a pathologist reported height of 90.2 cm (35.5 in) and weight of 17.7 kg (39.0 lbs). Pre-crash, she was seated in a forward facing position while consuming a food item. Lack of belt usage evidence that was reported for the right front passenger and reports from the driver of the Neon and the PCR indicate that the child was not restrained during the crash. The D-ring for the available belt system was located in the full-down position at the time of crash. The child front right passenger was wearing a pink color pajamas top, lavender color pajamas bottoms, and aqua color socks at the time of the crash.

Child Front Right Passenger Injuries

Injury	Injury Severity (AIS-90)	Injury Mechanism
C3/C4 anterior subluxation	Moderate (650216.2,6)	Front right air bag
Herniation of the brain stem	Critical (140202.5,8)	Front right air bag

Injury	Injury Severity (AIS-90)	Injury Mechanism
Contusions over the pleural surface of the lungs	Severe (441410.4,3)	Compression between the right front adult occupant and the front right deployed air bag
Anterior neck contusions	Minor (390402.1,0)	Front right air bag
Anterior neck abrasions	Minor (390202.1,0)	Front right air bag
Medial right arm contusions	Minor (790402.1,1)	Front right air bag module cover flap
Right facial contusions	Minor (290402.1,1)	Front right air bag
Right dorsal hand lacerations	Minor (790602.1,1)	Windshield
Right dorsal hand hematoma	Minor (790402.1,1)	Windshield

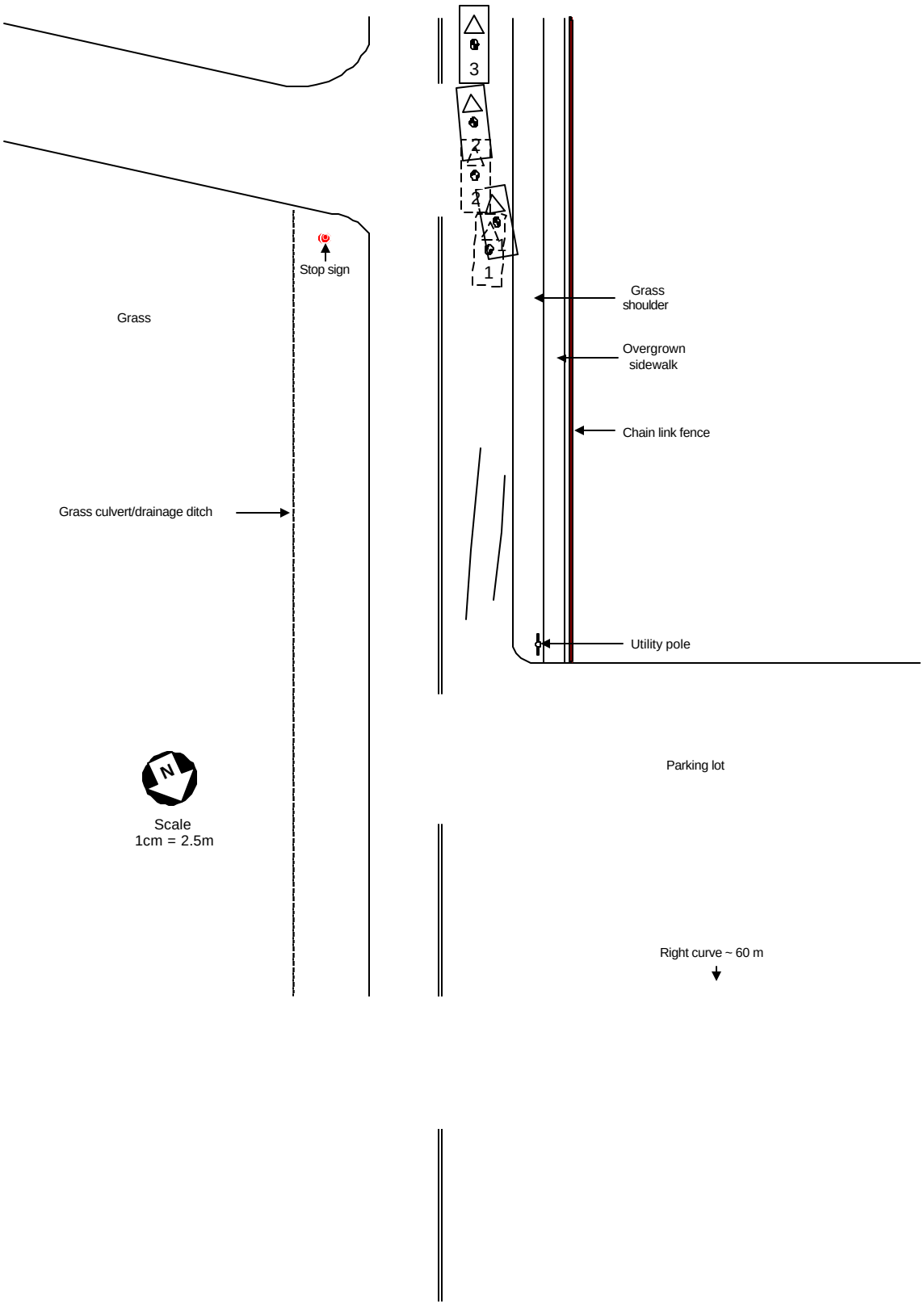
Child Right Front Passenger Kinematics

Pre-impact braking maneuvers by the driver of the Neon displaced the forward facing child and adult female passengers in a forward position. The forward displacement of the child was reinforced by the adult female passenger. The child extended her right hand in close proximity to her mother's on the right aspect of the front right air bag module cover flap in order to brace for the impending crash. At impact, the front right air bag module cover flap opened against the medial aspect of the child's right medial arm which resulted in a right arm contusion (AIS-1). The contusion began approximately 5 cm (2 in) below the elbow and extended to the axilla. The module cover flap displaced the child's hand to the windshield where a spiderweb-type pattern fracture and oil transfers were evident. Contact to the windshield from the child passenger's right hand resulted in a right dorsal hand lacerations(AIS-1) and hematoma (AIS-1). The opened module cover flap allowed for the deployment of the front right air bag against the forward positioned child occupant which compressed the child between the adult front right passenger and the deploying air bag. Air bag expansion against the child's face and neck, and chest compression between the air bag and the front right adult passenger resulted in right facial contusions (AIS-1), C3-C4 anterior subluxation (AIS-2) with a herniated brain stem(AIS-5), anterior neck contusions (AIS-1) and abrasions (AIS-1), and contusions over the pleural surface of the lungs (AIS-4), respectively. **Figures 10 and 11** identify the soft tissue injuries sustained by the child passenger.

Child Passenger Medical Treatment

The driver of the Neon removed the three year old child from the vehicle, noticed that she was not breathing, and stopped a passing vehicle to transport the child to the local emergency rescue team's facility located approximately 0.40 kilometer (0.25 mile) west of the crash scene. The driver carried the child, without cervical spine stabilization, to the attending EMT where aginal respirations (2 breaths per minute) and bradycardia (approximately 10 beats per minute) were diagnosed. The EMT attempted to open the child's airway via jaw thrust maneuver at which time he noticed a food item in the child's mouth. He cleared the child's mouth and attempted CPR by administering a first breath which reportedly passed into the child's lungs. Subsequent attempts by the EMT to breathe for the child were unsuccessful due to a

lodged food item in the throat. The EMT reported that the child's tongue had started to swell at that time, an indicator of asphyxiation. Additional indicators of asphyxiation were not reported. Paramedics responded to the rescue team's facility and intubated the child and dislodging the food item from her throat. Aginal respirations and bradycardia reportedly resumed. The child was transferred to a trauma center where she expired approximately 30 minutes post-crash.


3
2
1
Stop sign
Grass
Grass shoulder
Overgrown sidewalk
Chain link fence
Grass culvert/drainage ditch
Utility pole
N
Scale
1cm = 2.5m
Parking lot
Right curve ~ 60 m