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ON-SITE AIR BAG-RELATED FATALITY INVESTIGATION

CASE NUMBER - IN-05-020
LOCATION - TEXAS
VEHICLE - 1998 NISSAN SX
CRASH DATE - May 2005

Submitted:

September 28, 2006

Contract Number: DTNH22-01-C-07002

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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.

Technical Report Documentation Page

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16. *Abstract* This report covers an on-site investigation of an air bag-related fatality that involved a 1998 Nissan 200 SX (case vehicle), which ran-off-road and impacted a concrete construction barrier. This crash is of special interest because the case vehicle 's front right passenger [7-week-old, White (unknown if Hispanic) male] sustained a fatal injury related to contacting his deploying front right passenger air bag. The case vehicle was traveling northwest in the northwestbound lane of a curved, two lane city street. The roadway was under construction and there were concrete construction barriers located along the north side of the roadway. The driver had just abducted his son and step son from his estranged wife's home and was fleeing the area. The driver had placed the front right passenger supine (i.e., on his back with his head up) on the front right seat cushion with his head toward the right front door. The infant was unrestrained. As the case vehicle was negotiating a left curve at a high rate of speed, the right side of its front bumper sideswiped one of the barriers. The front right corner then immediately impacted the end of the next barrier in a narrow engagement involving primarily the right front wheel, right front door and sill. As a result, the deployment of the driver and front right passenger air bags was delayed. The impact projected the infant forward and he struck his forehead on the knee bolster and was deflected upward. As the air bag deployed, it impacted the infant and redirected him backward as the case vehicle was rotating clockwise. The infant then struck the back right side of his head on the deformed right front door causing his fatal head injury. The case vehicle rotated clockwise a total of approximately 270 degrees and traveled northwest approximately 56 meters (185 feet) and came to rest in a service station driveway heading southwest.			
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This investigation was brought to NHTSA's attention on June 1, 2005 by a news article. This crash involved a 1998 Nissan 200 SX (case vehicle), which ran-off-road and impacted a concrete construction barrier. The crash occurred in May, 2005, at 6:30 a.m., in Texas and was investigated by the county sheriff's department. This crash is of special interest because the case vehicle 's front right passenger [7-week-old, White (unknown if Hispanic) male] sustained a fatal injury related to contacting his deploying front right passenger air bag. This contractor inspected the case vehicle and scene and interviewed the infant's grandparents on June 28, 2005. One of the responding emergency medical technicians was interviewed on August 30, 2005. This contractor was unable to obtain an interview with the case vehicle's driver due to the ongoing criminal investigation regarding this crash. This report is based on the police crash report, police on-scene photographs, scene and vehicle inspections, an interview with the infant's grandparents and one of the responding emergency medical technicians, the infant's autopsy report, occupant kinematic principles and this contractor's evaluation of the evidence.

SUMMARY

The case vehicle was traveling northwest in the northwestbound lane of a curved, two lane city street. The roadway was under construction and there were concrete construction barriers located along the north side of the roadway. The driver had just abducted his son and step son from his estranged wife's home and was fleeing the area. The driver had placed the front right passenger supine (i.e., on his back with his head up) on the front right seat cushion with his head toward the right front door. The infant was unrestrained. As the case vehicle was negotiating a left curve at a high rate of speed, the right side of its front bumper sideswiped one of the barriers (event 1). The front right corner then immediately impacted the end of the next barrier (event 2) in a narrow engagement involving primarily the right front wheel, right front door and sill. As a result, the deployment of the driver and front right passenger air bags was delayed. The impact projected the infant forward and he struck his forehead on the knee bolster and was deflected upward. As the air bag deployed, it impacted the infant and redirected him backward as the case vehicle was rotating clockwise. The infant then struck the back right side of his head on the deformed right front door causing his fatal head injury. As a result of the impact, the case vehicle rotated clockwise a total of approximately 270 degrees and traveled northwest approximately 56 meters (185 feet) and came to rest in a service station driveway heading southwest.

The CDC for the case vehicle was determined to be: **12-RFLS-1** (**0** degrees) for event 1 and **12-FREE-8** (**0**-degrees) for event 2. The right front wheel was torn off the vehicle and the right front door was engaged and bowed outward, significantly separating it from the "A"-pillar, upper door frame and sill. The WinSMASH reconstruction program could not be used to reconstruct the case vehicle's highest Delta V (i.e., event 2) because there was minimal engagement and crush to the front bumper. However, based on the totality of the damage to the case vehicle, this contractor estimates the case vehicle's Delta V was in the range of 32-40 km.p.h. (20 - 25 m.p.h). The case vehicle was towed due to damage.

The case vehicle's back right passenger [4-year-old, White (Hispanic) male] was seated in an unknown position. He was not restrained by a child safety seat or the case vehicle's manual,

three-point, lap-and-shoulder safety belt. He was projected forward by the impact and impacted the back of the front right seat lacerating his forehead and fracturing his pelvis. He was transported by helicopter to a hospital and admitted for treatment of his injuries.

The case vehicle's driver [27-year-old, White (unknown if Hispanic) male] was restrained by his manual, three-point, lap-and-shoulder safety belt system. He was wearing only swim trunks at the time of the crash. He was intoxicated. He sustained only abrasions, contusions and lacerations as a result of the crash. He was not transported to a hospital for medical treatment.

CRASH CIRCUMSTANCES

Crash Environment: The trafficway on which the case vehicle was traveling was a two-lane, undivided city street, traversing in a northwest and southeast direction. The case vehicle's approach roadway curved to the left in the area of the crash. The north side of the roadway was under construction and there were concrete construction barriers placed along the north side of the roadway immediately adjacent to the travel lane. The barriers were approximately 50 centimeters (20 inches) in height and approximately 6 meters (20 feet) in length. Each travel lane was approximately 3.7 meters (12 feet) in width. Roadway pavement markings consisted of double yellow no-passing lines. It is not known if there were road construction warning signs posted on the case vehicle's approach to the crash location. The speed limit was 56 km.p.h. (35 m.p.h.). There was no regulatory speed limit sign posted near the crash site. At the time of the crash the light condition was daylight, the atmospheric condition was cloudy, and the roadway pavement was dry, level bituminous. Traffic density at the time of the crash is not known. See the Crash Diagram at the end of this report.

Pre-Crash: The case vehicle was traveling northwest at a high rate of speed in the northwestbound lane (**Figure 1**) in a left curve. The driver was intending to continue northwest bound. The driver had just taken abducted his son and step son from his estranged wife and was fleeing the area. The crash occurred at the concrete construction barriers on the north side of roadway in the left curve.

Figure 1: Approach of case vehicle northwest bound to crash location, arrow shows area of impact

Crash: As the case vehicle was negotiating the left curve, the right side of its front bumper sideswiped one of the barriers (event 1, **Figures 2** and **3** below). The case vehicle's front right corner (**Figure 4** below) then immediately impacted the end of the next barrier (event 2, **Figures 2** and **3** below) in a narrow engagement involving primarily the right front wheel, right front door and sill. The front right corner impact with the second barrier caused the case vehicle's driver and front right air bags to deploy. There was minimum engagement to the right corner of the front bumper from this impact, and the right front wheel engaged the barrier as did the sill and front of the right front door. The impact tore the right front wheel off the case vehicle and displaced

the right front door rearward and bowed it outward, significantly separating it from the "A"-pillar, upper door frame and sill. The police on-scene photographs show that the second impacted barrier had been placed such that it was slightly offset toward the roadway from the other barriers and exposed an errant vehicle to a narrow portion of the bluff end of the barrier (**Figures 2** and **3**).

Post-Crash: Based on the police crash report and the police on-scene photographs, the impact displaced the concrete barrier several inches to the northeast and approximately 20 centimeters (8 inches) northwest. The case vehicle rotated clockwise approximately 270 degrees and traveled northwest approximately 56 meters (185 feet) and came to rest in a service station driveway heading southwest (**Figure 5** below).

Figure 2: Police on-scene photo showing construction barriers impacted by case vehicle, green arrows shows initial sideswipe paint transfer, red arrow shows location of case vehicle's front right corner impact, light color of pavement (blue arrows) shows outline of barrier's pre-crash location

Figure 3: Police on-scene photo showing overview of impacted barriers

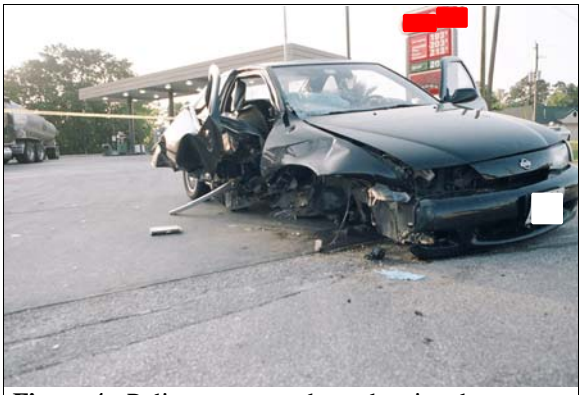


Figure 4: Police on-scene photo showing damage to case vehicle from impact with concrete construction barrier

CASE VEHICLE

The 1998 Nissan 200 SX was a two-door coupe (VIN: 1N4AB42D6WC------) equipped with an unknown size engine (either 2.4L or 1.6L), three-speed automatic transmission and driver and front right passenger air bags. Redesigned air bags began to be installed as a running change in the 1998 model year Nissan 200 SX. However, it is not known if the case vehicle was equipped with redesigned air bags. The front bucket seats were equipped with adjustable head restraints and three-point, lap-and-shoulder safety belt systems. The back seat was equipped with integral head restraints and three-point, lap-and-shoulder safety belt systems in the outboard seat positions and a lap belt in the center back seat position. Four-wheel anti-lock brakes were an option, but it is not known if the case vehicle was so equipped. The case vehicle's wheelbase was 253 centimeters (99.6 inches). The case vehicle's odometer reading at the time of the vehicle inspection was 165,249 kilometers (102,684 miles).

Exterior Damage: The case vehicle's initial impact with the concrete construction barrier involved the right corner of the front bumper and right fender. As the case vehicle continued to engage the barrier the right front wheel, right front door and sill were engaged. The right front wheel was torn off the vehicle, and the right front door was bowed outward, significantly separating it from the "A"-pillar, upper door frame and sill. The direct damage extended down the right side of the vehicle and involved approximately two thirds of the right front door. Direct damage from the impact with the end of the barrier began at the right corner of the front bumper and extended 11 centimeters (4.3 inches) along the bumper. Crush measurements were taken at the front bumper; however, the crush to the bumper was minimal because the bumper bar was not engaged. The maximum crush at the bumper was only 6 centimeters (2.4 inches) occurring at C_6. The table below shows the case vehicle's front bumper crush.

Figure 5: Police on-scene photo showing case vehicle's final rest position and view back to case vehicle's approach, arrows show impact area and right front wheel/suspension assembly

Units	Event	Direct Damage		Field L	C_1	C_2	C_3	C_4	C_5	C_6	Direct	Field L
		Width CDC	Max Crush								±D	±D
cm	1	11	6	147	0	1	1	2	3	6	73	0
in		4.3	2.4	57.9	0.0	0.4	0.4	0.8	1.2	2.4	28.7	0.0

The reduction of the case vehicle's right side wheelbase is unknown because the right front wheel and suspension was torn off the vehicle. The left side wheelbase was extended 2 centimeters (0.8 inches). Induced damage involved the front bumper, grille, hood, right fender, sill, right front door and right quarter panel.

The case vehicle's recommended tire size was: P175/65R14 and the vehicle was equipped with tires of this size. The case vehicle's right front tire was not inspected. It was not at the inspection facility. The case vehicle's tire data are shown in the table below. The damage status of the right front tire was based on the police on-scene photographs.

Tire	*Measured Pressure*		*Recommend Pressure*		*Tread Depth*		*Damage*	*Restricted*	*Deflated*
	kpa	psi	kpa	psi	milli-meters	32nd of an inch			
LF	200	29	228	33	8	10	None	No	No
RF	0	0	228	33	0	?	Tears in side wall	No	Yes
LR	193	28	200	29	7	9	None	No	No
RR	234	34	200	29	6	8	None	No	No

Vehicle Interior: Inspection of the case vehicle's interior (**Figure 6** and **Figure 7**) revealed that the driver and front right air bags had been cut out of the case vehicle. It was noted in the police crash report that the air bags were cut out by police and sent to the medical examiner for DNA testing. Numerous deposits of tissue, and what appeared to be brain matter from the front right passenger were also found throughout the right side interior of the case vehicle. These deposits were observed on the right sun visor, roof immediately behind the right "A"-pillar, lower right instrument panel, right front door, front right seat cushion and seat back, roof over the back right seat, upper backlite, backlite header, right "C" pillar, back right shoulder belt and the back right seat back. A skull fragment was also found on the front right seat cushion. This was also noted in the police crash report. In addition, a small scuff was observed on the back of the front right seat headrest, which was likely associated with contact by the unrestrained back right passenger. Several passenger compartment intrusions occurred in the front right seat position. The right instrument panel intruded longitudinally 25 centimeters (9.8 inches), the sill intruded laterally 21 centimeters (8.3 inches), the back portion of the right front door intruded laterally 20 centimeters (7.9 inches), and the front right seat cushion intruded laterally 12 centimeters (4.7 inches). Lastly, there was no evidence of deformation of the steering column or steering wheel (**Figure 8** below).

Figure 6: Overview of windshield, instrument panel and steering wheel

Figure 7: Overview of back right seat area and front right seat back

Damage Classification: Based on the vehicle inspection, the CDCs for the case vehicle were determined to be: **12-RFLS-1** (**0** degrees) for event 1 and **12-FREE-8** (**0**-degrees) for event 2.

The WinSMASH reconstruction program could not be used to reconstruct the case vehicle's highest Delta V (i.e., event 2) because there was minimal engagement and crush to the front bumper. However, based on the totality of the damage to the case vehicle, this contractor estimates the case vehicle's Delta V was in the range of 32 - 40 km.p.h. (20 - 25 m.p.h). The case vehicle was towed due to damage.

Figure 8: Steering column and steering wheel showing lack of deformation

Figure 9: Driver's air bag module cover flaps, the air bag was cut out of the module by police

AUTOMATIC RESTRAINT SYSTEM

The driver's air bag was located in the steering wheel hub and the front right passenger air bag was located in the top of the instrument panel. Inspection of these air bags could not be conducted because they had been cut out of the vehicle by police and sent to the medical examiner for DNA testing. Inspection of the driver and front right passenger air bag's module flaps indicated that the flaps had opened at the designated tear points (**Figure 9** and **Figure 10** below). The driver's top air bag module cover flap was rounded on top and rectangular at the tear seam. It was 10 centimeters (3.9 inches) in height at the center and 14 centimeters (5.5 inches) in width. The driver's bottom air bag cover flap was rectangular in shape. It was 14 centimeters (5.5 inches) in width and 4 centimeters (1.6 inches) in height. The front right passenger air bag module cover and cover flaps were bent due to the crash induced deformation of the right instrument panel. The upper air bag cover flap was rectangular in shape and was 25 centimeters (9.8 inches) in width and 3 centimeters (1.2 inches) in height. The lower air bag cover flap was rectangular in shape and was 25 centimeters (9.8 inches) in width and 5 centimeters (2 inches) in height.

CASE VEHICLE FRONT RIGHT PASSENGER KINEMATICS

Immediately prior to the crash the case vehicle's front right passenger [7-week-old, White (unknown if Hispanic) male; 57 centimeters and 5 kilograms (22 inches, 11 pounds)] was laying supine (i.e., on his back with his head up) on the front right seat cushion. According to the police crash report, the infant had been abducted by the driver (i.e. the infant's father) just prior to the

crash and placed on the seat. At the time of the vehicle inspection, the front right seat was located between its middle and rear-most track positions, and the seat back was slightly reclined. This is consistent with the adjustment of the seat and seat back observed in the police on-scene photographs.

Figure 10: Front right passenger's air bag module cover flaps, the air bag was cut out by police

Based on this contractor's vehicle inspection and his medical records, the case vehicle's infant, front right passenger (i.e., son) was not restrained in a child safety seat or using his manual, three-point, lap-and-shoulder safety belt system. Based on the infants's head injuries, police on-scene and vehicle photographs, and this contractor's analysis of his kinematics, this contractor believes the infant was laying on the seat cushion with his head toward the right front door; however, the exact orientation of the child on the seat is unknown.

Based on the available evidence, the case vehicle's driver made no known pre-crash avoidance maneuvers. As a result, the front right passenger's pre-impact body position did not change just prior to impact. The case vehicle's initial contact with the concrete construction barrier involved only a small portion of the right corner of the front bumper. The primary engagement occurred when the right front wheel assembly impacted the barrier, which was in turn driven back into the wheel house and the barrier engaged the right front door and sill. The initial narrow end engagement and subsequent wheel interaction (i.e., similar to a sideswiping impact that starts on the side but results in pocketing) resulted in the air bag deploying late during the impact sequence. This delayed deployment occurred due to the prolonged change in time (Delta T) relative to the change in speed (magnitude of Delta V–i.e., ramp versus spike). In addition, the barrier's engagement of the right front wheel and sill produced a vertical force on the vehicle as well as a longitudinal force. As a result, the impact caused the infant to move forward and upward along a path opposite the case vehicle's 0 degree direction of principal force as the case vehicle decelerated. As a result, given the infant's small stature and weight, he most likely moved forward like a projectile and contacted the case vehicle's right knee bolster with his forehead, prior to the air bag's deployment. Because of the vertical force discussed above, the infant's head rebounded upward from its initial impact with the knee bolster, leaving the child obliquely positioned with its head higher than its feet. When the front right passenger air bag deployed, it impacted the infant and redirected him downward and backward, in a head-over-heels fashion, causing the infant's head to lead as the child moved backwards. However, because the case vehicle was rotating clockwise as a result of its impact with the barrier, the back right side of the child's head most likely impacted the lower interior surface of the right front door, which had bowed outward from the crash forces but also rotated into the backward path of the child as the case vehicle rotated clockwise. In addition, the infant's back contacted the front of the front right seat's cushion contusing the child's right lung and pleural surfaces. As a result of the impact to the lower right door surface, the infant sustained multiple skull fractures and, according to the police on-scene photographs, at least one skull fragment came to rest on the front right seat cushion. In addition, brain matter was found on the front right seat cushion and on the damaged

right front door (**Figure 11**). In this contractor's opinion, the infant rebounded upward and rearward after striking the bowed door surface and front of the seat cushion and impacted the front right seat back. The infant front right passenger most likely fell onto the front right seat cushion as the case vehicle continued to rotate clockwise and traveled northwestward toward its final rest position. Based on information from an emergency medical technician, the infant was found wedged between the right "A"-pillar and the damaged right front door window frame. Brain matter was found on the door and the damaged instrument panel components in this area (**Figure 12**). As a direct result of all the rotation, blood and brain matter were splayed throughout the interior of the case vehicle. For example, blood and brain matter were spattered on the right sun visor and roof immediately rearward of the right "A"-pillar (**Figure 13**). Furthermore, brain matter was found on the front right seat back, right "C"-pillar, roof, back right shoulder belt, backlite header and upper backlite glazing (**Figures 13** and **14**). In addition, an on-scene photograph of the front right passenger air bag appears to show blood on the air bag's front and underneath surfaces (**Figure 15** below). This contractor believes that this blood evidence occurred when the infant was impacted by the air bag and redirected backward after the infant sustained lesions from contacting the front right knee bolster.

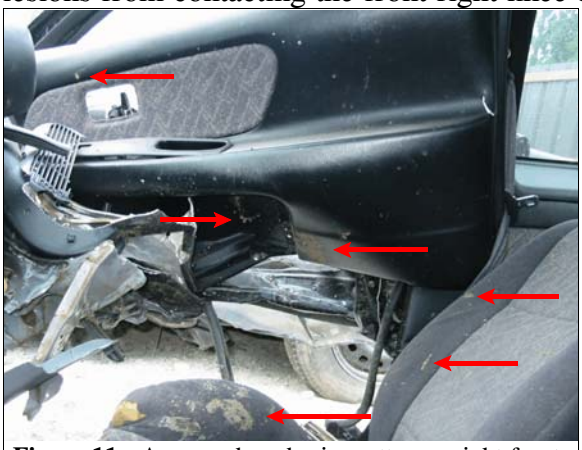


Figure 11: Arrows show brain matter on right front door and front right seat

Figure 12: Lower right instrument panel and damage to right front door, arrow shows area where front right passenger was reported located at final rest

Figure 13: Arrows show blood and brain matter spattered on right sun visor and roof

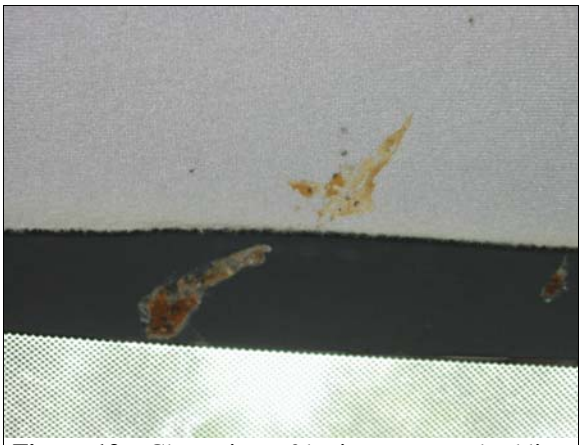


Figure 13: Close view of brain matter on backlite header and backlite

Figure 14: Arrows show brain matter on roof, backlite header, backlite and back right shoulder belt

Figure 15: Close view of police on-scene photo showing what appears to be blood (arrows) on front right passenger air bag

CASE VEHICLE FRONT RIGHT PASSENGER INJURIES

The police crash report indicated that the front right passenger had expired at the scene. The table below shows the front right passenger's injuries and injury mechanisms.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
1	Fracture, comminuted, basilar skull involving left and right anterior and right middle cranial fossae	severe 150206.4,8	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
2	Fracture, complex, open[1], right vault with torn dura and exposed and loss of brain tissue	severe 150406.4,1	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
3	Laceration, extensive, and disruption of posterior lateral right cerebral hemisphere	severe 140688.4,1	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy

[1] There was a gaping laceration, 17.8 x 8.9 cm (7.0 x 3.5 in), along the lateral right face and scalp exposing the skull and brain with several small black and gray metallic fragments embedded in the soft tissue.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
4	Hemorrhage, subdural, 5 mm, over posterior and base of right cerebral hemisphere	severe 140652.4,1	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
5	Hemorrhages, streak-like, in cerebral white matter, predominately in posterior aspect	severe 140642.4,9	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
6	Hemorrhages, subarachnoid, over cerebellar hemispheres	serious 140466.3,6	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
7	Contusions posterior right lung at upper pole of lower lobe	serious 441406.3,1	Seat cushion, front right passenger's {air bag-related}	Probable	Autopsy
8	Contusions, bilateral, pleural surfaces involving left lateral and right posterior surfaces	moderate 441804.2,3	Seat cushion, front right passenger's {air bag-related}	Probable	Autopsy
9 10	Contusion {subgaleal hemorrhage}, bilateral but only slight amount on left	minor 190402.1,1 190402.1,2	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
11	Laceration, curved, 3.8 cm (1.5 in) right occiput	minor 290602.1,1	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
12	Abrasion, brush, right forehead, not further specified	minor 290202.1,7	Air bag, front right passenger's	Probable	Autopsy
13	Abrasion, small, lateral right eyebrow, not further specified	minor 297202.1,1	Air bag, front right passenger's	Probable	Autopsy
14	Abrasion, small, oval, right cheek, not further specified	minor 290202.1,1	Air bag, front right passenger's	Possible	Autopsy
15	Abrasion tip of nose, not further specified	minor 290202.1,4	Knee bolster, front right passenger's	Probable	Autopsy
16	Contusion left upper eyelid	minor 297402.1,2	Knee bolster, front right passenger's	Probable	Autopsy

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
17	Contusion bridge of nose, not further specified	minor 290402.1,4	Knee bolster, front right passenger's	Probable	Autopsy
18	Lacerations multiple forehead, including: one irregular, curved, 7.6 cm (3 in), extending from mid-forehead across bridge of nose and over left eye; one over right upper eyelid; and one 1.6 cm (0.625 in) on upper right forehead	minor 290602.1,7	Knee bolster, front right passenger's	Probable	Autopsy
19	Laceration, 3.5 cm (1.375 in), obliquely oriented, lateral right eyebrow, exposing bone	minor 290602.1,1	Knee bolster, front right passenger's	Probable	Autopsy
20	Lacerations x 4, superficial, small, left cheek	minor 290602.1,2	Noncontact injury: flying glass, unknown source	Possible	Autopsy
21	Contusions {discoloration} x 4 right side of back, not further specified	minor 690402.1,1	Seat cushion, front right passenger's {air bag-related}	Probable	Autopsy
22	Contusion {discoloration} over lumbar region of back, not further specified	minor 690402.1,8	Seat cushion, front right passenger's {air bag-related}	Probable	Autopsy
23	Abrasions right posterior shoulder, lateral right deltoid, right forearm, along right wrist, distal dorsal right 3rd finger, and right 5th finger	minor 790202.1,1	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
24	Contusions lateral right arm, triceps, and elbow, and along right wrist, hand, and 5th finger	minor 790402.1,1	Right side interior surface, excluding hardware and/or armrest {air bag-related}	Probable	Autopsy
25	Laceration right elbow, not further specified	minor 790600.1,1	Unknown contact mechanism	Unknown	Autopsy
26	Contusions {discoloration} bilateral buttocks, not further specified	minor 890402.1,3	Seat cushion, front right passenger's {air bag-related}	Probable	Autopsy

Immediately prior to the crash the case vehicle's back right passenger [4-year-old, White (Hispanic) male; unknown height and weight] was seated in an unknown position. The police crash report indicated the child had been abducted by the driver just prior to the crash and placed in the back right seat. The child was not restrained. The base of a child safety seat was restrained in the back middle seat position, but police on-scene photographs showed no child safety seat was present in the case vehicle.

The case vehicle's driver made no known pre-crash avoidance maneuver. As a result, the back right passenger's pre-impact body position did not change just prior to the impact. The case vehicle's impact with the concrete construction barrier caused the back right passenger to move forward along a path opposite the case vehicle's 0 degree direction of principal force as the case vehicle decelerated and he impacted the back of the front right seat fracturing his pelvis and lacerating his right forehead. He rebounded off the seat back and most likely impacted the right side surface rear of the right "B"-pillar as the case vehicle rotated clockwise. He then rebounded off the side surface and impacted the base of the child seat secured in the center back seat position. An on-scene police photograph showed the child seat base displaced to the left and there was blood on it. The location of the back right passenger following the crash is not known. He was coded as ejected on the police crash report, but no other information was given. However, an emergency medical technician, who treated the child, stated the child was not ejected during the crash. He exited the vehicle under his own power following the crash and was found by a witness.

CASE VEHICLE BACK RIGHT PASSENGER INJURIES

The police crash report indicated that the back right passenger sustained an "A" (incapacitating) injury and was transported from the scene to a medical facility by helicopter. The table below shows the back right passenger's injuries and injury mechanisms.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
1	Fracture left pelvis, not further specified	moderate 852600.2,2	Seat back, front right passenger's {Indirect injury}	Probable	Police Crash Report
2	Lacerations {cuts} over right eye requiring stitches, not further specified	minor 290600.1,7	Seat back, front right passenger's	Certain	Interviewee (relative)
3	Lacerations {random cuts} along right side of leg from hip to ankle	minor 890600.1,1	Noncontact injury: flying glass, right front glazing	Probable	Interviewee (relative)

Immediately prior to the crash the case vehicle's driver [27-year-old, White (unknown if Hispanic) male; unknown height and weight] was most likely seated in a nominal upright driving position. The position of his hands and feet are not known. At the time of the vehicle inspection, the driver's seat track was located in its rear-most position, the seat back was fully reclined and the tilt steering column was adjusted to its full-up position. It is unlikely that the driver's seat back was fully reclined at the time of the crash. The police crash report indicated the driver was wearing only swim trucks.

The case vehicle's driver was restrained by his manual, three-point, lap-and-shoulder safety belt system. The police crash report indicated that belt pattern bruising was observed on the driver's shoulder and chest. Inspection of the safety belt assembly showed evidence of past usage on the latch plate, but no evidence of loading to the safety belt webbing was observed. The D-ring was constructed of metal and showed no evidence of belt scuffing.

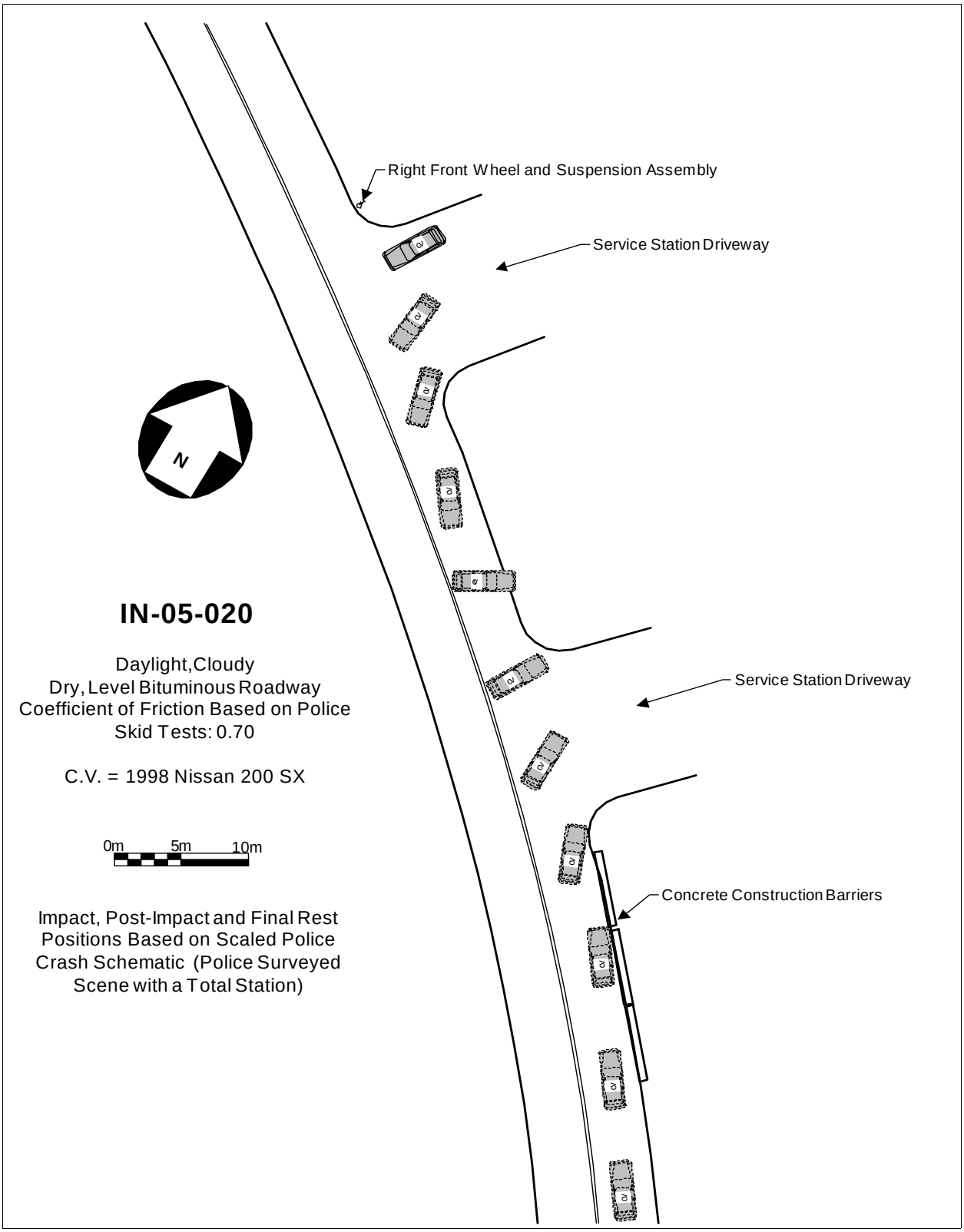
The case vehicle's driver made no known pre-crash avoidance maneuver. As a result, his pre-impact body position did not change just prior to the impact. The case vehicle's impact with the concrete construction barrier locked the driver's safety belt retractor and caused the driver to move forward along a path opposite the case vehicle's 0 degree direction of principal force. The driver loaded his safety belt abrading his left shoulder and bruising his chest and right hip. The driver's left arm impacted his deployed air bag abrading the inside of his left arm. In addition, flying glass may have been the source of a small laceration to the driver s left ear, left knee and a toe on his left foot. The driver remained restrained in his seat as the vehicle rotated clockwise to final rest. He exited the vehicle without assistance.

CASE VEHICLE DRIVER INJURIES

The police crash report indicated the driver sustained a"B" (non-incapacitating-evident) injury as a result of the crash. He was transported by police from the scene to a police substation and then to a hospital for a mandatory blood sample. There was no indication that the driver was treated for his injuries while at the hospital. The table below shows the driver's injuries and injury mechanisms.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
1	Laceration left ear, not further specified	minor 290600.1,2	Noncontact injury: flying glass, right front glazing	Probable	Police Crash Report
2	Contusion {bruise} left chest {from left shoulder, angled downward toward right hip}	minor 490202.1,2	Torso portion of safety belt system	Certain	Police Crash Report
3	Abrasion left shoulder, not further specified	minor 790202.1,2	Torso portion of safety belt system	Certain	Police Crash Report

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
4	Abrasion medial {inside} left arm, not further specified	minor 790202.1,2	Air bag, driver's	Probable	Police Crash Report
5	Contusion {bruise} right hip, not further specified	minor 890402.1,1	Lap portion of safety belt system	Certain	Police Crash Report
6	Laceration left knee, not further specified	minor 890600.1,2	Noncontact injury: flying glass, right front glazing	Probable	Police Crash Report
7	Laceration left 1st digit (toe), not further specified	minor 890600.1,2	Noncontact injury: flying glass, right front glazing	Probable	Police Crash Report


Right Front Wheel and Suspension Assembly
Service Station Driveway
Service Station Driveway
Concrete Construction Barriers
N
IN-05-020
Daylight, Cloudy
Dry, Level Bituminous Roadway
Coefficient of Friction Based on Police Skid Tests: 0.70
C.V. = 1998 Nissan 200 SX
0m
5m
10m
Impact, Post-Impact and Final Rest Positions Based on Scaled Police Crash Schematic (Police Surveyed Scene with a Total Station)