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ON-SITE CHILD SAFETY SEAT INVESTIGATION

CASE NUMBER - IN-05-019
LOCATION - OHIO
VEHICLE - 1994 GEO TRACKER SPORT
CRASH DATE - May 2005

Submitted:

June 6, 2006
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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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15. *Supplementary Notes* On-site child safety seat investigation involving a 1994 Geo Tracker Sport with manual safety belts.			
16. *Abstract* This report covers an on-site investigation of a crash that involved a 1994 Geo Tracker Sport (case vehicle), which ran-off-road, impacted the back, top section of a bicycle tunnel header wall and rolled over. This crash is of special interest because the case vehicle was involved in a severe rollover crash, and the case vehicle's back right passenger [4-year-old, male] was restrained in a forward facing child seat and sustained a police reported "B" (non-incapacity) injury as a result of the crash. The case vehicle was traveling east in an exit ramp from a four-lane, divided state highway. As the case vehicle entered the exit ramp, it essentially continued straight ahead and departed the left (north) side of the roadway. The case vehicle followed a curved path and began to rotate clockwise as it approached the back, top section of a bicycle tunnel header wall. The case vehicle's left side wheels impacted the header wall and the vehicle tripped and rolled over, driver side leading. The unrestrained driver was ejected out the left front window during the rollover and was thrown onto the exit ramp roadway. The back right passenger remained restrained in his child seat. The case vehicle came to final rest on its wheels facing northwest. The case vehicle rolled over a total of four quarter rolls. The driver was transported to a local hospital and then transferred by helicopter to a trauma center. She sustained several brain injuries, fractures and multiple lacerations, contusions and abrasions. The back right passenger was not transported. He sustained only a small cut on the forehead and bruised left cheek.			
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This investigation was brought to NHTSA's attention on or about May 10, 2005 through an Ohio newspaper article. This crash involved a 1994 Chevrolet, Geo Tracker Sport; which ran-off-road and impacted the back, top section of a bicycle tunnel header wall and rolled over. The crash occurred in May, 2005, at 5:16 p.m., in Ohio and was investigated by the applicable city police department. This crash is of special interest because the case vehicle was involved in a severe rollover crash, and the case vehicle's back right passenger [4-year-old, White (non-Hispanic) male] was restrained in a forward facing child seat and sustained a police reported "B" (non-incapacity) injury as a result of the crash. This contractor inspected the case vehicle, child seat and the scene on May 26, 2005; interviewed the case vehicle's driver on May 18, 2006 and interviewed the witness who removed the child from the case vehicle on June 3, 2006. This report is based on the police crash report, witness statements, scene and vehicle inspections; interviews with the case vehicle's driver, a witness and the investigating police officer; occupant kinematic principles and this contractor's evaluation of the evidence.

SUMMARY

The case vehicle was traveling east in an exit ramp from a four-lane, divided state highway. Prior to entering the exit ramp, witnesses reported that the case vehicle was weaving right and left and leaving its travel lane. The driver was reportedly under the influence of drugs. As the case vehicle entered the exit ramp, it essentially continued straight ahead and departed the left (north) side of the roadway. The case vehicle traveled through the grass, and the driver steered right in an attempt to regain the roadway. It is not known if the driver applied the brakes. The case vehicle followed a curved path and began to rotate clockwise as it approached the back, top section of a bicycle tunnel header wall. The case vehicle's left rear wheel impacted the west corner of the header wall followed shortly by the left front wheel's impact to the corner of the center section of the header wall. The case vehicle was tripped by these impacts and rolled over, driver side leading. The unrestrained driver was ejected through the left front window during the rollover and was thrown onto the exit ramp roadway. The back right passenger remained restrained in his child seat. The case vehicle came to final rest on its wheels facing northwest. The case vehicle rolled over a total of four quarter rolls. At the time of the crash, the light condition was daylight, the atmospheric condition was cloudy, and the roadway pavement was dry.

The CDCs for the case vehicle were determined to be: **09-LBWN-1** (**280**-degrees) and **09-LFWN-1** (**280** degrees) for the left side wheel impacts with the header wall. A CDC of **00-TYDO-4** was assigned for the rollover. The maximum residual roof crush was measured as 42 centimeters (16.5 inches) occurring at the right roof side rail near where it joins the right A-pillar. Based on the damage to the left front and left rear wheels, this contractor estimates the Delta V to be low [24-23 km.p.h. (9-14 m.p.h) for each of the wheel impacts. In addition, this contractor estimates the severity of the rollover to be severe. The case vehicle was towed due to damage.

The back right passenger was seated in a forward facing child seat manufactured by Cosco Inc., on August 16, 1995. It was identified by model name"Explorer" and model number 023990DD. The case vehicle's driver purchased the child seat at a yard sale approximately two years prior to the crash and had used it on a regular basis. The child seat consisted of a plastic,

one-piece shell and a padded, plastic shield. The child seat was not damaged in this crash. The child seat was designed with a recessed safety belt guide across the front of the shield. The child seat was designed to be secured in a vehicle with a lap belt or lap-and-shoulder belt routed across this guide. Based on an interview with the driver and the witness who removed the child from the case vehicle following the crash, the child seat was not secured in the case vehicle as designed. It was positioned in the back right seat position, and the child was restrained in the child seat by the lap portion of the three-point, lap-and-shoulder safety belt positioned across his lap. The shoulder belt was positioned behind the child. The child remained restrained in the child seat during the crash. The witness, who had been directly behind the case vehicle and was the first person to reach the case vehicle following the crash, released the safety belt and removed the child from the case vehicle through the right rear window.

Just prior to the crash, the case vehicle was in a clockwise rotation due to the driver's right steer. The back right passenger most likely moved up and down and to the left in his child seat during this time prior to the impact. The case vehicle's left rear and left front wheel impacts with the header wall caused the child to move to the left and slightly forward within hischild seat opposite the case vehicle's 280 degree direction of principal force as the vehicle decelerated. He impacted the left side of his cheek on the child seat shield bruising his cheek. He moved toward the roof as the case vehicle began to roll over driver side leading. He then moved toward the roof and to the right as the case vehicle landed hard on its right roof side rail during the case vehicle's third quarter roll. The right upper corner of the child seat shield impacted the right side panel of the case vehicle, and flying glass lacerated the child's forehead. The child remained restrained in his child seat as the case vehicle came to final rest.

The back right passenger was not transported to a medical facility. The investigating police officer indicated the child was taken from the scene to the police station and was picked up by the driver's boyfriend. The child was not subsequently taken to a medical facility.

Immediately prior to the crash the case vehicle's driver (25-year-old, female) was most likely seated in a nominal upright driving position. She most likely had both hands on the steering wheel and was leaning to the left and steering right as the case vehicle was rotating clockwise. The position of the driver's feet is not known, but it is likely her right foot was off the accelerator. The driver's seat track was in its forward-most position, and the seat back was upright. The steering column was not equipped with a tilt adjustment. The driver was not restrained by her manual, three-point, lap-and-shoulder safety belt.

Just prior to the crash, the case vehicle was in a clockwise rotation due to the driver's right steer. The case vehicle's left rear and left front wheel impacts with the header wall caused the driver to move to her left and slightly forward opposite the case vehicle's 280 degree direction of principal force as the vehicle decelerated. The driver's right knee most likely contacted and scuffed the right knee bolster, and she impacted the driver's door with the left side of her body fracturing her left humerus, acetabulum and sacrum. The impact to the door slightly bowed the door outward and broke the partially open window. As the vehicle immediately began to rollover, driver side leading, the driver rode up the door and started coming out of the driver's door window. As the vehicle continued to roll over, its rotational velocity increased and the driver was

totally ejected out of the driver's door window. The driver was thrown a distance of approximately 11 meters (36 feet) and landed in the exit ramp roadway on her face and chest causing a nasal fracture, left frontal sinus fracture, multiple brain injuries and a fractured sternum. The driver's non-use of her three-point, lap-and-shoulder safety belt resulted in her ejection from the case vehicle during the rollover.

The police crash report indicated the driver sustained an "A" (incapacitating) injury and was initially transported by ambulance to a local hospital and subsequently transported by helicopter to a regional trauma center.

CRASH CIRCUMSTANCES

Crash Environment: The trafficway on which the case vehicle was traveling was a one-lane exit ramp from a divided state highway, traversing in an easterly direction (**Figures 1** and **2**). The exit ramp was curved to the right and was bordered by improved shoulders. There was a barrier curb and a guardrail adjacent to right shoulder. A bicycle tunnel crossed under the ramp, and a tunnel header wall was present on each side of the ramp. The exit ramp travel lane was 4.6 meters (15 feet) in width. The left shoulder was 1.1 meters (3.6 feet) in width. The right shoulder was 2.2 meters (7.2 feet) in width. The roadway grade was approximately 2% positive. The roadway markings consisted of a solid yellow left edge line with intermittent reflectors and a solid white right edge line. The case vehicle's approach to the crash location was uncontrolled, and the police reported speed limit was 88 km.p.h. (55 m.p.h.). At the time of the crash, the light condition was daylight, the atmospheric condition was cloudy, and the roadway pavement was dry bituminous with an estimated coefficient of friction of 0.75. Traffic density was moderate at the time of the crash, and the site of the crash was urban.

Figure 1: View to southwest at case vehicle's approach on the divided highway, photo taken adjacent to mouth of exit ramp

Figure 2: Approach of case vehicle northeastbound on the exit ramp

Pre-Crash: The case vehicle was traveling east in the exit ramp. Prior to entering the exit ramp, witnesses reported that the case vehicle was weaving right and left and leaving its travel lane. As the case vehicle entered the exit ramp, it essentially continued straight ahead and departed the left (north) side of the roadway (**Figure 3**). Based on evidence found in the driver's personal effects,

the police indicated that the driver was suspected of being under the influence of drugs. The crash occurred on the north side of the trafficway.

Figure 3: Area of case vehicle's roadway departure

Figure 4: Approach of case vehicle to impact (arrow) with back, top section of bicycle tunnel header wall

Figure 5: Damage to left rear wheel (arrow) from impact with header wall

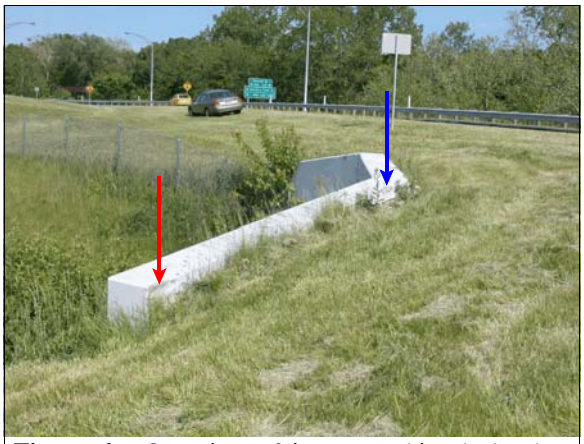


Figure 6: Overview of impact to bicycle header wall, red arrow shows left rear wheel impact, blue arrow shows left front wheel impact

Crash: The case vehicle traveled through the grass (**Figure 4**), and the driver steered right in an attempt to regain the roadway. It is not known if the driver applied the brakes. The case vehicle followed a curved path and began to rotate clockwise as it approached the back of the top section of a bicycle tunnel header wall. The case vehicle's left rear wheel (**Figure 5**) impacted the west corner of the header wall (**Figure 6**), followed shortly by the left front wheel's (**Figure 7** below) impact to the corner of the center section of the header wall (**Figure 6** and **Figure 8** below). The case vehicle was tripped by these impacts and began to rollover, driver side leading, as it rotated clockwise. The left rear tire then made contact with the top of the face of the east section of the header wall (**Figure 8** below) during the case vehicle's first quarter roll. The case vehicle continued to rollover and the roof and right roof side rail (**Figure 9** below) impacted the ground breaking out the right front and right rear windows and depositing tinted tempered glass from the right rear window and clear tempered glass from the right front window on the ground (**Figure 10** below) and crushing the right roof side rail, roof, windshield header and right A-pillar (**Figure**

11. As the case vehicle continued to roll over, the driver was ejected out the driver's door window and thrown onto the exit ramp roadway.

Figure 7: Damage to left front wheel from impact with header wall

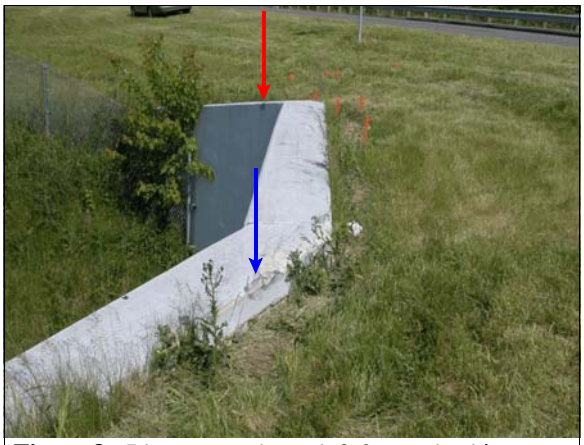


Figure 8: Blue arrow shows left front wheel impact, red arrow shows left rear tire contact to header wall

Figure 9: Crush to case vehicle's roof, right roof side rail, A-pillar and windshield header from the rollover

Figure 10: Orange flags show tempered glass deposit, area where case vehicle's right roof rail impacted ground, arrow shows final rest area of case vehicle, orange stakes show ground divots

Figure 11: Crush to right roof side rail, right A-pillar and windshield header, each black/white section on tape is 0.31 meter (1 foot)

Post-Crash: The case vehicle came to final rest on it wheels facing northwest (**Figure 10** and **Figure 12** below). The driver came to rest in the exit ramp roadway (**Figures 13 and 14** below) approximately 9 meters (29.5 feet) southeast of the final rest position of the case vehicle.

Figure 12: Police on-scene photo of case vehicle at its final rest position, view is to southwest back to roadway, arrow shows sign post in photo 13

Figure 13: View northwest back to roadway through case vehicle's final rest position to area of final rest of ejected driver (arrow), can with orange top shows case vehicle's right rear wheel position

CASE VEHICLE

The 1994 Chevrolet, Geo Tracker Sport was a two-door, four wheel drive, sport utility vehicle (VIN: 2CNBJ18U8R6------) equipped with a 1.6L, L4 engine and five speed manual transmission. The front seating row was equipped with bucket seats with integral head restraints and manual, three-point, lap-and-shoulder safety belts. The back seating row was equipped with a bench seat and manual, three point, lap-and-shoulder safety belts in the outboard seat positions. There was no designated back middle seat position. The case vehicle's wheelbase was 220 centimeters (86.6 inches). The odometer reading at the time of the vehicle inspection was 264,161 kilometers (164,147 miles).

Figure 14: Police on-scene photo showing blood spot (arrow) in roadway at driver's final rest position

CASE VEHICLE DAMAGE

Exterior Damage: The case vehicle's impact with the back of the top section of the bicycle tunnel header wall involved the left rear and left front wheels. The rim was bent on both wheels. The left front wheel was bent inward at the bottom and driven into the back of the wheel house. The rollover involved the roof, right side and front left corner. The primary components damaged during the rollover were the right roof side rail, roof, windshield header, windshield, right A-pillar and right portion of the hood (**Figures 15** and **16** below). The residual maximum roof crush was 42 centimeters (16.5 inches) occurring at the right roof side rail near where it joins the right A-pillar (**Figure 11** above). The left side wheelbase was reduced 17 centimeters (6.7 inches). The right side wheelbase was extended 2 centimeters (0.8 inches). Induced damage involved the entire case vehicle.

Figure 15: Top view of damage to case vehicle

Figure 16: Top view of damage to case vehicle

The recommended tire size was: P205/75R15. The case vehicle was equipped with P215/70R15 on the left front and right front wheels, and P205/75R15 on the left rear and right rear wheels. The case vehicle's tire data are shown in the table below.

Tire	*Measured Pressure*		*Recommend Pressure*		*Tread Depth*		*Damage*	*Restricted*	*Deflated*
	kpa	psi	kpa	psi	milli-meters	32nd of an inch			
LF	69	10	159	23	4	5	Sidewall scuffed, rim dented, concrete in rim	Yes	No
RF	145	21	159	23	4	5	None	No	No
LR	0	0	159	23	1	1	Sidewall scuffed, rim dented, concrete in rim	Yes	Yes
RR	165	24	159	23	2	2	None	No	No

Vehicle Interior: Inspection of the case vehicle's interior revealed two scuffs on the lower instrument panel (**Figure 17**) right of the steering wheel, probably due to contact by the driver's right knee. There were also multiple occupant contact marks on the driver's door (**Figure 18** below). In addition, the driver's door was bowed outward slightly (**Figure 19** below) due to loading by the driver. The driver's door window, which was partially open at the time of the crash, was also broken out due to driver impact to the door. A small scuff and dent were observed in the vinyl side panel adjacent to the back right seat (**Figure 20** below) where the child was seated in his child

Figure 17: Tapes show location of probable knee scuffs on lower instrument panel

seat. The dent and scuff appeared to be due to contact by the right corner of the child seat shield. A small scuff on the right rear window frame (**Figure 20**) was also noted, which was possibly due to contact by the child's head during the rollover. Numerous intrusions were noted to the case vehicle's interior. The most severe intrusions occurred in the front right seat position (**Figure 21**). These intrusions occurred along the vertical axis. They were: 39 centimeters (15.4 inches) of roof intrusion, 37 centimeters (14.6 inches) of roof side rail intrusion, and 34 centimeters (13.4 inches) of right A-pillar intrusion. The most severe intrusions into the driver's seat position also occurred along the vertical axis. They were: 23 centimeters (9.1 inches) of windshield intrusion, and 21 centimeters (8.3 inches) of roof and windshield header intrusion. The most severe intrusions to the back right seat position were 21 centimeters (8.3 inches) of vertical roof intrusion and 21 centimeters (8.3 inches) of lateral right B-pillar intrusion. Lastly, there was no evidence of compression of the energy absorbing steering column, and no deformation of the steering wheel rim was observed (**Figure 22** below).

Figure 18: Tapes show occupant contact marks on driver's door

Figure 19: Top view of occupant contacts to driver's door, door is slightly bowed outward

Figure 20: Overview of back right seat position, red arrow shows probable contact by child seat, blue arrow shows scuff on right rear window frame

Figure 21: Overview of front seat area showing intrusion, each increment on rod is 5 cm (2 in)

Damage Classification: Based on the vehicle inspection, the CDCs for the case vehicle were determined to be: **09-LBWN-1** (**280**-degrees) and **09-LFWN-1** (**280** degrees) for the left side

wheel impacts with the header wall. A CDC of **00-TYDO-4** was assigned for the rollover. The WinSMASH reconstruction program could not be used to reconstruct the case vehicle's Delta V because wheel impacts and rollovers are out-of-scope of the program. However, based on the damage to the left front and left rear wheels, this contractor estimates the Delta V to be low [24-23 km.p.h. (9-14 m.p.h) for each of the wheel impacts. In addition, this contractor estimates the severity of the rollover to be severe. The case vehicle was towed due to damage.

Figure 22: Left side view of steering column and steering wheel showing lack of deformation

CHILD SAFETY SEAT

The back right passenger was seated in a forward facing child seat (**Figures 23** and **24**). The child seat was manufactured by Cosco Inc., on August 16, 1995 and was identified by model name"Explorer" and model number 023990DD. The case vehicle's driver purchased the child seat at a yard sale approximately two years prior to the crash and used it on a regular basis.

Figure 23: Front of child seat, arrow shows guide for safety belt

Figure 24: Back view of child seat

The child seat consisted of a plastic, one-piece shell and a plastic shield. The shield and the seat cushion were covered with a cloth pad. The shield was attached to the left side of the seat and was designed to swivel in and out of place (**Figure 25** below). Each side of the child seat was designed with a step-shaped contour at the top. The shield fit into this contour when it was swivelled into the restrained position. There was no latch to secure the shield to the child seat. The shield was designed with a recessed safety belt guide across the front (**Figure 23**). The child seat was designed to be secured in a vehicle with a lap belt or lap-and-shoulder belt routed across this guide. Based on an interview with the driver and the witness who removed the child from the case vehicle following the crash, the child seat was not secured in the case vehicle as designed. It was positioned in the back right seat position, and the child was restrained in the child seat by the lap portion of the three-point, lap-and-shoulder safety belt positioned across his lap. The shoulder belt was positioned behind the child. The child remained restrained in the child seat during the crash. The witness, who had been directly behind the case vehicle and was the first person to reach the

case vehicle following the crash, released the safety belt and removed the child from the case vehicle through the right rear window. He reported that the safety belt was very tight and required that he push down on the child seat to release the safety belt buckle.

Figure 25: Left side view of child seat showing swivel mount for shield

Inspection of the child seat revealed no deformation or fractures to the seat or the shield. There were several areas of minor scratches and abrasions on the child seat. In addition, there were wear abrasions on the top of the sides of the child seat due to the shield being moved in and out of the restrained position. There was also a localized area of heavy abrasion and a small piece of cloth jammed in the assembly seam on the right lower corner of the shield (**Figure 26**). The cloth was not of the same material as the blanket that was found draped over the seat back. The source of these abrasions and the cloth could not be determined and appeared unrelated to this crash. A small area of abrasion was also noted on the left corner of the belt guide on the front of the shield This abrasion was determined not to be related this crash. Lastly, no warning or instruction labels were affixed to the child seat.

Figure 26: Close view of back right corner of shield showing abrasion and cloth jammed in assembly seam

CASE VEHICLE BACK RIGHT PASSENGER KINEMATICS

Immediately prior the crash the case vehicle's back right passenger [4-year-old White (non-Hispanic) male, 107 centimeters (42 inches) and 20 kilograms (43 pounds)] was seated in his forward facing child seat. He was most likely seated in an upright position with his legs dangling over the edge of the seat cushion. The child was restrained in the child seat by the lap portion of the three-point, lap-and-shoulder safety belt positioned across his lap. The should belt was behind his back.

Just prior to the crash, the case vehicle was in a clockwise rotation due to the driver's right steer. The child most likely moved up and down and to the left in his child seat during this time prior to the impact. The case vehicle's left rear and left front wheel impacts with the header wall caused the child to move to the left and slightly forward within his child seat opposite the case vehicle's 280 degree direction of principal force as the vehicle decelerated. He impacted the left side of his face on the child seat shield bruising his cheek. He then moved toward the roof as the

case vehicle began to roll over driver side leading. The child loaded his lap belt as the case vehicle landed hard on its right roof side rail during the case vehicle's third quarter roll. It appears that the right upper corner of the shield probably impacted the right side panel of the case vehicle and the right side of the child's head possibly contacted the bottom of the right rear window frame. The child remained restrained in his child seat as the case vehicle came to final rest. He was removed from the vehicle through the right rear window by a witness.

CASE VEHICLE BACK RIGHT PASSENGER INJURIES

The police crash report indicated that the child sustained a "B" (non-incapacitating) injury and was not transported to a medical facility. The investigating police officer indicated that the child was taken from the scene to the police station and was picked up by the driver's boyfriend. The child was not subsequently taken to a medical facility. 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	Contusions x 2 {bruises} on left cheek, not further specified	minor 290402.1,2	Child safe-ty seat–shield	Probable	Interviewee (driver)
2	Laceration {cut}, small, on forehead, not further specified	minor 290602.1,7	Noncontact injury: flying glass, right rear glazing	Probable	Other: Police

CASE VEHICLE DRIVER KINEMATICS

Immediately prior to the crash the case vehicle's driver [25-year-old, White (non-Hispanic) female; 160 centimeters and 59 kilograms (63 inches, 130 pounds)] was most likely seated in a nominal upright driving position. Due to the case vehicle's off-road excursion, the driver most likely had both hands on the steering wheel and was leaning to the left and steering right as the case vehicle was rotating clockwise. The position of the driver's feet is not known, but it is likely her right foot was off the accelerator. During the case vehicle inspection, the driver's seat track was found in its forward-most position, and the seat back was found upright. The steering column was not equipped with a tilt adjustment.

The evidence indicates the case vehicle's driver was not using her manual, three-point, lap-and-shoulder safety belt system. In addition, the driver stated she was not restrained.

Just prior to the crash, the case vehicle was in a clockwise rotation due to the driver's right steer. The case vehicle's left rear and left front wheel impacts with the header wall caused the driver to move to her left and slightly forward opposite the case vehicle's 280 degree direction of principal force as the vehicle decelerated. The driver's right knee most likely contacted and scuffed the right knee bolster, and she impacted the driver's door with the left side of her body

fracturing her left humerus, acetabulum and sacrum. The impact to the door slightly bowed the door outward and broke the partially open window. As the vehicle immediately began to rollover, driver side leading, the driver rode up the door and started coming out of the driver's door window. As the vehicle continued to roll over, its rotational velocity increased and the driver was totally ejected out of the driver's door window. The driver was thrown a distance of approximately 11 meters (36 feet) and landed in the exit ramp roadway on her face and chest causing a nasal fracture, left frontal sinus fracture, multiple brain injuries and a fractured sternum. The driver's non-use of her three-point, lap-and-shoulder safety belt resulted in her ejection from the case vehicle during the rollover.

CASE VEHICLE DRIVER INJURIES

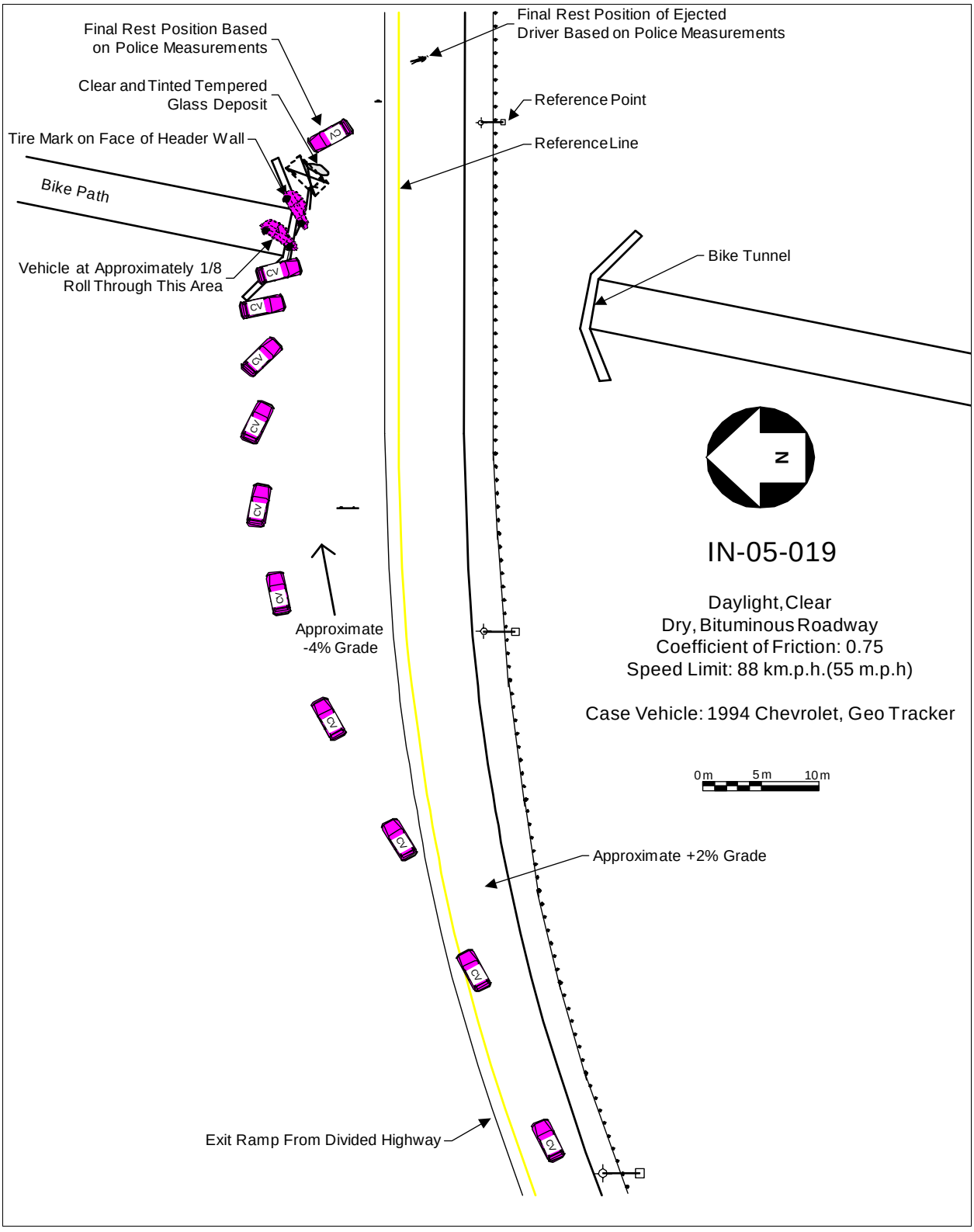
The police crash report indicated the driver sustained an "A" (incapacitating) injury and was initially transported by ambulance to a local hospital and subsequently transported by helicopter to a regional trauma center. The driver indicated she was hospitalized for 35 days. She has had two follow-up medical visits for physical therapy. The driver also indicated she has been unable to work and has lost her job. The table below shows the case vehicle 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	Nonanatomic brain injury with prior unconsciousness of un-known duration; amnesic to events; lethargic and/or stu-porous on observation with confusion, slow mental pro-cessing, distractable, decreased attention, and severely impaired cognition[1]; and anisocoria (i.e., unequal pupils–left > right)	serious 160608.3,0	Ground {pavement}	Certain	Hospitalization records
2	Contusion, small, left posterior frontal lobe	serious 140606.3,2	Ground {pavement}	Certain	Hospitalization records
3	Hemorrhage, intracerebral, NFS, in right high convexity without midline shift	severe 140638.4,1	Ground {pavement}	Certain	Hospitalization records
4	Hemorrhage, subdural, small {little} along tentorium, not further specified	severe 140650.4,9	Ground {pavement}	Certain	Hospitalization records

[1] This patient has impaired working memory, impaired judgment and safety awareness, and requires 24-hour supervision–Rancho Los Amigos V.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
5 6	Hemorrhage, intraventricular, left lateral ventricle in posterior horn and trigone, and right lateral ventricle in isthmus of cingulate gyrus	severe 140678.4,2 140678.4,1	Ground {pavement}	Certain	Hospitalization records
7	Hemorrhage, subarachnoid, with left Sylvian fissure	serious 140684.3,2	Ground {pavement}	Certain	Hospitalization records
8	Fracture, non-displaced, through left frontal sinus involving anterior and posterior plates	moderate 150402.2,5	Ground {pavement}	Certain	Hospitalization records
9	Fracture, non-displaced, left nasal bone	minor 251002.1,4	Ground {pavement}	Certain	Hospitalization records
10	Fracture mid-body of sternum	moderate 450804.2,4	Ground {pavement}	Probable	Hospitalization records
11	Fracture, non-displaced, left proximal humeral head, involving greater tuberosity	moderate 752602.2,2	Left front window sill	Probable	Hospitalization records
12	Fracture, non-displaced, left acetabulum involving anterior column and anterior rim	moderate 852602.2,2	Left side interior hardware and/or armrest	Probable	Hospitalization records
13	Fracture, non-displaced, left sacrum, not further specified	moderate 852602.2,6	Left side interior hardware and/or armrest	Probable	Hospitalization records
14	Contusion {hematoma} left parietal region	minor 190402.1,2	Ground {pavement}	Certain	Hospitalization records
15	Laceration, 3 cm (1.2 in) lateral to right eye	minor 290602.1,1	Unknown	Unknown	Emergency room records
16	Laceration right eyelid, not further specified	minor 297602.1,1	Noncontact injury: flying glass, left front glazing	Possible	Hospitalization records
17 18	Contusion {hematoma, bruise} bilateral orbital areas	minor 297402.1,1 297402.1,2	Ground {pavement}	Probable	Hospitalization records
19	Abrasions nasal area, not further specified	minor 290202.1,4	Ground {pavement}	Certain	Hospitalization records
20	Abrasion right shoulder, not further specified	minor 790202.1,1	Ground {pavement}	Probable	Hospitalization records
21	Abrasion left elbow with edema around elbow	minor 790202.1,2	Left side interior hardware and/or armrest	Probable	Hospitalization records

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
22	Contusions {bruises} bilateral arms, not further specified	minor 790402.1,3	Left side interior surface, excluding hardware and/or armrest	Possible	Hospitalization records
23	Abrasion left outer knee, not further specified	minor 890202.1,2	Left side interior surface, excluding hardware and/or armrest	Probable	Hospitalization records
24	Contusion {bruise} right thigh, not further specified	minor 890402.1,1	Steering wheel rim	Possible	Hospitalization records


Final Rest Position Based on Police Measurements
Clear and Tinted Tempered Glass Deposit
Tire Mark on Face of Header Wall
Bike Path
Vehicle at Approximately 1/8 Roll Through This Area
Final Rest Position of Ejected Driver Based on Police Measurements
Reference Point
Reference Line
Bike Tunnel
N
IN-05-019
Daylight, Clear
Dry, Bituminous Roadway
Coefficient of Friction: 0.75
Speed Limit: 88 km.p.h.(55 m.p.h)
Case Vehicle: 1994 Chevrolet, Geo Tracker
0m 5m 10m
Approximate -4% Grade
Approximate +2% Grade
Exit Ramp From Divided Highway
CV
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