

**CRASH DATA RESEARCH CENTER**

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**CALSPAN ON-SITE CHILD SAFETY SEAT CRASH INVESTIGATION  
CENTURY CONVERTIBLE CHILD SAFETY SEAT  
SCI CASE NO: CA05-004**

**VEHICLE: 2004 CHRYSLER TOWN & COUNTRY  
LOCATION: MARYLAND  
CRASH DATE: NOVEMBER, 2004**

Contract No. DTNH22-01-C-17002

Prepared for:

U.S. Department of Transportation  
National Highway Traffic Safety Administration  
Washington, D.C. 20590

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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.

## TECHNICAL REPORT STANDARD TITLE PAGE

<p>1. Report No. CA05-004</p>	<p>2. Government Accession No.</p>	<p>3. Recipient's Catalog No.</p>	
<p>4. Title and Subtitle Calspan On-Site Child Safety Seat Crash Investigation Vehicle: 2004 Chrysler Town &amp; Country Location: Maryland</p>		<p>5. Report Date: August 2006</p>	
		<p>6. Performing Organization Code</p>	
<p>7. Author(s) Crash Data Research Center</p>		<p>8. Performing Organization Report No.</p>	
<p>9. Performing Organization Name and Address Calspan Corporation Crash Data Research Center P.O. Box 400 Buffalo, New York 14225</p>		<p>10. Work Unit No. C00410.0000.0237</p>	
		<p>11. Contract or Grant No. DTNH22-01-C-17002</p>	
<p>12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Washington, D.C. 20590</p>		<p>13. Type of Report and Period Covered Technical Report Crash Date: November 2004</p>	
		<p>14. Sponsoring Agency Code</p>	
<p>15. Supplementary Note An investigation of an offset head-on crash involving a 2004 Chrysler Town &amp; Country and a 2204 Toyota Highlander.</p>			
<p>16. Abstract This investigation focused on the performance of a Century Convertible Child Safety Seat (CSS) installed in a forward facing manner in the second row right position of a 2004 Chrysler Town &amp; Country. A 2 year old female was restrained within the child safety seat. The Chrysler Town &amp; Country was involved in a head-on crash with a 2004 Toyota Highlander. The Chrysler was driven by a 26 year old female and occupied by a 20 year old male front right passenger, and by a 4 year old female seated in a booster seat (make/model unknown) in the left second row position. The Toyota Highlander was driven by a 24 year old female and occupied by a 20 year old female front right passenger. Reportedly, the driver of the Chrysler lost directional control of the vehicle, and allowed the vehicle to cross the centerline precipitating the crash. Both vehicles sustained disabling damage, were towed from the crash scene, and subsequently were considered a total loss by their respective insurance companies. All six individuals in the crash were transported by ground ambulance to a regional trauma center with police reported non-life threatening minor injuries.</p>			
<p>17. Key Words Offset head-on Tray Shield      Restrained Driver Chest Retainer Clip      Convertible Child Safety Seat AIS 1 injury</p>			<p>18. Distribution Statement General Public</p>
<p>19. Security Classif. (of this report) Unclassified</p>	<p>20. Security Classif. (of this page) Unclassified</p>	<p>21. No. of Pages 13</p>	<p>22. Price</p>

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**CALSPAN ON-SITE CHILD SAFETY SEAT CRASH INVESTIGATION**  
**SCI CASE NO: CA05-004**  
**VEHICLE: 2004 CHRYSLER TOWN & COUNTRY**

**LOCATION: MARYLAND**  
**CRASH DATE: NOVEMBER 2004**

***BACKGROUND***

This investigation focused on the performance of a Century Convertible Child Safety Seat (CSS) installed in a forward facing manner in the second row right position of a 2004 Chrysler Town & Country, **Figure 1**. A 2 year old female was restrained within the child safety seat. The Chrysler Town & Country was involved in a head-on crash with a 2004 Toyota Highlander. The Chrysler was driven by a 26 year old female and occupied by a 20 year old male front right passenger, and by a 4 year old female seated in a booster seat (make/model unknown) in the left second row position. The Toyota Highlander was driven by a 24 year old female and occupied by a



**Figure 1: Left front oblique view of the Chrysler.**

20 year old female front right passenger. Reportedly, the driver of the Chrysler lost directional control of the vehicle, and allowed the vehicle to cross the centerline precipitating the crash. Both vehicles sustained disabling damage, were towed from the crash scene, and subsequently were considered a total loss by their respective insurance companies. All six individuals in the crash were transported by ground ambulance to a regional trauma center with police reported non-life threatening minor injuries.

The Crash Investigation Division of the National Highway Traffic Safety Administration forwarded the Police Accident Report of this crash to the Special Crash Investigations team at Calspan on January 12, 2005 for follow-up investigation. The SCI team initiated contact with the respective insurance carriers and established cooperation. The vehicles were located at two salvage yards and were available for inspection. The subject child safety seat was located with the Chrysler. The booster seat was not with the vehicle and was not inspected. The case was assigned January 21, 2005 and the on-site portion of the investigation took place during the week of January 24, 2005.

***SUMMARY***

***VEHICLE DATA***

***2004 Chrysler Town & Country***

The 2004 Chrysler Town & Country minivan was identified by the Vehicle Identification Number (VIN): 1C4GP45R54B (production sequence deleted). The four-door, seven passenger minivan was configured on the 287 cm (113.1 in) wheelbase and had a Gross Vehicle Weight Rating of 2,540 kg (5,600 lb). The power train consisted of a 3.3 liter/V6 engine linked to a

four-speed automatic transmission. The service brakes were a front disc/rear drum system with ABS. The seating configuration consisted of two manual bucket seats in the front row, a two passenger bench seat in the second row, and a third row three passenger bench seat. The manual restraint system consisted of three-point lap and shoulder belts in the six outboard positions and a third row center lap belt. The front restraints utilized buckle pretensioners. The frontal air bag system consisted of advanced dual stage driver and front right passenger air bags. The vehicle's date of manufacture was unknown. The digital odometer could not be read due to crash related damage to the vehicle's electrical system. The Chrysler was equipped with Guardsman III tires in the left front and front right positions, a Goodyear Integrity in the left rear position and a Mastercraft Sensys 01 in the right rear position. All the tires were size P215/70R15. The recommended tire pressure was 241 kPa (35 PSI). The specific measured tire data was as follows:

<b>Tire</b>	<b>Measured Pressure</b>	<b>Tread Depth</b>	<b>Restricted</b>	<b>Damage</b>
LF	0 kPa	6 mm (8/32)	Yes	Trapped by deformation
LR	0 kPa	6 mm (8/32)	No	None
RF	186 kPa (27 PSI)	6 mm (8/32)	No	Unknown
RR	207 kPa (30 PSI)	6 mm (8/32)	No	None

***2004 Toyota Highlander***

The 2004 Toyota Highlander was identified by the Vehicle Identification Number (VIN): JTEEP21A440 (production sequence deleted). The four-door sport utility vehicle was configured on a 272 cm (106.9 in) wheelbase and had a Gross Vehicle Weight Rating of 2,430 kg (5,360 lb). The power train consisted of a 3.3 liter/V6 engine linked to a five-speed automatic transmission. The service brakes were a four wheel disc system with ABS. The leather upholstered interior had the capacity to transport eight passengers (2/3/3). The front row consisted for two bucket seats, a three passenger split bench seat comprised the second row and a three passenger folding bench seat was used in the third row. The manual restraint systems in the Toyota consisted of three-point lap and shoulder belts in all eight seat positions. The front air bag system was certified by the manufacturer to have met the requirements of the advanced Federal Motor Vehicle Safety Standard (FMVSS) 208 and consisted of dual stage driver and front air passenger air bags. The vehicle was manufactured in April 2004. The Highlander was equipped with Goodyear Integrity P225/65R17 tires in the left rear, right front and right rear positions. The left front tire separated due to the impact and was missing. The recommended tire pressure was 207 kPa (30 PSI). The specific measured tire data was as follows:

<b>Tire</b>	<b>Measured Pressure</b>	<b>Tread Depth</b>	<b>Restricted</b>	<b>Damage</b>
LF	N/A	N/A	N/A	N/A
LR	165 kPa (24 PSI)	7 mm (9/32)	No	None
RF	0 kPa	6 mm (8/32)	No	None
RR	0 kPa	7 mm (9/32)	No	None

## ***CRASH SITE***

The crash occurred during the nighttime hours of November 2004. At the time of the crash it was dark and the area was illuminated by overhead artificial street lighting. It was raining and the asphalt road surface was wet. The crash occurred on a two lane east/west road in a residential setting. **Figure 2** is an eastbound trajectory view. The width of the each travel lane measured 3.4 m (11.4 ft). The travel lanes were separated by solid double yellow centerlines and delineated by white edge lines. The width of the respective road shoulders measured 1 m (3 ft). The road was straight and level in the area of the impact. A hillcrest was located approximately 25.9 m (85 ft)



**Figure 2: Eastbound trajectory view at the crash site.**

west of the point of impact. The grade of the road was a positive five percent in the eastbound direction leading into the crash site. At the time of the SCI investigation, there was no physical evidence at the crash site that was identified the point of impact and there was no documented evidence reported in the police crash report. The speed limit in the area of the crash was 48 km/h (30 mph). A schematic of the crash is included as **Figure 15** at the end of this report.

## ***CRASH SEQUENCE***

### ***Pre-Crash***

The 2004 Chrysler Town & Country was eastbound driven by a 26 year old restrained female. The Chrysler was occupied by a 20 year old unrestrained male in the front right passenger seat, 4 year old female in the second row left position and a 2 year old female in the second row right position. The children in the second row were seated in a booster seat and a forward facing convertible seat, respectively. The 2004 Toyota Highlander was westbound driven by a 24 year old restrained female. A 20 year old unrestrained female was the vehicle's front right passenger. For unknown reasons, the driver of the Chrysler lost directional control and drifted across the centerline of the road precipitating the crash.

### ***Crash***

The crash occurred with the left aspect of the Chrysler's front plane impacting the left aspect of the Toyota in an off-set collision. The principle directions of the impact force were in the 12 and 12 o'clock sectors for the Chrysler and Toyota, respectively. The front left of the Chrysler impacted the front of the Toyota immediately outboard of the bumper reinforcement and then engaged the forward left side of the vehicle. The force of the impact fired the seat belt pretensioners and caused the frontal air bags in both vehicles to deploy. The offset impact configuration caused both vehicles to rotate counterclockwise during separation. The Chrysler rotated approximately 150 degrees and came to rest facing northwest in the eastbound travel lane. The Toyota rotated approximately 160 degrees and came to rest on the north road shoulder. There was no physical evidence of the crash remaining at the crash site due to the time delay between crash date and SCI crash notification.

The offset impact configuration and dynamics of the crash resulted in a non-central collision. The vehicles did not reach a common velocity at maximum engagement. The common velocity assumption was a basis premise of the WINSMASH model; therefore, this crash was beyond the scope of the model. It could not be used to analyze this crash. The model's Missing Vehicle Algorithm calculated an 18 km/h (11.2 mph) delta V for the Chrysler. This value underestimated the severity of the crash based of SCI field experience.

### ***Post-Crash***

The police and ambulance personnel responded to the crash. The six individuals involved in the incident were transported via ground ambulance to a regional trauma center located within 32 km (20 miles) with police reported non-life threatening injuries. Both vehicles sustained disabling damage in the crash and were towed from the scene. Both vehicles were deemed a total loss by their respective insurance companies and transferred to two different salvage yards.

## ***2004 CHRYSLER TOWN & COUNTRY***

### ***Exterior Damage***

**Figures 3 and 4** are the front and left lateral views of the Chrysler. The front plane of the Chrysler sustained a combined width of direct and induced damage that extended across the entire 163 cm (64 in) of the vehicle. The direct damage began 41 cm (16 in) left of center and extended 41 cm (16 in) to the left corner. The fascia fractured and separated from the bumper reinforcement in the impact. The right side of the bumper reinforcement separated from the right sub-frame due to an induced overload as a result of the crush of the reinforcement's left aspect. The residual crush was measured along the lower radiator support due to the bumper separation. The residual deformation along the lower radiator support was as follows: C1 = 44 cm (17.3 in), C2 = 24 cm (9.4 in), C3 = 10 cm (4.0 in), C4 = 1 cm (0.5 in), C5 = 0, C6 = 0.



**Figure 3: Front view**



**Figure 4: Left lateral view.**

The impact crushed the left fender and deformed the left front suspension and wheel assembly rearward into the lower cowl and left A-pillar. The left front tire deflated and was captured within the damage. The left wheelbase was reduced 23 cm (9.1 in). There was no dimensional change of the right wheelbase. The left and center aspects of the windshield fractured due to the

exterior force of the impact. The right aspect of the windshield fractured due to the deployed front right passenger air bag. The left front door was removed by extrication. The sliding left rear and right rear doors were operational. The right front door was jammed. The Collision Deformation Classification (CDC) was 12-FLEW3

## **2004 TOYOTA HIGHLANDER**

### ***Exterior Damage***

**Figure 5** is a left front oblique view of the damaged Toyota Highlander. It had been disassembled prior to the SCI inspection for insurance purposes. The vehicle sustained an impact to the left corner, immediately outboard of the bumper reinforcement bar. The direct contact damage began 61 cm (24 in) left of center and extended 20 cm (8 in) to the left corner. The front bumper fascia fractured at its left end and separated. The extreme left end of the reinforcement bar was deflected 2 cm (0.8 in). The damage pattern then extended along the left side of the vehicle (outboard of the frame rail) to the forward aspect of the front door opening.



**Figure 5: Left oblique view of the Toyota.**

There was no deformation of the left frame rail. The left front door had been removed and missing. The left sill was buckled from direct contact. The direct contact to the sill ended 61 cm (24 in) forward of the left B-pillar. The left front fender crushed and separated. The left front suspension deformed rearward into the cowl and the wheel assembly separated at the lower control arm. The left front wheel assembly was missing. The rearward displacement of the upper shock tower measured 22 cm (8.5 in). The left A-pillar and left roof rail were buckled. The windshield was fractured from the exterior crash force. The left rear door was open but could not be latched due to distortion of the vehicle's body. The right doors were operational. The right wheelbase was unchanged. The CDC of the Toyota was 12-FLEE6.

## **2004 CHRYSLER TOWN & COUNTRY**

### ***Interior Damage***

The interior damage to the Chrysler Town & Country consisted of minor intrusion into the driver's position, occupant contacts and the deployment of the frontal air bags. The intrusion of the left corner of the instrument panel measured 8 cm (3 in). The outboard aspect of the toe pan intruded 19 cm (7.5 in). **Figures 6 and 7** are front interior views of the Chrysler.

The driver seat was adjusted to a mid to rear track position that measured 7 cm (2.8 in) forward of full rear. The total seat track travel measured 22 cm (8.5 in). The seat back was reclined 18 degrees. The horizontal distance from the seat back to the center hub of the steering wheel rim measured 51 cm (20 in). This horizontal distance was measured 30 cm (12 in) above the seat bight.

The four-spoke steering wheel rim was turned 180 degrees clockwise at inspection. The tilt adjustment of the steering wheel was jammed. The lower half of rim was deformed forward. The maximum deflection measured 4 cm (1.5 in) in the 5 o'clock sector. The steering column had completely separated from the shear capsules. The displacement measured 3 cm (1 in).

The driver's knee bolster exhibited two scuff marks indicative of contact from the driver's lower extremities. The left lower extremity contact measured 5 cm x 5 cm (2 in x 2 in) and was located 25 cm (10 in) left of the steering column center line. A 5 cm x 16 cm (2 in x 6 in) abrasion attribute to contact from the right lower extremity was located 8 cm (3 in) right of the steering column center line.

The front right passenger seat was adjusted to a mid to forward track position that measured 13 cm (5 in) forward of full rear. The total seat track travel measured 22 cm (8.5 in). The seat back was reclined 40 degrees. The horizontal distance from the seat back to the vertical face of the instrument panel measured 79 cm (31 in). This horizontal distance was measured 30 cm (12 in) above the seat bight.

The only noted physical evidence to the front right interior consisted of abrasions to the trim surrounding the right aspect of the center instrument panel. The two areas of abrasion were located 51 cm to 56 cm (20 in to 22 in) and 64 cm to 67 cm (25 in to 26.5 in) above the floor, respectively. The abrasions resulted from frictional contact with the deployed front right passenger air bag as the unrestrained front right passenger rode down the crash force. The glove box disengaged from the lower right instrument panel and was found in the right foot well. There was no evidence of contact to the door.



**Figure 6 Driver's interior.**



**Figure 7: Center and front right interior.**

The second row of the Chrysler consisted of a Lower Anchors and Tethers for Children (LATCH) compatible two passenger fixed bench seat. There was no intrusion into the second row and no noted contacts to the interior or front seat backs. The seat back was reclined 30 degrees. The right side of the seat cushion appeared to have been abraded and imprinted by the base of the convertible child safety seat through repeated use.

### ***Manual Restraint Systems***

The driver restraint in the 2004 Chrysler Town & Country consisted of continuous loop webbing, a sliding latch plate, an adjustable D-ring, and an Emergency Locking Retractor (ELR) located in the base of the B-pillar. The D-ring was in the full down position. The inboard buckle stalk was attached to the seat track and was equipped with a pretensioner. The pretensioner had fired as a result of the crash. The residual barrel length of the pretensioner measured 41 mm (1.6 in). The driver's webbing was extended upon initial inspection. An abrasion on the webbing as a result of frictional contact with the D-ring was identified. It was located 179 cm to 194 cm (70.5 to 76 in) above the outboard anchor. The D-ring was abraded across its full width. Examination of the latch plate revealed indicators of historical use. All the evidence identified during the course of the SCI inspection indicated the driver was restrained at the time of the crash.

The front right passenger manual restraint consisted of continuous loop webbing, a light weight locking latch plate, an adjustable D-ring and an ELR retractor. The webbing was stowed in the retractor upon initial inspection. Examination of the webbing was unremarkable for crash related evidence. The D-ring was adjusted to a mid position and the surface of the D-ring was not abraded. Examination of the buckle pretensioner indicated that it had fully stroked. The residual length of the barrel measured 5 mm (0.2 in). The observations of the SCI inspection indicated the front right passenger was unrestrained at the time of the crash. **Figure 8** is a view of the compressed front safety belt buckles.



**Figure 8: View of the front safety belt buckles.**

The manual restraint systems in the second row consisted of continuous loop webbing, a light weight locking latch plate, a fixed D-ring and an ELR retractor. These restraints were used to restrain the convertible child safety seat in the right position and the booster seat in the left position. Inspection of these restraints found each belt system operable. There was no evidence of loading to the respective belt's webbing and there was no frictional evidence observed on either D-ring surface.

### ***Frontal Air Bag System***

The Frontal Air Bag System in the 2001 Chrysler Town & Country consisted of driver and front right passenger air bags that deployed as a result of the crash, **Figure 9**. The driver air bag module was designed in the typical manner and located in the center hub of the steering wheel rim. The driver air bag module had a single semi-circular flap that was hinged along its top aspect. The vinyl cover flap measured 20 cm (8 in) in diameter. There was no contact evidence on the cover flap. The diameter of the deployed driver air bag measured 66 cm (26 in) in its deflated state. It was tethered by four internal straps sewn to the face of the bag and vented internally. There was no contact evidence on the face of the bag

The front right passenger air bag was a mid-mount design located in the right aspect of the instrument panel. The single cover flap measured 30 cm x 20 cm (12 in x 8 in), width by height, and conformed to the contoured shape of the instrument panel. The passenger air bag was internally vented and was not tethered. The face of the deflated bag measured 46 cm x 66 cm (18 in x 26 in), width by height. There was no residual contact evidence on the face of the bag. A 20 cm (8 in) section of the outboard side panel and top surface of the bag was captured between the rotated cover flap and the windshield. It was not unlikely that the captured position of the air bag was an artifact of the crash. The air bag probably was placed in this position post-crash for unknown reasons.



**Figure 9: Frontal air bags in the Chrysler.**

#### ***CHILD SAFETY SEAT DATA***

The two year old child was restrained a Century convertible Child Safety Seat (CSS) in the right rear position at the time of the crash, **Figure 10**. The CSS was manufactured on August 29, 2002 and had the following model and serial numbers: 3500 STE MG, 44339EL1. The convertible CSS was labeled for use an infant from 2.3 kg to 10 kg (5 to 22 lb) in a rear facing mode and for a forward facing child 9 kg to 18 kg (20 to 40 lb). The CSS had a height requirement for a child 48 cm to 102 cm (19 in to 40 in). The CSS was designed with a three-point harness and a tray shield. The CSS was designed for LATCH. Neither the lower anchor belt nor the tether were in use. The seat was restrained by the vehicle's



**Figure 10: View of the Century convertible Child Safety Seat.**

three-point lap and shoulder belt. Inspection of the belt path and the vehicle's safety belt was unremarkable for crash related evidence. The CSS was designed with an adjustable foot. The labeled instructions indicated the foot was to be used during forward facing use. At the time of the inspection, the foot was folded into the base (not in use) and the seat back angle of the second row appeared to have been adjusted to match the angle of the CSS.

Initial inspection of the CSS found that the tray shield was separated from the seat. Inspection of the components revealed loading evidence to the tray shield by the child occupant. The left side support arm of the tray shield was fractured, **Figures 11 and 12**. The right support arm of the tray shield was intact. Both harness straps were cut by EMS and the tray shield had been removed from the seat. The tray shield did not appear to be damaged. The straps of the three-point internal harness were routed through the top slots. The straps were roped and creased,

**Figure 13.** The chest restrainer clip was adjusted to the lowest position and the straps were roped within the clip, **Figure 14.** There were no noted fractures or damage to the shell.



**Figure 11:** Left side view of the CSS.



**Figure 12:** Fractured tray shield support.



**Figure 13:** CSS front view.



**Figure 14:** Close-up view of the harness straps and retainer clip.

The four year old child was seated on the left side of the second row in an unknown make/model booster seat. The booster seat was not in the vehicle. Inspection of the vehicle's three-point lap and shoulder belt was unremarkable for crash related evidence. Information regarding this seat could not be ascertained. The driver (mother) declined an interview.

***OCCUPANT DEMOGRAPHICS***

	<b><i>Driver</i></b>	<b><i>Front Right Passenger</i></b>
Age/Sex:	24 year old / Female	20 year old / Male
Height:	Not reported	Not reported
Weight:	Not reported	Not reported
Seat Position:	Mid to rear	Mid to forward
Manual Restraint Use:	Three-point lap and shoulder	Unrestrained
Usage Source:	SCI inspection	SCI inspection
Medical Treatment:	Transported to a local hospital, treated and released	Transported to a local hospital, treatment unknown

	<b><i>Second Row Left Passenger</i></b>	<b><i>Second Row Right Passenger</i></b>
Age/Sex:	4 year old / Female	2 year old / Female
Height:	Not reported	Not reported
Weight:	Not reported	Not reported
Manual Restraint Use:	Restrained within a convertible child safety seat in a forward facing mode	Restrained with an unknown booster seat by the vehicle's three point lap and shoulder belt
Usage Source:	SCI inspection, PAR	SCI inspection, PAR
Medical Treatment:	Transported to a local hospital, treatment unknown	Transported to a local hospital, treatment unknown

***DRIVER INJURY***

<b><i>Injury</i></b>	<b><i>Injury Severity (AIS 98 Update)</i></b>	<b><i>Injury Source</i></b>
Blunt torso trauma	Unknown Severity 415099.7,0	Steering wheel loading
Left knee contusion	Minor (890402.1,2)	Knee bolster
Left shin abrasion	Minor (890202.1,2)	Knee bolster

*Note: the above injuries were identified in the driver's Emergency Room records. Additionally, she had complaints of pain to multiple areas (neck, chest, lower extremities) without diagnosed injury.*

***DRIVER KINEMATICS***

The 24 year old driver was seated in a mid to rear track position in a presumed upright posture. She relinquished directional control and allowed the vehicle to drift across the center line of the road precipitating the crash.

At impact, the seat belt buckle pretensioner fired and the frontal air bags deployed. The firing of the pretensioner removed potential slack in the belt system and tightened the restraint above the driver. The driver responded to the 12 o'clock direction of the impact force by exhibiting a forward trajectory. The driver loaded the seat belt system evidenced by the webbing and D-ring

abrasions. The driver contacted the deployed driver air bag and rode down the force of the impact through a combined loading of the belt system and air bag. The driver's loading of the air bag was evidenced by the deformation of the steering wheel rim and shear capsule displacement. The driver's lower extremities contacted the knee bolster evidenced by scuff marks to the panel and the identified left lower extremity abrasion/contusion. The driver then rebounded back into her seat and came to rest. Her ride down of the crash force resulted in complaints of pain to multiple body regions without objective injury.

#### ***FRONT RIGHT PASSENGER INJURY***

There was no record of treatment for this occupant at the identified hospital.

#### ***FRONT RIGHT PASSENGER KINEMATICS***

The 20 year old front right passenger was unrestrained at the time of the crash. He was seated in a mid to forward seat track position. At impact, the frontal air bags deployed and the occupant initiated a forward trajectory in response to the 12 o'clock direction of the crash force. The occupant contacted and loaded the deployed front right passenger air bag and rode down the force of the crash. This loading was evidenced by the minor abrasions to the trim surrounding the right aspect of the center instrument panel. The occupant then rebounded back into his seat and came to rest. The police report indicated he sustained a possible injury however; the hospital could not locate any records of treatment for this occupant.

#### ***SECOND ROW LEFT PASSENGER INJURY***

There was no record of treatment for this occupant at the identified hospital.

#### ***SECOND ROW LEFT PASSENGER KINEMATICS***

The 4 year old female was seated in a booster seat and was restrained by the vehicle's three point lap and shoulder belt system at the time of the crash. At impact, the seat belt retractor locked and the child exhibited a forward trajectory in response to the 12 o'clock direction of the impact. The child contacted and loaded the seat belt system and rode down the force of the impact. The child then rebounded back into her seat and came to rest. She was transported to a local hospital with a police reported non-incapacitating injury. The identified hospital could not locate any records of treatment for this occupant.

#### ***SECOND ROW RIGHT PASSENGER INJURY***

There was no record of treatment for this occupant at the identified hospital.

#### ***SECOND ROW RIGHT PASSENGER KINEMATICS***

The 2 year old female was seated in a forward facing mode in a convertible child safety seat and was restrained by the child seat's internal three-point harness straps and tray shield. The harness straps were routed through the top slots and the chest retainer clip was adjusted to the lowest position. Upon impact, the child exhibited a forward trajectory in response to the 12 o'clock direction of the impact force. The child began to load the harness straps with her shoulders, however, the low adjustment of the chest retainer clip allowed the straps to separate laterally and

the child translated forward. The child loaded the tray shield with her chest as she rode down the force of the crash. Her loading to the tray shield caused a fracture of the left side support arm (internal to the assembly). The tray shield did not separate during the crash. The child then rebounded back into the shell and came to rest.

The harness straps were cut and the tray shield was removed by EMS. The child was transported by ground to a local hospital with a police reported non-incapacitating injury; however the identified hospital had no record of treatment for this occupant.

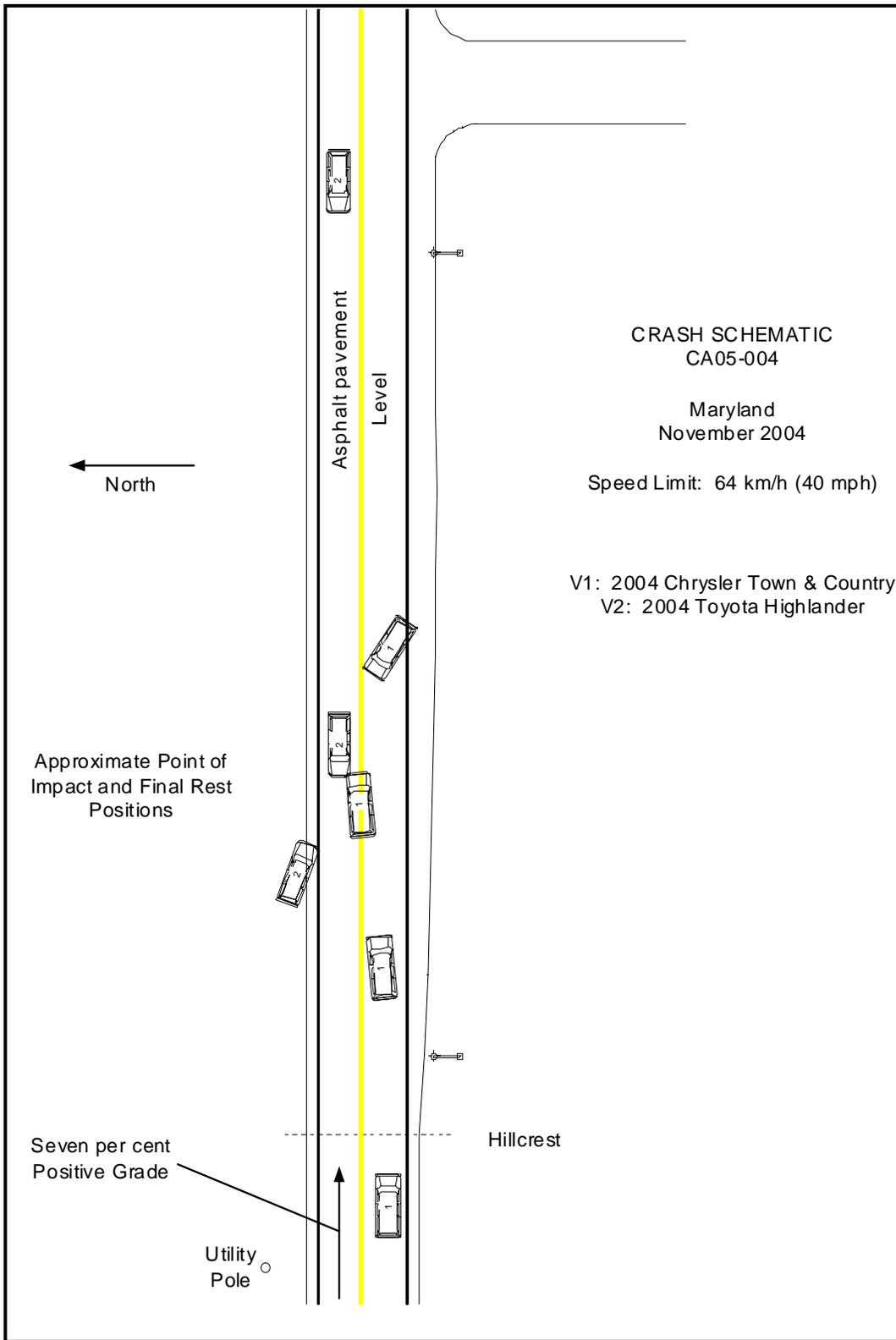


Figure 15: Crash Schematic.