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Special Crash Investigations: On-Site Child Safety Seat Crash Investigation; Vehicle: 2003 Toyota Camry; Location: Virginia; Crash Date: October 2021

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Each crash represents a unique sequence of events, and generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicles or their safety systems. This report and associated case data are based on information available to the Special Crash Investigation team on the date this report was submitted.

16. Abstract

This on-site investigation documents the crash of a 2003 Toyota Camry and a 2005 Subaru Forester that resulted in fatal injuries to the Toyota's belted 7-year-old female passenger in a backless booster seat. A belted 29-year-old female drove the Toyota with a 2-year-old female restrained in a forward-facing child restraint system (CRS) in the second-row left seat, the belted 7-year-old passenger in the second-row middle seat situated on the booster seat, and a 6-year-old female in the second-row right seat in a forward-facing CRS occupying the vehicle. A belted 45-year-old female drove the Subaru. The Subaru, traveling southwest on a four-leg intersection, struck the Toyota traveling northeast while making a left turn through the same intersection. The Toyota's 7-year-old passenger sustained a critical (AIS-5) head injury and was transported by ambulance to a level-1 trauma center where she expired 9 days post-crash. The Toyota driver and 2-year-old passenger sustained police-reported C-level (possible) injuries and were transported to hospitals by ambulance where they were treated and released. The 6-year-old passenger sustained police-reported C-level injuries and was flown to a trauma center where she was treated and released. The Subaru driver did not sustain any police-reported injury.

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Background

This on-site investigation documented the crash of a 2003 Toyota Camry (Figure 1) and a 2005 Subaru Forester that resulted in fatal injuries to the Toyota's second-row middle passenger, a belted 7-year-old female who was seated in a backless booster seat (Figure 2). The National Highway Traffic Safety Administration received notification in October 2021 and the investigation was assigned to the Special Crash Investigations (SCI) team at Crash Research & Analysis in the same month. The investigating police agency was contacted in October 2021 and a written request was required to obtain information. The police agency responded in November 2021. Inspections of both vehicles, the crash scene, and the Toyota driver interview were completed in November 2021.

Figure 1. The 2003 Toyota Camry

Figure 2. Police on-scene image of child seats after passenger exits

The crash occurred in a four-leg intersection of a divided State highway and an undivided county roadway. The Toyota was initially traveling northeast and was in the process of making a left turn through the intersection. The Subaru was traveling southwest on the same roadway and was approaching the intersection. The Subaru driver intended to proceed straight through. Both drivers acknowledged entering the intersection on a yellow traffic light. As the Toyota was turning left, the front of the Subaru struck the right side of the Toyota. The Toyota rotated clockwise and was redirected west. It came to final rest at the northwest corner of the intersection facing west. The Subaru continued southwest after impact and crossed over the raised concrete median. It came to final rest in the through lanes of the southwest leg of the intersection, facing north. Both vehicles were towed due to damage.

The Toyota was occupied by a belted 29-year-old female driver, a 2-year-old female restrained in a forward-facing child restraint system (CRS) in the second-row left seat, a belted 7-year-old female passenger in a booster seat in the second-row middle seat, and a 6-year-old female in the second-row right seat in a forward-facing CRS. The 7-year-old passenger sustained a critical (AIS-5) head injury and was transported by ambulance to a level 1 trauma center where she expired 9 days post-crash. The driver and 2-year-old sustained police-reported C-level (possible) injuries and were transported to hospitals by ambulance where they were treated and released. The 6-year-old passenger was flown to a trauma center where she was treated and released. The Subaru driver did not sustain any police-reported injury.

On-site activities included documentation and measurements of the Toyota's exterior and interior damage, identification of occupant contact points, and inspections of the manual and supplemental restraint and CRS. The Toyota's event data recorder (EDR) was imaged by the Bosch Crash Data Retrieval tool. Additional on-site activities included an exterior inspection of the Subaru, plus documentation of the crash site's physical environment using photographs and a total station mapping system.

Summary

Crash Site

The crash occurred during the day at the intersection of a six-lane State highway and four-lane undivided county road. According to a local weather report, the temperature was 18 °C (65 °F) with 8 km/h (5 mph) winds from the northeast. Both vehicles' roadways traversed in a northeast/southwest direction. The Toyota's roadway had two through lanes and left and right turn lanes separated from the southwest-bound lanes by a raised concrete median. The Subaru's roadway had two through lanes, a right turn lane, and a left turn lane separated from the through lanes by a raised concrete median. There was also a marked bicycle lane between the right turn and through lanes. The Subaru's roadway was separated from the northeast-bound lanes by a raised concrete median. All roadways involved were level bituminous and both vehicles' lanes were approximately 4 m (13 ft) wide. Roadway markings consisted of solid white lane lines and solid yellow median lines with arrows denoting the turn lanes. Traffic flow through the intersection was controlled by an overhead traffic signal system. The posted speed limit for both vehicles was 80 km/h (50 mph).

Pre-Crash

The Toyota was traveling northeast in the left turn lane, approaching the intersection. The Toyota driver stated she observed the overhead traffic signal transition from a green signal phase to yellow as she entered the intersection and initiated the left turn (Figure 3) to proceed northwest. The Subaru was traveling southwest in the left-through lane (Figure 4) and was proceeding through the intersection. The Subaru driver also stated to the police that she entered the intersection on a yellow traffic signal phase.

Figure 3. Northeast view, the Toyota's travel path to impact

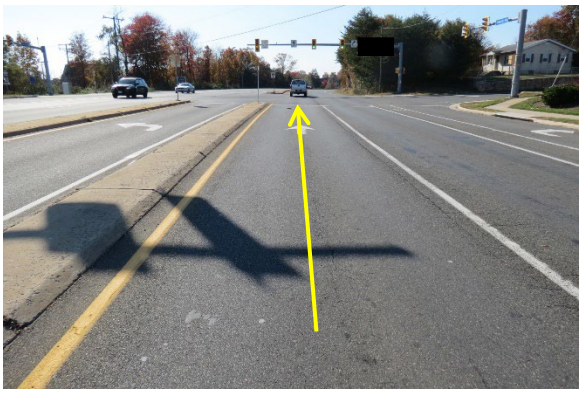

Figure 4. Southwest view, the Subaru's travel path to impact

Crash

The front of the Subaru struck the right side of the Toyota. The initial contact involved the front right corner of the Subaru against the right front door of the Toyota. As the vehicles crashed and reached maximum engagement, the full front of the Subaru engaged the right B-pillar, rear door, and quarter panel of the Toyota. Directions of force were 11 o'clock for the Subaru and 2 o'clock for the Toyota. The Toyota was rotated clockwise by the momentum of the Subaru and due to the

engagement occurring aft of the vehicle's center of gravity. The crash deployed the frontal air bags in both vehicles. The Toyota driver's seat belt pretensioner also actuated.

The Toyota was redirected to the northwest corner of the intersection, approximately 10 m (33 ft) from the area of impact. The vehicle rotated clockwise approximately 450° and came to final rest at the northwest corner of the intersection, facing west. The Subaru continued forward and passed through the intersection after the crash. It rotated clockwise approximately 180° and traveled over the center median. The Subaru traveled approximately 47 m (154 ft) from the impact area and came to final rest facing north, straddling the two-northeast bound through lanes. Figure 5 shows the travel paths, impact area, and the final rest of both vehicles.

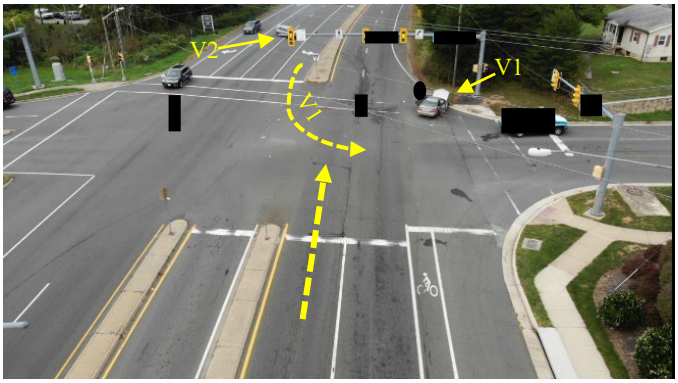

Figure 5. Police image, southwest/overhead view of travel paths, impact area, and final rest locations

Post-Crash

The police were notified of the crash and rescue personnel also responded. According to the Toyota driver, she crawled into the back seat to attend to her children after the vehicle came to final rest. She stated during the SCI interview that she assisted the second-row left 2-year-old passenger out of the vehicle and carried the second-row middle 7-year-old passenger out of the vehicle with the help of a bystander. She further stated that rescue personnel removed the second-row right 6-year-old passenger from the vehicle. The driver and 2-year-old passengers sustained police-reported C-level (possible) injuries and were transported by ambulance to a hospital where they were treated and released. The 7-year-old was critically injured and transported by ambulance to a level 1 trauma center where she expired 9 days post-crash. The 6-year-old sustained a police-reported C-level injury and was flown to a level 1 trauma center where she was treated and released. The Subaru driver did not sustain any police-reported injury. Both vehicles were towed due to damage. A diagram of the crash is included at the end of this report.

2003 Toyota Camry

Description

The Toyota was a front-wheel drive, 4-door sedan manufactured in January 2003 with Vehicle Identification Number (VIN) 4T1BE32K83Uxxxxxx. The Toyota was powered by a 2.4-liter, 4-cylinder engine with a 4-speed automatic transmission and on a 272 cm (107.1 in) wheelbase. The service brakes were power-assisted 4-wheel discs with ABS and electronic brake force distribution. The power-assisted hydraulic rack and pinion steering system was speed proportional. The manufacturer's recommended tire size was P205/65R15. The Toyota was equipped with B.F. Goodrich Advantage T/A Sport tires of the recommended size on original equipment manufacturer steel wheels. The Toyota's interior had front bucket seats and a rear bench seat with forward folding seatbacks that provided seating for five occupants (2/3). The front-row and second-row left and right positions had adjustable head restraints. All seating surfaces were cloth. Manual restraint was provided by 3-point lap and shoulder seat belts for the five positions with supplemental dual-stage frontal air bags for the driver and front right passenger positions. The front seat belts had retractor pretensioners. Both frontal air bags deployed during the crash and the driver's pretensioner actuated. The Toyota had Lower Anchors and Tethers for CHildren (LATCH) in the second-row left and right positions. Although equipped, the LATCH was not used for the two forward-facing CRSs.

Exterior Damage

The right side of the Toyota sustained direct damage during the impact (Event 1) with the front of the Subaru. The direct contact damage began 90 cm (35.4 in) rear of the right front axle and extended 233 cm (91.7 in) rearward. The maximum engagement occurred at the location of the right B-pillar and resulted in a hinge failure of the right rear door. The latch/striker remained intact. Crush measurements were taken on the front door at the mid-door level. For reference purposes, the right rear door fascia was repositioned on the vehicle during the SCI inspection. Due to the gap between the door fascia and door structure, crush measurements were taken at the belt line, which reflected a more accurate representation of the total crush (Figure 6). The combined length of the direct contact and induced damage (Field L) was 270 cm (106.3 in). The maximum residual crush was 33 cm (13.0 in), located 164 cm 64.6 in) aft of the right front axle. The sill height was 16 cm (6.3 in), the height of the maximum crush was 30 cm (11.8 in), and the door sill differential was 5 cm (2.0 in). The crush values were C1 = 3 cm (1.2 in), C2 = 11 cm (4.3 in), C3 = 14 cm (5.5 in), C4 = 33 cm (13.0 in), C5 = 19 cm (7.5 in), C6 = 2 cm (0.8 in). the damage algorithm of the WinSMASH program calculated the total delta V as 27 km/h (16.8 mph). The longitudinal and lateral velocity changes were -14 km/h (-8.7 mph) and -23 km/h (-14.3 mph). These results fit the parameters of the program and the results were considered low. The collision deformation classification for this impact was 02RZAW3 (60°).

Figure 6. Right-side damage to the Toyota

Event Data Recorder

The Toyota's EDR was imaged with version 21.3 and reported with version 24.0 of the Bosch Crash Data Retrieval software. Electrical power was supplied by an external battery and the data was imaged via connection to the vehicle's diagnostic link connector. The EDR reported three front/rear events, with the first two unrelated to this crash. The EDR report is included in Appendix A.

The EDR was capable of recording deployment and non-deployment events. Non-deployment events meet a specified recording threshold but involve no deployments of the air bags or pretensioners. Non-deployment events can be overwritten by a succeeding event that meets the specific recording threshold. Deployment events involve an air bag or pretensioner deployment and cannot be overwritten or deleted by the air bag engine control unit (ECU).

System status at deployment: The deployment was recorded during the Toyota's impact with the Subaru. The driver's buckle switch was reported as "Buckled." No data trouble codes (DTC) were reported and the air bag warning lamp ON time since DTC was set was 0 minutes. The maximum longitudinal delta V was reported as -31.2 km/h (-19.4 mph) and occurred 150 msec after algorithm enable (AE).

Interior Damage

The Toyota's interior had moderate damage with intrusion to the occupant compartment from the impact with the Subaru. Maximum static intrusion was 25 cm (9.8 in) of lateral displacement of the forward upper quadrant of the right rear door panel. Dynamically, this component intruded further due to the separation of the B-pillar-mounted door hinges. The right doors and B-pillar intruded laterally and induced intrusion of additional interior components listed in the following table. There were no discernable occupant contacts noted in the vehicle.

Position	Component	Magnitude	Direction
12 (CF)	Center console	7 cm (2.8 in)	Lateral
13 (RF)	Door panel, rear upper quadrant	12 cm (4.7 in)	Lateral
13 (RF)	Front seat back	15 cm (5.9 in)	Lateral
23 (RR)	Door panel, forward upper quadrant	25 cm (9.8 in)	Lateral

Position	Component	Magnitude	Direction
23 (RR)	Right B-pillar	21 cm (8.3 cm)	Lateral
23 (RR)	Floor/sill	16 cm (6.3 in)	Lateral
23 (RR)	Second-row seat back	7 cm (2.8 in)	Lateral
23 (RR)	Second-row seat cushion	7 cm (2.8 in)	Lateral

Manual Restraint Systems

The front row had continuous loop 3-point lap and shoulder seat belts with sliding latch plates and adjustable upper anchors. The Toyota driver's upper anchor was adjusted to the full-down position. The Toyota driver's retractor was an emergency locking retractor (ELR) and the unoccupied front right seat and the three second-row seats were equipped with switchable ELR/automatic locking retractors (ALR). The Toyota driver's seat belt pretensioner actuated during the crash. The second-row seat belts were continuous loops with sliding latch plates and fixed upper anchors. The second-row center position shoulder belt extended from left to right across the 7-year-old and buckled adjacent to the second-row right buckle. A belt guide was attached to the top aspect of the seatback.

The Toyota driver was restrained by the lap and shoulder seat belt. There was no discernable loading evidence on the latch plate, D-ring, or belt webbing. A length of belt webbing extended from the locked retractor, consistent with usage.

The second-row left CRS was restrained by the vehicle's lap and shoulder seat belt that was routed through the proper forward-facing belt path. The Toyota driver said she pulled the shoulder belt fully to engage the lock and secure the CRS. A supplemental police crash report showed that the seat belt was not switched into locking ALR mode. Slight load marks consisting of frictional abrasions were noted on the latch plate belt guide as well as the belt path of the CRS.

The 7-year-old passenger in the second-row center was seated in a backless booster CRS and was restrained by the vehicle's lap and shoulder seat belt. The 7-year-old loaded the seat belt in response to the 2 o'clock direction of force impact. The belt webbing was gathered and pinched in the seat belt guide on top of the seatback and the sliding latch plate (Figures 7 and 8). Load marks were also noted on the belt webbing and latch plate.

Figure 7. Second-row, middle seat pinched webbing at top of the belt guide

Figure 8. Second-row, middle seat pinched webbing and load mark on the latch plate belt guide

The 6-year-old passenger's second-row right CRS was restrained by the vehicle's lap and shoulder seat belt. The webbing was pinched in the latch plate with frictional abrasions present on the latch plate and belt webbing.

Supplemental Restraint Systems

The Toyota had dual-stage driver's and passenger's frontal air bags. Both air bags deployed during the crash.

The driver's frontal air bag was located in the steering wheel hub. The deflated air bag was 60 cm (23.6 in) in diameter and there was no damage or discernable evidence of occupant contact. The module cover was a two-flap configuration constructed of pliable vinyl with a horizontal tear seam. The top flap was 16.5 cm (6.5 in) wide and 8 cm (3.1 in) high, while the bottom flap measured 14 cm (5.5 in) across the top of the flap and 9 cm (3.5 in) across the bottom. The bottom flap was 9 cm (3.5 in) high. There was no damage nor discernable evidence of occupant contact with the cover flaps.

The passenger's frontal air bag was mounted in the top of the instrument panel and deployed through a single cover flap. The deployed air bag in this unoccupied position was 58 cm (22.8 in) in height and 39 cm (15.4 in) wide. There was no discernable contact evidence but one small hole (approximately 6 mm) in the right center of the air bag. This may have been caused by flying glass during the crash. The module cover was constructed of dense foam covered with vinyl and measured 21 cm (8.3 in) by 9 cm (3.5 in). There was no damage nor discernable contact evidence to the flap.

Child Restraint Systems

Second-Row Left Passenger Convertible CRS

The 2-year-old child passenger was seated in a forward-facing EvenFlo SureRide/Titan 65 convertible seat (Figure 9) with model number 37111623. It was manufactured in November 2014 and its expiration date was November 2020. The CRS was made with a one-piece plastic shell with an attached, pull-out "foot" (leveler) on the bottom. The head area of the CRS was lined with a 1 to 2 cm (0.4 to 0.8 in) Styrofoam insert and the front of the CRS was covered with a 1 cm (0.4 in) thick padded cover. The LATCH system was present at this position for the CRS.

Figure 9. Evenflo SureRide/Titan 65 convertible CRS (LR Passenger)

Height and weight parameters were as follows:

CRS Forward-Facing:	
Height:	48 – 137 cm (19 – 54 in)
Weight:	10 – 29.4 kg (22 – 65 lb)
CRS Rear-Facing:	
Height:	48 – 102 cm (19 – 40 in)
Weight:	2.3 – 18 kg (5 – 40 lb)

This CRS was installed in the second-row left position and was secured to the vehicle by the manual 3-point lap and shoulder belt system that was routed through the forward-facing belt path. Although the Toyota driver stated she set the seat belt retractor to the ALR mode, a supplemental police crash report said the seat belt was not in locking ALR mode. The 2-year-old female passenger weighed 11.3 kg (25 lb.); however, her height is unknown. She was restrained in the CRS by the 5-point internal harness. The harness straps, buckle, and retainer clip used to

secure the child were in good working order and the shoulder straps were routed through the lowest slots in the upper set of three. The Toyota driver stated in the SCI interview that the retainer clip was not used during the crash. The police crash report said that the vehicle's seat belt alone secured the CRS, the belt webbing was twisted, and the lower anchor straps and connectors were not used. Inspection of the CRS revealed minor stress marks on the right-side interior of the CRS but there was no damage.

The police crash report also stated the bottom of the seat was displaced at a near 45° angle (Figure 10) with the upper portion canted toward the direction of force (approximately 60°). The CRS was not firmly secured by the vehicle's seat belt. Also, the Styrofoam on the left side of the CRS' head area was fractured, though it is unknown if this was from previous damage.

Figure 10. On-scene police image of the second-row left CRS prior to removal post-crash

Second-Row Middle Passenger's Booster Seat

The 7-year-old child passenger was seated in a Chicco Gofit booster seat (Figure 11) with model number: 050 79751 810 070. It was manufactured in September 2020 and the expiration date was September 2028. The booster seat was 42 cm wide (16.5 in) wide and 12 cm (4.7 in) high and was constructed with a two-piece seating base with a 1 to 2 cm (0.4 to 0.8 in) padded cover. The booster was recommended for children 4 years and older that weighed 18 to50 kg (40 to 110 lb) and were between 97 to 145 cm (38 to 57 in) tall.

Inspection of the booster seat revealed a separation of the bottom portion from the top, a stress mark, and tearing of the plastic at the front of the seat (Figure 12). Stress marks were also noted on the left and right sides of the seat (Figure 13). There were no load marks on the belt guides of the booster seat. The top half of the right armrest was fractured and separated, and the remaining portion was cracked. This breakage probably occurred as the 7-year-old was displaced right and forward as a result of the crash.

Figure 11. Top of the booster seat

Figure 12. Separation of seating surface from the booster seat base

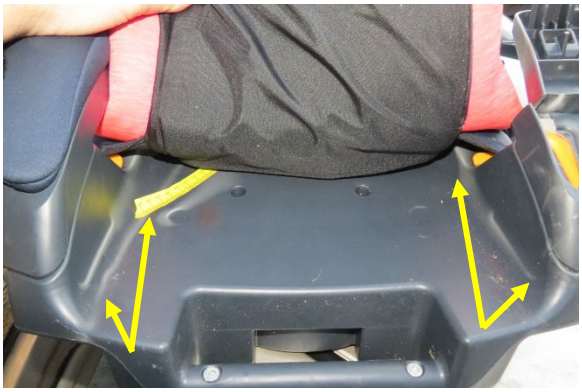

Figure 13. Stress marks on top of the booster seat

Second-Row Right Passenger Convertible Child Restraint System

The 6-year-old passenger was seated in a forward-facing Evenflo Evolve forward-facing combination booster seat (Figure 14). The CRS model number was 34411770 and manufactured in December 2017 with an expiration date of February 2025. The CRS was constructed of multiple plastic and metal components, a lightly padded cloth cover, and dual armrests with integrated cup holders. The adjustable headrest was lined with a 1 to 3 cm (0.4 to 1.2 in) collar of Styrofoam. This CRS could be used as a forward-facing CRS, a high-backed booster, and a backless booster if the back was removed. When used with the 5-point internal harness, the vehicle's seat belt or the tether and lower anchor straps and connectors (not used in this crash) could be used to secure the CRS. When used as a booster seat, the vehicle's seat belt would be used to secure the child. The back could also be removed, and the unit could be used as a backless booster, with the vehicle's seat belt used to restrain the child.

Height and weight parameters were as follows:

CRS Harnessed Booster:

Height	Between 71 – 127 cm (28 – 50 in)
Weight:	Between 10 – 29.4 kg (22 – 65 lb)

CRS Belt-Positioning Booster (With or Without Back):

Height:	112 – 145 cm (44 – 57 in)
Weight:	18 – 54.4 kg (40 – 120 lb)

Figure 14. Second-row right CRS

Based on information from the police crash report and evidence within the vehicle, the CRS was secured by the vehicle's 3-point lap and shoulder seat belt during this crash. According to the police, the seatbelt was routed correctly through the proper channels on the back of the CRS in ELR mode and not switched into locking ALR mode. An examination of the vehicle's seat belt showed load marks on the belt webbing and latch plate belt guide as well as the seat belt routing ports on the back of the CRS.

Inspection of the CRS revealed the buckles, hardware, and retainer clip to be undamaged and in good working order and the shoulder straps were routed through the top slots in the cover and the slots below the top level on the back rest. Stress marks were noted on both sides of the top of the seat and a tear of the plastic was noted on the left front of the seat (Figure 15). Significant cracking and breakage was noted on the bottom of the plastic base (Figure 16), which became separated from the upper base panel on the left side. These were due to the intrusion from the right door and possibly lateral movement of the booster seat at the middle position. The collar of Styrofoam padding at the head area was fractured in two places.

Figure 15. Front/top of CRS seat stress marks on the right and left sides

Figure 16. Broken and cracked plastic bottom of the second-row right CRS

Stress marks were also found on both CRS sides, just above each armrest and at the top left of the backrest. The top right of the backrest exhibited an abrasion, possibly from contact with the right C-pillar. The police crash report also noted that the left side of the CRS also exhibited a scuff (Figure 17), possibly made by the shoulder of the second-row, middle passenger.

Figure 17. Scuff on the left exterior of the headrest

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2003 Toyota Camry Occupants

Driver Demographics

Age/sex:	29 years/female
Height:	163 cm (64 in)
Weight:	79 kg (175 lb.)
Eyewear:	None
Seat type:	Bucket seat with adjustable head restraint
Seat track position:	Between middle and rearmost positions
Manual restraint usage:	Lap and shoulder seat belt
Usage source:	Vehicle inspection
Air bags:	Frontal air bag available; deployed
Alcohol/drug involvement:	None
Egress from vehicle:	Exited under own power
Transport from scene:	Ambulance to hospital; treated and released

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Laceration to left anterior shin, NFS	810600.1	Isolated Front – Left lower instrument panel (includes knee bolster)	Probable
2	Right forehead hematoma	210402.1	Isolated Left Air Bag – Steering wheel hub	Probable
3	Right forehead abrasion	210202.1	Isolated Left Air Bag – Steering wheel hub	Probable
4	Left chest contusion*	410402.1	Isolated Interior – Shoulder portion of belt restraint	Certain
5	Right hip contusion*	810402.1	Isolated Interior – Lap portion of belt restraint	Probable

Source: Emergency room record
*Driver interview

Driver Kinematics

The Toyota driver was seated in an upright posture with the seat track set between the middle and rearmost positions, and the seatback was slightly reclined. The adjustable head restraint was 3 cm (1.2 in) above the top of the seatback. The Toyota driver was restrained by the available lap and shoulder seat belt system.

At impact with the Subaru, the Toyota driver's frontal air bag deployed and the retractor pretensioner actuated. She responded to the 2 o'clock direction of force impact by moving to her right and forward. The Toyota driver loaded the manual seat belt system that resulted in a left

chest and right hip contusion. Her forehead contacted the deployed driver's frontal air bag producing an abrasion and a hematoma. The Toyota driver's left shin contacted the lower left instrument panel resulting in a laceration.

The seat belt system held the Toyota driver within her position where she came to final rest. She said during the SCI interview that after the crash, she unbuckled her seat belt and crawled into the back seat to tend to her children. The driver opened the left rear door of the Toyota and assisted the 2-year-old passenger from the vehicle. The Toyota driver was transported by ambulance to a hospital where she was treated for her injuries and released.

Second-Row Left Passenger Demographics

Age/sex:	2 years/female
Height:	Unknown
Weight:	11 kg (25 lb)
Eyewear:	None
Seat type:	Bench with folding backs
Seat track position:	Non-adjustable
Manual restraint usage:	Restrained within a forward-facing CRS by the internal 5-point harness system
Usage source:	Vehicle/CRS inspection
Air bags:	None available
Egress from vehicle:	Exited with assistance
Transport from scene:	Ambulance to hospital; treated and released

Second-Row Left Passenger Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Left mid shaft clavicle fracture, slightly displaced	750651.2	Isolated Interior – Child safety seat harness system (i.e., straps, retainer clip, latch plate, buckle)	Certain
2	Left shoulder contusion	710402.1	Isolated Interior – Child safety seat harness system (i.e., straps, retainer clip, latch plate, buckle)	Certain
3	Right shoulder contusion	710402.1	Isolated Interior – Child safety seat harness system (i.e., straps, retainer clip, latch plate, buckle)	Certain

Source: Emergency room record

Second-Row Left Passenger Kinematics

The 2-year-old passenger in the second-row left seat was secured in a convertible CRS, which was installed in the forward-facing position. The CRS was secured by the vehicle's lap and shoulder seat belt that was routed through the forward-facing belt path. The child passenger was restrained in the CRS by the internal 5-point harness system.

The right-side impact displaced the child to the right and forward, then in multiple directions as the vehicle rotated clockwise. The child loaded the 5-point harness system of the CRS that prevented her from contact with interior components outside the confines of the CRS. She sustained a left clavicle fracture and bilateral shoulder contusions from loading the harness system.

Following the crash, she was removed from the CRS by the Toyota driver and was subsequently transported by ambulance to a local hospital where she was treated and released.

Second-Row Center Passenger Demographics

Age/sex:	7 years/female
Height:	124 cm (49 in)
Weight:	28 kg (61 lb)
Eyewear:	Prescription eyeglasses
Seat type:	Bench with folding backs
Seat track position:	Non-adjustable
Manual restraint usage:	Lap and shoulder seat belt with backless booster CRS
Usage source:	Vehicle/CRS inspection
Air bags:	None available
Egress from vehicle:	Removed while unconscious
Transport from scene:	Transported to level 1 trauma center; expired 9 days post-crash

Second-Row Center Passenger Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Brain swelling with loss of gray-white matter differentiation and loss of basilar cistern	140666.5	Isolated IPC Primary: Right Door Panel – Right forward upper quadrant Alternate: Interior – Other interior object (specify): CRS to right of occupant	Probable Possible
2	Diffuse subarachnoid hemorrhage involving basilar cisterns, fourth ventricle, third ventricle extending to lateral ventricles; subarachnoid blood involving portions of suprasellar cistern, adjacent to Sylvian fissure	140695.3	Isolated IPC Primary: Right Door Panel – Right forward upper quadrant Alternate: Interior – Other interior object (specify): CRS to right of occupant	Probable Possible

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
3	Cranio-cervical distraction injury: the atlanto-dental interval is widened to approximately 1.8 cm; interval between occiput and posterior C1 ring also widened 1.0 cm	650208.3	Isolated IPC Primary: Right Door Panel – Right forward upper quadrant Alternate: Interior – Other interior object (specify): CRS to right of occupant	Probable Possible
4	Left intracranial cerebral artery occlusion	122804.3	Isolated IPC Primary: Right Door Panel – Right forward upper quadrant Alternate: Interior – Other interior object (specify): CRS to right of occupant	Probable Possible
5	Right internal carotid artery dissection	320202.3	Isolated IPC Primary: Right Door Panel – Right forward upper quadrant Alternate: Interior – Other interior object (specify): CRS to right of occupant	Probable Possible
6	Distal cervical artery occlusion	321018.3	Isolated IPC Primary: Right Door Panel – Right forward upper quadrant Alternate: Interior – Other interior object (specify): CRS to right of occupant	Probable Possible
7	Bilateral cervical vertebral artery dissection, left worse than right (left)	321002.2	Isolated Right Door Panel – Right forward upper quadrant	Probable
8	Right cervical vertebral artery dissection	321002.2	Isolated Right Door Panel – Right forward upper quadrant	Probable
9	Left pneumothorax	442202.2	Isolated IPC Interior – Shoulder portion of belt restraint	Certain
10	Pelvis fractures: right sacral fracture with diastasis of sacroiliac joint, fracture of right superior and inferior pubic rami; fractures of left superior pubic ramus and pubic bone	856151.2	Critical 2-point IPC Critical #1: Interior – Other interior object (specify): CRS to left of occupant Critical #2 - Interior – Other interior object (specify): CRS to right of occupant	Probable Probable

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
11	Extensive pre-vertebral/ retropharyngeal hematoma, most prominent at skull base and upper cervical levels	340602.2	Isolated Caused by other injury (650208.3)	Probable
12	Lower abdomen seat belt bruise	510402.1	Isolated Interior – Lap portion of belt restraint	Certain
13	Abrasion to right forehead	210202.1	Isolated Right Door Panel – Right forward upper quadrant	Probable
14	Abrasion to left back	410402.1	Isolated Other interior object (specify): CRS to left of occupant	Probable

Source: Hospital records and medical examiner report (external)

Second-Row Center Passenger Kinematics

The 7-year-old passenger in the second-row center was seated in a backless booster CRS and was restrained by the vehicle's 3-point lap and shoulder seat belt system. Seat belt use was determined from frictional abrasions to the polymer surface of the latch plate, gathering of the belt webbing in the guide path of the latch plate and gathering of the shoulder belt webbing at the belt guide at the top aspect of the seatback.

The child passenger responded to the 2 o'clock direction of force impact by initiating a right and forward trajectory. The intruding right rear door panel displaced the second-row right CRS to the vehicle's left and compressed the right armrest of the booster seat into the 7-year-old's pelvis and compressed her between the two outboard-mounted CRSs. As a result of the compression, she sustained pelvis fractures of the right sacrum, the right superior and inferior pubic rami and of the left superior pubic ramus and pubic bone with diastasis of the sacroiliac joint.

She loaded the vehicle's 3-point lap and shoulder seat belt system which caused a lower abdominal contusion and a left pneumothorax. As she initiated her right lateral and forward trajectory, her right shoulder/flank contacted the left outer aspect of the second-row right CRS, scuffing the polymer shell and fracturing the Styrofoam backer.

The angular direction of force coupled with the location of damage occurring aft of the vehicle's center of gravity caused a clockwise rotation to the Toyota. During the 7-year-old's right and forward trajectory, she slid out of the shoulder belt webbing that was routed from her left shoulder to right hip. As the vehicle rotated, her trajectory translated more forward. Her torso and head traveled forward of the second-row right CRS. It should be noted that the front-row right seat was adjusted to a more forward track position and that there was no contact evidence for this seatback. Its location was too far forward for contact by this occupant. The extent and nature of the head and brain injuries show impact with a hard structure. Her right forehead likely contacted the intruding right door panel. The static level of intrusion was estimated at 25 cm (10 in); however, the dynamic intrusion was greater due to the separation of the door hinges from the B-pillar and elastic properties of the deformed structure.

The 7-year-old's head contact resulted in a craniocervical distraction injury with widening of the atlantodental interval, diffuse subarachnoid hemorrhage of the basilar cisterns, and brain swelling with loss of matter. As her head impacted the intruding door panel, her neck flexed laterally as her body continued to load. She sustained multiple cervical artery dissections.

The 7-year-old rebounded back to her left. Her back contacted the right aspect of the second-row left CRS resulting in an abrasion of her left back.

Following the crash, the Toyota's driver and a passerby removed the 7-year-old from the vehicle. She was transported by ambulance to a level 1 trauma center where she was admitted in critical condition. She was mechanically supported, and the decision was made to disconnect life support 9 days after the crash, and she expired.

Second-Row Right Passenger Demographics

Age/sex:	6 years/female
Height:	102 cm (40 in)
Weight:	25 kg (55 lb)
Eyewear:	Prescription eyeglasses
Seat type:	Bench with folding backs
Seat track position:	Non-adjustable
Manual restraint usage:	Restrained in a forward-facing CRS by the internal 5-point harness system
Usage source:	Vehicle/CRS inspection
Air bags:	None available
Egress from vehicle:	Exited with assistance by EMS
Transport from scene:	Ambulance to level 1 trauma center

Second-Row Right Passenger Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Closed head injury, NHS	100099.9	Tandem IPC Primary: Interior – Child safety seat shell (i.e., interior, exterior, base, cup holder, padding, head restraint, handle) Secondary: Right Door Panel – Right forward upper quadrant	Certain Probable
2	Multiple superficial stellate lacerations to right forehead	210602.1	Isolated Non-Contact Injury – Flying glass	Certain
3	Abrasions to right forehead	210202.1	Isolated Non-Contact Injury – Flying glass	Certain

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
4	Abrasion to right knee	810202.1	Isolated Right Door Panel – Right hardware/armrest forward lower quadrant	Probable

Source: Emergency room record

Second-Row Right Passenger Kinematics

The 6-year-old passenger in the second-row right was seated in a forward-facing CRS. She was restrained by the 5-point harness system of the CRS that was secured to the vehicle by the 3-point lap and shoulder lap seat belt system.

At impact with the Subaru, the right rear door of the Toyota intruded against the CRS and the tempered door glazing disintegrated. Flying glass contacted the forehead of the 6-year-old causing stellate lacerations and abrasion of the forehead. She responded to the 2 o'clock impact force by moving laterally right and slightly forward. The internal 5-point harness system held the 6-year-old within the CRS. Her head contacted the right aspect of the CRS shell that resulted in an unspecific closed head injury. The child's right knee contacted the intruding right rear door panel that resulted in an abrasion of the knee.

Following the crash, she was removed from the vehicle by rescue personnel and transported by helicopter to a level 1 trauma center where she was treated for her injuries and released.

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2005 Subaru Forester

Description

The Subaru was an all-wheel drive, five-occupant, 4-door SUV, manufactured in April 2004 with VIN JF1SG69625HXXXXXX. It had a 2.5-liter 4-cylinder engine and configured on a 252 cm (99.2 in) wheelbase. The Subaru had dual frontal air bags and outboard front seat-mounted side-impact air bags. Both frontal air bags deployed during the crash.

Exterior Damage

The Subaru (Figure 18) sustained frontal damage that was distributed across the entire end width of the vehicle from the crash with the Toyota. The direct contact damage was 155 cm (61.0 in), and crush measurements were taken on the front bumper bar and the maximum residual crush was 22 cm (8.7 in) which occurred 46 cm (18.1 in) left of the right end of the bumper bar. The crush values were C1 = 2 cm (0.8 in), C2 = 16 cm (6.3 in), C3 = 22 cm (8.7 in), C4 = 22 cm (8.7 in), C5 = 19 cm (7.5 in), C6 = 17 cm (6.7 in). The damage algorithm of the WinSMASH program calculated the total delta V as 30 km/h (18.6 mph). The longitudinal and lateral velocity changes were -29 km/h (-18.0 mph) and 10 km/h (6.2 mph). These results fit the parameters of the program and the results were considered reasonable. The CDC for this impact was 11FDEW1 (340°).

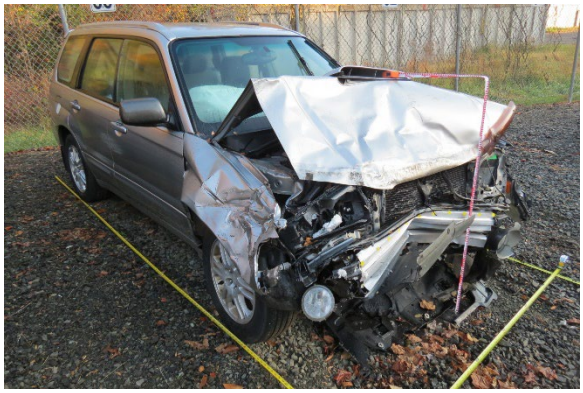
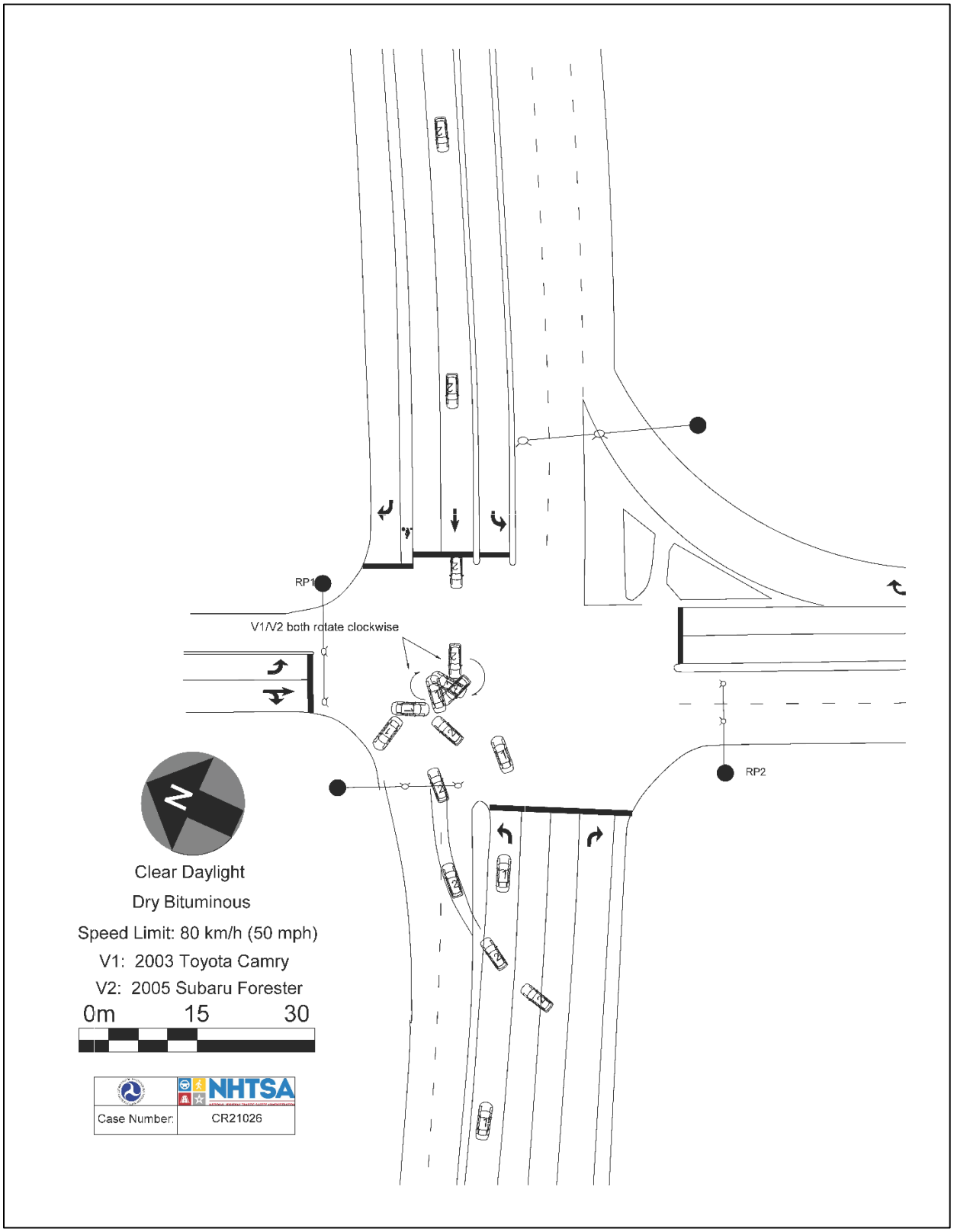


Figure 18. Front/right of the Subaru

Occupant Data

The Subaru driver was a 45-year-old female. The police crash report said that she was restrained by the manual seat belt system with supplemental protection provided by the deployment of the frontal air bag. She did not sustain any injury from the crash.

Crash Diagram



Appendix A: 2003 Toyota Camry Event Data Recorder Report[1]

[1] The EDR report contained in this technical report was imaged using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report contained in the associated Crash Viewer application may differ relative to this report.

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN/Frame Number	4T1BE32K83U******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CR21026_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 21.3
Imaged with Software Licensed to (Company Name)	NHTSA
Reported with CDR version	Crash Data Retrieval Tool 24.0
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	Front/Rear (3)

Comments

No comments entered.

Data Limitations

CDR Record Information:

- Due to limitations of the data recorded by the airbag ECU, such as the resolution, data range, sampling interval, time period of the recording, and the items recorded, the information provided by this data may not be sufficient to capture the entire crash.
- Pre-Crash data is recorded in discrete intervals. Due to different refresh rates within the vehicle's electronics, the data recorded may not be synchronous to each other.
- Airbag ECU data should be used in conjunction with other physical evidence obtained from the vehicle and the surrounding circumstances.
- If the airbags did not deploy or the pretensioners did not operate during an event that meets a specified recording threshold, it is called a Non-Deployment Event. Data from a Non-Deployment Event can be overwritten by a succeeding event that meets the specified recording threshold. If the airbag(s) deploy or the pretensioners are operated, it is called a Deployment Event. Deployment Event data cannot be overwritten or deleted by the airbag ECU following that event.
- If power supply to the airbag ECU is lost during an event, all or part of the data may not be recorded.
- The EDR does not record diagnostic trouble codes.
- The TaSCAN, Global Tech Stream, or Intelligent Tester II devices (or any other Toyota genuine diagnostic tool) can be used to obtain detailed information on the diagnostic trouble codes from the airbag system, as well as diagnostic information from other systems.

General Information:

- The data recording specifications of Toyota's airbag ECUs are divided into the following categories. The specifications for 12EDR or later are designed to be compatible with NHTSA's 49CFR Part 563 rule.
  - 00EDR / 02EDR / 04EDR / 06EDR / 10EDR / 12EDR / 13EDR / 15EDR / 17EDR / 19EDR / 21EDR / 22EDR / 23EDR / 24EDR
- The airbag ECU records data for all or some of the following accident types: frontal crash, rear crash , side crash, and rollover events. Depending on the installed airbag ECU, data for side crash and/or rollover events may not be recorded.
- The airbag ECU records post-crash data and may record pre-crash data in the event of a frontal/rear crash. In addition, it may record post-crash data in the event of a side crash or rollover.
- The airbag ECU has the following recording pages (memory maps) for each accident type to store event data: three pages for frontal or rear crash, one page for a side crash (if airbag ECU is applicable) , and one page for rollover events. (if airbag ECU is applicable)
- The data recorded by the airbag ECU in the event of a frontal/rear crash includes information that indicates the sequence and interval of each previously-occurring frontal/rear crash event.
  - Time from Previous TRG
  - TRG Count
- The point in time at which the recording trigger is established is regarded as time zero for the recorded data. For the time indicated in "Lateral Delta-V", "Roll Angle" or "Lateral Acceleration", the first sampling point after the recording trigger establishment is regarded as time zero. The time zero of the data and the recording trigger establishment do not always occur simultaneously.
- The recording trigger judgment threshold value differs depending on the collision type (i.e., frontal crash, rear crash, side crash, or rollover event).
- Some of the data recorded by the airbag ECU is transmitted to the airbag ECU from various vehicle control modules by the vehicle's Controller Area Network (CAN).

- In some cases, the airbag ECU part number printed on the ECU label may not match the airbag ECU part number that the CDR tool reports. The part number retrieved by the CDR tool should be considered as the official ECU part number.
- The sampling interval of "Roll Angle" and "Lateral Acceleration" is 8 [ms] or 128 [ms]. A field indicating the sampling interval is not provided. The graph scaling can assist with derterming the sample rate. The time zero is indicated by count (0).
- "Prior Event" is the event that occurred before the "1st Prior Event" that reached the greatest MAX Delta-V. Therefore, "Prior Event" is not always the prior event of "1st Prior Event".

Data Element Sign Convention:
The following table provides an explanation of the sign notation for data elements that may be included in this CDR report.

Data Element Name	Positive Sign Notation Indicates
Max. Longitudinal Delta-V	Forward
Longitudinal Delta-V	Forward

Data Definitions:

- The "ON" setting for the "Freeze Signal" indicates a state in which the non-volatile memory can not be overwritten or deleted by the airbag ECU. After "Freeze Signal" has been turned ON, subsequent events will not be recorded.
- "Time to Deployment Command" indicates the time between recording trigger establishment and the determination of airbag deployment. This value may differ from the actual time it takes for the airbag to fully deploy.
- Even if an airbag/pretensioner did not deploy due to the "front passenger airbag disable switch and/or "RSCA Disable Switch" in the ON position or other disabling criteria are met, the "Time to deployment command" data element for that airbag/pretensioner may still be recorded.
- "Engine RPM" indicates the number of engine revolutions, not the number of motor revolutions. The recorded value has an upper limit of 6,000 rpm. Resolution is 400 rpm and the value is rounded down and recorded. For example, if the actual engine speed is 799 rpm, the recorded value will be 400 rpm.
- The upper limit for the recorded "Vehicle Speed" value is 126 km/h (78.3mph). Resolution is 2km/h (1.2mph) and the value is rounded down and recorded. The accuracy of the "Vehicle Speed" value can be affected by various factors. These include, but not limited, to the following.
  - Significant changes in the tire's rolling radius
  - Wheel lock and wheel slip
- The "Accelerator Rate" value is recorded as a voltage or level. In the case of voltage, the voltage increases as the driver depresses the accelerator. In case of the level, the following three levels are recorded.
  - FULL / MIDDLE / OFF
- "Accelerator Rate" may be recorded as "OFF" even if the accelerator pedal is depressed lightly. In addition, "FULL" may be recorded when the accelerator pedal is depressed strongly but not fully.
- The "Drive" setting for the "Shift Position" value indicates the shift position state is other than "R,"(Reverse), "N" (Neutral), or "P" (Park). It also includes communication disruption. Regardless of an actual shift position, "Drive" is always set for M/T vehicles because the shift position signal is not available.
- Depending on the type of occupant sensor installed in the vehicle, one of the following three recording formats for "Occupancy Status, Passenger" will be utilized.
  - Occupied / Not Occupied
  - Adult / Child / Not Occupied
  - AM50 / AF05 / Child / Not Occupied
- Resolution of the "Air Bag Warning Lamp ON Time Since DTC was Set" is 15 minutes, and the value is rounded down and recorded.
- "Longitudinal Delta-V" indicates the change in forward speed after establishment of the recording trigger. This does not refer to vehicle speed, and it does not include the change in speed during the period from the start of the actual collision to establishment of the recording trigger.
- "Roll Angle peak" may not always match the peak value within the "Roll Angle" sampling points due to differences in data calculation method.
- For "Lateral Delta-V", the sensor location (B-pillar, front door, C-pillar, and slide door) shows the outline of a typical sensor position. Sensory location can be confirmed using the repair manual.
- "TRG Count" indicates the number of frontal/rear recording triggers that have been established. The calculated value does not include the number of times side or rollover recording triggers have been established. The sequence in which each frontal/rear event occurred can be verified from the "TRG Count". The lesser the "TRG Count" value, the older the data. The upper limit for the recorded value is 255 times. When more than one event reaches the upper limit, the actual "TRG Count" may be greater than what is displayed for that event.
- "TRG Count" value is rewritten by the airbag ECU every time the ignition is switched ON. At this time, the "TRG Count" values become 0, 1, or 2 in order from the smallest to the largest "TRG Count" value of each recorded frontal/rear page (memory map). For example, if the frontal/rear "TRG Count" values before rewriting are 2 for Page 0, 3 for Page 1, and 4 for Page 2, the rewritten "TRG Count" values will be 0 for Page 0, 1 for Page 1, and 2 for Page 2. However, the values are not rewritten when the "Freeze Signal" is set "ON".
- Resolution of the "Time from Pre-Crash to TRG" is 100 [ms], and the value is rounded down and recorded.
- For "Time from Previous TRG", the recording trigger of side crash and rollover is not considered. The upper limit for the recorded value is 5000 [ms] or 5100 [ms] depending on the ECU part number. Resolution is 20 [ms] and the value is rounded down and recorded. When it's displayed as 5100ms, the actual "Time from Previous TRG" may be longer than what is displayed for that event.
- For "Diagnostic Trouble Codes Exist", the default/initial value (= NO) is indicated when the front airbag did not deploy.
- For Non-Deployment Event, "Buckle Switch", "Ignition Cycle Since DTC was Set" and "Airbag Warning Lamp ON Time Since DTC was Set" is the ACM parameter data at the time of retrieval, not the parameter data when the recording trigger was established. For Deployment Event, it is the information when the airbag deployment.
- If the seat belt switch has a fault condition, the recorded value of "Buckle Switch" may not be applicable. A Toyota genuine diagnostic tool can be used to determine if DTCs for seat belt switch exist.
- If 2 or more frontal/rear events occur successively within a period of 5000ms (or 5120ms for ECUs with 1.024 data sampling

intervals), the actual sample time before the trigger is not displayed for subsequent events. The sample time before trigger will only be displayed for the first event of the successive events. For subsequent events (i.e second event or later events), the pre-crash "Time (sec)" data is replaced by integers -5 through -1 and the heading "Time (sec)" is replaced with "Sample Count". The time between "Sample Count" integers (-5 through -1) cannot be determined. The time between the last integer and TRG cannot be determined.

- "Pre-Crash Data Status" indicates data communication status of the vehicle. If communication disruption or other failure is occur, "Invalid" is set. Moreover, "Invalid" is set for some M/T vehicles because the shift position signal is not transmitted for them even if the other data is valid.

05000_ToyotaDENSO_r043

System Status at Time of Retrieval

ECU Part Number	89170-33230
ECU Generation	00EDR
Freeze Signal	ON

Front/Rear Event Record Summary at Retrieval

Events Recorded	TRG Count	Crash Type	Time (msec)	Event & Crash Pulse Data Recording Status
Most Recent Frontal/Rear Event	3	Front/Rear Crash	0	Not Supported (Page 0)
1st Prior Frontal/Rear Event	2	Front/Rear Crash	-5100	Not Supported (Page 1)
Prior Frontal/Rear Event	0	Front/Rear Crash	N/A	Not Supported (Page 2)

System Status at Front Airbag Deployment

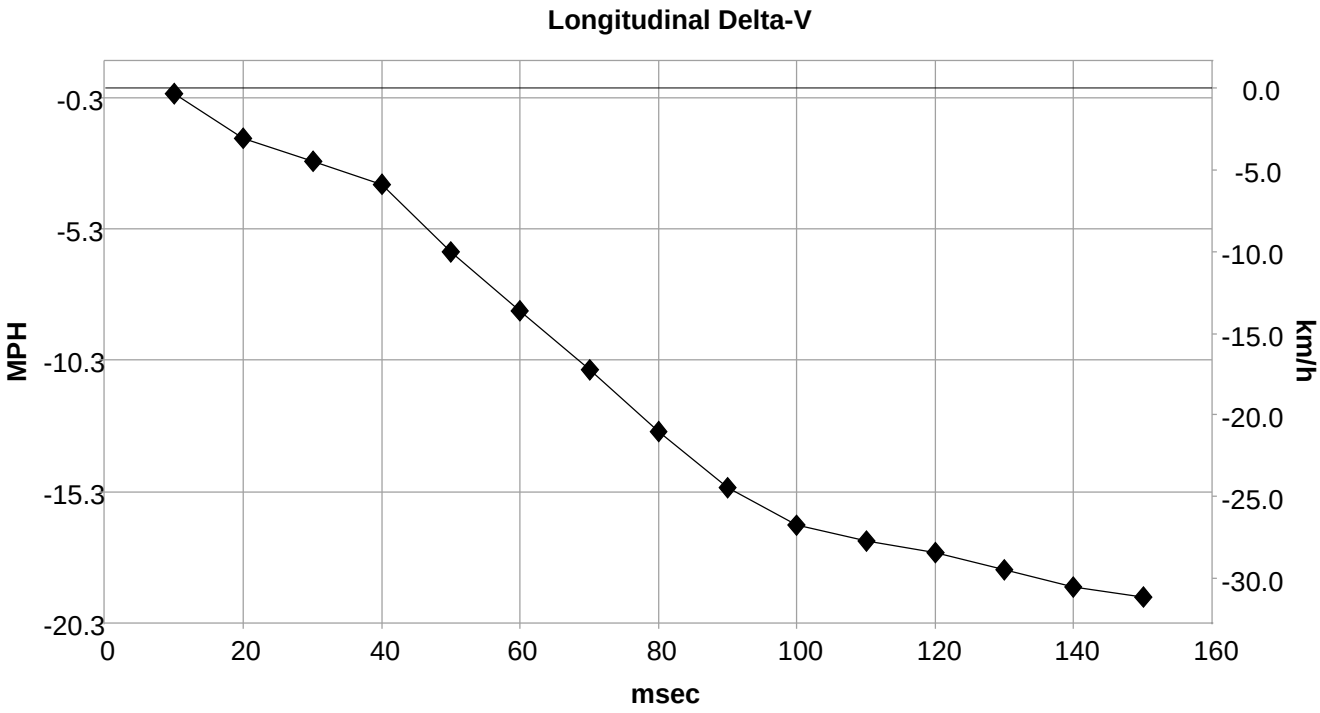
Time to Deployment Command, Front Airbag, Driver (msec)	14
Time to Deployment Command, Front Airbag, Passenger (msec)	14
Event Severity Status, Driver	Level 3
Event Severity Status, Passenger	Level 3
Diagnostic Trouble Codes Exist	No
Buckle Switch, Driver	Buckled
Buckle Switch, Passenger	Unbuckled
Seat Position, Driver	Rearward
Ignition Cycle Since DTC was Set (times)	0
Airbag Warning Lamp ON Time Since DTC was Set (min)	0

System Status at Event (Most Recent Frontal/Rear Event, TRG 3)

TRG Count	3
Time From Previous TRG (msec)	5,100

Longitudinal Crash Pulse (Most Recent Frontal/Rear Event, TRG 3 - table 1 of 2)

Max Longitudinal Delta-V (MPH [km/h])	-19.4 [-31.2]



Longitudinal Crash Pulse (Most Recent Frontal/Rear Event, TRG 3 - table 2 of 2)

Time (msec)	Longitudinal Delta-V (MPH [km/h])
10	-0.2 [-0.3]
20	-1.9 [-3.1]
30	-2.8 [-4.5]
40	-3.6 [-5.9]
50	-6.2 [-10.0]
60	-8.5 [-13.6]
70	-10.7 [-17.2]
80	-13.1 [-21.0]
90	-15.2 [-24.5]
100	-16.6 [-26.7]
110	-17.2 [-27.8]
120	-17.7 [-28.4]
130	-18.3 [-29.5]
140	-19.0 [-30.5]
150	-19.4 [-31.2]

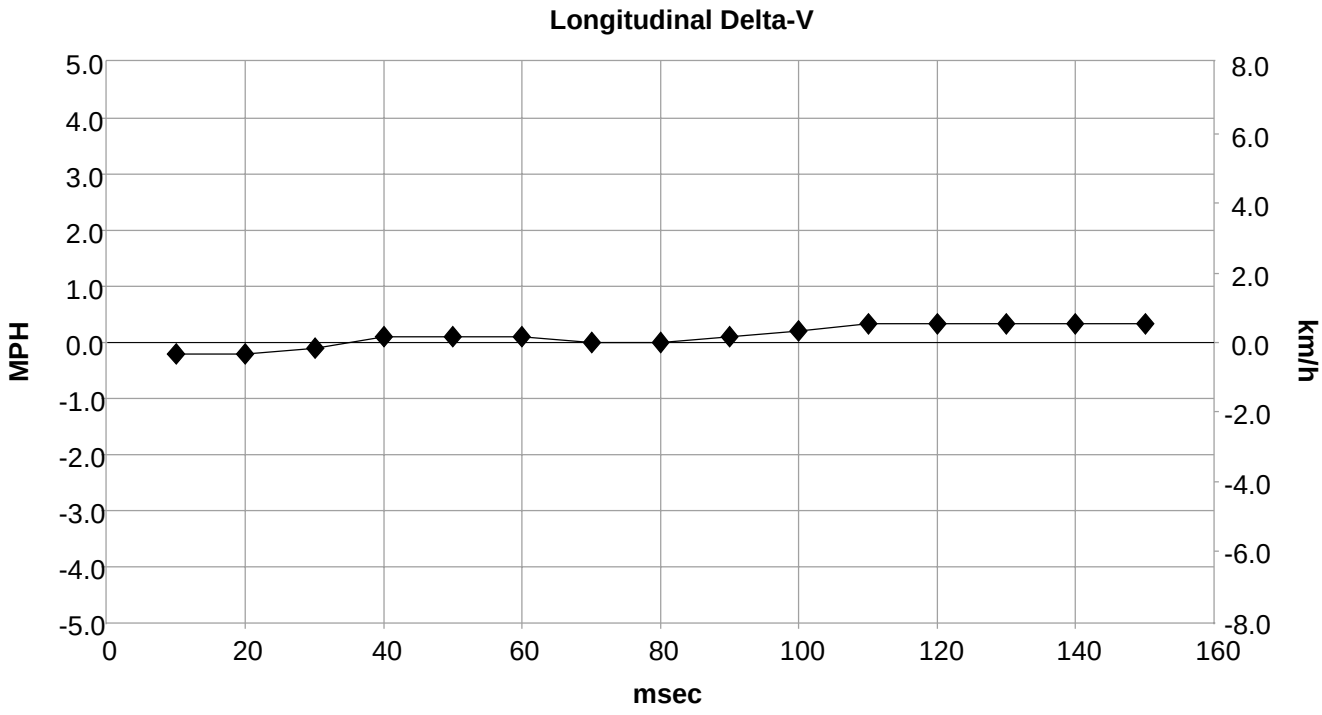
* "Invalid" may be set for M/T vehicle

System Status at Event (1st Prior Frontal/Rear Event, TRG 2)

TRG Count	2
Time From Previous TRG (msec)	5,100

Longitudinal Crash Pulse (1st Prior Frontal/Rear Event, TRG 2 - table 1 of 2)

Max Longitudinal Delta-V (MPH [km/h])	0.3 [0.5]



Longitudinal Crash Pulse (1st Prior Frontal/Rear Event, TRG 2 - table 2 of 2)

Time (msec)	Longitudinal Delta-V (MPH [km/h])
10	-0.2 [-0.3]
20	-0.2 [-0.3]
30	-0.1 [-0.2]
40	0.1 [0.2]
50	0.1 [0.2]
60	0.1 [0.2]
70	0.0 [0.0]
80	0.0 [0.0]
90	0.1 [0.2]
100	0.2 [0.3]
110	0.3 [0.5]
120	0.3 [0.5]
130	0.3 [0.5]
140	0.3 [0.5]
150	0.3 [0.5]

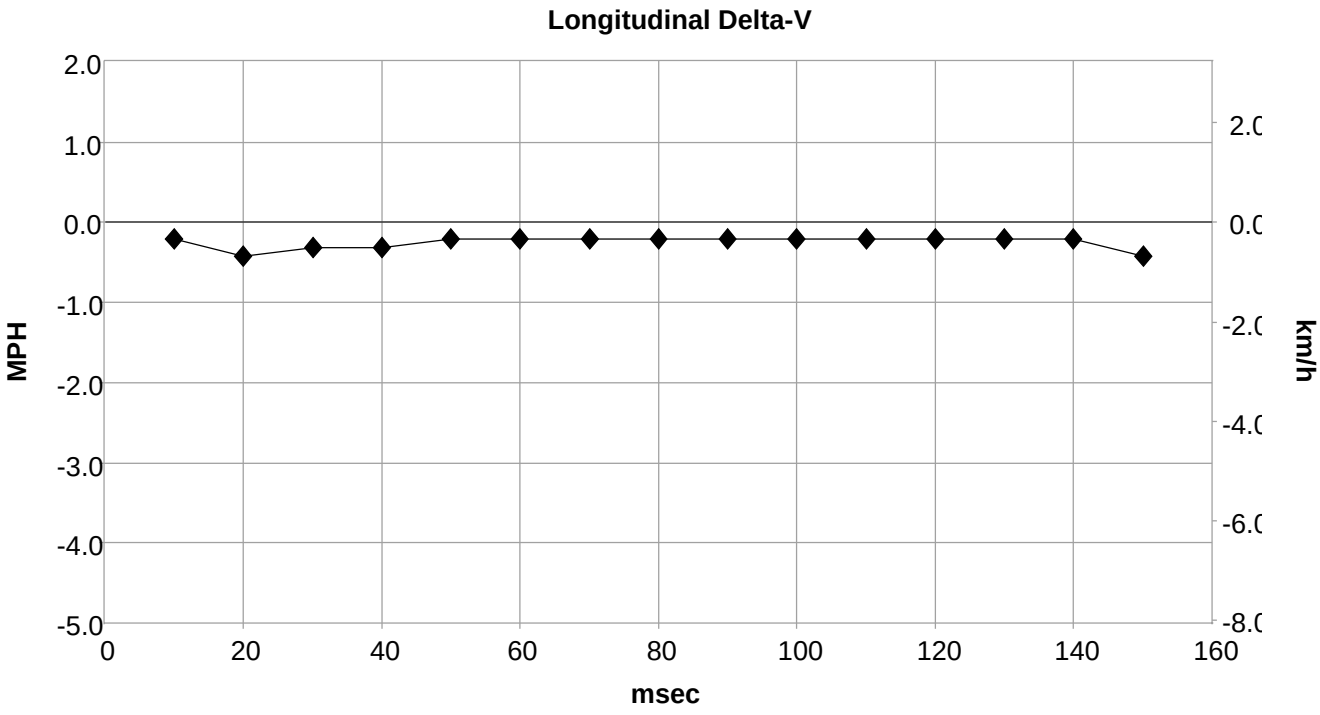
* "Invalid" may be set for M/T vehicle

System Status at Event (Prior Frontal/Rear Event, TRG 0)

TRG Count	0
Time From Previous TRG (msec)	5,100

Longitudinal Crash Pulse (Prior Frontal/Rear Event, TRG 0 - table 1 of 2)

Max Longitudinal Delta-V (MPH [km/h])	-0.4 [-0.7]



Longitudinal Crash Pulse (Prior Frontal/Rear Event, TRG 0 - table 2 of 2)

Time (msec)	Longitudinal Delta-V (MPH [km/h])
10	-0.2 [-0.3]
20	-0.4 [-0.7]
30	-0.3 [-0.5]
40	-0.3 [-0.5]
50	-0.2 [-0.3]
60	-0.2 [-0.3]
70	-0.2 [-0.3]
80	-0.2 [-0.3]
90	-0.2 [-0.3]
100	-0.2 [-0.3]
110	-0.2 [-0.3]
120	-0.2 [-0.3]
130	-0.2 [-0.3]
140	-0.2 [-0.3]
150	-0.4 [-0.7]

Hexadecimal Data

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

PIDs	PID	Data
	00	B0 FE 00 00
	01	00
	02	(no response)
	03	00
	04	02 00
	09	30 30 30 30 30
	0A	30 30 30 30 30
	0B	30 36 30 37 30
	0C	30 36 30 37 30
	0D	33 33 32 33 30
	0E	30 30 30 30 30
	0F	30 30 30 30 30
	11	44 4E
	12	33 33 32 33 30
	13	04
	14	0B
	15	00 7A
	16	FF FF FF FF FF FF
	17	FF FF FF FF FF FF
	18	FF FF FF FF FF FF
	19	FF FF FF FF FF FF
	1A	FF FF FF FF FF FF
	1B	FF FF FF FF FF FF
	1C	FF FF FF FF FF FF
	1D	FF FF FF FF FF FF
	1E	FF FF FF FF FF FF
	1F	FF FF FF FF FF FF
	20	FF FF FF FF FF FF
	21	FF FF FF FF FF FF
	22	FF FF FF FF FF FF
	23	FF FF FF FF FF FF
	24	FF FF FF FF FF FF
	25	FF FF FF FF FF FF
	26	FF FF FF FF FF FF
	27	FF FF FF FF FF FF
	28	FF FF FF FF FF FF
	29	FF FF
	2A	FF
	2B	44 45 44 45
	2C	30 36 30 37 30
	31	30 30
	32	30 30 30 30 30
	33	00
	34	FF
	35	FF FF
	36	FF FF FF FF FF FF
	37	FF FF FF FF FF FF
	38	FF FF FF FF FF FF
	39	FF FF FF FF FF FF
	3A	FF FF FF FF FF FF
	3B	FF FF FF FF FF FF
	3C	FF FF FF FF FF FF
	3D	FF FF FF FF FF FF
	3E	FF FF FF FF FF FF
	3F	FF FF FF FF FF FF
	40	FF FF FF FF FF FF
	41	FF FF FF FF FF FF
	42	FF FF FF FF FF FF
	43	FF FF FF FF FF FF

```
44    FF FF FF FF FF FF
45    FF FF FF FF FF FF
46    FF FF FF FF FF FF
47    FF
48    FF
49    FF
4A    FF
4B    FF
51    30 30
52    30 30 30 30 30
53    00
54    FF
55    FF FF
56    FF FF FF FF FF FF
57    FF FF FF FF FF FF
58    FF FF FF FF FF FF
59    FF FF FF FF FF FF
5A    FF FF FF FF FF FF
5B    FF FF FF FF FF FF
5C    FF FF FF FF FF FF
5D    FF FF FF FF FF FF
5E    FF FF FF FF FF FF
5F    FF FF FF FF FF FF
60    FF FF FF FF FF FF
61    FF FF FF FF FF FF
62    FF FF FF FF FF FF
63    FF FF FF FF FF FF
64    FF FF FF FF FF FF
65    FF FF FF FF FF FF
66    FF FF FF FF FF FF
67    FF
68    FF
69    FF
6A    FF
6B    FF
6C    30 30
6F    ( no response )
B0    ( no response )
B1    ( no response )
B2    ( no response )
B3    ( no response )
B4    ( no response )
B5    ( no response )
B6    ( no response )
B7    ( no response )
B8    ( no response )
B9    ( no response )
BA    ( no response )
BB    ( no response )
BC    ( no response )
BD    ( no response )
BE    02 02 FF 00 FF 00
BF    00 00 00 00 00 00
C0    00 00 02 FF 00 01
C1    FF FF FF FF FF
C2    FF FF FF FF FF FF
C3    FF FF FF FF FF FF
C4    02 00 FF FE 00 00
C5    01 00 FF FF FF 00
C6    00 00 00 FF 02 00
C7    FF FF FF FF FF
C8    FF FF FF FF FF FF
C9    FF FF FF FF FF FF
CA    02 10 08 08 18 15
CB    15 16 14 0D 06 04
CC    06 06 04 FF 03 08
CD    FF FF FF FF FF
CE    FF FF FF FF FF FF
```

CF	FF FF FF FF FF FF
D0	99 99 99
D1	A5
D2	07 00 0F 00 01 00
D3	00 00 00 00
E0	C0 10 00 00
E1	08 08
E2	08 08
EC	FF

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