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Special Crash Investigations: On-Site Driver Air Bag Inflator Rupture Crash Investigation; Vehicle: 2004 Honda Civic; Location: Alabama; Crash Date: March 2018

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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 published.

16. Abstract

This report documents the investigation of the rupture of the driver's frontal air bag inflator in a 2004 Honda Civic involved in a fatal head-on crash in March 2018 with a 2017 Toyota Corolla. The Honda had dual-stage driver's and passenger's frontal air bags. Impact forces resulted in the deployment of the Honda's driver's frontal air bag, which had an explosive rupture of its inflator during the deployment that projected metallic fragments rearward and into the occupant compartment. The belted 48-year-old male driver of the Honda was fatally injured. A search of the NHTSA recall database, www.nhtsa.gov/recalls, revealed that the vehicle had an incomplete recall at the time of the crash, with NHTSA Campaign Number 15V-320, issued on May 2, 2015, recalling certain Honda vehicles equipped with driver frontal air bags that fell into the Takata air bag defect population.

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Background

This report documents the investigation of the rupture of the driver's frontal air bag inflator in a 2004 Honda Civic (Figure 1) involved in a head-on crash with a 2017 Toyota Corolla in March 2018. The Honda had dual-stage driver and passenger frontal air bags. Impact forces deployed the Honda's driver's frontal air bag, which had an explosive rupture of its inflator that projected metallic fragments rearward into the occupant compartment, striking the belted 48-year-old male driver in the face. He sustained undetermined fatal injuries as a result of the crash. No autopsy was performed.

Figure 1. Left front oblique view of the Honda.

Notification of the crash was received by the National Highway Traffic Safety Administration in July 2018, and an on-site crash investigation was assigned to the Special Crash Investigations team at Crash Research & Analysis, Inc., in August 2018. The Honda was in the possession of an attorney representing the deceased driver's estate. The SCI team contacted the attorney and scheduled an inspection of the vehicle, which took place in August 2018. A search of the NHTSA recall database, www.nhtsa.gov/recalls, showed that the vehicle had an incomplete recall, with NHTSA Campaign Number 15V-320, issued on May 2, 2015, recalling certain Honda vehicles equipped with driver frontal air bags in the Takata air bag defect population.

The on-site activities included an inspection of the Honda to document the exterior and interior damage, identify points of occupant contact, and evaluate the manual and supplemental restraint systems. Additionally, a detailed examination of the Honda's driver's frontal air bag system was conducted. A technical representative from Honda America attended and participated in the inspection. It was determined through previous SCI research that Honda vehicles manufactured

during this period were equipped with rudimentary Event Data Recorders (EDRs) that had very limited capabilities. It did not have the capability to record pre-crash data. The EDR was not supported by the Bosch Crash Data Retrieval tool; therefore, EDR data were not available for this investigation. The Honda's air bag control module was removed from the vehicle and retained by the attorney as evidence. The Toyota, which had been released to its insurer, was in transit to an insurance vehicle salvage facility and not available for inspection. The Toyota's EDR was removed from the vehicle and was in the possession of the investigating law enforcement agency, which imaged the EDR. The SCI investigator obtained a PDF copy of the data, which was then used to aid the crash reconstruction. On-scene police images showing final rest positions of the vehicles were obtained from the law enforcement investigator. Additional on-site activities included the documentation of the crash site.

Summary

Crash Site

The crash occurred at night in March 2018. The environmental conditions reported by the National Weather Service at the time of the crash included fair skies with a temperature of 12 °C (54 °F), a northwest wind of 8 km/h (5 mph), and relative humidity of 64 percent. The police-reported conditions were clear, dry, and dark, without artificial lighting.

The crash occurred in the northbound lane of a two-lane roadway in a rural setting. The roadway had an elongated S-curve. There was a hillcrest with a sharp curve. The roadway measured 5.5 m (18.0 ft) wide and was unmarked. Roadside ditches bordered the edges of asphalt pavement. The posted speed limit was 56 km/h (35 mph). A crash diagram is included at the end of this report.

In the Honda's pre-crash northbound direction (Figure 2), there was a right curve, and the roadway had a positive grade of 5.9 percent. The radius of the curve measured 297 m (974.4 ft). The Toyota's pre-crash southbound direction (Figure 3) had a positive 4.2 percent grade and a shallow right curve that extended beyond the hillcrest. The radius of this curve measured 277 m (908.8 ft). At the hillcrest, the grade of the roadway rapidly changed. The point of impact was 58.4 m (191.6 ft) south of the hillcrest in the northbound lane.

Figure 2. Northbound pre-crash trajectory view for the Honda

Figure 3. Southbound pre-crash trajectory view for the Toyota

Pre-Crash

The Honda was traveling north, driven by the belted 48-year-old male, the sole occupant. The SCI crash reconstruction estimated that the pre-crash speed of the Honda was approximately 48 to 56 km/h (30 to 35 mph). As it proceeded north toward the crash site, the Honda traveled through the right curve, entered a straight section of the roadway, and progressed up the positive grade of the roadway. Due to the grade, opposite traffic approaching this vehicle was likely not visible to the Honda driver.

The Toyota was traveling south, driven by a belted 44-year-old male with a belted 44-year-old male front passenger. The police investigation determined that the Toyota driver was operating the vehicle with a blood alcohol content above the legal limit. The EDR-reported speed of the

Toyota was 142 km/h (88.2 mph) 4.6 seconds prior to the algorithm enable (AE). The Toyota traveled through the right curve as it progressed up the positive grade of the hill at an EDR-recorded speed of 143 km/h (88.9 mph) 2.1 seconds prior to AE. The vehicle crested the hill approximately 1.5 seconds prior to the crash and became momentarily airborne, which allowed the drivetrain to spin up to an EDR-recorded speed of 165.0 (102.5 mph) 1.1 seconds prior to impact. It should be noted that this value was only a recorded speed of the drivetrain and was not the speed of the Toyota. This value was not used in the time/distance calculations or analysis of the crash. An estimated speed of 145 km/h (90 mph) was used for this time step. The excessive speed caused the Toyota to drift left of center into the northbound lane as it exited the right curve and descended from the hillcrest. EDR data indicated that the Toyota driver had right steering throughout the pre-crash recording and that his right steering input increased beginning 1.1 seconds prior to AE. The EDR recorded that the service brakes were on 0.6 seconds prior to AE.

It was determined through the scene inspection that the horizontal profile and grade of the roadway approaching the area of impact likely obstructed the vision of each driver to oncoming traffic. The crash reconstruction calculated that the vehicles became visible to each other approximately 1.5 seconds prior to the impact.

Crash

The front of the Toyota struck the front of the Honda (Event 1). The damage pattern of the Honda indicated that there was 100-percent overlap and an alignment of the vehicles' centers of mass. The EDR-recorded impact speed of the Toyota was 121.0 km/h (75.2 mph). Gouge marks in the northbound lane, highlighted by the yellow cones in Figure 4, evidenced the point of impact. The impact deployed the frontal air bag systems of both vehicles. The Honda's driver's air bag inflator ruptured during deployment. The seat belt pretensioners actuated; the front, side impact, and inflatable curtain air bags in the Toyota deployed.

Figure 4. South-facing image of the point of impact (the Toyota's perspective) in the northbound lane of the roadway

The impact momentum of the Toyota stopped and then reversed the direction of the Honda. Both vehicles slid to the south, evidenced by a series of scratch marks in the northbound lane of the roadway. The Honda rotated approximately 90 degrees clockwise as it slid 29.0 m (95.1 ft) to its final rest position in the northbound lane. At final rest, the Honda was facing east, straddling the

east road edge. The Toyota rotated approximately 145 degrees counterclockwise, as it slid to its final rest position in the northbound lane. At final rest, the Toyota was facing northeast 28.0 m (91.9 ft) south of the point of impact. As the vehicles neared their respective final rest locations, the right rear corner of the Toyota struck the left quarter panel of the Honda adjacent to its taillight (Event 2) in a minor secondary impact.

Figures 5 and 6 are the south-facing and north-facing views of the crash site showing the final rest locations of the vehicles. The three blue cones in the images denote the final rest locations of the Toyota's left front and rear tires. The yellow cones depict the final rest positions of the Honda's rear tires. An analysis of the severity of the crash (delta V) using the missing vehicle algorithm of the WinSMASH program calculated that the delta V of the Honda was 86 km/h (53 mph), and that the delta V of the Toyota was 80 km/h (50 mph). The calculated results were considered reasonable based on SCI experience.

Figure 5. South-facing view of the crash site (the Toyota's perspective) depicting the final rest locations of the vehicles

Figure 6. North-facing view of the crash site (the Honda's perspective) depicting the final rest locations of the vehicles

Post-Crash

Emergency vehicles and personnel responded to the crash site. The driver of the Honda, evaluated by the emergency medical personnel, was pronounced deceased at the crash site. The driver and front passenger of the Toyota were assisted from the vehicle, transferred to ambulances, and transported to a local hospital. They had police-reported incapacitating (A-level) injuries. The vehicles were removed from the scene by local tow agencies. An attorney representing the driver of the Honda took possession of the vehicle and stored it on private property, where it was inspected by SCI and Honda America. The Toyota was released to its insurer and was in transit to an insurance vehicle salvage facility at the time of the SCI on-site investigation.

2004 Honda Civic

Description

The 2004 Honda Civic 2-door coupe with the EX-level trim package (Figure 7), manufactured in October 2003, was identified by VIN 1HGEM22944Lxxxxxx. The powertrain was a 1.7 liter, transverse-mounted, 4-cylinder gasoline engine linked to a 4-speed automatic transmission. Standard equipment included power-assisted front disc/rear drum brakes with 4-wheel ABS and electronic brakeforce distribution, traction control, and power steering. The gross vehicle weight rating for this vehicle was 1,601 kg (3,530 lb) with gross axle weight ratings of 835 kg (1,841 lb) front and 771 kg (1,700 lb) rear. At the time of the crash, the Honda had Dextero Touring P195/60R16 tires of the manufacturer-recommended size, with matching tire identification numbers of Y9K5 CVHX 0717. Each had a tread depth measuring 6 mm (8/32 in). The sidewall of the left front tire was cut. The tires at the right front and rear axle locations remained inflated.

Figure 7. Front view of the Honda depicting the extent of its deformation

The interior of the Honda had seating for five occupants with front row folding bucket seats and a three-passenger rear bench seat. The driver's seat was adjusted in a mid-to-rear track position. The front row right seat was adjusted mid-track. All seating surfaces were leather. The head restraints in the front row were adjustable (fully down). Manual restraint was provided by 3-point lap and shoulder seat belts for the five seating positions. The front seat belts were equipped with buckle and retractor pretensioners. Supplemental restraint consisted of dual-stage frontal and seat-mounted side impact air bags for the driver and front row right positions. The Honda was not equipped with inflatable curtain air bags.

Vehicle History

A CARFAX vehicle history report stated the Honda had five owners over its lifetime spanning 14 years and five months, from October 2003 to March 2018. The first owner purchased the Honda from a dealership located in Washington State in November 2004 and relocated it to Alabama in October 2006. The Honda maintained an Alabama registration throughout the next four periods of ownership; the 48-year-old driver was its fifth owner. The history report stated that he registered the vehicle 25 days prior to the crash. The mileage at the time of purchase was

not provided. The Honda had three crashes in its reported history. Two crashes occurred during its first ownership. A September 2006 crash involved an impact with another vehicle; however, the damage sustained by the Honda was not specified. A July 2008 crash was reported as a frontal crash with another vehicle. The history report stated that the Honda was functional. No information was included in the history report about the deployment of air bags in either crash. The third reported crash was the March 2018 crash that is the subject of this investigation.

NHTSA Recalls and Investigations

A query of the NHTSA website, www.nhtsa.gov/recalls, using the Honda's VIN in August 2018 and again at the time of this report determined that there was one open, incomplete recall and investigation. Specifically, this recall, dated May 27, 2015, addressed the potential rupture of the driver air bag module (NHTSA Recall Number: 15V-320). NHTSA number EA15001 identified this investigation.

Exterior Damage

The Honda sustained severe damage to its front (Event 1) and minor damage to the left side (Event 2). The direct contact damage (Figure 8) associated to Event 1 extended across the entire 142 cm (56.0 in) end width of the vehicle's front plane. The structures of the engine compartment crushed rearward. The hood buckled and tented vertically. The Field L measured 108 cm (42.5 in). The residual crush profile measured across the deformed bumper reinforcement beam was as follows: C1 = 59 cm (23.2 in), C2 = 61 cm (24.0 in), C = 67 cm (26.4 in), C4 = 72 cm (28.3 in), C5 = 54 cm (21.3 in), and C6 = 44 cm (17.3 in). The maximum crush was located 12 cm (4.7 in) right of centerline and measured 72 cm (28.3 in). The left wheelbase was reduced 23 cm (9.1 in). The right wheelbase was reduced 11 cm (4.3 in). Both front tires were in contact with the aft portion of the wheel openings and were restricted. The windshield was fractured across its entire width. The left door was open at the time of inspection and would not latch closed due to deformation of the vehicle's body. The right door was operational. The Collision Deformation Classification (CDC) assigned to the frontal damage pattern was 12FDEW4. The delta V calculated by the missing vehicle algorithm of the WinSMASH program was 86 km/h (53 mph). The longitudinal and lateral components were -86 km/h (-53 mph) and 0, respectively.

Figure 8. Overhead view of the Honda's frontal deformation

The Event 2 left plane damage was located on the Honda's quarter panel (Figures 9 and 10). The direct contact damage began 54 cm (21.3 in) aft of the left rear axle and extended to the rear corner. The damage consisted of minor deformation (less than 5 cm [2.0 in]) of the body panel. There was no involvement of the rear bumper. The rear bumper fascia was separated from the structure at the time of the SCI inspection. The assigned CDC was 09LBEW3.

Figure 9. Left side view of the Honda

Figure 10. Close-up view of the secondary impact damage to the Honda's quarter panel

Event Data Recorder

The Honda air bag control module was mounted on the center tunnel below the center instrument panel. The module monitored the diagnostics of the vehicle's air bag systems and controlled its deployment. Previous SCI research determined that Honda vehicles manufactured during this period had rudimentary EDRs with very limited capabilities. It could not record pre-crash data. The EDR was not supported by the Bosch Crash Data Retrieval tool; therefore, EDR data were not available. The module was removed by the Honda representative during its inspection and will be retained by the attorney for possible imaging at a later date. The Honda representative present during the investigation did not attempt to image the EDR at the time of the inspection. At the time of this final report, no further information was forwarded to SCI regarding the presence or availability of any recorded EDR data.

Interior Damage

The Honda interior (Figure 11) sustained moderate longitudinal intrusion and floor pan buckling as a result of the Event 1 impact. The toe pan intrusion (Figure 12) was uniform across the width of the interior and was an estimated 15 cm (5.9 in) at both the left and right positions of the front row. The floor pan buckling jammed the track adjustment of both front seats in their at-crash positions. The estimated position of the driver seat was a mid-to-rear track adjustment. The forward aspect of the driver's seat cushion was deformed downward an estimated 10 cm (3.9 in) due to driver loading. The left and right instrument panel intrusion was an estimated 2 cm (0.8 in). The bolster covering of the lower instrument panel had separated and was missing. The lower aspect of the steering column was exposed. The displacement of the steering column shear capsules was approximately 13 mm (0.5 in). The lower half sector of the steering wheel rim (Figure 13) was deformed forward 9 cm (3.5 in). Blood spatter was noted over a large portion of the surfaces of the front left interior. A 15 cm (5.9 in) semi-circular area was noted to the interior

surface of the left front window. The vanity mirror attached to the backside of the left sun visor was fractured (Figure 14).

Figure 11. Left lateral view of the Honda's interior

Figure 12. Interior view looking forward at the left lower instrument panel of the Honda

Figure 13. Interior view depicting the steering wheel rim deformation of the Honda

Figure14. Interior view depicting the left sun visor and fractured vanity mirror of the Honda

Manual Restraint Systems

The Honda had 3-point lap and shoulder seat belt systems for all five seating positions. The front seat belts used continuous loop webbing with sliding latch plates, fixed D-rings, and pretensioners (buckle and retractor). The driver's seat belt retracted onto an emergency locking retractor (ELR), while the front right passenger's seat belt used an ELR/automatic locking retractor (ALR). All three second-row systems had ELR/ALR retractors.

At the time of the SCI inspection, the driver's belt was extended from its retractor, and the webbing was locked by the actuation of the retractor pretensioner. The webbing had been cut 29 cm (11.4 in) below the D-ring by the first responders during rescue. The total length of the extended webbing (Figure 15) measured 175 cm (68.9 in) from the floor anchor to the D-ring. The latch plate was still in the buckle receiver (Figure 16). The buckle pretensioner had also actuated. As a result of contact and loading from the driver's lower torso, the lap section of the

webbing was cupped over a 13 cm (5.1 in) length. The shoulder portion of the webbing was blood stained and appeared waffled from driver loading. The cut shoulder webbing was abraded at the D-ring. The observations of the seat belt inspection showed that the driver was belted at the time of the crash.

Figure 15. Left lateral view depicting the condition of the driver's seat belt in the Honda

Figure 16. Image depicting the latch plate of the Honda driver's seat belt in the buckle receiver

Supplemental Restraint Systems

The Honda had dual-stage frontal air bags and front-seat-mounted side impact air bags. Both frontal air bags deployed in the head-on crash. The driver's frontal air bag inflator ruptured during deployment. The passenger's frontal air bag deployed as designed. The seat-mounted side impact air bags did not deploy.

At an unknown time prior to SCI's involvement in this investigation and at the request of the attorney, the Honda was inspected by people representing the driver. During that inspection, the driver's frontal air bag fabric and the separated components of the inflator (Figure 17) were removed from the interior of the Honda and were secured by the attorney as evidence. The driver's frontal air bag module remained fastened to the steering column (Figure 18).

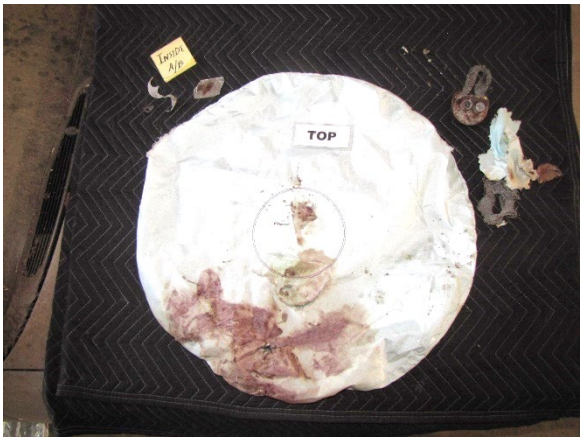


Figure 17. Overall image depicting the Honda's driver's frontal air bag fabric and the separated components of the inflator

Figure 18. Image of the Honda's driver's frontal air bag module depicting the condition of the ruptured inflator. Image taken five months post-crash

The driver's frontal air bag fabric measured 66 cm (26.0 in) in diameter at inspection. This air bag was tethered and was vented by two vent ports located on the backside of the fabric. It was embossed with the date, September 27, 2003, and the number 0007455. The face of the air bag was blood-stained in the 5- to 7 o'clock sectors. At the center of the air bag (Figure 19), there was a 14 cm (5.5 in) semi-circular tear in the fabric caused by the penetration of the separated cap of the inflator. A 13 cm (5.1 in) tear in the peripheral seam at the 10 o'clock sector was also identified (Figure 20).

Figure 19. Image depicting the tear in the fabric at the center of the Honda's driver's frontal air bag

Figure 20. Image depicting the tear in the peripheral seam of the Honda's driver's frontal air bag

The Honda representative removed the driver's frontal air bag module from the steering wheel (Figure 21). It was observed that the electrical connectors had fractured and had separated from the squibs. Figure 22 is an image of the backside of the module and the inflator. The serial number of the driver's frontal air bag module was H0YF53996, and the serial number attached to the inflator was JGDP738936N. The Stage 1 squib had detonated. The Stage 2 squib was missing and separated. This squib was located on the floor of the Honda forward of the driver seat. An imprint of the steering shaft and retainer nut was observed on the back plate of the inflator.

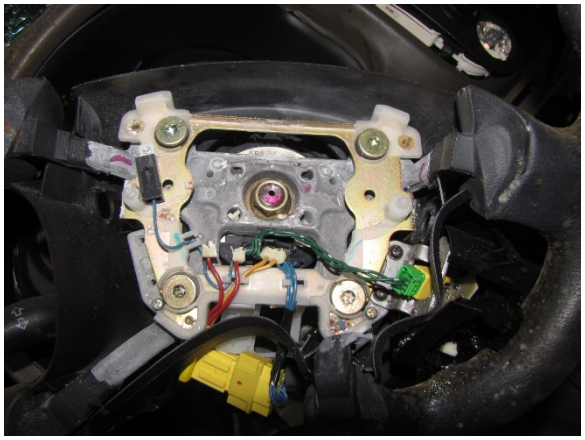


Figure 21. Image depicting the Honda's steering wheel after the driver's frontal air bag module was removed

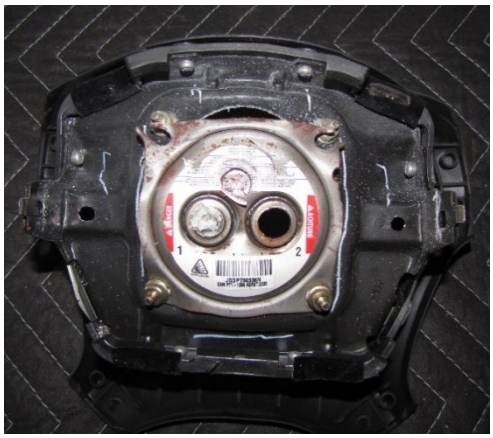


Figure 22. Image depicting the backside of the Honda driver's frontal air bag module

During the deployment sequence, the cap of the inflator (Figures 23 and 24) ruptured. It was observed that the dome of the cap had fractured and deformed 90 degrees across its mid-line. The wire mesh filter in the cap was extruded. The cap then separated from the base of the inflator at the friction weld and was projected rearward through the fabric of the air bag, striking the driver. The cap of the inflator was manufactured with four vent holes, oriented symmetrically around its circumference. Each vent hole was open and clear during the inspection.

Figure 23. Back view depicting the Honda's ruptured and separated driver's frontal air bag inflator cap

Figure 24. Side view depicting the Honda's ruptured and separated driver's frontal air bag inflator cap

The passenger's frontal air bag module was a top-mount design located in the right instrument panel. This air bag deployed as designed (Figure 25). It was not tethered and was vented by two ports located on its side panels. The inspection of the air bag fabric was unremarkable. A label fixed to the module assembly (Figure 26) identified the module with the number PQP05Q217.

Figure 25. Interior image of the Honda depicting the deployed passenger's frontal air bag

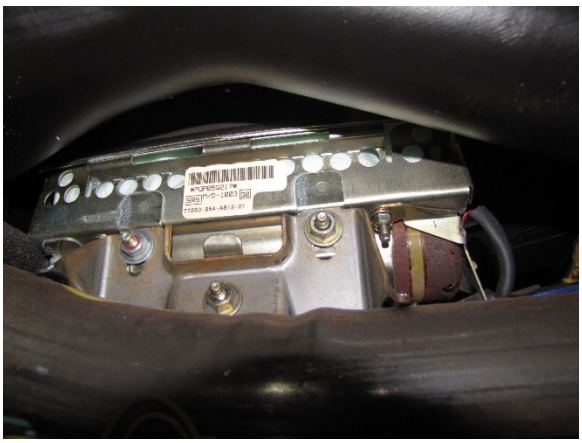


Figure 26. View of the Honda's passenger air bag module and its identification label

2004 Honda Civic Occupant Data

Driver Demographics

Age/sex:	48 years/male
Height:	Unknown
Weight:	Unknown
Eyewear:	None
Seat type:	Forward-facing bucket seat with adjustable head restraint
Seat track position:	Mid-to-rear track (estimated)
Manual restraint usage:	3-point lap and shoulder seat belt system
Usage source:	Vehicle inspection, PAR
Air bags:	Front air bag available; ruptured during deployment
Alcohol/drug data:	Unknown
Egress from vehicle:	Fatal prior to removal
Transport from scene:	None, fatally injured
Type of medical treatment:	None, fatally injured

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Blunt force trauma to body*	099999.9	Unknown	Unknown
2	Gaping wound to left side of face	210604.2	Isolated IPC: Left air bag – steering wheel hub (module rupture)	Certain
3	Enucleation of left eye	240402.2	Isolated IPC: Left air bag – steering wheel hub (module rupture)	Certain
4	Contusion to chest	410402.1	Isolated IPC: Interior – Shoulder portion of belt restraint	Certain
5	Abrasion to chest	410202.1	Isolated IPC: Interior – Shoulder portion of belt restraint	Certain
6	Minor laceration to left abdomen	510602.1	Isolated IPC: Interior – Lap portion of belt restraint	Certain
7	Contusion to abdomen	510402.1	Isolated IPC: Interior – Lap portion of belt restraint	Certain
8	Abrasion to abdomen	510202.1	Isolated IPC:	Certain

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
8 (cont.)			Interior – Lap portion of belt restraint	
9	Avulsion to left knee	810804.2	Isolated IPC: Front – Left lower instrument panel (including knee bolster)	Certain

*Source: on-scene photos (no autopsy performed). *Cause of death listed on death certificate (no autopsy performed).*

Driver Kinematics

The 48-year-old male driver of the Honda was presumed to be seated in a normal upright posture with the seat adjusted to a mid-to-rear track position. He was restrained by the vehicle's 3-point lap and shoulder seat belt. As the Honda traveled north through the right curve and ascended the grade of the roadway, the Toyota crested the hill ahead of his position approximately 1.5 seconds prior to the crash. The Toyota had crossed the centerline and was in the northbound lane. The driver of the Honda likely had insufficient time to react to the errant position of the approaching vehicle.

The front of the Toyota struck the front of the Honda in a head-on, 100-percent overlapping configuration. The severity of the crash actuated the seat belt pretensioners and deployed the frontal air bag systems of both vehicles. This actuation/deployment likely occurred prior to any significant forward kinematic response by the Honda driver. The Toyota's EDR recorded actuation and deployment times of 3-msec. Due to the severity of the impact, similar deployment timing would be expected in the Honda.

At deployment, the driver's upright posture positioned him directly in front of the steering wheel and air bag module. During the deployment of the driver's frontal air bag, the air bag inflator ruptured with a separation of the inflator cap and its internal components. As the air bag was inflating, the separated cap and other undetermined internal components penetrated through the air bag fabric and struck the driver, inflicting blunt force facial/head injuries. Observations of the on-scene police images indicated that the driver was struck in the central-left aspect of his face. The entire fabric membrane of the driver's frontal air bag separated from the module.

As the vehicles crushed to maximum engagement, the driver responded to the 12 o'clock direction of the impact force with a forward trajectory and loaded the seat belt with his torso and pelvis. His knees engaged and deformed the lower left instrument panel (knee bolster). The forward aspect of the driver's seat compressed and deformed downward. These evidences and abrasions to the driver's abdomen and right upper chest (observed in the on-scene police images) are suggestive that the driver submarined the seat belt. The sub-optimal fit of the seat belt in this severe impact allowed the driver's abdomen and chest to contact and deform the steering wheel rim. The steering column was displaced forward and vertically upward. Contact to the vehicle

structures/components forward of his position likely resulted in unidentified internal blunt force internal injuries.

At rest, the driver was found slouched and lying in the driver seat. His knees were still in contact with the lower instrument panel. The driver's frontal air bag fabric membrane was located in the footwell, immediately forward of his seat adjacent to his right leg. The driver was pronounced deceased at the scene by the responding medical professionals and the coroner. No autopsy was performed.

2017 Toyota Corolla

Description

The Toyota (Figure 27) was identified by the VIN 5YFBURHE5HPxxxxxx. The 4-door sedan was built on a 270 cm (106.3 in) wheelbase with a 1.8 liter, inline, 4-cylinder, gasoline engine and SE level trim. The curb weight was 1,265 kg (2,789 lb). The interior of the Toyota was configured for the seating of up to five occupants (2/3) with manual 3-point lap and shoulder seat belts for all five seat positions. Supplemental restraint systems included Certified Advanced 208-Compliant frontal air bags, front-seat-mounted side impact air bags, and inflatable curtain air bags. At impact, all air bags deployed.

Figure 27. On-scene police image of the Toyota at its final rest position. Image provided by the police investigator

Exterior Damage

The Toyota was not available for inspection by SCI. A review of the on-scene images determined that the Toyota sustained moderate-to-severe frontal damage which extended across the entire width of the vehicle. The extent and width of damage were consistent with the dynamics of the impact. The CDC assigned to the damage pattern was 12FDEW3. The delta V calculated by the WinSMASH missing vehicle algorithm was 80 km/h (50 mph). The result was considered reasonable.

Event Data Recorder

The 2017 Toyota Corolla's ACM was mounted on the center tunnel beneath the center instrument stack. The ACM monitored the diagnostic functions of the vehicle's supplemental restraint systems (air bags and seat belt pretensioners) and controlled the deployment/actuation of those devices dependent upon crash event severity. The ACM also had EDR capabilities to record crash event data for longitudinal, lateral, and rollover crash events. During the police investigation, the ACM was removed and transferred to another police jurisdiction for imaging. The data were imaged via a direct-to-module connection with software version 17.6.1 of the Bosch Crash Data Retrieval tool. The data were imaged on ignition cycle 2,963. The police investigator shared a PDF copy of the imaged data with SCI, which is included at the end of this report.

The system status table of the imaged data reported that this EDR generation was designated as 13EDR and was designed to be compatible with Title 49 Code of Federal Regulation, Part 563. The EDR used the concept of a trigger counter that chronologically ordered the total number of recognized events. Five events were saved in memory and were associated to trigger counts 1, 4, 5, 6, and 7. The events associated to trigger counter 1 and 4 were historical events and were not associated to the crash under investigation.

The events triggering counter 5, 6, and 7 were all related to the crash (SCI Event 1) as identified in Figure 28 below. The imaged report indicated that the data were locked and completely written to memory. There were no diagnostic trouble codes present. The crash was first recognized as a front/rear event (Trigger 5) followed by the recognition of the side event (Trigger 6) due to the lateral component of the impact. The rollover algorithm was enabled 23 milliseconds later (Trigger 7) due to the potential for a predicted rollover event. These three triggers all occurred on ignition cycle 2,961. At the time of each trigger, the air bag warning lamp was off; the seat belts for the driver and front passenger were buckled.

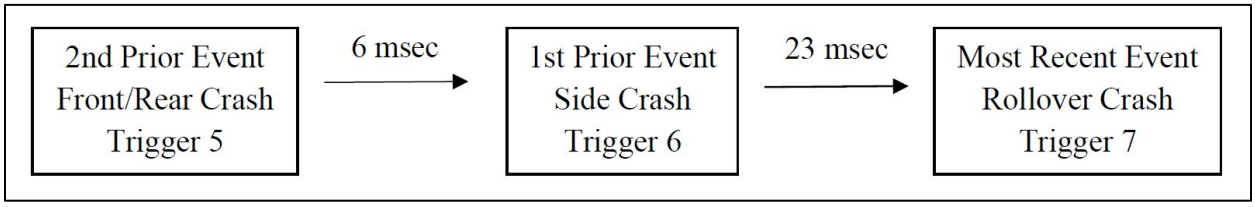


Figure 28. EDR events summary

The front/rear crash algorithm commanded the actuation of the pretensioners and the deployment of all the air bag systems due to the magnitude of the head-on crash. The pretensioners actuated at 3 milliseconds after AE. Stage 1 of the frontal air bags, the front-seat-mounted side impact air bags, and the IC air bags deployed at 3 milliseconds. Stage 2 of the frontal air bags deployed at 13 milliseconds. The maximum recorded longitudinal delta V associated with the second prior event (Trigger 5) was -51.3 km/h (-31.9 mph) at 37 milliseconds. This value was considered by SCI to be underreported. A field in the data table (page 23 of the EDR report) stated that the values reported by the longitudinal and lateral accelerometers were clipped (the magnitude of the crash acceleration exceeded the measurement range of the sensors for an [unreported] period during the crash). These unreported values would affect the calculation of the delta V and result in an underreported value.

A 5.0-second pre-crash buffer, which described various vehicle performance parameters including vehicle speed, accelerator pedal position, brake status, throttle position, and engine rpm, was recorded for each event trigger. These performance parameters were recorded asynchronously in 0.5-second intervals. The 5-second pre-crash data buffer for Triggers 5, 6, and 7 were all the same. A portion of the recorded parameters is included in the table on the next page.

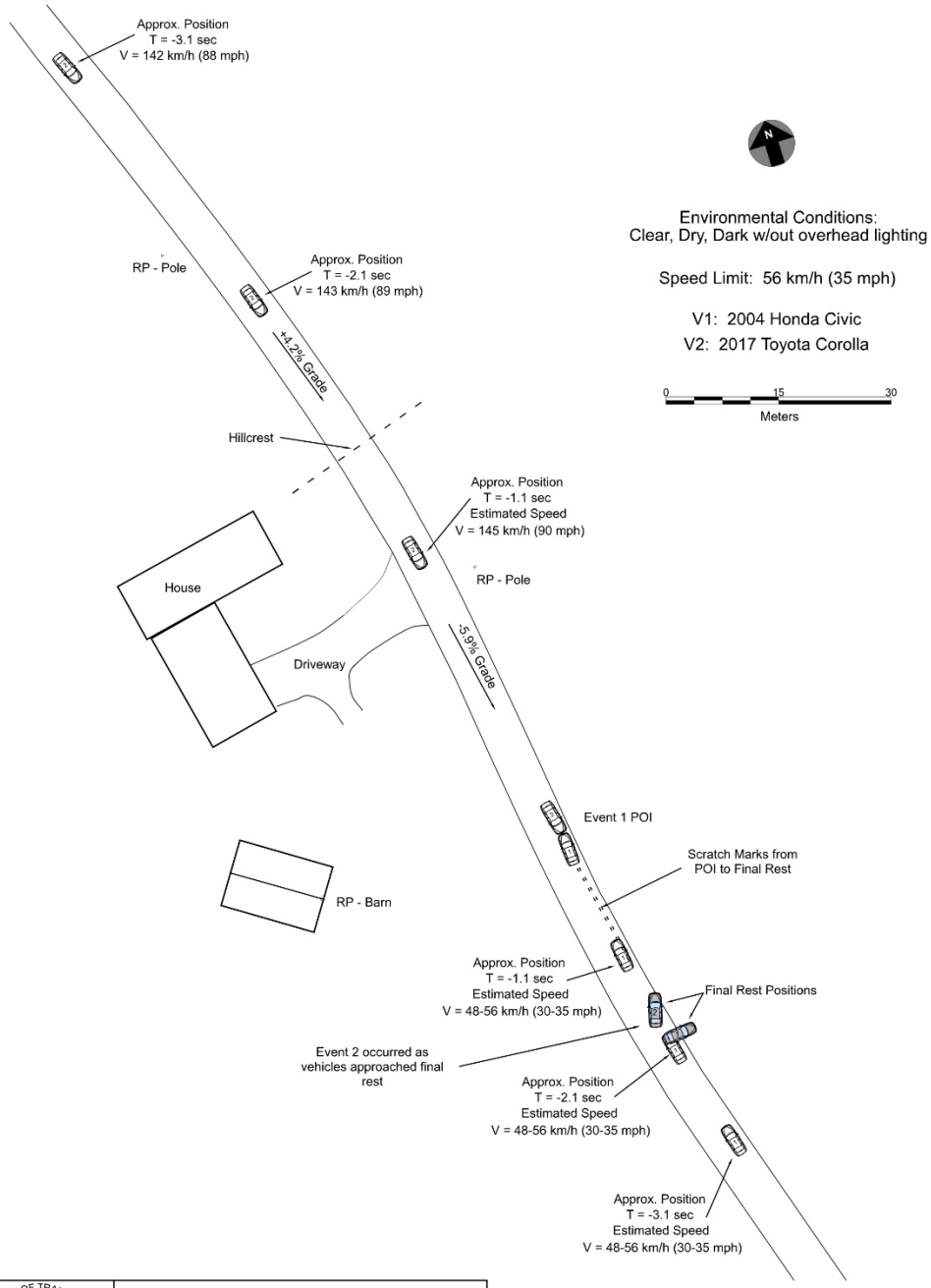
Time sec.	Speed km/h (mph)	Accelerator Pedal Percentage	Throttle Percentage	Engine rpm	Service Brake Status
-4.6	142 (88.2)	65.0	91.0	4,500	Off
-4.1	142 (88.2)	89.5	64.0	4,500	Off
-3.6	142 (88.2)	74.5	83.5	4,800	Off
-3.1	142 (88.2)	67.0	79.5	4,900	Off
-2.6	143 (88.9)	95.0	94.0	4,900	Off
-2.1	143 (88.9)	97.0	97.0	4,900	Off
-1.6	143 (88.9)	81.0	83.5	5,000	Off
-1.1	165 (102.5)	58.0	16.0	5,500	Off
-0.6	132 (82.0)	0.0	0.0	4,500	On
-0.1	118 (73.3)	0.0	0.0	3,900	On
0 Trg	121 (75.2)	0.0	0.0	3,900	On

The data trends confirmed the high speed of the vehicle as it ascended the grade of the roadway and crested the hill. The time/distance analysis indicated that the vehicle crested the hill approximately 1.5 seconds prior to the impact. The driver perceived the errant trajectory of the vehicle's path, released the accelerator, and applied the brakes. The status change in these parameters was recorded 0.6 seconds prior to the impact.

Occupant Data

The Toyota was driven by a belted 44-year-old male with a belted 44-year-old male front passenger. The police investigation determined that the driver had a blood alcohol content above the legal limit. Both occupants sustained police-reported A-level (incapacitating) injuries and were transported by ambulance to local hospitals. Their treatment status was unknown.

Crash Diagram



Appendix A: Event Data Recorder Report for 2017 Toyota Corolla[1]

[1] The CDR report in this technical report was imaged by the investigating law enforcement agency using version 17.6.1 of the Bosch CDR software. Only an electronic PDF file of the Bosch CDR report was provided by the law enforcement agency, and the EDR hexadecimal data have been deleted from the report due to potential personal identifiable information (vehicle identification number, etc.).

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	5YFBURHE5HPxxxxxx
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 17.6.1
Imaged with Software Licensed to (Company Name)	
Reported with CDR version	Crash Data Retrieval Tool 17.6.1
Reported with Software Licensed to (Company Name)	
EDR Device Type	Airbag Control Module
Event(s) recovered	Front/Rear (1), Side (2), Rollover (2)

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 any of the front passenger seat airbags, side airbags, or Curtain Shield Airbags have deployed, data will not be overwritten or deleted by the airbag ECU following that event. If none of the airbags have deployed, the data of that event may be overwritten by a following event even if other airbags (pretensioner, rear seat airbag, etc.) have deployed.
- If power supply to the airbag ECU is lost during an event, all or part of the data may not be recorded.
- "Diagnostic Trouble Codes" are information about faults when a recording trigger is established. Various diagnostic trouble codes could be set and recorded due to component or system damage during an accident.
- The airbag ECU records only diagnostic information related to the airbag system. It does not record diagnostic information related to other vehicle systems.
- 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. However, in some cases, the diagnostic trouble codes of the airbag system recorded by the airbag ECU when the event occurred may not match the diagnostic trouble codes read out when the diagnostic tool is used.

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
- 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.
- This airbag ECU records record pre-crash data and post-crash data.
  - If a single event occurs independently, the data for that event is recorded on a one-to-one basis.
  - If multiple events occur successively (within a period of approximately 500ms), the establishment of the recording trigger for the first event is defined as the "pre-crash recording trigger". Pre-crash data for the first event and post-crash data for each successive event is then recorded.
- The airbag ECU has two recording pages (memory maps) to store pre-crash data. Additionally, to store post-crash data, the airbag ECU has two recording pages for each accident type: two pages for frontal and rear crash, two pages for a side crash, and two pages for rollover event.
- The data recorded by the airbag ECU includes correlating information between each previously occurring event (i.e., information that clarifies the collision event sequence. This correlation information consists of the following items.
  - Time from Previous Pre-Crash TRG
  - Linked Pre-Crash Page
  - Time from Pre-Crash TRG
  - TRG Count
  - Previous Crash Type

- In frontal and rear collision events, the first point where a longitudinal cumulative delta-V of over 0.8 km/h (0.5 mph) is reached is regarded as time zero for the recorded data. In side impact collision and rollover events, the point in time at which the recording trigger is established is regarded as time zero for the recorded data.
- 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.
- In frontal and rear collision events, the record time varies depending on the period during which a longitudinal cumulative delta-V of over 0.8 km/h (0.5 mph) is reached, and time series data is recorded for up to 250 ms. The record time described above is indicated as "Length of Delta-V". "Delta-V, Longitudinal" outside the record time is indicated by area shaded in the table, and not indicated in the graph.

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
Maximum Delta-V, Longitudinal	Forward
Delta-V, Longitudinal	Forward
Lateral Acceleration for Frontal/Rear Crash, Floor Sensor	Left to Right
Lateral Acceleration, Side Satellite Sensor 1	Left to Right
Lateral Acceleration, Side Satellite Sensor 2	Left to Right
Lateral Acceleration, Side Satellite Sensor 3	Left to Right
Lateral Acceleration, Side Satellite Sensor 4	Left to Right
Lateral Acceleration for Side Crash, Floor Sensor	Left to Right
Roll Angle Peak	Clockwise Rotation
Roll Angle at the Time of TRG	Clockwise Rotation
Roll Rate	Clockwise Rotation
Lateral Acceleration for Rollover, Floor Sensor	Left to Right
Longitudinal Acceleration , VSC Sensor	Forward
Yaw Rate	Left Turn
Steering Input	Left Turn

Data Definitions:
1)
- 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.
- "Recording Status" indicates a state in which all recorded event data has been written into the non-volatile memory, or a state in which this process was interrupted and not fully written into the non-volatile memory. If "Recording Status" is "Incomplete", recorded event data may not be valid.
- If the "Occupant Size Classification, Front Passenger" displays "Child" or "Not Occupied", "Side Air Bag Deployment, Time to Deploy" and "Pretensioner Deployment, Time to Fire" may indicate a time even if deployment did not occur on the for following part no's:
  - 89170-07280, 35400, 35410, 35470, 42660, 0R120, 0R080, 0R081, 0R150
- "Engine RPM" indicates the number of engine revolutions, not the number of motor revolutions. The recorded value has an upper limit of 12,800 rpm. Resolution is 100 rpm and the value is rounded down and recorded. For example, if the actual engine speed is 799 rpm, the recorded value will be 700 rpm.
- If the electric vehicle is using a calculated/virtual engine RPM for drivetrain control, "Engine RPM" may be recorded, but should not be used during data analysis.
- The upper limit for the recorded "Vehicle Speed" value is 200 km/h (125mph). Resolution is 1km/h (0.6mph) 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
- "Accelerator Pedal" has two recording specifications. Both the recorded value increases as the driver depresses the accelerator.
  - Percentage of accelerator pedal depressed (recorded as 0-100(%)).
  - Output voltage of accelerator pedal module (recorded as 0-5(V)).
- If M/T transmission vehicle of some limited model, "Shift Position" may display "Drive" regardless of the actual shift position.
- Depending on the type of occupant sensor installed in the vehicle, one of the following three recording formats for "Occupant Size Classification, Front Passenger" will be utilized.
  - Occupied / Not Occupied
  - AM50 / AF05 / Child / Not Occupied
  - AM50 / AF05 / Child or Not Occupied
- "Cruise Control Status" indicates whether the cruise control system is actuated or not. OFF indicates that the cruise control system is not actuated, but can also indicates that the vehicle is not equipped with the system.
- "Air Bag Warning Lamp, On/Off", "Ignition Cycle, Crash", "Seat Track Position Switch, Foremost, Status, Driver", "Occupant Size Classification, Front Passenger", "Safety Belt Status, Driver", "Safety Belt Status, Front Passenger", "Frontal Air Bag Suppression Switch Status, Front Passenger", and "RSCA Disable Switch" indicate the state approximately 1 second before time zero. They may not always indicate the state at the moment of collision.
- The upper and lower limits for the recorded value of "Motor RPM" is 17,500 rpm and -7,500 rpm respectively. Resolution is 100 rpm and the value is rounded down and recorded.
- "Brake Oil Pressure" has an upper limit of 12.14 Mpa. In the case of the vehicle that has not VSC system, "0 Mpa" or "Invalid" may be displayed.
- "Longitudinal Acceleration , VSC Sensor" has upper and lower limits for the recorded value of 8.973 m/s^2 and -8.973 m/s^2 respectively. This acceleration sensor does not sense collisions.

- "Sequential Shift Range" displaying "Undetermined" indicates the shift range is undetermined or was not being used.
- Some vehicles will not be equipped with all "Drive Mode" types indicated in the "Drive Mode" table. If some or all drive modes are not applicable to vehicle, "OFF" or "Invalid" may be displayed. The item in the "Drive Mode" table may not match the name of switch or indicator that equipped the vehicle.
- The upper and lower limits for the recorded value of "Steering Input" is 375 deg and -375 deg respectively. Resolution is 1.5 deg and the value is rounded down and recorded.
- Resolution of the "Air Bag Warning Lamp ON Time Since DTC was Set" is 15 minutes, and the value is rounded down and recorded.
- "Delta-V, Longitudinal" indicates the change in forward speed after time zero. 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 time zero.
- "Location of Side Satellite Sensor" shows the outline of a typical sensor position. Sensory location can be confirmed using the repair manual.
- "Time from Previous Pre-Crash TRG" indicates the time between the establishment of an event's pre-crash recording trigger to the establishment of a more recent event's pre-crash recording trigger. The upper limit for the recorded value is 16,381 milliseconds. In the event of establishment of the first pre-crash recording trigger after the ignition is switched ON, the upper limit value(max value) is recorded.
- "TRG Count" indicates a calculated value of the number of times recording triggers have been established for all crash types. The sequence in which each event occurred can be verified from the "TRG Count". The smaller the "TRG Count" value, the older the data. The upper limit for the recorded value is 65,533 times. When more than one event reaches the upper limit, the actual "TRG Count" may be greater than what is displayed for that event.
- "Linked Pre-Crash Page" is used to link 'paged" pre-crash data with 'paged" post-crash data. When old pre-crash data is overwritten by new pre-crash data, the "Linked Pre-Crash Page" value may record a page number that is not actually linked.
- Resolution of the "Time from Pre-Crash to TRG" is 50 [ms], and the value is rounded up and recorded.
- "Roll Angle at the Time of TRG" and "Roll Angle Peak" do not represent the actual roll angle of the vehicle. These values are used internally by the airbag ECU for sensing a rollover.

05013_ToyotaS00std_r026

System Status at Time of Retrieval

ECU Part Number	89170-02K90
EDR Generation	13EDR
Complete File Recorded	Yes
Freeze Signal	ON
Freeze Signal Factor	Front Airbag Deployment
Diagnostic Trouble Codes Exist	No
Ignition Cycle ,Download (times)	2963
Multi-event, number of events (times)	2 or greater
Time from event 1 to 2 (s)	0.023
Time from Previous Pre Crash TRG (msec)	16381 or greater
Latest Pre-Crash Page	0
Contains Unlinked Pre-Crash Data	No

Event Record Summary at Retrieval

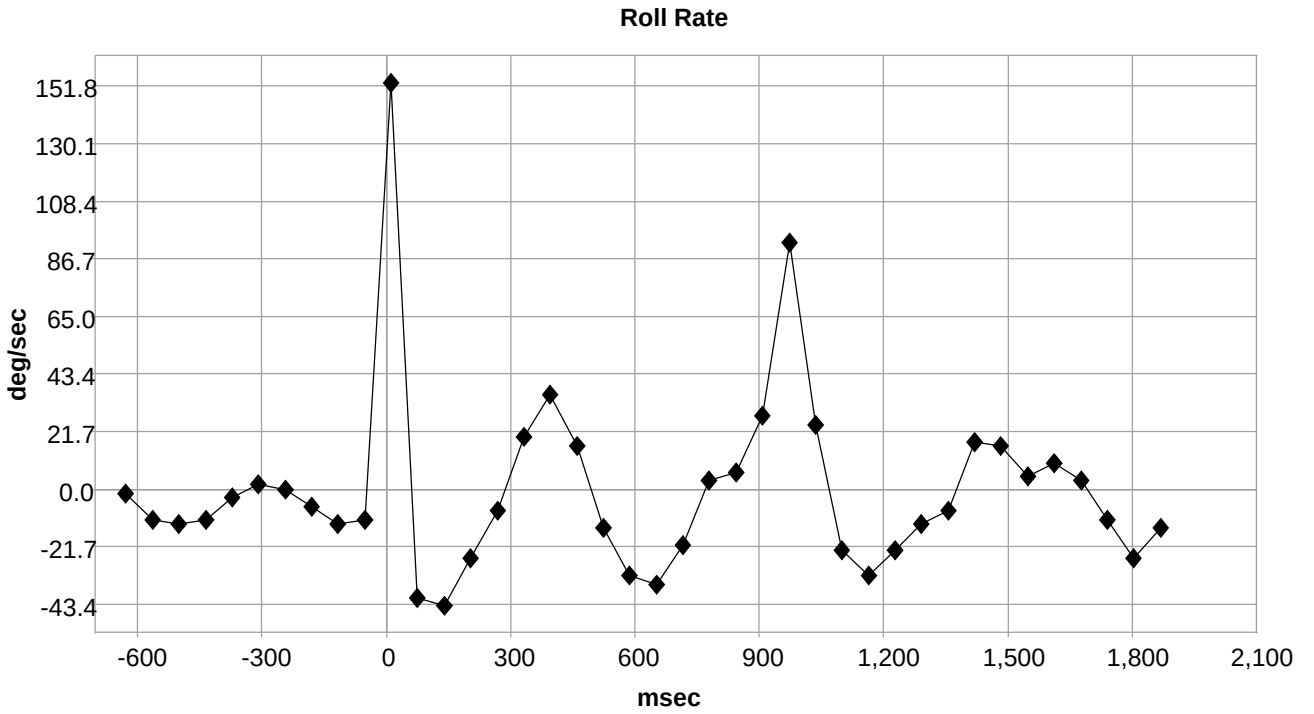
Events Recorded	TRG Count	Crash Type	Time (msec)	Pre-Crash & DTC Data Recording Status	Event & Crash Pulse Data Recording Status
Most Recent Event	7	Rollover	0	Complete (Page 0)	Complete (Rollover Page 1)
1st Prior Event	6	Side Crash	-23	Complete (Page 0)	Complete (Side Page 1)
2nd Prior Event	5	Front/Rear Crash	-29	Complete (Page 0)	Complete (Front/Rear Page 0)
3rd Prior Event	4	Side Crash	-16381 or greater	Complete (Page 1)	Complete (Side Page 0)
4th Prior Event	1	Rollover	N/A	N/A	Complete (Rollover Page 0)

System Status at Event (Most Recent Event, TRG 7)

Recording Status, Rollover Crash Info.	Complete
Crash Type	Rollover
TRG Count (times)	7
Previous Crash Type	Side Crash
Time from Pre-Crash TRG (msec)	26
Linked Pre-Crash Page	0
Side Curtain Airbag Deployment, Time to Deploy (msec)	No
Pretensioner Deployment, Time to Fire, Driver (msec)	No
Pretensioner Deployment, Time to Fire, Front Passenger (msec)	No

Rollover Crash Pulse (Most Recent Event, TRG 7 - table 1 of 2)

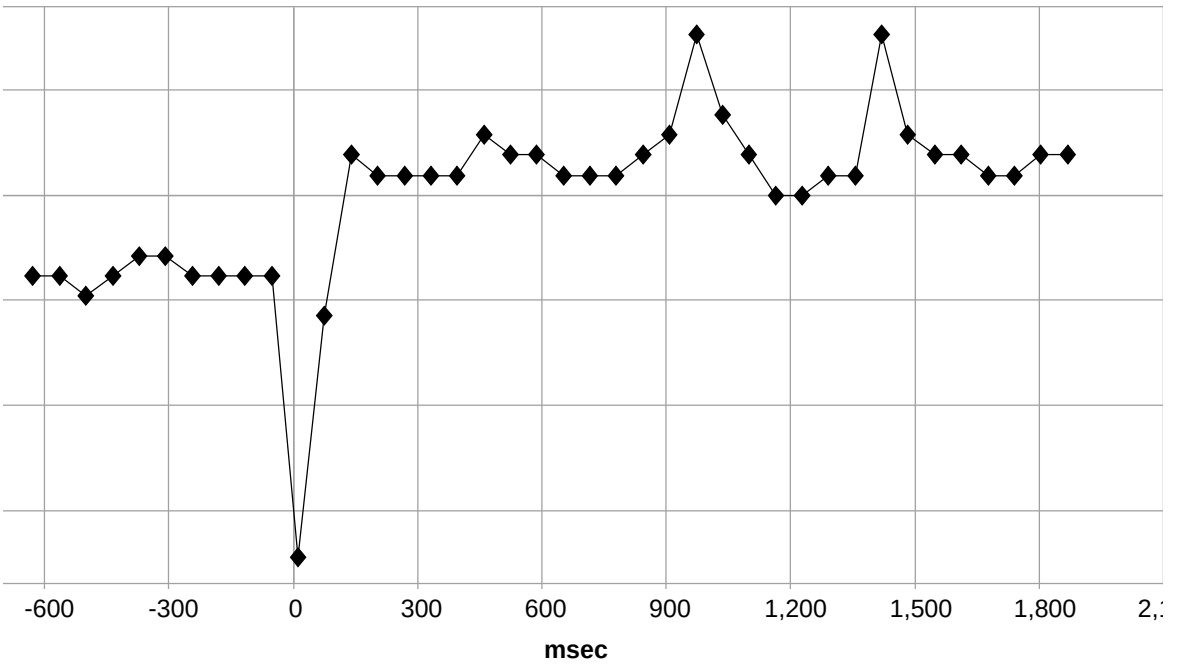
Recording Status, Time Series Data	Complete
Time from TRG to Next Sample (msec)	12
Roll Angle Peak (degrees)	-16.0
Roll Angle at the Time of TRG (degrees)	-6.8



Deployment Time Marker Key

1	Driver/Passenger CSA
2	Driver/Passenger Pretensioner

Lateral Acceleration for Rollover, Floor Sensor



Deployment Time Marker Key

1	Driver/Passenger CSA
2	Driver/Passenger Pretensioner

Rollover Crash Pulse (Most Recent Event, TRG 7 - table 2 of 2)

Time (msec)	Roll Rate (deg/sec)	Lateral Acceleration for Rollover, Floor Sensor (m/sec^2)
-628	-1.6	-7.7
-564	-11.4	-7.7
-500	-13.0	-9.6
-436	-11.4	-7.7
-372	-3.3	-5.7
-308	1.6	-5.7
-244	0.0	-7.7
-180	-6.5	-7.7
-116	-13.0	-7.7
-52	-11.4	-7.7
12	153.1	-34.5
76	-40.7	-11.5
140	-44.0	3.8
204	-26.1	1.9
268	-8.1	1.9
332	19.5	1.9
396	35.8	1.9
460	16.3	5.7
524	-14.7	3.8
588	-32.6	3.8
652	-35.8	1.9
716	-21.2	1.9
780	3.3	1.9
844	6.5	3.8
908	27.7	5.7
972	92.8	15.3
1036	24.4	7.7
1100	-22.8	3.8
1164	-32.6	0.0
1228	-22.8	0.0
1292	-13.0	1.9
1356	-8.1	1.9
1420	17.9	15.3
1484	16.3	5.7
1548	4.9	3.8
1612	9.8	3.8
1676	3.3	1.9
1740	-11.4	1.9
1804	-26.1	3.8
1868	-14.7	3.8

DTCs Present at Time of Event (Most Recent Event, TRG 7)

Recording Status, Diagnostic	Complete
Ignition Cycle Since DTC was Set (times)	0
Airbag Warning Lamp ON Time Since DTC was Set (min)	0
Diagnostic Trouble Codes	None

Pre-Crash Data, 1 Sample (Most Recent Event, TRG 7)

Recording Status, Pre-Crash/Occupant	Complete
Time from Pre-Crash to TRG (msec)	100
TRG Count when Pre-crash TRG was Established (times)	5
Safety Belt Status, Driver	ON
Safety Belt Status, Front Passenger	ON
Occupant Size Classification, Front Passenger	AF05 (Not Child)
Frontal Airbag Suppression Switch Status, Front Passenger	SNA
RSCA Disable Switch	SNA
Seat Track Position Switch, Foremost, Status, Driver	SNA
Airbag Warning Lamp, On/Off	OFF
Ignition Cycle ,Crash (times)	2961

Pre-Crash Data, -5 to 0 seconds (Most Recent Event, TRG 7)

Time (sec)	-4.6	-4.1	-3.6	-3.1	-2.6	-2.1	-1.6	-1.1	-0.6	-0.1	0 (TRG)
Vehicle Speed (MPH [km/h])	88.2 [142]	88.2 [142]	88.2 [142]	88.2 [142]	88.9 [143]	88.9 [143]	88.9 [143]	102.5 [165]	82 [132]	73.3 [118]	75.2 [121]
Accelerator Pedal, % Full (%)	65.0	89.5	74.5	67.0	95.0	97.0	81.0	58.0	0.0	0.0	0.0
Percentage of Engine Throttle (%)	91.0	64.0	83.5	79.5	94.0	97.0	83.5	16.0	0.0	0.0	0.0
Engine RPM (RPM)	4,500	4,500	4,800	4,900	4,900	4,900	5,000	5,500	4,500	3,900	3,900
Motor RPM (RPM)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid
Service Brake, ON/OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Brake Oil Pressure (Mpa)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.56	9.84	9.89
Longitudinal Acceleration , VSC Sensor (m/sec^2)	0.502	0.933	0.502	0.431	0.502	0.359	0.431	-0.431	-4.235	-5.312	Invalid
Yaw Rate (deg/sec)	-1.95	-0.49	-2.44	-1.46	-2.44	-2.93	-4.88	-8.78	-11.71	-5.37	-1.95
Steering Input (degrees)	-4.5	-3.0	-9.0	3.0	-7.5	-10.5	-18.0	-34.5	-58.5	-58.5	-52.5
Shift Position	D	D	D	D	D	D	D	D	D	D	D
Sequential Shift Range	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined
Cruise Control Status	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, PWR	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, ECO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Sport	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Snow	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, EV	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

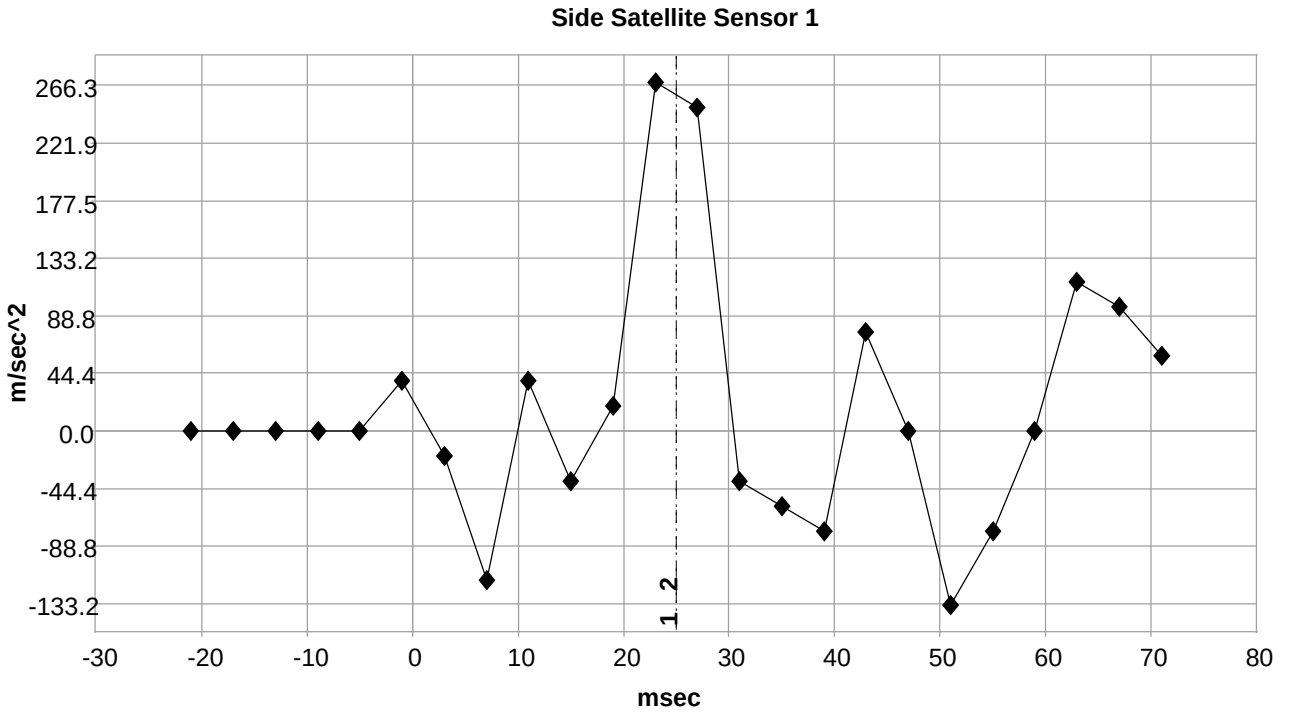
Fuel Injection Quantity (mm3/st)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid

System Status at Event (1st Prior Event, TRG 6)

Recording Status, Side Crash Info.	Complete
Crash Type	Side Crash
TRG Count (times)	6
Previous Crash Type	Front/Rear Crash
Time from Pre-Crash TRG (msec)	3
Linked Pre-Crash Page	0
Side Airbag Deployment, Time to Deploy (If Equipped) (msec)	25
Side Curtain Airbag Deployment, Time to Deploy (If Equipped) (msec)	25
Pretensioner Deployment, Time to Fire (msec)	25
Rear Window Airbag Deployment, Time to Deploy (msec)	SNA

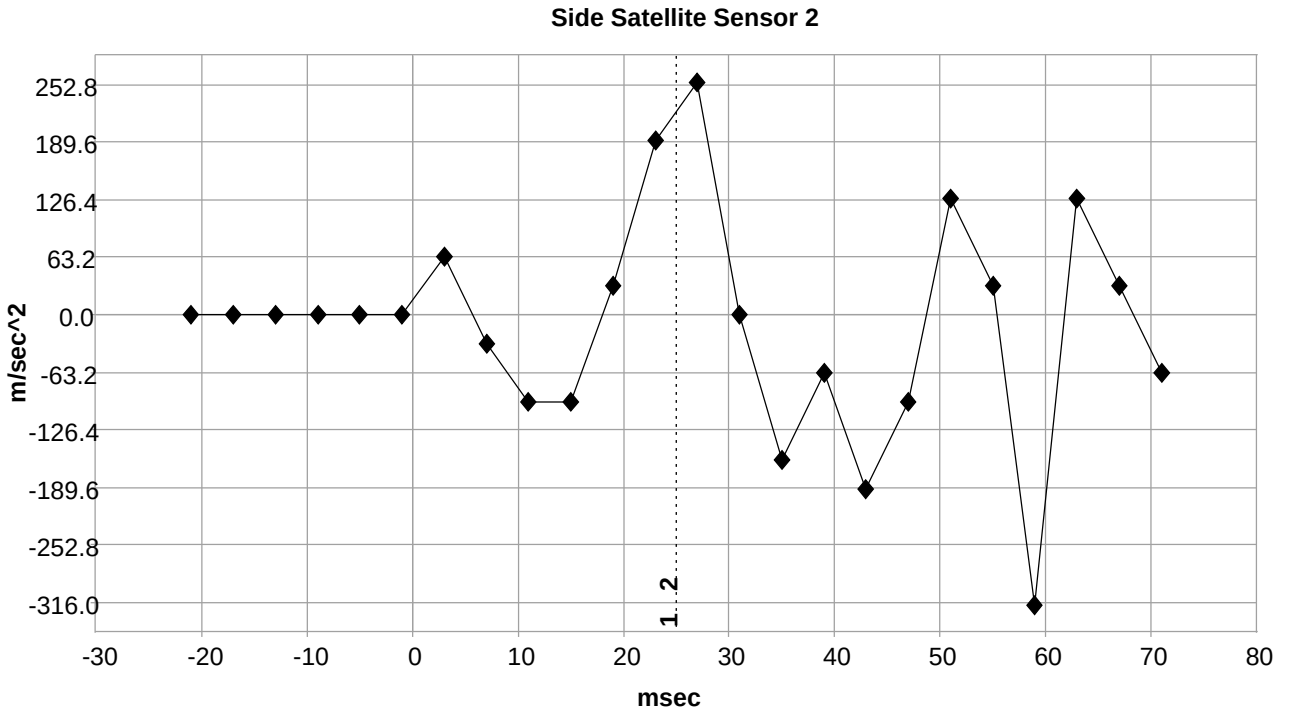
Lateral Crash Pulse (1st Prior Event, TRG 6 - table 1 of 2)

Recording Status, Time Series Data	Complete
Recorded Side	Left Side
Time from TRG to Next Sample (msec)	3
Location of Side Satellite Sensor 1	B-Pillar
Location of Side Satellite Sensor 2	Front Door
Location of Side Satellite Sensor 3	C-Pillar
Location of Side Satellite Sensor 4	Not Equipped
Location of Floor Sensor	Airbag ECU
Clipping Time of Lateral Acceleration, Side Satellite Sensor 1 (msec)	7.0
Clipping Time of Lateral Acceleration, Side Satellite Sensor 2 (msec)	No
Clipping Time of Lateral Acceleration, Side Satellite Sensor 3 (msec)	No
Clipping Time of Lateral Acceleration, Side Satellite Sensor 4 (msec)	SNA
Clipping Time of Lateral Acceleration, Floor Sensor (msec)	-3.0



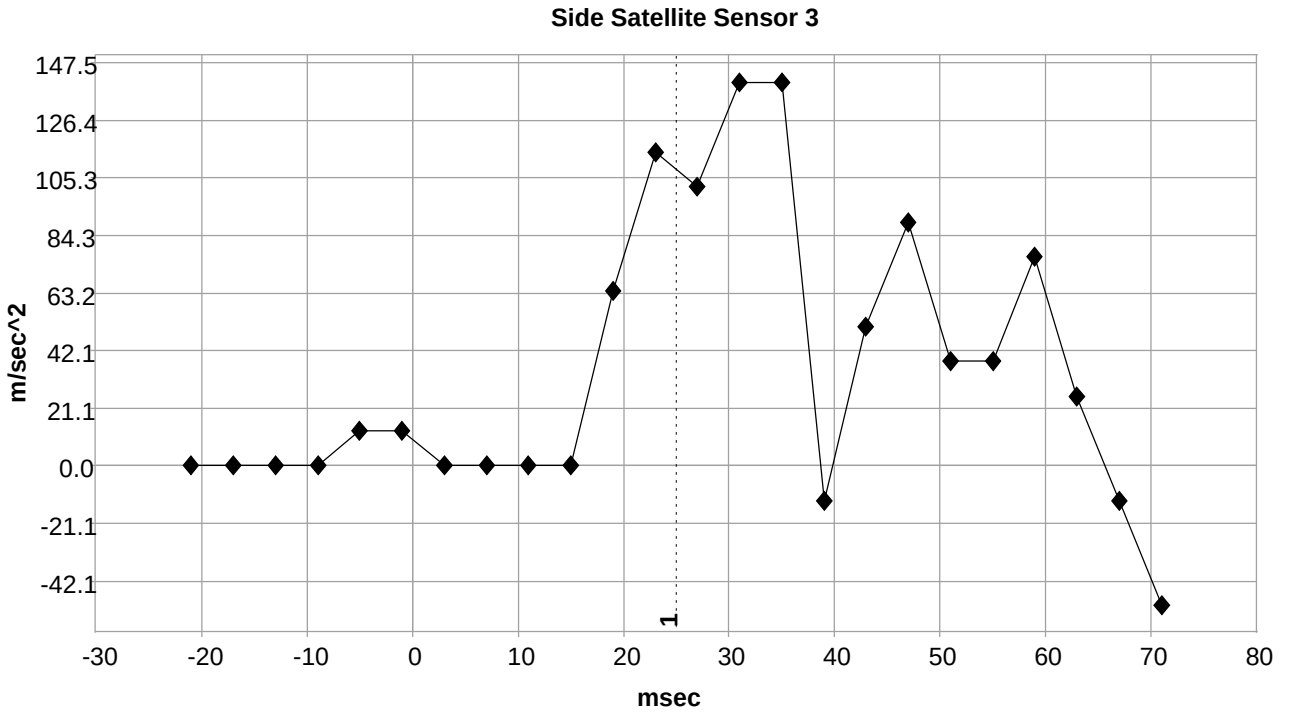
Deployment Time Marker Key

1	Driver/Passenger Pretensioner
2	Side Airbag
3	Rear Window Airbag Deployment Time



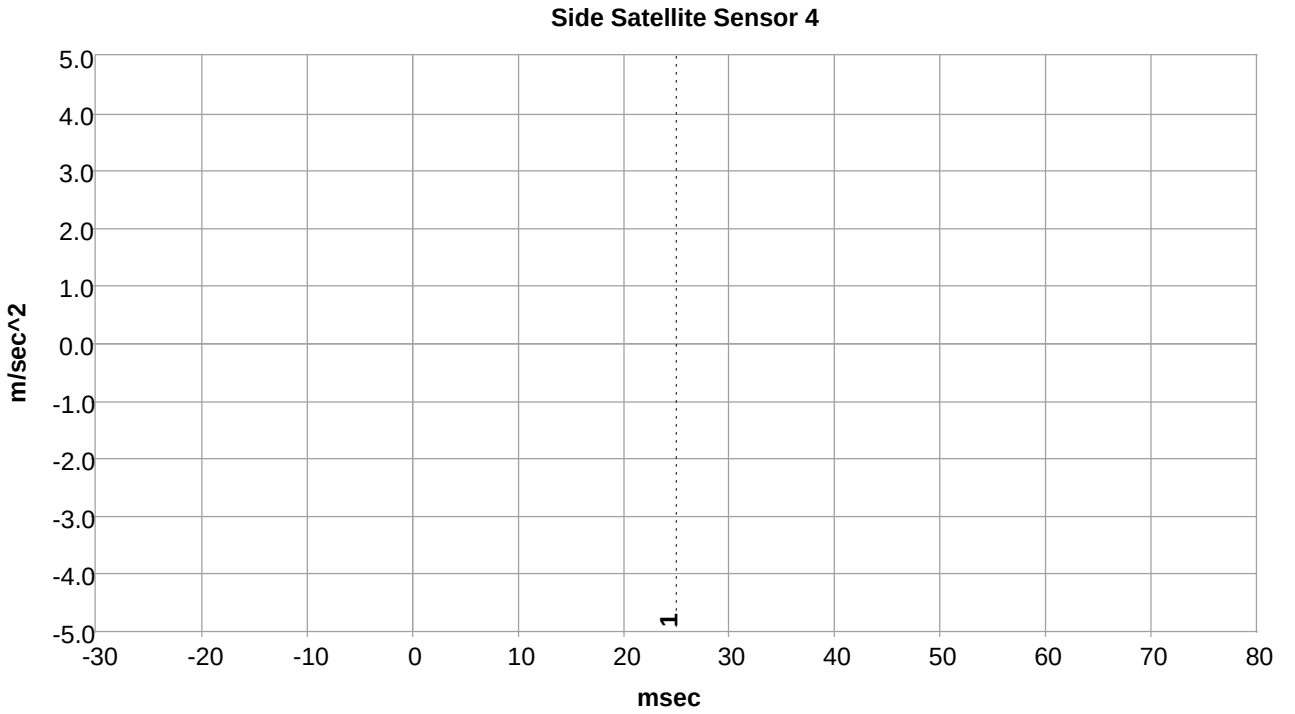
Deployment Time Marker Key

1	Driver/Passenger Pretensioner
2	Side Airbag
3	Rear Window Airbag Deployment Time



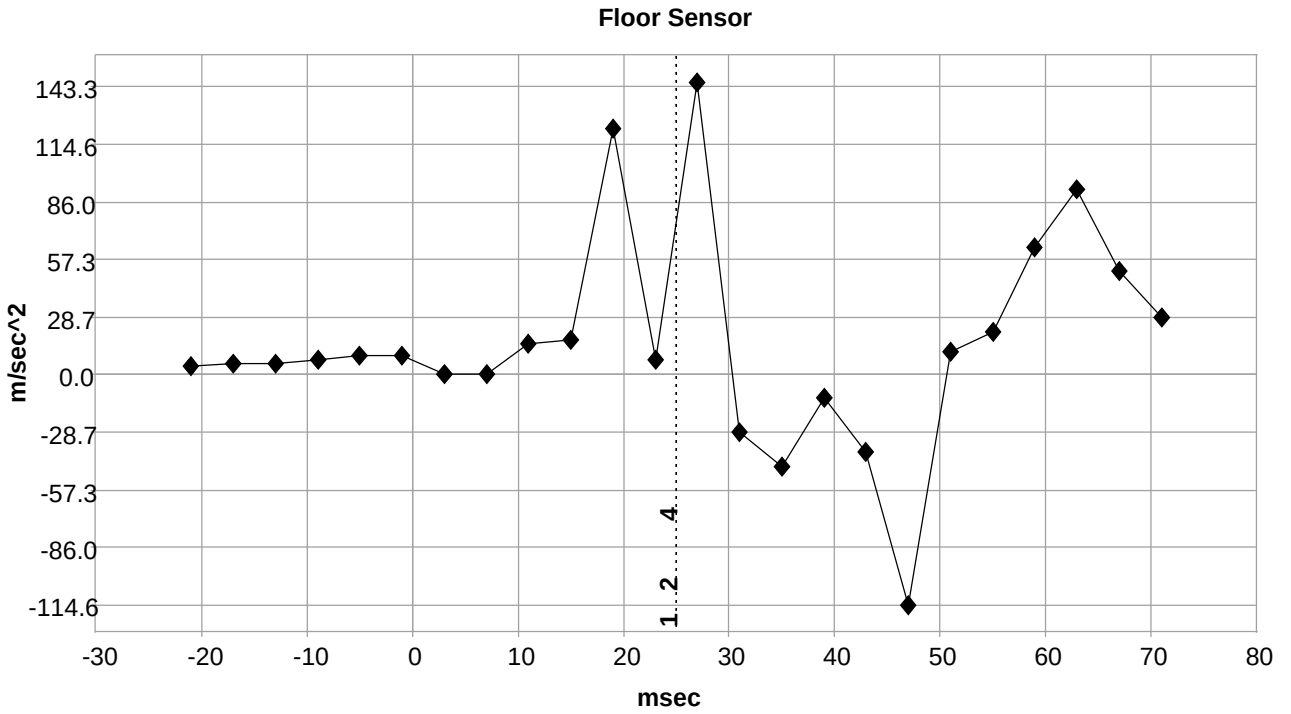
Deployment Time Marker Key

1	Side Curtain Airbag



Deployment Time Marker Key

1	Side Curtain Airbag



Deployment Time Marker Key

1	Driver/Passenger Pretensioner
2	Side Airbag
3	Rear Window Airbag Deployment Time
4	Side Curtain Airbag

Lateral Crash Pulse (1st Prior Event, TRG 6 - table 2 of 2)

Time (msec)	Lateral Acceleration, Side Satellite Sensor 1 (m/sec^2)	Lateral Acceleration, Side Satellite Sensor 2 (m/sec^2)	Lateral Acceleration, Side Satellite Sensor 3 (m/sec^2)	Lateral Acceleration, Side Satellite Sensor 4 (m/sec^2)	Lateral Acceleration for Side Crash, Floor Sensor (m/sec^2)
-21	0.0	0.0	0.0	SNA	3.8
-17	0.0	0.0	0.0	SNA	5.7
-13	0.0	0.0	0.0	SNA	5.7
-9	0.0	0.0	0.0	SNA	7.7
-5	0.0	0.0	12.8	SNA	9.6
-1	38.4	0.0	12.8	SNA	9.6
3	-19.2	63.8	0.0	SNA	0.0
7	-115.3	-31.9	0.0	SNA	0.0
11	38.4	-95.8	0.0	SNA	15.3
15	-38.4	-95.8	0.0	SNA	17.2
19	19.2	31.9	63.8	SNA	122.6
23	269.0	191.5	114.9	SNA	7.7
27	249.8	255.4	102.2	SNA	145.6
31	-38.4	0.0	140.5	SNA	-28.7
35	-57.6	-159.6	140.5	SNA	-46.0
39	-76.9	-63.8	-12.8	SNA	-11.5
43	76.9	-191.5	51.1	SNA	-38.3
47	0.0	-95.8	89.4	SNA	-114.9
51	-134.5	127.7	38.3	SNA	11.5
55	-76.9	31.9	38.3	SNA	21.1
59	0.0	-319.2	76.6	SNA	63.2
63	115.3	127.7	25.5	SNA	91.9
67	96.1	31.9	-12.8	SNA	51.7
71	57.6	-63.8	-51.1	SNA	28.7

DTCs Present at Time of Event (1st Prior Event, TRG 6)

Recording Status, Diagnostic	Complete
Ignition Cycle Since DTC was Set (times)	0
Airbag Warning Lamp ON Time Since DTC was Set (min)	0
Diagnostic Trouble Codes	None

Pre-Crash Data, 1 Sample (1st Prior Event, TRG 6)

Recording Status, Pre-Crash/Occupant	Complete
Time from Pre-Crash to TRG (msec)	100
TRG Count when Pre-crash TRG was Established (times)	5
Safety Belt Status, Driver	ON
Safety Belt Status, Front Passenger	ON
Occupant Size Classification, Front Passenger	AF05 (Not Child)
Frontal Airbag Suppression Switch Status, Front Passenger	SNA
RSCA Disable Switch	SNA
Seat Track Position Switch, Foremost, Status, Driver	SNA
Airbag Warning Lamp, On/Off	OFF
Ignition Cycle ,Crash (times)	2961

Pre-Crash Data, -5 to 0 seconds (1st Prior Event, TRG 6)

Time (sec)	-4.6	-4.1	-3.6	-3.1	-2.6	-2.1	-1.6	-1.1	-0.6	-0.1	0 (TRG)
Vehicle Speed (MPH [km/h])	88.2 [142]	88.2 [142]	88.2 [142]	88.2 [142]	88.9 [143]	88.9 [143]	88.9 [143]	102.5 [165]	82 [132]	73.3 [118]	75.2 [121]
Accelerator Pedal, % Full (%)	65.0	89.5	74.5	67.0	95.0	97.0	81.0	58.0	0.0	0.0	0.0
Percentage of Engine Throttle (%)	91.0	64.0	83.5	79.5	94.0	97.0	83.5	16.0	0.0	0.0	0.0
Engine RPM (RPM)	4,500	4,500	4,800	4,900	4,900	4,900	5,000	5,500	4,500	3,900	3,900
Motor RPM (RPM)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid
Service Brake, ON/OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Brake Oil Pressure (Mpa)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.56	9.84	9.89
Longitudinal Acceleration , VSC Sensor (m/sec^2)	0.502	0.933	0.502	0.431	0.502	0.359	0.431	-0.431	-4.235	-5.312	Invalid
Yaw Rate (deg/sec)	-1.95	-0.49	-2.44	-1.46	-2.44	-2.93	-4.88	-8.78	-11.71	-5.37	-1.95
Steering Input (degrees)	-4.5	-3.0	-9.0	3.0	-7.5	-10.5	-18.0	-34.5	-58.5	-58.5	-52.5
Shift Position	D	D	D	D	D	D	D	D	D	D	D
Sequential Shift Range	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined
Cruise Control Status	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, PWR	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, ECO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Sport	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Snow	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, EV	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

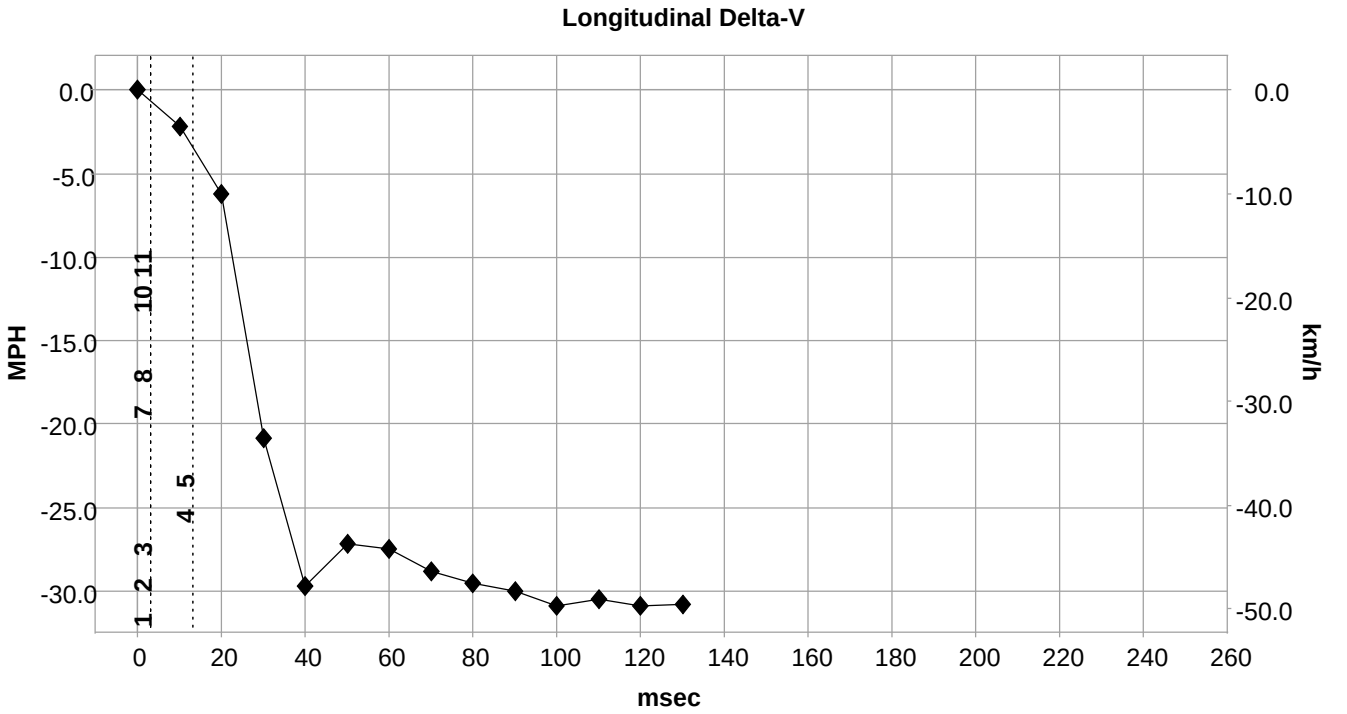
Fuel Injection Quantity (mm3/st)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid

System Status at Event (2nd Prior Event, TRG 5)

Recording Status, Front/Rear Crash Info.	Complete
Crash Type	Front/Rear Crash
TRG Count (times)	5
Previous Crash Type	No Event
Time from Pre-Crash TRG (msec)	0
Linked Pre-Crash Page	0
Frontal Airbag Deployment, Time to 1st Stage Deployment, Driver (msec)	3
Frontal Airbag Deployment, Time to 1st Stage Deployment, Front Passenger (msec)	3
Pretensioner Deployment, Time to Fire, Driver (msec)	3
Pretensioner Deployment, Time to Fire, Front Passenger (msec)	3
Frontal Airbag Deployment, Time to 2nd Stage, Driver (msec)	13
Frontal Airbag Deployment, Time to 2nd Stage, Front Passenger (msec)	13
Active Head Restraint, Time to Deploy, Driver (msec)	SNA
Active Head Restraint, Time to Deploy, Front Passenger (msec)	SNA
Side Curtain Airbag Deployment, Time to Deploy, Driver (msec)	3
Side Curtain Airbag Deployment, Time to Deploy, Passenger (msec)	3
Side Airbag Deployment, Time to Deploy, Driver (msec)	3
Side Airbag Deployment, Time to Deploy, Passenger (msec)	3
Rear Window Airbag Deployment, Time to Deploy (msec)	SNA

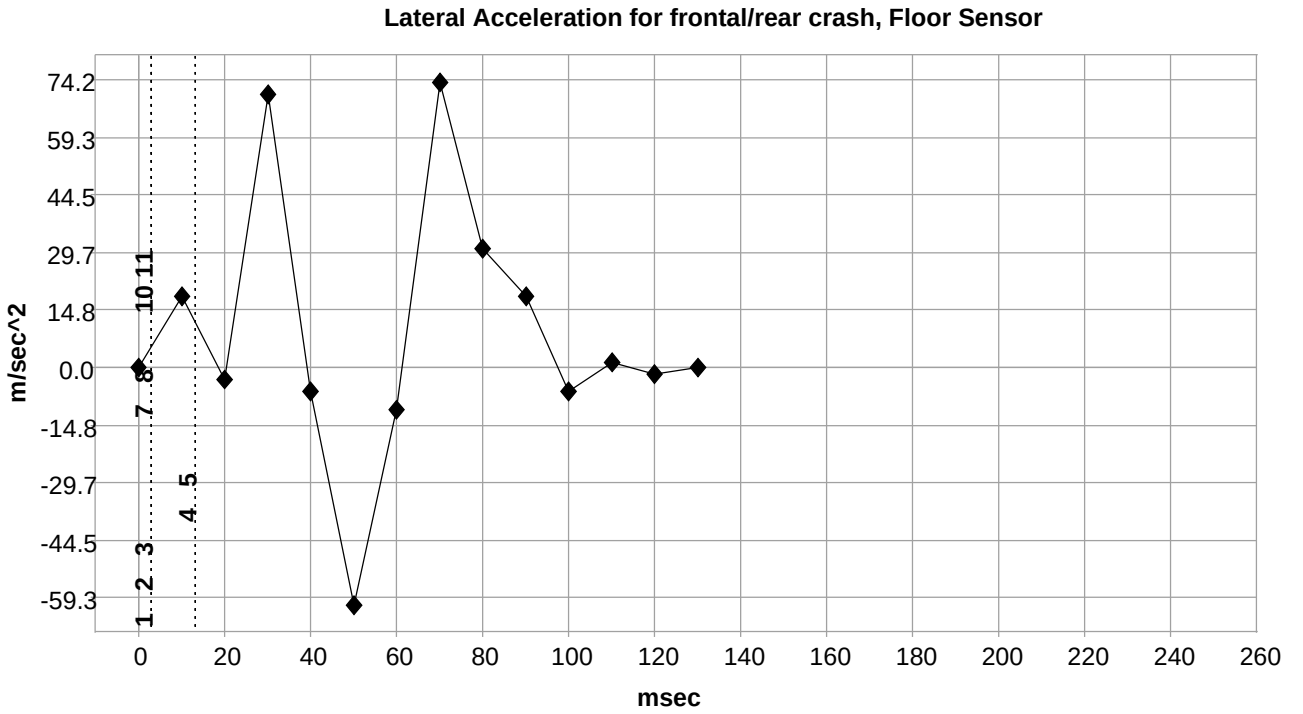
Longitudinal/Lateral Crash Pulse (2nd Prior Event, TRG 5 - table 1 of 2)

Recording Status, Time Series Data	Complete
Time from Time Zero to TRG (msec)	3.0
Length of Delta-V (msec)	130
Max. Longitudinal Delta-V (MPH [km/h])	-31.9 [-51.3]
Time, Maximum Delta-V, Longitudinal (msec)	37.0
Power Supply Status at Max. Delta-V	OFF
Clipping Time of Longitudinal Delta-V (msec)	30.0
Clipping Time of Lateral Acceleration, Floor Sensor (msec)	3.0



Deployment Time Marker Key

1	Driver Airbag Deployment Time
2	Passenger Airbag Deployment Time
3	Driver/Passenger Pretensioner
4	Driver 2nd Stage Airbag Deployment Time
5	Passenger 2nd Stage Airbag Deployment
6	Driver/Passenger AHR
7	Driver CSA
8	Passenger CSA
9	Rear Window Airbag Deployment Time
10	Driver SAB
11	Passenger SAB



Deployment Time Marker Key

1	Driver Airbag Deployment Time
2	Passenger Airbag Deployment Time
3	Driver/Passenger Pretensioner
4	Driver 2nd Stage Airbag Deployment Time
5	Passenger 2nd Stage Airbag Deployment
6	Driver/Passenger AHR
7	Driver CSA
8	Passenger CSA
9	Rear Window Airbag Deployment Time
10	Driver SAB
11	Passenger SAB

Longitudinal/Lateral Crash Pulse (2nd Prior Event, TRG 5 - table 2 of 2)

Time (msec)	Longitudinal Delta-V (MPH [km/h])	Lateral Acceleration for Frontal/Rear Crash, Floor Sensor (m/sec^2)	Power Supply Status
0	0.0 [0.0]	0.0	ON
10	-2.2 [-3.6]	18.4	ON
20	-6.2 [-10.0]	-3.1	OFF
30	-20.8 [-33.5]	70.5	OFF
40	-29.7 [-47.8]	-6.1	OFF
50	-27.1 [-43.7]	-61.3	OFF
60	-27.4 [-44.2]	-10.7	OFF
70	-28.8 [-46.4]	73.5	OFF
80	-29.6 [-47.6]	30.6	OFF
90	-30.0 [-48.3]	18.4	OFF
100	-30.8 [-49.6]	-6.1	OFF
110	-30.5 [-49.1]	1.5	OFF
120	-30.9 [-49.7]	-1.5	OFF
130	-30.8 [-49.5]	0.0	OFF
140	0.0 [0.0]	0.0	ON
150	0.0 [0.0]	0.0	ON
160	0.0 [0.0]	0.0	ON
170	0.0 [0.0]	0.0	ON
180	0.0 [0.0]	0.0	ON
190	0.0 [0.0]	0.0	ON
200	0.0 [0.0]	0.0	ON
210	0.0 [0.0]	0.0	ON
220	0.0 [0.0]	0.0	ON
230	0.0 [0.0]	0.0	ON
240	0.0 [0.0]	0.0	ON
250	0.0 [0.0]	0.0	ON

DTCs Present at Time of Event (2nd Prior Event, TRG 5)

Recording Status, Diagnostic	Complete
Ignition Cycle Since DTC was Set (times)	0
Airbag Warning Lamp ON Time Since DTC was Set (min)	0
Diagnostic Trouble Codes	None

Pre-Crash Data, 1 Sample (2nd Prior Event, TRG 5)

Recording Status, Pre-Crash/Occupant	Complete
Time from Pre-Crash to TRG (msec)	100
TRG Count when Pre-crash TRG was Established (times)	5
Safety Belt Status, Driver	ON
Safety Belt Status, Front Passenger	ON
Occupant Size Classification, Front Passenger	AF05 (Not Child)
Frontal Airbag Suppression Switch Status, Front Passenger	SNA
RSCA Disable Switch	SNA
Seat Track Position Switch, Foremost, Status, Driver	SNA
Airbag Warning Lamp, On/Off	OFF
Ignition Cycle ,Crash (times)	2961

Pre-Crash Data, -5 to 0 seconds (2nd Prior Event, TRG 5)

Time (sec)	-4.6	-4.1	-3.6	-3.1	-2.6	-2.1	-1.6	-1.1	-0.6	-0.1	0 (TRG)
Vehicle Speed (MPH [km/h])	88.2 [142]	88.2 [142]	88.2 [142]	88.2 [142]	88.9 [143]	88.9 [143]	88.9 [143]	102.5 [165]	82 [132]	73.3 [118]	75.2 [121]
Accelerator Pedal, % Full (%)	65.0	89.5	74.5	67.0	95.0	97.0	81.0	58.0	0.0	0.0	0.0
Percentage of Engine Throttle (%)	91.0	64.0	83.5	79.5	94.0	97.0	83.5	16.0	0.0	0.0	0.0
Engine RPM (RPM)	4,500	4,500	4,800	4,900	4,900	4,900	5,000	5,500	4,500	3,900	3,900
Motor RPM (RPM)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid
Service Brake, ON/OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Brake Oil Pressure (Mpa)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.56	9.84	9.89
Longitudinal Acceleration , VSC Sensor (m/sec^2)	0.502	0.933	0.502	0.431	0.502	0.359	0.431	-0.431	-4.235	-5.312	Invalid
Yaw Rate (deg/sec)	-1.95	-0.49	-2.44	-1.46	-2.44	-2.93	-4.88	-8.78	-11.71	-5.37	-1.95
Steering Input (degrees)	-4.5	-3.0	-9.0	3.0	-7.5	-10.5	-18.0	-34.5	-58.5	-58.5	-52.5
Shift Position	D	D	D	D	D	D	D	D	D	D	D
Sequential Shift Range	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined
Cruise Control Status	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, PWR	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, ECO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Sport	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Snow	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, EV	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

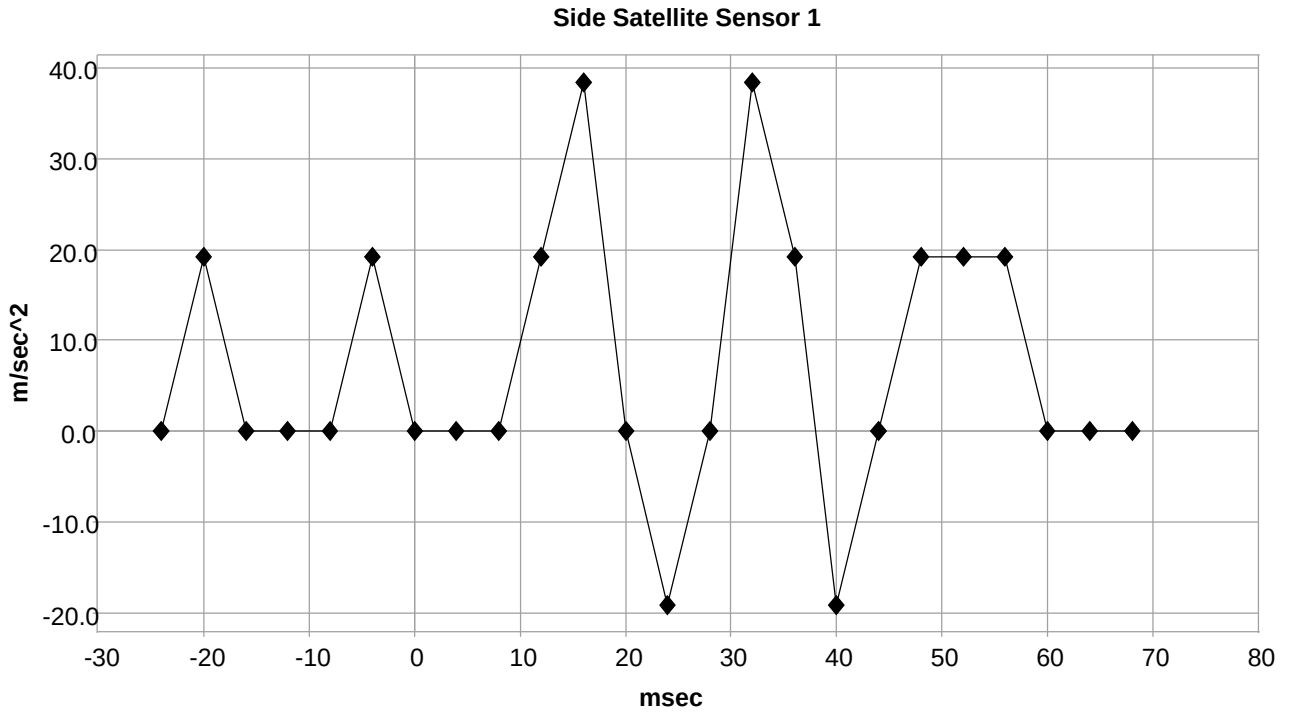
Fuel Injection Quantity (mm3/st)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid

System Status at Event (3rd Prior Event, TRG 4)

Recording Status, Side Crash Info.	Complete
Crash Type	Side Crash
TRG Count (times)	4
Previous Crash Type	No Event
Time from Pre-Crash TRG (msec)	0
Linked Pre-Crash Page	1
Side Airbag Deployment, Time to Deploy (If Equipped) (msec)	No
Side Curtain Airbag Deployment, Time to Deploy (If Equipped) (msec)	No
Pretensioner Deployment, Time to Fire (msec)	No
Rear Window Airbag Deployment, Time to Deploy (msec)	SNA

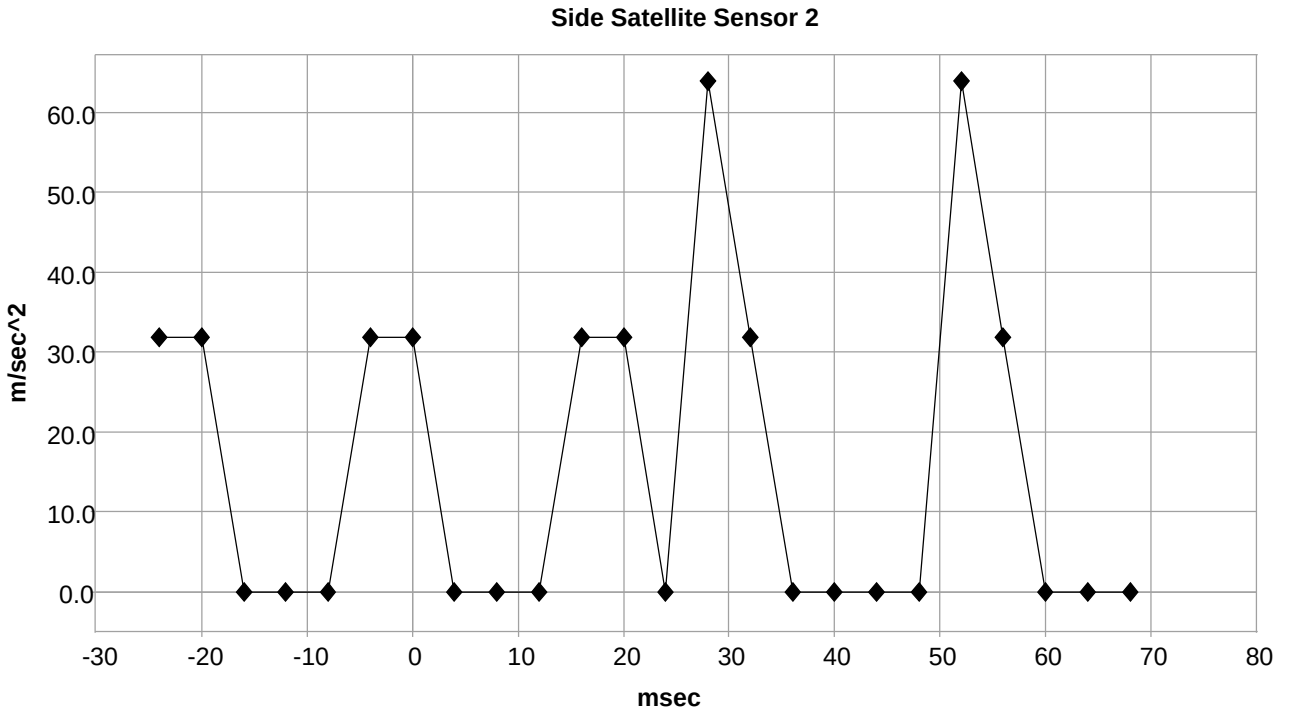
Lateral Crash Pulse (3rd Prior Event, TRG 4 - table 1 of 2)

Recording Status, Time Series Data	Complete
Recorded Side	Right Side
Time from TRG to Next Sample (msec)	0
Location of Side Satellite Sensor 1	B-Pillar
Location of Side Satellite Sensor 2	Front Door
Location of Side Satellite Sensor 3	C-Pillar
Location of Side Satellite Sensor 4	Not Equipped
Location of Floor Sensor	Airbag ECU
Clipping Time of Lateral Acceleration, Side Satellite Sensor 1 (msec)	No
Clipping Time of Lateral Acceleration, Side Satellite Sensor 2 (msec)	No
Clipping Time of Lateral Acceleration, Side Satellite Sensor 3 (msec)	No
Clipping Time of Lateral Acceleration, Side Satellite Sensor 4 (msec)	SNA
Clipping Time of Lateral Acceleration, Floor Sensor (msec)	No



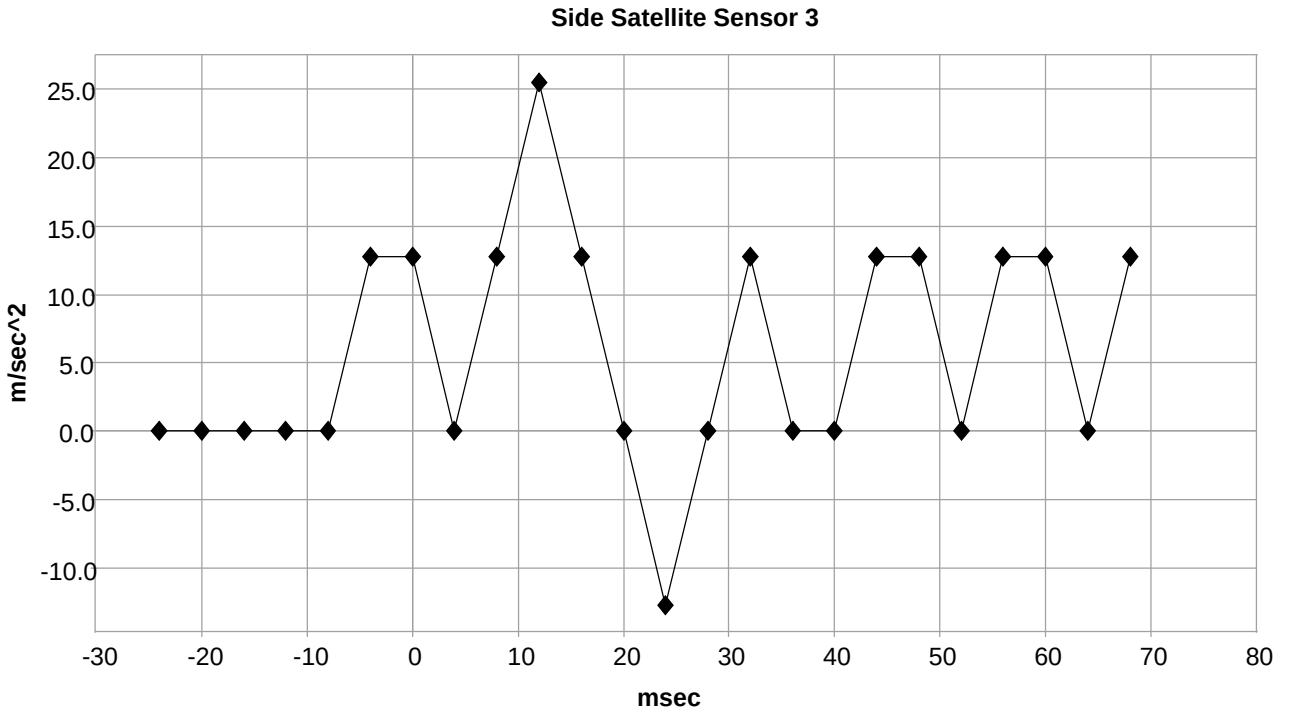
Deployment Time Marker Key

1	Driver/Passenger Pretensioner
2	Side Airbag
3	Rear Window Airbag Deployment Time



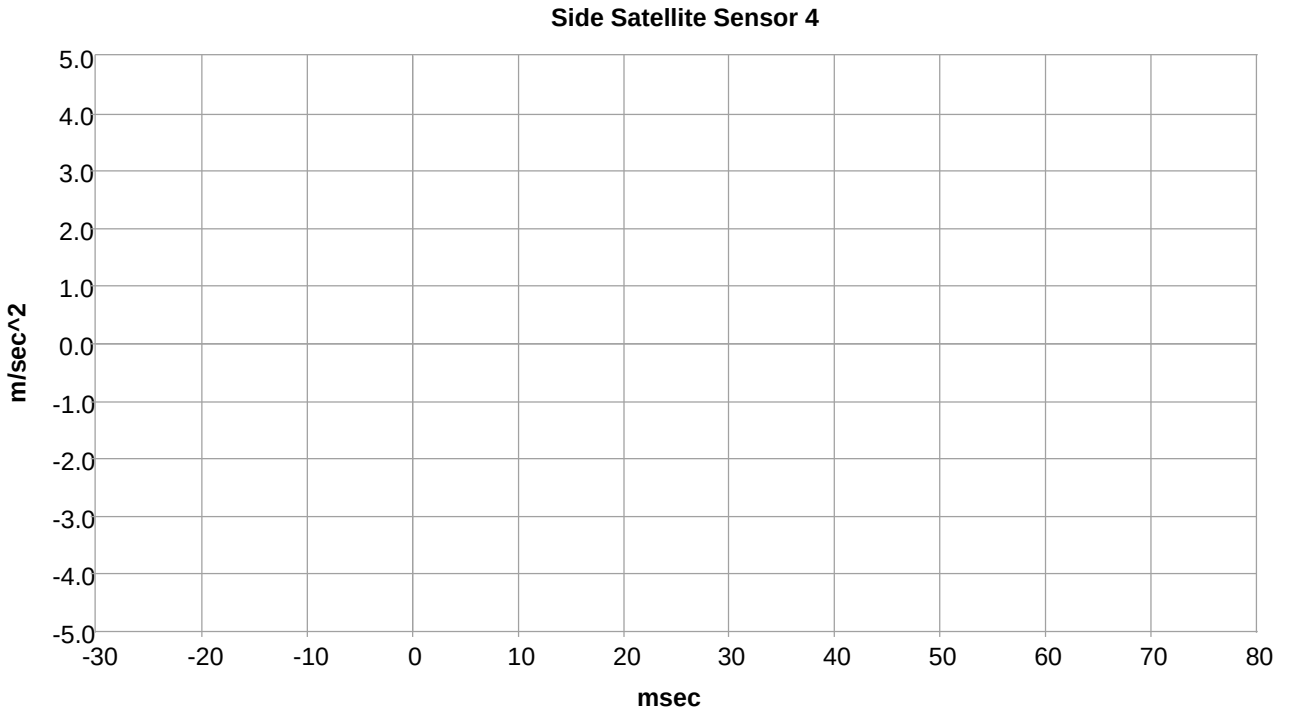
Deployment Time Marker Key

1	Driver/Passenger Pretensioner
2	Side Airbag
3	Rear Window Airbag Deployment Time



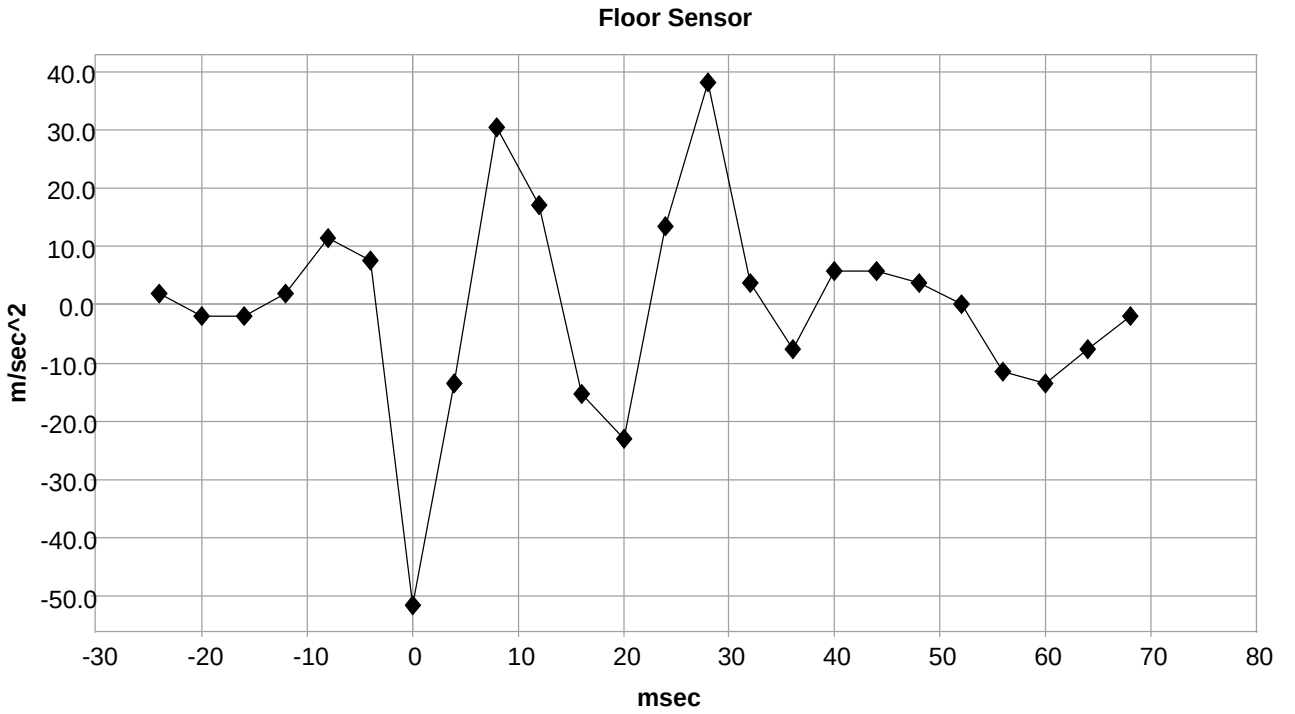
Deployment Time Marker Key

1	Side Curtain Airbag



Deployment Time Marker Key

1	Side Curtain Airbag



Deployment Time Marker Key

1	Driver/Passenger Pretensioner
2	Side Airbag
3	Rear Window Airbag Deployment Time
4	Side Curtain Airbag

Lateral Crash Pulse (3rd Prior Event, TRG 4 - table 2 of 2)

Time (msec)	Lateral Acceleration, Side Satellite Sensor 1 (m/sec^2)	Lateral Acceleration, Side Satellite Sensor 2 (m/sec^2)	Lateral Acceleration, Side Satellite Sensor 3 (m/sec^2)	Lateral Acceleration, Side Satellite Sensor 4 (m/sec^2)	Lateral Acceleration for Side Crash, Floor Sensor (m/sec^2)
-24	0.0	31.9	0.0	SNA	1.9
-20	19.2	31.9	0.0	SNA	-1.9
-16	0.0	0.0	0.0	SNA	-1.9
-12	0.0	0.0	0.0	SNA	1.9
-8	0.0	0.0	0.0	SNA	11.5
-4	19.2	31.9	12.8	SNA	7.7
0	0.0	31.9	12.8	SNA	-51.7
4	0.0	0.0	0.0	SNA	-13.4
8	0.0	0.0	12.8	SNA	30.6
12	19.2	0.0	25.5	SNA	17.2
16	38.4	31.9	12.8	SNA	-15.3
20	0.0	31.9	0.0	SNA	-23.0
24	-19.2	0.0	-12.8	SNA	13.4
28	0.0	63.8	0.0	SNA	38.3
32	38.4	31.9	12.8	SNA	3.8
36	19.2	0.0	0.0	SNA	-7.7
40	-19.2	0.0	0.0	SNA	5.7
44	0.0	0.0	12.8	SNA	5.7
48	19.2	0.0	12.8	SNA	3.8
52	19.2	63.8	0.0	SNA	0.0
56	19.2	31.9	12.8	SNA	-11.5
60	0.0	0.0	12.8	SNA	-13.4
64	0.0	0.0	0.0	SNA	-7.7
68	0.0	0.0	12.8	SNA	-1.9

DTCs Present at Time of Event (3rd Prior Event, TRG 4)

Recording Status, Diagnostic	Complete
Ignition Cycle Since DTC was Set (times)	0
Airbag Warning Lamp ON Time Since DTC was Set (min)	0
Diagnostic Trouble Codes	None

Pre-Crash Data, 1 Sample (3rd Prior Event, TRG 4)

Recording Status, Pre-Crash/Occupant	Complete
Time from Pre-Crash to TRG (msec)	350
TRG Count when Pre-crash TRG was Established (times)	4
Safety Belt Status, Driver	ON
Safety Belt Status, Front Passenger	OFF
Occupant Size Classification, Front Passenger	Child or Not Occupied
Frontal Airbag Suppression Switch Status, Front Passenger	SNA
RSCA Disable Switch	SNA
Seat Track Position Switch, Foremost, Status, Driver	SNA
Airbag Warning Lamp, On/Off	OFF
Ignition Cycle ,Crash (times)	2516

Pre-Crash Data, -5 to 0 seconds (3rd Prior Event, TRG 4)

Time (sec)	-4.85	-4.35	-3.85	-3.35	-2.85	-2.35	-1.85	-1.35	-0.85	-0.35	0 (TRG)
Vehicle Speed (MPH [km/h])	43.5 [70]	44.1 [71]	44.7 [72]	45.4 [73]	46 [74]	46 [74]	44.7 [72]	43.5 [70]	42.9 [69]	42.9 [69]	41.6 [67]
Accelerator Pedal, % Full (%)	4.0	20.0	22.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentage of Engine Throttle (%)	0.0	13.0	14.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engine RPM (RPM)	1,600	1,300	1,500	1,700	1,600	1,200	1,200	1,100	1,100	1,100	1,100
Motor RPM (RPM)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid
Service Brake, ON/OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
Brake Oil Pressure (Mpa)	0.00	0.00	0.00	0.00	0.00	0.48	0.67	0.38	0.29	0.24	0.24
Longitudinal Acceleration , VSC Sensor (m/sec^2)	0.000	-0.287	0.000	-0.359	-0.359	-0.574	-1.723	-1.220	-0.646	-1.005	Invalid
Yaw Rate (deg/sec)	0.49	0.00	-0.49	-0.49	0.00	0.49	1.95	0.98	1.46	2.44	2.93
Steering Input (degrees)	4.5	3.0	0.0	0.0	3.0	4.5	7.5	6.0	7.5	13.5	13.5
Shift Position	D	D	D	D	D	D	D	D	D	D	D
Sequential Shift Range	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined
Cruise Control Status	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, PWR	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, ECO	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Sport	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, Snow	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Drive Mode, EV	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

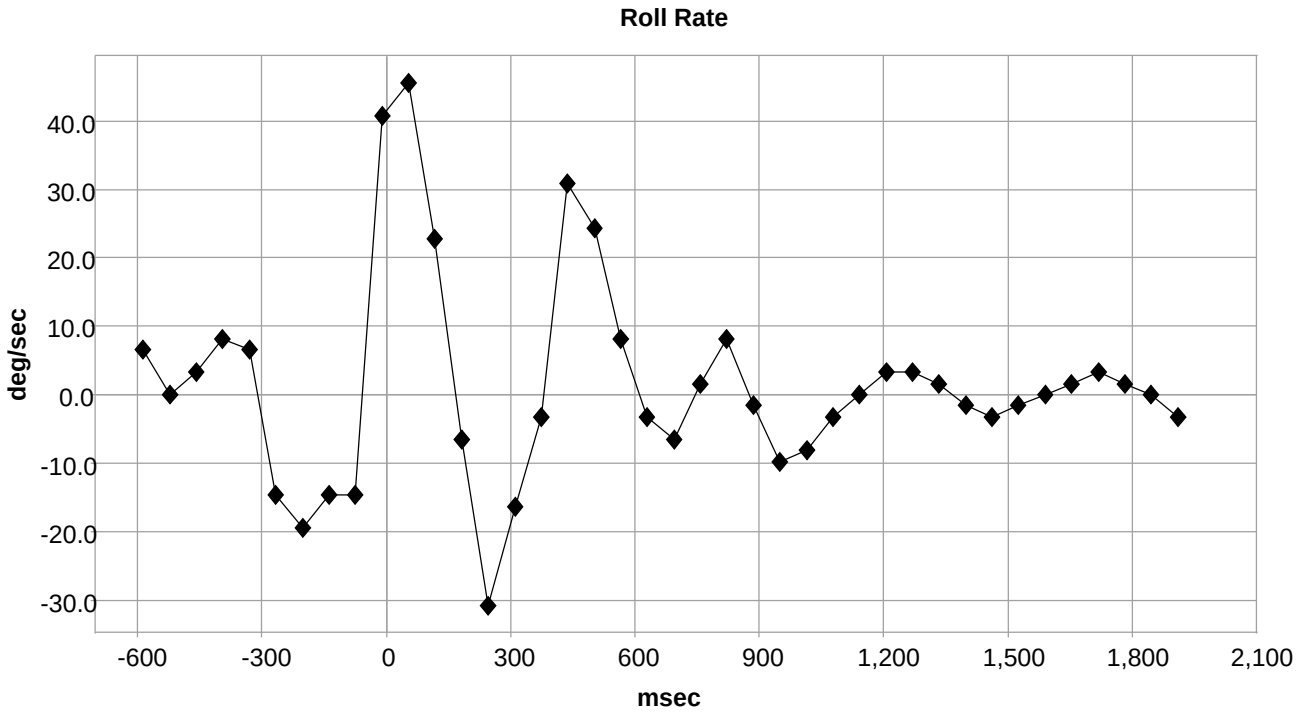
Fuel Injection Quantity (mm3/st)	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid	Invalid

System Status at Event (4th Prior Event, TRG 1)

Recording Status, Rollover Crash Info.	Complete
Crash Type	Rollover
TRG Count (times)	1
Previous Crash Type	No Event
Time from Pre-Crash TRG (msec)	0
Linked Pre-Crash Page	0
Side Curtain Airbag Deployment, Time to Deploy (msec)	No
Pretensioner Deployment, Time to Fire, Driver (msec)	No
Pretensioner Deployment, Time to Fire, Front Passenger (msec)	No

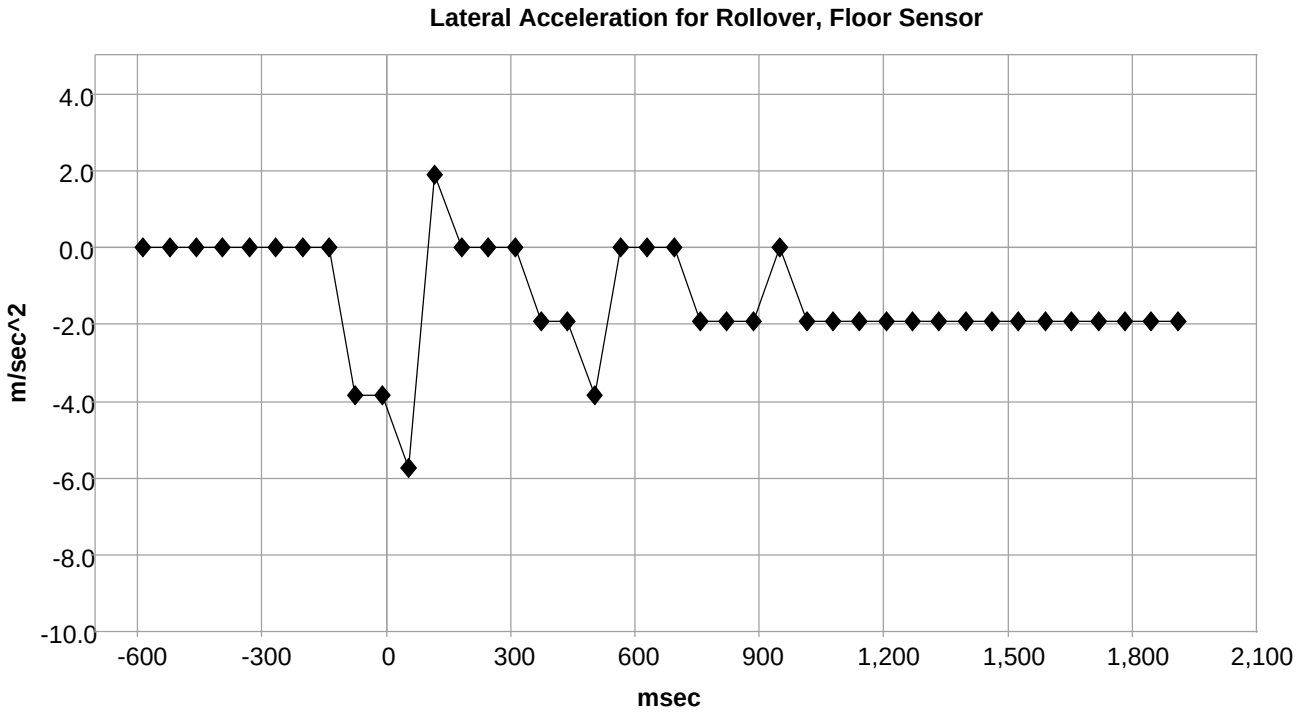
Rollover Crash Pulse (4th Prior Event, TRG 1 - table 1 of 2)

Recording Status, Time Series Data	Complete
Time from TRG to Next Sample (msec)	54
Roll Angle Peak (degrees)	3.6
Roll Angle at the Time of TRG (degrees)	1.0



Deployment Time Marker Key

1	Driver/Passenger CSA
2	Driver/Passenger Pretensioner



Deployment Time Marker Key

1	Driver/Passenger CSA
2	Driver/Passenger Pretensioner

Rollover Crash Pulse (4th Prior Event, TRG 1 - table 2 of 2)

Time (msec)	Roll Rate (deg/sec)	Lateral Acceleration for Rollover, Floor Sensor (m/sec^2)
-586	6.5	0.0
-522	0.0	0.0
-458	3.3	0.0
-394	8.1	0.0
-330	6.5	0.0
-266	-14.7	0.0
-202	-19.5	0.0
-138	-14.7	0.0
-74	-14.7	-3.8
-10	40.7	-3.8
54	45.6	-5.7
118	22.8	1.9
182	-6.5	0.0
246	-30.9	0.0
310	-16.3	0.0
374	-3.3	-1.9
438	30.9	-1.9
502	24.4	-3.8
566	8.1	0.0
630	-3.3	0.0
694	-6.5	0.0
758	1.6	-1.9
822	8.1	-1.9
886	-1.6	-1.9
950	-9.8	0.0
1014	-8.1	-1.9
1078	-3.3	-1.9
1142	0.0	-1.9
1206	3.3	-1.9
1270	3.3	-1.9
1334	1.6	-1.9
1398	-1.6	-1.9
1462	-3.3	-1.9
1526	-1.6	-1.9
1590	0.0	-1.9
1654	1.6	-1.9
1718	3.3	-1.9
1782	1.6	-1.9
1846	0.0	-1.9
1910	-3.3	-1.9

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