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Special Crash Investigations: On-Site Rollover Crash Investigation; Vehicle: 2019 Chevrolet Equinox; Location: California; Crash Date: October 2022

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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.
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16. Abstract

This on-site investigation documents the fatal rollover involving a 2019 Chevrolet Equinox and a 2016 Honda CR-V in California in 2022. The Chevrolet driver was a belted 49-year-old female, and the front passenger was a belted 52-year-old male. The Honda was driven by a belted 47-year-old male and occupied by a belted 44-year-old male front passenger. The Chevrolet rolled down a dirt embankment and struck a wire fence twice. The Chevrolet driver sustained chest and head injuries and was pronounced deceased on-scene. The front passenger was transported with police-reported "A" (suspected serious) injuries and was hospitalized for 6 days.

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Background

This report documents the on-site investigation of a fatal rollover crash of a 2019 Chevrolet Equinox. In December 2022, the National Highway Traffic Safety Administration notified the Special Crash Investigation team of the crash and requested photos of the 2019 Chevrolet Equinox (Figures 1–2). In December 2022 the team submitted photos obtained via an online auto auction and the case was assigned the same day. The police crash report (PCR) was obtained via the Police Accident Report Sampling Engine. Field inspections were completed in January 2023. The Chevrolet had an air bag control module (ACM)[1] with event data recorder (EDR) capability supported by the Bosch Crash Data Retrieval (CDR) system. SCI imaged the crash data during the inspection.

The crash occurred at 2:15 a.m. in October 2022 in California. Conditions were dark, clear, and dry. The crash site was the southbound lanes of an interstate highway. The Chevrolet driver was a belted 49-year-old female and the front passenger was a belted 52-year-old male. The other vehicle was a 2016 Honda CR-V driven by a belted 47-year-old male and the front passenger was a belted 44-year-old male. The Honda was traveling in the left lane and the Chevrolet was traveling in the adjacent lane. According to the PCR, the Chevrolet traveled into the left lane where its left plane struck the Honda's right plane. The Chevrolet driver apparently then lost control and the vehicle traveled to the right and departed the roadway on the right edge. It traveled down a dirt embankment, struck a wire fence, rolled an estimated nine quarter-turns, and struck the fence a second time before coming to rest on its right side. The Honda came to rest on the right shoulder.

Figure 1. The 2019 Chevrolet Equinox

Figure 2. The 2019 Chevrolet Equinox

[1] The GM name is sensing and diagnostic module, referred to hereafter as ACM.

The Chevrolet driver sustained blunt force trauma chest and head injuries and was pronounced deceased on-scene. The front passenger was transported with police-reported “A” (suspected serious) injuries and was hospitalized for 6 days. The Chevrolet was towed due to disabling damage. The Honda sustained minor damage and its occupants were not injured. They drove the vehicle from the scene.

Summary

Crash Site

The crash site was on the southbound lanes of an interstate highway with a posted speed limit of 113 km/h (70 mph). The roadway had three concrete paved lanes in the southbound direction delineated by dashed white painted lines and raised ceramic reflectors (Figure 3). The left edge was bordered by a solid yellow painted edge line with raised ceramic reflectors, an asphalt shoulder with a milled-in rumble strip, dirt center median, and a metal guardrail. The right edge was bordered by a solid white painted edge line, an asphalt shoulder with a milled-in rumble strip, and a descending dirt embankment leading to a wire fence and drainage ditch. The travel lanes were 3.7 m (12 ft) wide; the left shoulder was 1.8 m (6 ft) wide, and the right shoulder was 3.0 m (10 ft) wide. The wire fence was 10.7 m (35 ft) to the right of the right shoulder. The roadway was straight and level. The crash occurred during dark, clear, and dry conditions. A crash diagram is included at the end of this report.

Figure 3. Crash site looking south

Pre-Crash

The Chevrolet was traveling southbound in the middle lane at an EDR-reported vehicle speed of 127 km/h (79 mph) at time -4.0 seconds to algorithm enable (AE) (Event 3). The accelerator pedal position was 30 percent full, engine throttle was 59 percent full, the service brake was "off," and engine rpm was 2,432. Cruise control was "off." The Honda was traveling southbound in the left lane at a police-estimated speed of 113–121 km/h (70–75 mph). The Chevrolet passed the Honda in the adjacent lane and then moved to the left, crossing the lane line and moving into the left lane. The reason for this was unknown. The Chevrolet's front passenger told police he was unsure of the situation because he was in and out of sleep.

Crash

The crash included four events. In the left lane, the Chevrolet's left plane struck the Honda's right plane (Event 1). This appears to have been a minor severity impact, and the Honda driver brought the vehicle to a controlled stop on the right shoulder. For the Chevrolet, it was a non-deployment event that was either not captured by the EDR or overwritten by a subsequent event. The Chevrolet's front passenger told police he heard and felt the vehicle-to-vehicle impact, and

then the Chevrolet driver lost control of the vehicle before departing the roadway. Following the vehicle-to-vehicle impact, it appears the Chevrolet driver overcorrected her steering to the right.

The vehicle departed the roadway on the right edge, traveled down a descending embankment and struck a wire fence with its front plane (Event 2). This was a non-deployment event either not captured by the EDR or overwritten by a subsequent event. Following the fence impact, the Chevrolet initiated a counterclockwise yaw and a right-side-leading trip rollover (Event 3). The rollover was a deployment event captured by the EDR (Event 3).[2] According to EDR data, the driver did not brake prior to the rollover and the vehicle speed was 127 km/h (79 mph) from T-4.5 seconds to AE. In response to the rollover, the left and right inflatable curtain (IC) air bags deployed and the front row seat belt pretensioners actuated. Both occupants were using their lap and shoulder seat belts. The vehicle rolled an estimated nine quarter-turns along its longitudinal axis in a clockwise rotation. Late in the rollover sequence, the Chevrolet struck the fence a second time (Event 4). The second fence impact was a non-deployment event not captured by the EDR. A second deployment occurred during the rollover that the EDR captured (Event 2). The air bag deployments were likely triggered in response to the vehicle's right plane striking the ground during the rollover. In response to this event, the driver's and passenger's frontal air bags deployed, and the front passenger's outboard, seat-mounted, side-impact air bag deployed. The EDR reported a vehicle speed of 83 km/h (52 mph) at T-0.5 seconds to AE with a maximum lateral delta V of -127 km/h (-79 mph) and a maximum longitudinal delta V of -15 km/h (-9 mph) for this event. The EDR-reported time between the two deployment events was 3.97 seconds. The Chevrolet came to rest on its right side and facing north on the roadside. The estimated roll distance, based on police measurements, was 56 m (184 ft).

Post-Crash

A witness to the crash stopped and called for emergency assistance. The Chevrolet's EDR report showed an OnStar notification was sent. Responders found the Chevrolet driver buckled in her seat with her upper body leaning toward the right and resting on the front passenger. The driver sustained fatal injuries described as blunt force trauma to the head and chest and was pronounced deceased on-scene. The front passenger sustained severe injuries including fractures to the pelvic ring and to one rib. Due to his perceived serious injuries and the orientation of the vehicle at rest, he was removed by responders through an opening in the windshield that was made by removing the glass. He was transported by ambulance and hospitalized for 6 days. The Honda occupants were not injured or transported. The Honda was driven from the scene and the Chevrolet was towed due to disabling damage.

[2] Based on the EDR pre-crash data it appears that Event 3 preceded Event 2 by approximately 4 seconds.

2019 Chevrolet Equinox

Description

The 2019 Chevrolet Equinox had the Vehicle Identification Number (VIN) 2GNAXKEV2K6xxxxxx. The manufacture date was November 2018, and the odometer reading was unknown due to the absence of power to the instrument panel. The Chevrolet was a 5-door SUV with two rows of seats for five passengers. It had a 4-cylinder, 1.5-liter gasoline engine, and front-wheel drive. The vehicle manufacturer recommended size 225/65R17 tires with air pressure of 240 kPa (35 psi). It had Hankook Kinergy tires of the recommended size on the front; it had a Mohave Crossover tire, size 225/60R17, on the left rear. The right rear tire was missing and its specifications were unknown. The Chevrolet had combination side-impact/roll-sensing IC air bags that deployed during the crash.

The vehicle had front-row bucket seats with adjustable head restraints. The driver's seat was set in the middle-track position and the front passenger's seat was set between the forward-most and middle-track positions. The front passenger's seat back was found in a reclined position consistent with the statement made to police that he was asleep prior to the crash. The steering column had tilt and telescoping functionality. At inspection, it was set to full-up and full-forward.

Exterior Damage

Several impacts caused direct and induced damage to the front, back, top (Figure 4), bottom, left, and right planes of the Chevrolet. The left-front tire was flat and de-beaded, the right-side wheels were fractured and off the vehicle, and the right-front tire was flat, de-beaded and cut. The left wheelbase was reduced by 5 cm (2 in) and the right wheelbase was unchanged. The front grille, headlight assemblies, bumper fascia, and front trim were detached and the radiator was out of place. The left and right side-view mirrors were missing.

Damage to the left plane sustained in Event 1 was masked by rollover damage. According to police, contact to the Chevrolet in the vehicle-to-vehicle impact was located at the forward aspect of the left side. The estimated collision deformation classification (CDC) for the Chevrolet in Event 1 was 12LBES1.

Figure 4. Rollover damage, the 2019 Chevrolet Equinox

Direct damage to the front plane sustained in Event 2 was unknown. The bumper fascia, energy absorbing foam, and grille were missing. Fourteen measurements taken at the bumper backing bar using the Nikon total station resulted in 6 crush measurements as follows: C1 = 0 cm, C2 = 1 cm (0.4 in), C3 = 5 cm (2 in), C4 = 6 cm (2.4 in), C5 = 4 cm (1.6 in), and C6 = 6 cm (2.4 in). The CDC for the Chevrolet in Event 2 was 12F9991.

There was lateral damage from roof side rail to roof side rail and measured 120 cm (47.2 in). It was distributed longitudinally from the windshield header to the backlight header and measured 230 cm (90.6 in). Maximum vertical crush to the greenhouse measured 20 cm (7.9 in) and was located on the right roof inboard of the right C-pillar at 30 cm (11.8 in) forward of the right rear axle and 20 cm (7.9 in) to the left of the right roof side rail. Maximum lateral crush measured 14 cm (5.5 in) and was located on the right roof side rail at 5 cm (2 in) forward of the right rear axle and 30 cm (11.8 in) aft of the right C-pillar. The CDC for the Chevrolet in Event 3 was 00TDDO3.

Damage to the right plane sustained in Event 4 was masked by rollover damage. The estimated CDC for Event 4 was 00R99999.

Rollover Discussion

According to NHTSA's safety rating website,[3] the Chevrolet had a NHTSA rollover rating of 4 stars out of a possible 5 stars. A rollover resistance test was used to measure the risk of rollover in a single-vehicle, loss-of-control scenario; the result for this vehicle was a rollover risk of 16.4 percent.

The Insurance Institute for Highway Safety gave the vehicle a "good" (highest) rating for roof strength.[4] During testing, the peak strength-to-weight ratio recorded at any time before the roof is crushed 5 in is the key measurement of roof strength. A good rating requires a strength-to-weight ratio of at least 4. The roof must withstand a force of at least 4 times the vehicle's weight before the plate crushes the roof by 13 cm (5 in). The strength-to-weight ratio for this vehicle was 5.26.

The Chevrolet had the following passenger restraint systems designed to deploy in rollover crashes.

- Front row seat belt retractor pretensioners. The pretensioners actuated during the rollover event.
- IC air bags.[5] The left and right IC air bags deployed in the rollover event.

The rollover followed a vehicle-to-vehicle impact, roadway departure, and fence impact. It appears the driver lost control following the vehicle-to-vehicle impact. Based on EDR-reported data, there was no pre-rollover braking. The Chevrolet appears to have tripped in the area of a descending embankment and drainage ditch, then rolled in a southbound path along the depression. During the rollover, it struck the fence a second time; a second deployment event occurred, most likely when the vehicle's right plane struck the ground. The EDR-reported time between the two deployment events was 3.97 seconds. The vehicle rolled an estimated nine

[3] National Highway Traffic Safety Administration. (n.d.). *2019 Chevrolet Equinox*. [Database]. www.nhtsa.gov/vehicle/2019/CHEVROLET/EQUINOX/SUV/FWD#safety-ratings-rollover

[4] NHTSA. (n.d.). Roof strength. [Database]. www.iihs.org/ratings/vehicle/chevrolet/equinox-4-door-suv/2020#roof-strength

[5] Per the vehicle owner's manual, the IC air bags were designed to inflate during a rollover.

quarter-turns and came to rest on its right side. The estimated roll distance, based on police measurements, was 56 m (184 ft). Based on the roll distance and coefficient of friction of 0.5, the estimated speed at the trip point was approximately 84 km/h (52 mph). This appears to correspond with the EDR-reported vehicle speed of 83 km/h (52 mph) at T-0.5 seconds to AE in Event Record 2.

Event Data Recorder

The Chevrolet had an ACM with EDR capability. Using the data link connector method with the Bosch CDR CANplus tool, the crash data was imaged during the vehicle inspection using CDR software version 23.0.2. The data was reported using software version 24.3.634. The report captured deployment Events 1, 2, and 3. Given the EDR-reported ignition cycles at the event, the investigation determined that Event 1 was associated with a prior incident and Event 2 and 3 were associated with this crash. The EDR report included pre-crash, deployment, post-crash, and velocity change data; it reported lateral and longitudinal crash pulse data for Event 2, and rollover and vertical crash pulse data for Event 3. The complete EDR report is included in Appendix A of this report.

Interior Damage

The Chevrolet had interior damage caused by impact forces, integrity loss, air bag deployments, and occupant contacts. The right front door, right rear door, and rear hatch were jammed shut. Passenger compartment integrity loss was present on the front, back, left, and right planes. The windshield was holed and out of place; the backlight, left front side glass, and all right-side glass was disintegrated. Five of the available six air bags were deployed. The front-row seat belts were stretched and scuffed as a result of occupant contacts. The right IC air bag and right roof header exhibited blood deposits, and the roof had scuff marks and black transfers. The IC air bags were cut during the post-crash response.

The front-row passenger compartment was reduced by vertical intrusion of the right roof (6 cm [2.4 in]) and lateral intrusion of the right-front door, rear lower quadrant (10 cm [3.9 in]). The second row was reduced by vertical intrusion of the right roof (9 cm [3.5 in]) and right roof side rail (21 cm [8.3 in]). It was reduced by lateral intrusion of the right door panel, forward upper quadrant (5 cm [2 in]).

Manual Restraint Systems

The Chevrolet had lap and shoulder seat belts for all seat positions. The EDR report showed both front row occupants were belted and their pretensioners actuated. The PCR stated the front passenger was belted properly and the driver was belted improperly, using only the shoulder portion of the belt. Police made that determination based on the driver's position following the rollover. She was hanging by the shoulder portion of the driver's seat belt and her upper body was resting on the front passenger. Additionally, police observed seat belt abrasions on the driver's left clavicle and neck, but not on her abdomen. The SCI investigation determined the driver was using the lap and shoulder belt. The medical examiner's report stated the driver was initially found belted in the driver's seat. The medical examination revealed a 2.5 cm (1 in) wide transverse abrasion across her lower abdomen with an associated transverse laceration of the subcutaneous tissue. Emergency responders cut the driver's seat belt webbing 22 cm (8.7 in) above the lower anchor and again near the D-ring. The webbing had 25 cm (9.8 in) of stretch

marks at the upper aspect and the latch plate had evidence of historical usage. The front passenger's belt was not locked in place by the actuated pretensioner. The webbing had scuff marks located near the D-ring and the latch plate had evidence of historical usage.

Figure 5. Right IC air bag, the 2019 Chevrolet Equinox

Supplemental Restraint Systems

The Chevrolet had frontal and outboard seat-mounted side-impact air bags for the front row, and combination side-impact/roll-sensing IC air bags (Figure 5) for both rows. According to a vehicle history report, it was involved in a crash with deployments of the driver's frontal air bag and both IC air bags approximately 4 months and 469 ignition cycles prior to the rollover crash and those air bags were replaced.[6] The IC air bags were deployable in rollover crashes. Five air bags deployed in this crash. The left and right IC air bags and the seat belt pretensioners deployed during the rollover, and the driver's and passenger's frontal air bags and front passenger's seat-mounted side-impact air bag deployed in a right-side impact following the rollover. The air bags appeared to have deployed normally. The right IC air bag, front row section, had blood deposits on the face and appeared to have been cut lengthwise during post-crash activities. The other deployed air bags were unremarkable.

NHTSA Recalls and Investigations

VIN-based NHTSA recall searches queried in January 2023 and March 2025 revealed no unrepaired recalls for this vehicle.

[6] The prior deployment event was captured in the EDR report (Event 1).

2019 Chevrolet Equinox Occupants

Driver Demographics

Age/sex:	49 years/female
Height:	165 cm (65 in)
Weight:	180 kg (397 lb)
Eyewear:	Unknown
Seat type:	Bucket with adjustable head restraint
Seat track position:	Middle track
Manual restraint usage:	Lap and shoulder belt available; used
Usage source:	Vehicle inspection, EDR report, medical records
Air bags:	Frontal, seat-mounted, and IC air bag available; frontal and IC air bags deployed
Alcohol/drug data:	None detected per toxicology report
Egress from vehicle:	Removed by responders; pronounced deceased on-scene
Transport from scene:	Unknown
Type of medical treatment:	None

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Subarachnoid hemorrhage, brain stem	140210.5	Other occupant	Possible
2	Unilateral flail chest, rib cage; anterior L1-L7; lateral L2-L6; posterior L1-L4	450212.3	Left door panel	Possible
3	Fractures, right ribs; lateral R2-R9	450203.3	Other occupant	Possible
4 5	Hemothoraces; right, 250 cc; left, 430 cc	442200.3 442200.3	Other occupant Left door panel	Possible Possible
6 7	Pleural lacerations, right, and left	441800.2 441800.2	Other occupant Left door panel	Possible Possible
8 9	Fracture, right clavicle Fracture, left clavicle	750500.2 750500.2	Other occupant Shoulder belt	Possible Possible
10	Fracture, sternum	450804.2	Shoulder belt	Possible
11	Subgaleal hemorrhage, right parietal and occipital scalp	110402.1	Other occupant	Possible
12	Laceration, minor, right scalp	210602.1	Other occupant	Possible
13 14	Bilateral conjunctival and scleral hemorrhages	240416.1 241299.1	Other occupant	Possible
15	Laceration, minor, inferior right lateral palpebrae (eye lid), right ear, chin	210602.1	Other occupant	Possible
16	Abrasions, right cheek	210202.1	Other occupant	Possible
17 18	Fracture, transverse process, C5-C6	650220.1 650220.1	Other occupant	Possible
19	Laceration, minor, left neck	310602.1	Shoulder belt	Possible

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
20	Laceration, minor, upper chest	410602.1	Shoulder belt	Possible
21	Abrasions, chest	410202.1	Shoulder belt	Possible
22	Abrasion, abdomen	510202.1	Lap belt	Possible
23	Abrasions, right forearm	710202.1	Other occupant	Possible
24	Abrasions, left upper arm, forearm, hand, fingers	710202.1	Left door panel	Possible
25	Contusions, left arm and forearm	710402.1	Left door panel	Possible

Source: Autopsy report.

Driver Kinematics

The driver was using the lap and shoulder seat belt. The vehicle-to-vehicle impact displaced the driver to the left. She overcorrected her steering to the right, causing the vehicle to depart the roadway onto a descending embankment of the roadside where it struck a wire fence. The driver was likely displaced forward and upward in response to the impact and the sudden change in elevation. The Chevrolet initiated a right-side-leading rollover and the driver was displaced in several directions in response to the rotation. During the rollover, she loaded the shoulder belt causing fractures to the left clavicle and the sternum, and minor lacerations to the neck and chest. She loaded the lap belt causing abrasions and a transverse laceration to the subcutaneous tissue of the lower abdomen. The driver contacted the left door panel causing fractures to the left ribs, left plural lacerations, and a left hemothorax. At some point during the rollover, the driver's upper body was displaced to the right while the lap belt held her in her seat. Her head, face, and thorax contacted the front passenger causing injuries to the driver including a subarachnoid hemorrhage to the brain stem, a subgaleal hemorrhage to the right parietal and occipital scalp, abrasions and minor lacerations to the face, transverse process fractures to the cervical spine at C5 and C6, a fracture to the right clavicle, fractures to the right ribs, right plural lacerations, and a right hemothorax. The vehicle came to rest on its right side and the driver's lower body was held in her seat while her upper body rested on the front passenger. Emergency responders cut the driver's seat belt and removed her from the vehicle. She was pronounced deceased on-scene.

Front-Row Right Occupant Demographics

Age/sex:	52 years/male
Height:	180 cm (71 in)
Weight:	84 kg (185 lb)
Eyewear:	Unknown
Seat type:	Bucket with adjustable head restraint
Seat track position:	Between forward most and middle track
Manual restraint usage:	Lap and shoulder belt available; used
Usage source:	Vehicle inspection, EDR report, PCR
Air bags:	Frontal, seat-mounted, and IC air bag available; all deployed
Egress from vehicle:	Removed by responders due to perceived serious injuries
Transport from scene:	Ambulance to hospital
Type of medical treatment:	Admitted for 6 days

Front-Row Right Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Contusion, upper right lung	441407.2	Right door panel	Probable
2	Pneumomediastinum	442209.2	Right door panel	Probable
3	Fractures, pelvic ring, right pubic rami and sacrum, stable, mildly displaced	856151.2	Right door panel	Probable
4	Fracture, rib R1 anterior	450201.1	Right door panel	Probable
5	Abrasion, lower abdomen	510202.1	Lap belt	Probable

Source: EMS and hospital medical records.

Front-Row Right Occupant Kinematics

The front passenger was using the lap and shoulder seat belt. He told police that he was in and out of sleep prior to the crash. He heard and felt the vehicle-to-vehicle impact and remained in his seated position. When the vehicle departed the roadway onto the descending roadside and struck a wire fence, he was likely displaced forward and upward in response to the impact and the sudden change in elevation. The Chevrolet initiated a right-side-leading rollover and the occupant was displaced to the right in response to the rotation. During the rollover, the driver's head and upper body were displaced to the right, reducing the front passenger's space. He contacted the right door panel and the deployed right IC air bag, causing a contusion to the right lung, a pneumomediastinum, and fractures to the pelvis and a right rib. The vehicle came to rest on its right side with the driver's upper body resting on the front passenger. Due to his perceived serious injuries and the orientation of the vehicle, he was removed by emergency responders through an opening in the windshield. He was transported by ambulance and hospitalized for 6 days.

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2016 Honda CR-V

Description

The 2016 Honda CR-V was identified by police using the VIN 5J6RM4H46GLxxxxxx. It was a 5-door compact SUV with two rows of seats for five passengers. It had a 4-cylinder, 2.4-liter gas engine, and all-wheel drive.

Exterior Damage

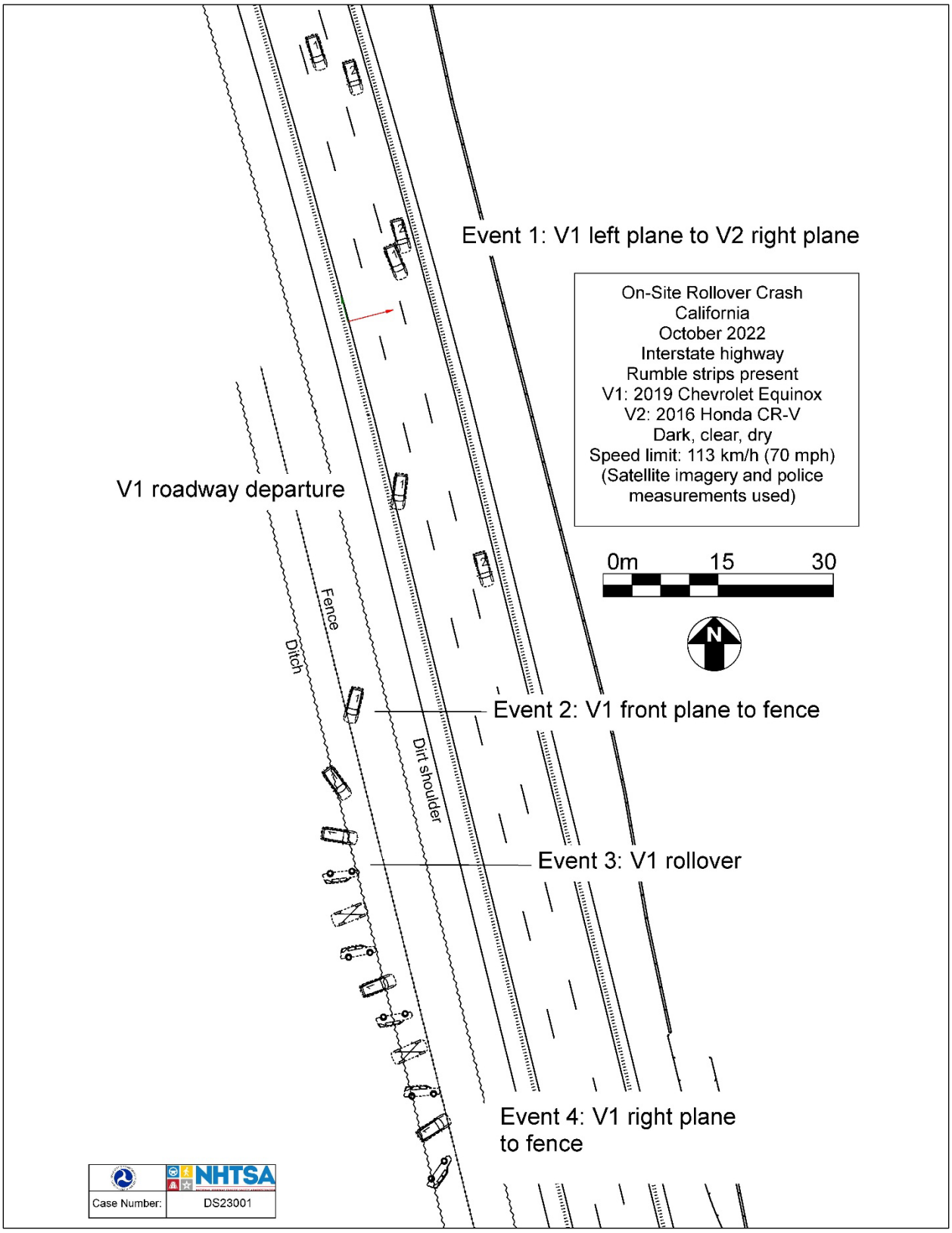
The Honda had minor damage in the right-front quadrant described as a tire rub mark on the right-front fender (Figure 6). Based on police photos, the estimated CDC for the Honda in Event 1 was 06RFES01. The vehicle was driven from the scene.

Occupant Data

Demographic and belt information for the Honda occupants was obtained from the PCR. The driver was a belted 47-year-old male and the front-right occupant was a belted 44-year-old male. They were not injured or transported.

Figure 6. Right plane damage, the 2016 Honda CR-V (police photo)

Crash Diagram



Appendix A: Event Data Recorder Report – 2019 Chevrolet Equinox[7]

[7] The EDR Report contained in this 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	2GNAXKEV2K6******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	DS23001_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 23.0.2
Imaged with Software Licensed to (Company Name)	NHTSA
Reported with CDR version	Crash Data Retrieval Tool 24.3.634
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	Deployment, Deployment, Deployment

Comments

No comments entered.

Data Limitations

Recorded Crash Events:

There are two types of recorded crash events for Front, Side, and Rear (FSR) Events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). The minimum SDM Recorded Vehicle Velocity Change, that is needed to record a Non-Deployment Event, is five MPH [8 km/h]. A Non-Deployment Event contains Pre-Crash and Crash data. The oldest Non-Deployment event can be overwritten by a Deployment Event, if all three records are full and the Non-Deployment Event is not locked. A Non-Deployment Event can be overwritten by a more recent Non-Deployment Event if all three records are full and the Non-Deployment is older than approximately 250 ignition cycles. Also, a Non-Deployment event can be recorded if one of the following occurs without the Deployment of any of the frontal air bags, side air bags, or roll bars:

-Pretensioner(s) only Deployment
-Head Rest Deployment
-Battery Cut-Off Deployment

The second type of SDM recorded crash event for FSR Events is the Deployment Event. It also contains Pre-Crash and Crash data. Deployment Events cannot be overwritten or cleared by the SDM.
Rollover Events contains Pre-Crash and Crash data. Rollover event follow the same rules as FSR Deployment events.
The SDM can store up to three Events.

Data:

For FSR Events, SDM Recorded Vehicle Velocity Change reflects the change in velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event and is also not the Barrier Equivalent Velocity. For Deployment and Non-Deployment Events, the SDM will record up to 300 milliseconds of data after time zero. The SDM will also record up to 300 milliseconds of Vehicle Acceleration data after time zero.
For Rollover Events, the SDM may record Lateral Acceleration, Vertical Acceleration, and Roll Rate data, if the SDM is rollover capable. This data reflects what the sensing system experienced during the recorded portion of the event. For Rollover Deployment Events, the SDM will record up to 700 milliseconds of data before the Deployment criteria is met and 290 milliseconds after the Deployment criteria is met.
-Deployment loops may be displayed as being deployed in a Non-Deployment event record, if a Deployment event is qualified during the Non-Deployment event. That is, if two or more events are occurring at the same time and one is a Non-Deployment event and one of the others is a Deployment event, and the Deployment event is qualified while the Non-Deployment is still active, the deployed loops may be recorded in the Non-Deployment event record.
-Time between events is recorded in 10 msec intervals and is displayed in seconds for a maximum time of 655.33 seconds. The counter measures the time from the start of one event to the start of the next event if both events occur within the same ignition cycle.
-The Maximum SDM Recorded Vehicle Velocity Change may occur between the recorded 10 millisecond sample points of the SDM Recorded Vehicle Velocity Change.
-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.
-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:

-Significant changes in the tire's rolling radius
-Final drive axle ratio changes
-Wheel lockup and wheel slip

-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.
-Pre-Crash data is recorded asynchronously. The 0.5 second Pre-crash data value (most recent recorded data point) is the data point last sampled before Time Zero. That is to say, the last data point may have been captured just before Time Zero but no more than 0.5 second before Time Zero. All subsequent Pre-crash data values are referenced from this data point.
-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if:
-The SDM receives a message with an "invalid" flag from the module sending the pre-crash data
-Pre-Crash Electronic Data Validity Check Status indicates "Data Not Available" if:
-No data is received from the module sending the pre-crash data
-For diesel powered vehicles, the data displayed as Throttle Position (%) is actually the data for the Air Inlet Flap Position. This is not the same as the throttle position for a gasoline powered engines.
-Belt Switch Circuit Status indicates the status of the seat belt switch circuit.
-The ignition cycle counter will increment when the power mode cycles from OFF/Accessory to RUN. Applying and removing of battery power to the module will not increment the ignition cycle counter.
-Ignition Cycles Since DTCs Were Last Cleared can be recorded with a maximum value of 253 cycles and can only be reset by a scan tool.
-Dynamic Deployment Event Counter tracks the number of Deployment events that have occurred during the SDM's lifetime.
-Dynamic Event Counter tracks the number of qualified events (either Deployments, Non-deploy, or Rollover events) that have occurred during the SDM's lifetime.
-For Deployment Events, DTC B0052 (Deployment commanded) shall be recorded with the remainder of the data for this event even though it occurred after Event Enable.
-Once a firing loop has been commanded to be deployed, it will not be commanded to be deployed again during the same ignition cycle. Firing loop times for subsequent deployment type events, during the same ignition cycle, will record the deployment times as N/A.
-The airbag control module may continue to function after the vehicle has been turned off or to accessory, for a set period of time, this is called Prolongation. However, all other vehicle modules may have their functions shut down during Prolongation. For example, if the SIR warning lamp is commanded on by the airbag control module, during Prolongation, and is recorded in the EDR as being commanded on, the actual state of the warning lamp would be off to an observer since the vehicle display cluster would have been in the off state. Vehicle pre-event and system data may be recorded in the EDR as their commanded state, default state, or data invalid state.
-The GM parameter name is displayed in parentheses after the NHTSA Part 563 parameter name.
-The reported range of the longitudinal and lateral acceleration values is approximately ± 50 g.
-All data should be examined in conjunction with other available physical evidence from the vehicle and scene.

Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Status Data (Pre-Crash) is transmitted by the Body Control Module, via the vehicle's communication network.
-The Belt Switch Circuit is wired directly to the SDM.

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. Directional references to sign notation are all from the perspective of the driver when seated in the vehicle facing the direction of forward vehicle travel.

Data Element Name	Positive Sign Notation Indicates
Longitudinal Acceleration	Forward
Longitudinal Velocity Change	Forward
Lateral Acceleration	Left to Right
Lateral Velocity Change	Left to Right
Vertical Acceleration	Downward
Roll Rate	Clockwise Rotation

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 tool.

01049_SDM30-autoliv_r016

System Status at Time of Retrieval

Dynamic Deployment Event Counter	3
Multi-Event, Number of Events (Dynamic Event Counter)	5
Dynamic OnStar Notification Event Counter	3
Vehicle Identification Number (VIN)	2GNAXKEV2K6******
Ignition Cycle, Download (Ignition Cycles at Investigation)	6770
End Model Part Number	00CE729D
System Type	Autoliv with integrated IMU
Software Module Identifier 1	00CE7298
Software Module Identifier 2	05062428
Software Module Identifier 3	015E927A
Manufacturing Traceability Data, LineID	2
Manufacturing Traceability Data, ShiftID	3
Manufacturing Traceability Data, Year	18
Manufacturing Traceability Data, DayOfTheYear	326
Manufacturing Traceability Data, Serial/Lot/BatchNumber	000019717
ESS # 1 Traceability Data, Component Identifier	AU
ESS # 1 Traceability Data, Part Number/Broadcast Code	6422
ESS # 1 Traceability Data, Supplier Code	E
ESS # 1 Traceability Data, Traceability Number	0C6644753
ESS # 2 Traceability Data, Component Identifier	AT
ESS # 2 Traceability Data, Part Number/Broadcast Code	6422
ESS # 2 Traceability Data, Supplier Code	E
ESS # 2 Traceability Data, Traceability Number	0F8544753
ESS # 3 Traceability Data, Component Identifier	00
ESS # 3 Traceability Data, Part Number/Broadcast Code	0000
ESS # 3 Traceability Data, Supplier Code	0
ESS # 3 Traceability Data, Traceability Number	000000000
ESS # 4 Traceability Data, Component Identifier	AJ
ESS # 4 Traceability Data, Part Number/Broadcast Code	1432
ESS # 4 Traceability Data, Supplier Code	E
ESS # 4 Traceability Data, Traceability Number	0B7B7E71F
ESS # 5 Traceability Data, Component Identifier	DA
ESS # 5 Traceability Data, Part Number/Broadcast Code	4470
ESS # 5 Traceability Data, Supplier Code	E
ESS # 5 Traceability Data, Traceability Number	03DEEC016
ESS # 6 Traceability Data, Component Identifier	DB
ESS # 6 Traceability Data, Part Number/Broadcast Code	4470
ESS # 6 Traceability Data, Supplier Code	E
ESS # 6 Traceability Data, Traceability Number	0A8D4B516
ESS # 7 Traceability Data, Component Identifier	00
ESS # 7 Traceability Data, Part Number/Broadcast Code	0000
ESS # 7 Traceability Data, Supplier Code	0
ESS # 7 Traceability Data, Traceability Number	000000000
ESS # 8 Traceability Data, Component Identifier	00
ESS # 8 Traceability Data, Part Number/Broadcast Code	0000
ESS # 8 Traceability Data, Supplier Code	0
ESS # 8 Traceability Data, Traceability Number	000000000

System Status at Event (Event Record 1)

Event Record Type	Deployment
OnStar Deployment Status Data Sent	Yes
Complete file recorded (Event Recording Complete)	Yes
Crash Record Locked	Yes
OnStar SDM Recorded Vehicle Velocity Change Data Sent	Yes
Deployment Event Counter	1
Multi-Event, Number of Events (Event Counter)	1
OnStar Notification Event Counter	1
Time From Event 1 to 2 (Time Between Events) (seconds)	Data Not Available
Ignition Cycle, Crash (Ignition Cycles at Event)	6299
Algorithm Active: Frontal	Yes
Algorithm Active: Side	No
Algorithm Active: Rollover	No
Algorithm Active: Rear	No
Concurrent Event Flag Set	No
Event Severity Status: Frontal Pretensioner	Yes
Event Severity Status: Frontal Stage 1	Yes
Event Severity Status: Frontal Stage 2	Yes
Event Severity Status: Left Side	No
Event Severity Status: Right Side	No
Event Severity Status: Rear	No
Event Severity Status: Rollover	No
Safety Belt Status, Driver (Driver Belt Switch Circuit Status)	Buckled
Safety Belt Status, Right Front Passenger (Passenger Belt Switch Circuit Status)	Not Buckled
Passenger Seat Occupancy Status	Empty
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Not Applicable)
Passenger Air Bag ON Indicator Status	Off
Passenger Air Bag OFF Indicator Status	On
Low Tire Pressure Warning Lamp Status 0.5 Seconds Prior to Time Zero	Off
Frontal Air Bag Warning Lamp (SIR Warning Lamp Status 0.5 Seconds Prior to Time Zero)	Off
SIR Warning Lamp ON/OFF Time Continuously (seconds)	655330
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	6097
Ignition Cycles Since DTCs Were Last Cleared 0.5 Seconds Prior to Time Zero	253
Maximum Delta-V, Longitudinal (Maximum Longitudinal SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h]	-12 [-20]
Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change)(msec)	114
Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h]	-1 [-1]
Time Maximum Delta-V, Lateral (Time From FSR Time Zero to Maximum Lateral SDM Recorded Vehicle Velocity Change)(msec)	94
High Voltage Disable Notification Sent	Yes
Deployment Commanded in Energy Reserve Mode	No

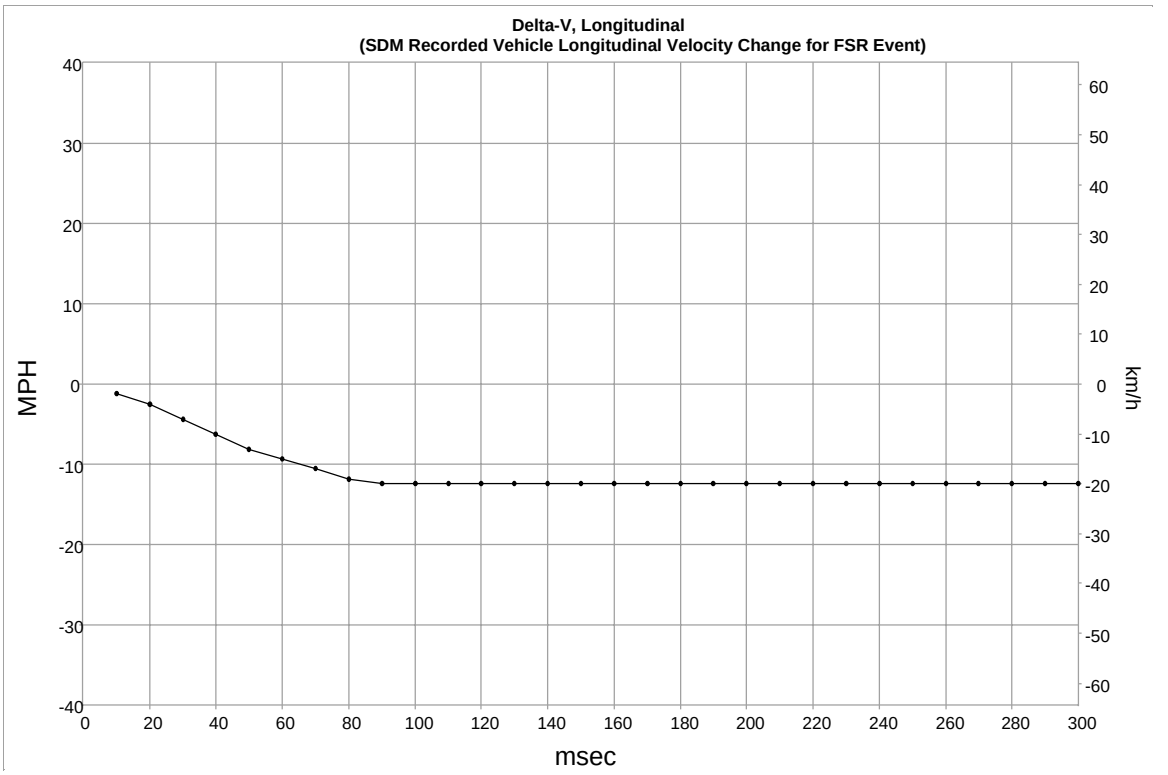
DTCs Present at Time of Event (Event Record 1)

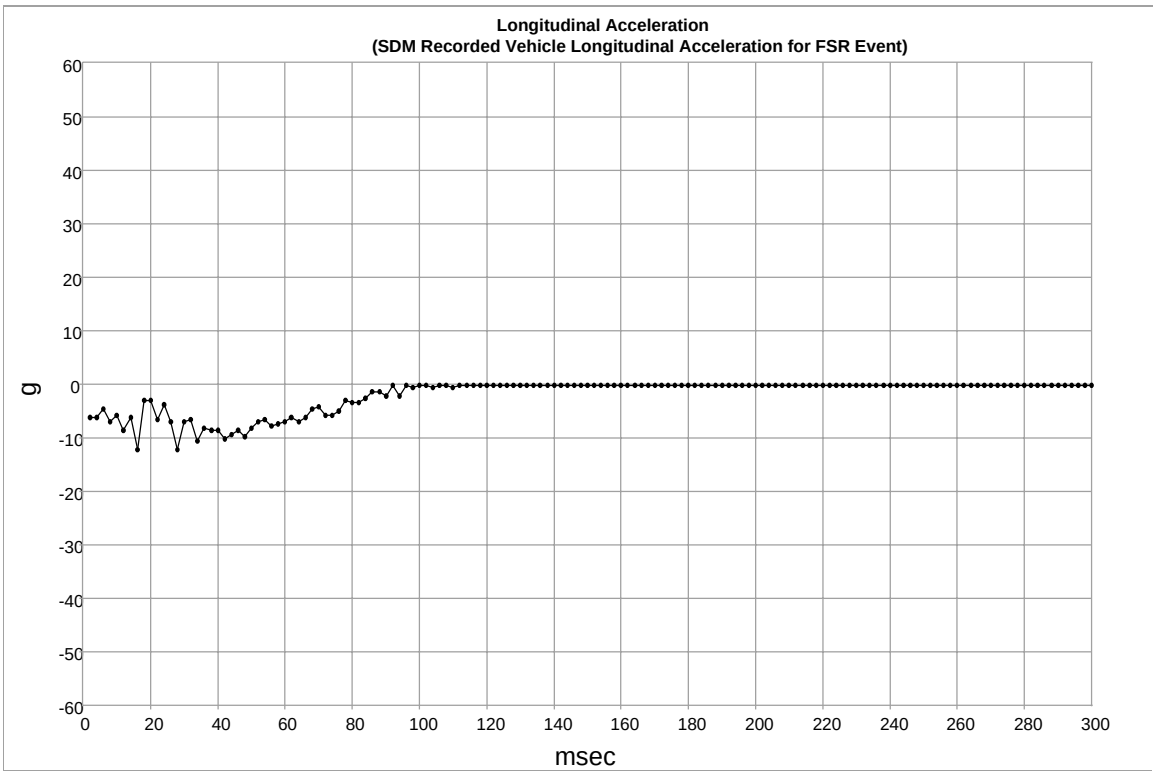
B0052-00

Event Data (Event Record 1)

Driver 1st Stage Deployment Loop Commanded	Yes
Passenger 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	Yes
Passenger 2nd Stage Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop #1 Commanded	Yes
Passenger Pretensioner Deployment Loop #1 Commanded	Yes
Driver Pretensioner Deployment Loop #2 Commanded	Yes
Passenger Pretensioner Deployment Loop #2 Commanded	Yes
Driver Thorax Loop Commanded	No
Passenger Thorax Loop Commanded	No
Left Row 1 Roof Rail/Head Curtain Loop Commanded	Yes
Right Row 1 Roof Rail/Head Curtain Loop Commanded	Yes
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Driver (Driver 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	29
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	32
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Right Front Passenger (Passenger 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Side air bag deployment, time to deploy, driver (Driver Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	42
Side air bag deployment, time to deploy, right front passenger (Passenger Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	42
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec)	15
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec)	15

Longitudinal Crash Pulse (Event Record 1)





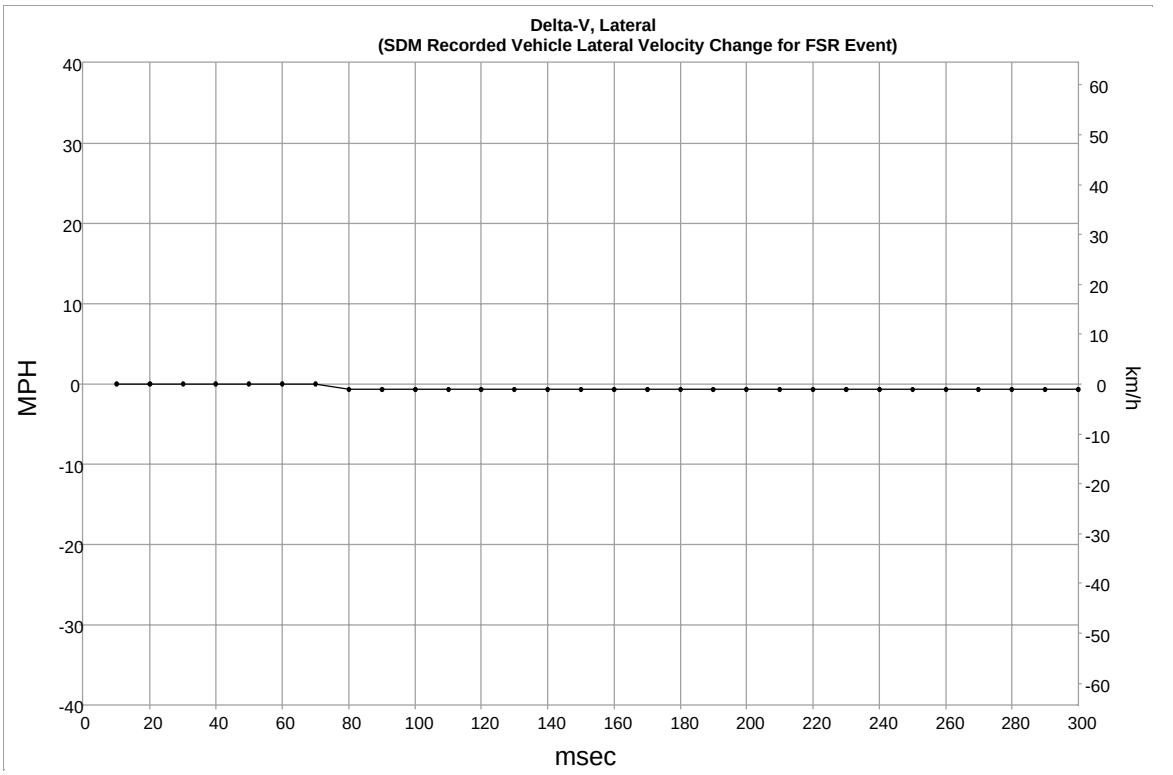
Longitudinal Crash Pulse (Event Record 1)

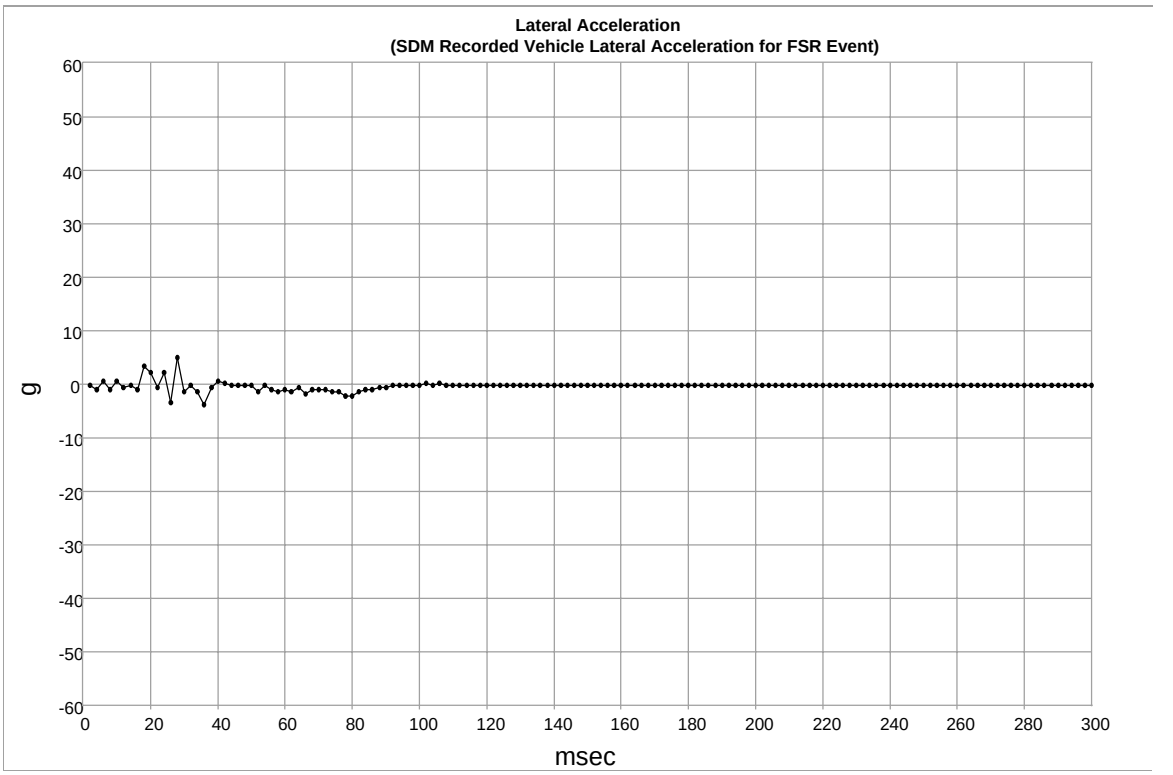
Time (msec)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (MPH)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (km/h)
10	-1.2	-2.0
20	-2.5	-4.0
30	-4.3	-7.0
40	-6.2	-10.0
50	-8.1	-13.0
60	-9.3	-15.0
70	-10.6	-17.0
80	-11.8	-19.0
90	-12.4	-20.0
100	-12.4	-20.0
110	-12.4	-20.0
120	-12.4	-20.0
130	-12.4	-20.0
140	-12.4	-20.0
150	-12.4	-20.0
160	-12.4	-20.0
170	-12.4	-20.0
180	-12.4	-20.0
190	-12.4	-20.0
200	-12.4	-20.0
210	-12.4	-20.0
220	-12.4	-20.0
230	-12.4	-20.0
240	-12.4	-20.0
250	-12.4	-20.0
260	-12.4	-20.0
270	-12.4	-20.0
280	-12.4	-20.0
290	-12.4	-20.0
300	-12.4	-20.0

Longitudinal Crash Pulse (Event Record 1)

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)	Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)	Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
2	-6.2	102	-0.2	202	-0.2
4	-6.2	104	-0.6	204	-0.2
6	-4.6	106	-0.2	206	-0.2
8	-7.0	108	-0.2	208	-0.2
10	-5.8	110	-0.6	210	-0.2
12	-8.6	112	-0.2	212	-0.2
14	-6.2	114	-0.2	214	-0.2
16	-12.2	116	-0.2	216	-0.2
18	-3.0	118	-0.2	218	-0.2
20	-3.0	120	-0.2	220	-0.2
22	-6.6	122	-0.2	222	-0.2
24	-3.8	124	-0.2	224	-0.2
26	-7.0	126	-0.2	226	-0.2
28	-12.2	128	-0.2	228	-0.2
30	-7.0	130	-0.2	230	-0.2
32	-6.6	132	-0.2	232	-0.2
34	-10.6	134	-0.2	234	-0.2
36	-8.2	136	-0.2	236	-0.2
38	-8.6	138	-0.2	238	-0.2
40	-8.6	140	-0.2	240	-0.2
42	-10.2	142	-0.2	242	-0.2
44	-9.4	144	-0.2	244	-0.2
46	-8.6	146	-0.2	246	-0.2
48	-9.8	148	-0.2	248	-0.2
50	-8.2	150	-0.2	250	-0.2
52	-7.0	152	-0.2	252	-0.2
54	-6.6	154	-0.2	254	-0.2
56	-7.8	156	-0.2	256	-0.2
58	-7.4	158	-0.2	258	-0.2
60	-7.0	160	-0.2	260	-0.2
62	-6.2	162	-0.2	262	-0.2
64	-7.0	164	-0.2	264	-0.2
66	-6.2	166	-0.2	266	-0.2
68	-4.6	168	-0.2	268	-0.2
70	-4.2	170	-0.2	270	-0.2
72	-5.8	172	-0.2	272	-0.2
74	-5.8	174	-0.2	274	-0.2
76	-5.0	176	-0.2	276	-0.2
78	-3.0	178	-0.2	278	-0.2
80	-3.4	180	-0.2	280	-0.2
82	-3.4	182	-0.2	282	-0.2
84	-2.6	184	-0.2	284	-0.2
86	-1.4	186	-0.2	286	-0.2
88	-1.4	188	-0.2	288	-0.2
90	-2.2	190	-0.2	290	-0.2
92	-0.2	192	-0.2	292	-0.2
94	-2.2	194	-0.2	294	-0.2
96	-0.2	196	-0.2	296	-0.2
98	-0.6	198	-0.2	298	-0.2
100	-0.2	200	-0.2	300	-0.2

Lateral Crash Pulse (Event Record 1)





Lateral Crash Pulse (Event Record 1)

Time (msec)	Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event) (MPH)	Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event) (km/h)
10	0.0	0.0
20	0.0	0.0
30	0.0	0.0
40	0.0	0.0
50	0.0	0.0
60	0.0	0.0
70	0.0	0.0
80	-0.6	-1.0
90	-0.6	-1.0
100	-0.6	-1.0
110	-0.6	-1.0
120	-0.6	-1.0
130	-0.6	-1.0
140	-0.6	-1.0
150	-0.6	-1.0
160	-0.6	-1.0
170	-0.6	-1.0
180	-0.6	-1.0
190	-0.6	-1.0
200	-0.6	-1.0
210	-0.6	-1.0
220	-0.6	-1.0
230	-0.6	-1.0
240	-0.6	-1.0
250	-0.6	-1.0
260	-0.6	-1.0
270	-0.6	-1.0
280	-0.6	-1.0
290	-0.6	-1.0
300	-0.6	-1.0

Lateral Crash Pulse (Event Record 1)

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)	Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)	Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
2	-0.2	102	0.2	202	-0.2
4	-1.0	104	-0.2	204	-0.2
6	0.6	106	0.2	206	-0.2
8	-1.0	108	-0.2	208	-0.2
10	0.6	110	-0.2	210	-0.2
12	-0.6	112	-0.2	212	-0.2
14	-0.2	114	-0.2	214	-0.2
16	-1.0	116	-0.2	216	-0.2
18	3.4	118	-0.2	218	-0.2
20	2.2	120	-0.2	220	-0.2
22	-0.6	122	-0.2	222	-0.2
24	2.2	124	-0.2	224	-0.2
26	-3.4	126	-0.2	226	-0.2
28	5.0	128	-0.2	228	-0.2
30	-1.4	130	-0.2	230	-0.2
32	-0.2	132	-0.2	232	-0.2
34	-1.4	134	-0.2	234	-0.2
36	-3.8	136	-0.2	236	-0.2
38	-0.6	138	-0.2	238	-0.2
40	0.6	140	-0.2	240	-0.2
42	0.2	142	-0.2	242	-0.2
44	-0.2	144	-0.2	244	-0.2
46	-0.2	146	-0.2	246	-0.2
48	-0.2	148	-0.2	248	-0.2
50	-0.2	150	-0.2	250	-0.2
52	-1.4	152	-0.2	252	-0.2
54	-0.2	154	-0.2	254	-0.2
56	-1.0	156	-0.2	256	-0.2
58	-1.4	158	-0.2	258	-0.2
60	-1.0	160	-0.2	260	-0.2
62	-1.4	162	-0.2	262	-0.2
64	-0.6	164	-0.2	264	-0.2
66	-1.8	166	-0.2	266	-0.2
68	-1.0	168	-0.2	268	-0.2
70	-1.0	170	-0.2	270	-0.2
72	-1.0	172	-0.2	272	-0.2
74	-1.4	174	-0.2	274	-0.2
76	-1.4	176	-0.2	276	-0.2
78	-2.2	178	-0.2	278	-0.2
80	-2.2	180	-0.2	280	-0.2
82	-1.4	182	-0.2	282	-0.2
84	-1.0	184	-0.2	284	-0.2
86	-1.0	186	-0.2	286	-0.2
88	-0.6	188	-0.2	288	-0.2
90	-0.6	190	-0.2	290	-0.2
92	-0.2	192	-0.2	292	-0.2
94	-0.2	194	-0.2	294	-0.2
96	-0.2	196	-0.2	296	-0.2
98	-0.2	198	-0.2	298	-0.2
100	-0.2	200	-0.2	300	-0.2

Rollover Crash Pulse (Event Record 1)
SDM Recorded Vehicle Roll Rate

Contains No Recorded Data

Rollover Crash Pulse (Event Record 1)
Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for Rollover Event)

Contains No Recorded Data

Vertical Crash Pulse (Event Record 1)
Normal Acceleration (SDM Recorded Vehicle Vertical Acceleration for Rollover Event)

Contains No Recorded Data

Pre-Crash Data -5.0 to -0.5 sec (Event Record 1)

Times (sec)	Accelerator Pedal, % Full (Accelerator Pedal Position)	Service Brake (Brake Switch Circuit State)	Engine RPM (Engine Speed)	Engine Throttle, % Full (Throttle Position)	Speed, Vehicle Indicated (Vehicle Speed) (MPH [km/h])
-5.0	14	Off	1728	32	20 [32]
-4.5	14	Off	1728	31	21 [33]
-4.0	12	Off	1664	28	21 [34]
-3.5	12	Off	1664	28	22 [35]
-3.0	12	Off	1728	28	22 [35]
-2.5	12	Off	1728	29	22 [35]
-2.0	12	Off	1408	28	22 [35]
-1.5	11	Off	1344	30	22 [35]
-1.0	11	Off	1344	30	22 [36]
-0.5	0	Off	1344	10	23 [37]

Pre-Crash Data -5.0 to -0.5 sec (Event Record 1)

Times (sec)	System Power Mode Status	System Backup Power Mode Status	System Backup Power Mode Enabled	CommEnable Status	SDM Power Mode Status	Ignition Prolongation Timer
-5.0	Run	Run	No	Active	Run	5.0
-4.5	Run	Run	No	Active	Run	5.0
-4.0	Run	Run	No	Active	Run	5.0
-3.5	Run	Run	No	Active	Run	5.0
-3.0	Run	Run	No	Active	Run	5.0
-2.5	Run	Run	No	Active	Run	5.0
-2.0	Run	Run	No	Active	Run	5.0
-1.5	Run	Run	No	Active	Run	5.0
-1.0	Run	Run	No	Active	Run	5.0
-0.5	Run	Run	No	Active	Run	5.0

Pre-Crash Data -2.0 to -0.5 sec (Event Record 1)

Times (sec)	Cruise Control Active	Cruise Control Resume Switch Active	Cruise Control Set Switch Active	Engine Torque (lb-ft [N-m])	Reduced Engine Power Mode Indicator
-2.0	No	No	No	22 [30]	Off
-1.5	No	No	No	42 [57]	Off
-1.0	No	No	No	44 [59]	Off
-0.5	No	No	No	33 [45]	Off

System Status at Event (Event Record 2)

Event Record Type	Deployment
OnStar Deployment Status Data Sent	Yes
Complete file recorded (Event Recording Complete)	Yes
Crash Record Locked	Yes
OnStar SDM Recorded Vehicle Velocity Change Data Sent	Yes
Deployment Event Counter	2
Multi-Event, Number of Events (Event Counter)	2
OnStar Notification Event Counter	3
Time From Event 1 to 2 (Time Between Events) (seconds)	Data Not Available
Ignition Cycle, Crash (Ignition Cycles at Event)	6768
Algorithm Active: Frontal	Yes
Algorithm Active: Side	Yes
Algorithm Active: Rollover	Yes
Algorithm Active: Rear	Yes
Concurrent Event Flag Set	No
Event Severity Status: Frontal Pretensioner	Yes
Event Severity Status: Frontal Stage 1	Yes
Event Severity Status: Frontal Stage 2	Yes
Event Severity Status: Left Side	No
Event Severity Status: Right Side	Yes
Event Severity Status: Rear	No
Event Severity Status: Rollover	No
Safety Belt Status, Driver (Driver Belt Switch Circuit Status)	Buckled
Safety Belt Status, Right Front Passenger (Passenger Belt Switch Circuit Status)	Buckled
Passenger Seat Occupancy Status	Occupied
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Adult)
Passenger Air Bag ON Indicator Status	On
Passenger Air Bag OFF Indicator Status	Off
Low Tire Pressure Warning Lamp Status 0.5 Seconds Prior to Time Zero	Off
Frontal Air Bag Warning Lamp (SIR Warning Lamp Status 0.5 Seconds Prior to Time Zero)	Off
SIR Warning Lamp ON/OFF Time Continuously (seconds)	315400
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	173
Ignition Cycles Since DTCs Were Last Cleared 0.5 Seconds Prior to Time Zero	177
Maximum Delta-V, Longitudinal (Maximum Longitudinal SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h]	-9 [-15]
Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change)(msec)	476
Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h]	-79 [-127]
Time Maximum Delta-V, Lateral (Time From FSR Time Zero to Maximum Lateral SDM Recorded Vehicle Velocity Change)(msec)	506
High Voltage Disable Notification Sent	Yes
Deployment Commanded in Energy Reserve Mode	No

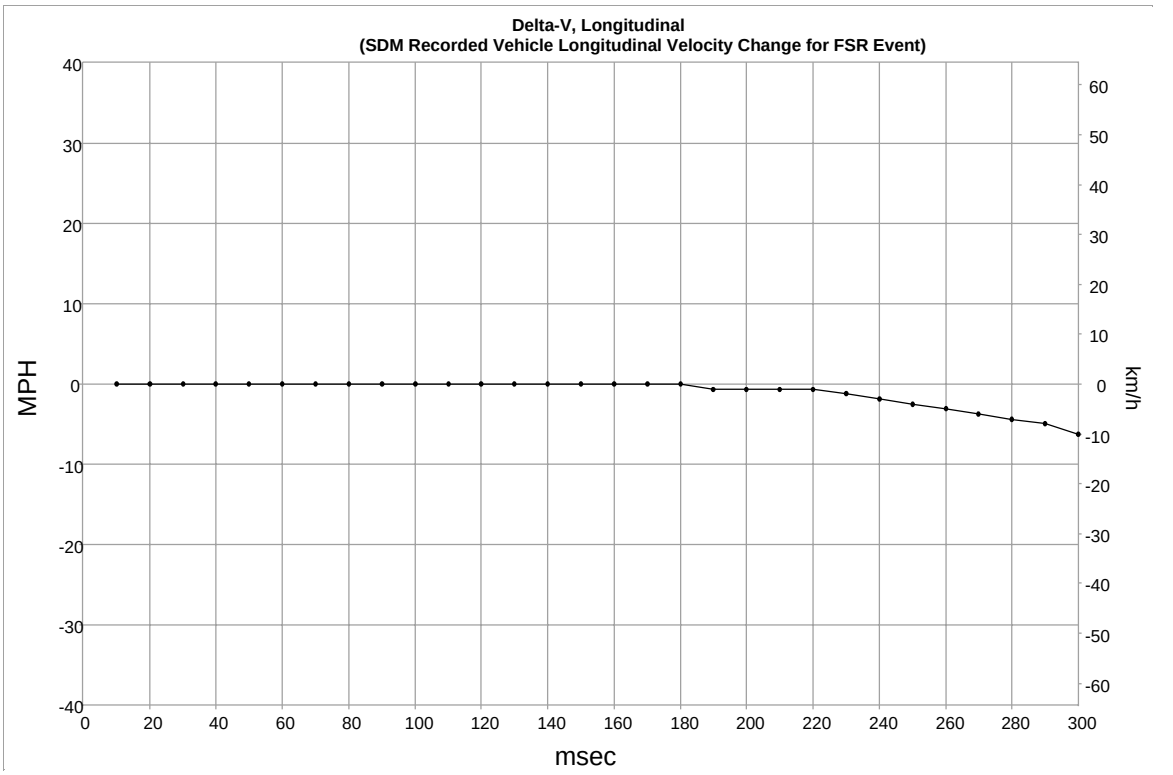
DTCs Present at Time of Event (Event Record 2)

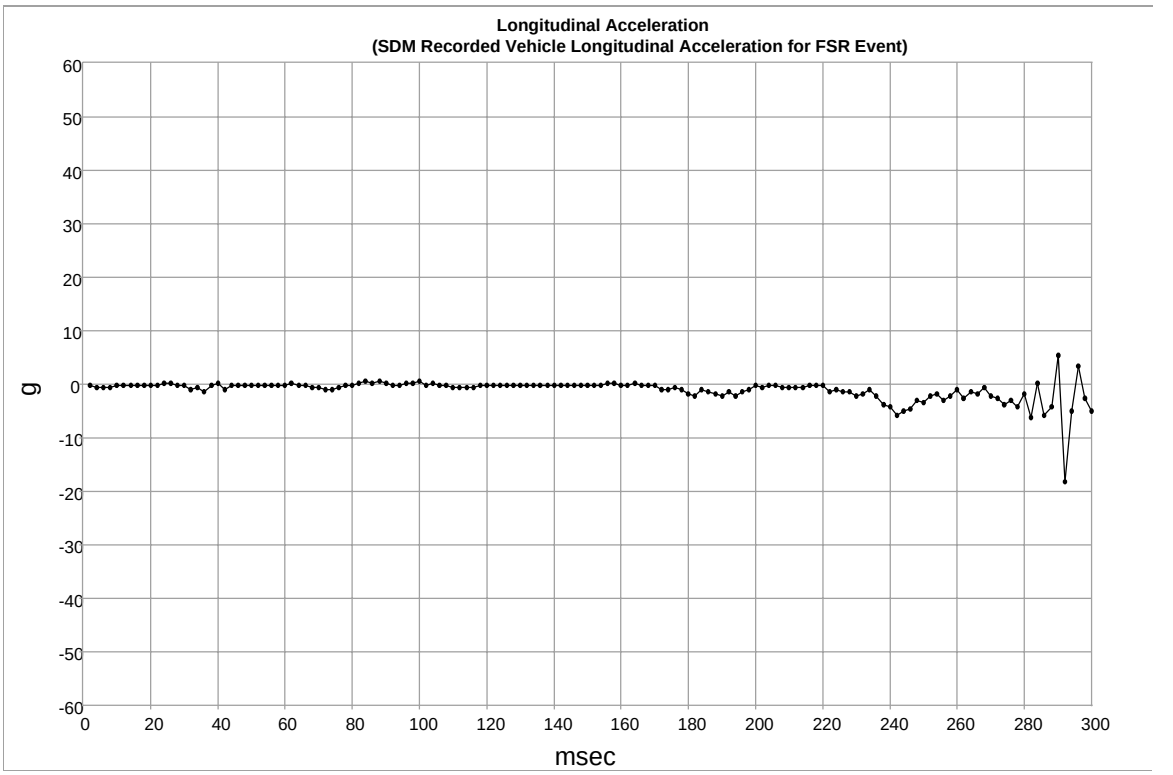
B0052-00

Event Data (Event Record 2)

Driver 1st Stage Deployment Loop Commanded	Yes
Passenger 1st Stage Deployment Loop Commanded	Yes
Driver 2nd Stage Deployment Loop Commanded	Yes
Passenger 2nd Stage Deployment Loop Commanded	Yes
Driver Pretensioner Deployment Loop #1 Commanded	No
Passenger Pretensioner Deployment Loop #1 Commanded	No
Driver Pretensioner Deployment Loop #2 Commanded	No
Passenger Pretensioner Deployment Loop #2 Commanded	No
Driver Thorax Loop Commanded	No
Passenger Thorax Loop Commanded	Yes
Left Row 1 Roof Rail/Head Curtain Loop Commanded	No
Right Row 1 Roof Rail/Head Curtain Loop Commanded	No
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Driver (Driver 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	253
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	253
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Right Front Passenger (Passenger 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	253
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	253
Side air bag deployment, time to deploy, driver (Driver Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Side air bag deployment, time to deploy, right front passenger (Passenger Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	253
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec)	Data Not Available
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec)	Data Not Available

Longitudinal Crash Pulse (Event Record 2)





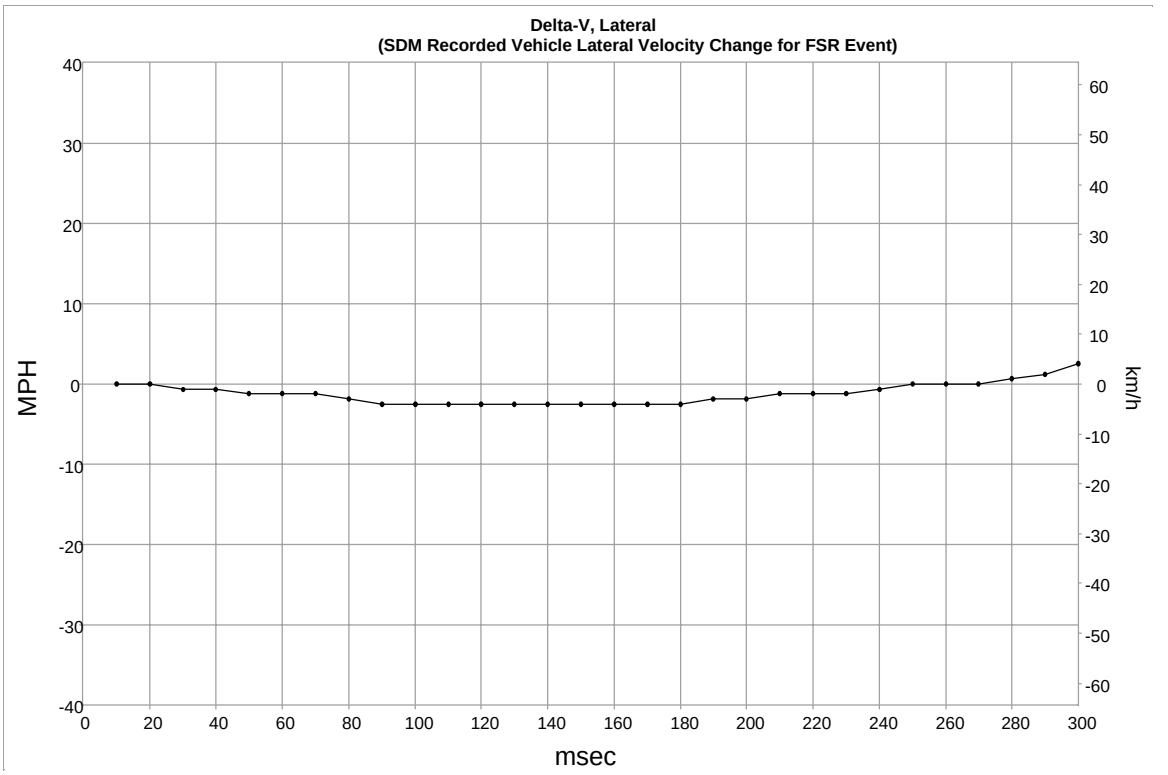
Longitudinal Crash Pulse (Event Record 2)

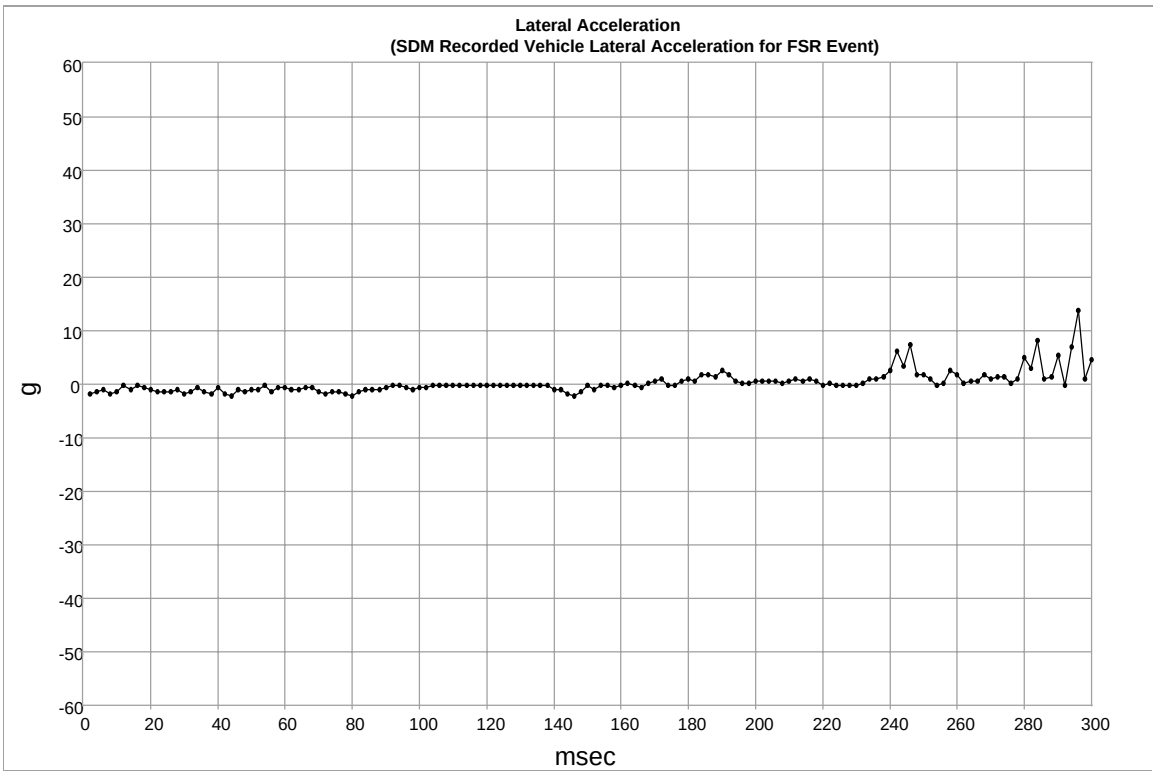
Time (msec)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (MPH)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (km/h)
10	0.0	0.0
20	0.0	0.0
30	0.0	0.0
40	0.0	0.0
50	0.0	0.0
60	0.0	0.0
70	0.0	0.0
80	0.0	0.0
90	0.0	0.0
100	0.0	0.0
110	0.0	0.0
120	0.0	0.0
130	0.0	0.0
140	0.0	0.0
150	0.0	0.0
160	0.0	0.0
170	0.0	0.0
180	0.0	0.0
190	-0.6	-1.0
200	-0.6	-1.0
210	-0.6	-1.0
220	-0.6	-1.0
230	-1.2	-2.0
240	-1.9	-3.0
250	-2.5	-4.0
260	-3.1	-5.0
270	-3.7	-6.0
280	-4.3	-7.0
290	-5.0	-8.0
300	-6.2	-10.0

Longitudinal Crash Pulse (Event Record 2)

Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)	Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)	Time (msec)	Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event) (g)
2	-0.2	102	-0.2	202	-0.6
4	-0.6	104	0.2	204	-0.2
6	-0.6	106	-0.2	206	-0.2
8	-0.6	108	-0.2	208	-0.6
10	-0.2	110	-0.6	210	-0.6
12	-0.2	112	-0.6	212	-0.6
14	-0.2	114	-0.6	214	-0.6
16	-0.2	116	-0.6	216	-0.2
18	-0.2	118	-0.2	218	-0.2
20	-0.2	120	-0.2	220	-0.2
22	-0.2	122	-0.2	222	-1.4
24	0.2	124	-0.2	224	-1.0
26	0.2	126	-0.2	226	-1.4
28	-0.2	128	-0.2	228	-1.4
30	-0.2	130	-0.2	230	-2.2
32	-1.0	132	-0.2	232	-1.8
34	-0.6	134	-0.2	234	-1.0
36	-1.4	136	-0.2	236	-2.2
38	-0.2	138	-0.2	238	-3.8
40	0.2	140	-0.2	240	-4.2
42	-1.0	142	-0.2	242	-5.8
44	-0.2	144	-0.2	244	-5.0
46	-0.2	146	-0.2	246	-4.6
48	-0.2	148	-0.2	248	-3.0
50	-0.2	150	-0.2	250	-3.4
52	-0.2	152	-0.2	252	-2.2
54	-0.2	154	-0.2	254	-1.8
56	-0.2	156	0.2	256	-3.0
58	-0.2	158	0.2	258	-2.2
60	-0.2	160	-0.2	260	-1.0
62	0.2	162	-0.2	262	-2.6
64	-0.2	164	0.2	264	-1.4
66	-0.2	166	-0.2	266	-1.8
68	-0.6	168	-0.2	268	-0.6
70	-0.6	170	-0.2	270	-2.2
72	-1.0	172	-1.0	272	-2.6
74	-1.0	174	-1.0	274	-3.8
76	-0.6	176	-0.6	276	-3.0
78	-0.2	178	-1.0	278	-4.2
80	-0.2	180	-1.8	280	-1.8
82	0.2	182	-2.2	282	-6.2
84	0.6	184	-1.0	284	0.2
86	0.2	186	-1.4	286	-5.8
88	0.6	188	-1.8	288	-4.2
90	0.2	190	-2.2	290	5.4
92	-0.2	192	-1.4	292	-18.2
94	-0.2	194	-2.2	294	-5.0
96	0.2	196	-1.4	296	3.4
98	0.2	198	-1.0	298	-2.6
100	0.6	200	-0.2	300	-5.0

Lateral Crash Pulse (Event Record 2)





Lateral Crash Pulse (Event Record 2)

Time (msec)	Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event) (MPH)	Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event) (km/h)
10	0.0	0.0
20	0.0	0.0
30	-0.6	-1.0
40	-0.6	-1.0
50	-1.2	-2.0
60	-1.2	-2.0
70	-1.2	-2.0
80	-1.9	-3.0
90	-2.5	-4.0
100	-2.5	-4.0
110	-2.5	-4.0
120	-2.5	-4.0
130	-2.5	-4.0
140	-2.5	-4.0
150	-2.5	-4.0
160	-2.5	-4.0
170	-2.5	-4.0
180	-2.5	-4.0
190	-1.9	-3.0
200	-1.9	-3.0
210	-1.2	-2.0
220	-1.2	-2.0
230	-1.2	-2.0
240	-0.6	-1.0
250	0.0	0.0
260	0.0	0.0
270	0.0	0.0
280	0.6	1.0
290	1.2	2.0
300	2.5	4.0

Lateral Crash Pulse (Event Record 2)

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)	Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)	Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event) (g)
2	-1.8	102	-0.6	202	0.6
4	-1.4	104	-0.2	204	0.6
6	-1.0	106	-0.2	206	0.6
8	-1.8	108	-0.2	208	0.2
10	-1.4	110	-0.2	210	0.6
12	-0.2	112	-0.2	212	1.0
14	-1.0	114	-0.2	214	0.6
16	-0.2	116	-0.2	216	1.0
18	-0.6	118	-0.2	218	0.6
20	-1.0	120	-0.2	220	-0.2
22	-1.4	122	-0.2	222	0.2
24	-1.4	124	-0.2	224	-0.2
26	-1.4	126	-0.2	226	-0.2
28	-1.0	128	-0.2	228	-0.2
30	-1.8	130	-0.2	230	-0.2
32	-1.4	132	-0.2	232	0.2
34	-0.6	134	-0.2	234	1.0
36	-1.4	136	-0.2	236	1.0
38	-1.8	138	-0.2	238	1.4
40	-0.6	140	-1.0	240	2.6
42	-1.8	142	-1.0	242	6.2
44	-2.2	144	-1.8	244	3.4
46	-1.0	146	-2.2	246	7.4
48	-1.4	148	-1.4	248	1.8
50	-1.0	150	-0.2	250	1.8
52	-1.0	152	-1.0	252	1.0
54	-0.2	154	-0.2	254	-0.2
56	-1.4	156	-0.2	256	0.2
58	-0.6	158	-0.6	258	2.6
60	-0.6	160	-0.2	260	1.8
62	-1.0	162	0.2	262	0.2
64	-1.0	164	-0.2	264	0.6
66	-0.6	166	-0.6	266	0.6
68	-0.6	168	0.2	268	1.8
70	-1.4	170	0.6	270	1.0
72	-1.8	172	1.0	272	1.4
74	-1.4	174	-0.2	274	1.4
76	-1.4	176	-0.2	276	0.2
78	-1.8	178	0.6	278	1.0
80	-2.2	180	1.0	280	5.0
82	-1.4	182	0.6	282	3.0
84	-1.0	184	1.8	284	8.2
86	-1.0	186	1.8	286	1.0
88	-1.0	188	1.4	288	1.4
90	-0.6	190	2.6	290	5.4
92	-0.2	192	1.8	292	-0.2
94	-0.2	194	0.6	294	7.0
96	-0.6	196	0.2	296	13.8
98	-1.0	198	0.2	298	1.0
100	-0.6	200	0.6	300	4.6

Rollover Crash Pulse (Event Record 2)
SDM Recorded Vehicle Roll Rate

Contains No Recorded Data

Rollover Crash Pulse (Event Record 2)
Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for Rollover Event)

Contains No Recorded Data

Vertical Crash Pulse (Event Record 2)
Normal Acceleration (SDM Recorded Vehicle Vertical Acceleration for Rollover Event)

Contains No Recorded Data

Pre-Crash Data -5.0 to -0.5 sec (Event Record 2)

Times (sec)	Accelerator Pedal, % Full (Accelerator Pedal Position)	Service Brake (Brake Switch Circuit State)	Engine RPM (Engine Speed)	Engine Throttle, % Full (Throttle Position)	Speed, Vehicle Indicated (Vehicle Speed) (MPH [km/h])
-5.0	30	Off	2432	55	79 [127]
-4.5	30	Off	2432	54	79 [127]
-4.0	33	Off	2432	65	79 [127]
-3.5	34	Off	2432	99	78 [125]
-3.0	0	Off	2304	21	76 [123]
-2.5	0	Off	2112	21	70 [113]
-2.0	0	Off	2112	21	68 [109]
-1.5	0	Off	1600	15	66 [107]
-1.0	16	Off	1664	24	59 [95]
-0.5	21	Off	1472	15	52 [83]

Pre-Crash Data -5.0 to -0.5 sec (Event Record 2)

Times (sec)	System Power Mode Status	System Backup Power Mode Status	System Backup Power Mode Enabled	CommEnable Status	SDM Power Mode Status	Ignition Prolongation Timer
-5.0	Run	Run	No	Active	Run	5.0
-4.5	Run	Run	No	Active	Run	5.0
-4.0	Run	Run	No	Active	Run	5.0
-3.5	Run	Run	No	Active	Run	5.0
-3.0	Run	Run	No	Active	Run	5.0
-2.5	Run	Run	No	Active	Run	5.0
-2.0	Run	Run	No	Active	Run	5.0
-1.5	Run	Run	No	Active	Run	5.0
-1.0	Run	Run	No	Active	Run	5.0
-0.5	Run	Run	No	Active	Run	5.0

Pre-Crash Data -2.0 to -0.5 sec (Event Record 2)

Times (sec)	Cruise Control Active	Cruise Control Resume Switch Active	Cruise Control Set Switch Active	Engine Torque (lb-ft [N-m])	Reduced Engine Power Mode Indicator
-2.0	No	No	No	-10 [-13]	Off
-1.5	No	No	No	-7 [-10]	Off
-1.0	No	No	No	-1 [-2]	Off
-0.5	No	No	No	16 [22]	Off

System Status at Event (Event Record 3)

Event Record Type	Deployment
OnStar Deployment Status Data Sent	Yes
Complete file recorded (Event Recording Complete)	Yes
Crash Record Locked	Yes
OnStar SDM Recorded Vehicle Velocity Change Data Sent	Yes
Deployment Event Counter	3
Multi-Event, Number of Events (Event Counter)	3
OnStar Notification Event Counter	2
Time From Event 1 to 2 (Time Between Events) (seconds)	3.97
Ignition Cycle, Crash (Ignition Cycles at Event)	6768
Algorithm Active: Frontal	Yes
Algorithm Active: Side	Yes
Algorithm Active: Rollover	Yes
Algorithm Active: Rear	Yes
Concurrent Event Flag Set	Yes
Event Severity Status: Frontal Pretensioner	No
Event Severity Status: Frontal Stage 1	No
Event Severity Status: Frontal Stage 2	No
Event Severity Status: Left Side	No
Event Severity Status: Right Side	No
Event Severity Status: Rear	No
Event Severity Status: Rollover	Yes
Safety Belt Status, Driver (Driver Belt Switch Circuit Status)	Buckled
Safety Belt Status, Right Front Passenger (Passenger Belt Switch Circuit Status)	Buckled
Passenger Seat Occupancy Status	Occupied
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Adult)
Passenger Air Bag ON Indicator Status	On
Passenger Air Bag OFF Indicator Status	Off
Low Tire Pressure Warning Lamp Status 0.5 Seconds Prior to Time Zero	Off
Frontal Air Bag Warning Lamp (SIR Warning Lamp Status 0.5 Seconds Prior to Time Zero)	Off
SIR Warning Lamp ON/OFF Time Continuously (seconds)	315400
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	173
Ignition Cycles Since DTCs Were Last Cleared 0.5 Seconds Prior to Time Zero	177
Maximum Delta-V, Longitudinal (Maximum Longitudinal SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h]	Data Not Available
Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change)(msec)	Data Not Available
Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h]	Data Not Available
Time Maximum Delta-V, Lateral (Time From FSR Time Zero to Maximum Lateral SDM Recorded Vehicle Velocity Change)(msec)	Data Not Available
High Voltage Disable Notification Sent	Yes
Deployment Commanded in Energy Reserve Mode	No

DTCs Present at Time of Event (Event Record 3)

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Event Data (Event Record 3)

Driver 1st Stage Deployment Loop Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop #1 Commanded	Yes
Passenger Pretensioner Deployment Loop #1 Commanded	Yes
Driver Pretensioner Deployment Loop #2 Commanded	Yes
Passenger Pretensioner Deployment Loop #2 Commanded	Yes
Driver Thorax Loop Commanded	No
Passenger Thorax Loop Commanded	No
Left Row 1 Roof Rail/Head Curtain Loop Commanded	Yes
Right Row 1 Roof Rail/Head Curtain Loop Commanded	Yes
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Driver (Driver 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 1st Stage Deployment, Right Front Passenger (Passenger 1st Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	Data Not Available
Side air bag deployment, time to deploy, driver (Driver Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	253
Side air bag deployment, time to deploy, right front passenger (Passenger Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	253
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec)	253
Pretensioner Deployment, Time to Fire, Right Front Passenger (Passenger Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec)	253

Longitudinal Crash Pulse (Event Record 3)
Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event)

Contains No Recorded Data

Longitudinal Crash Pulse (Event Record 3)
Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event)

Contains No Recorded Data

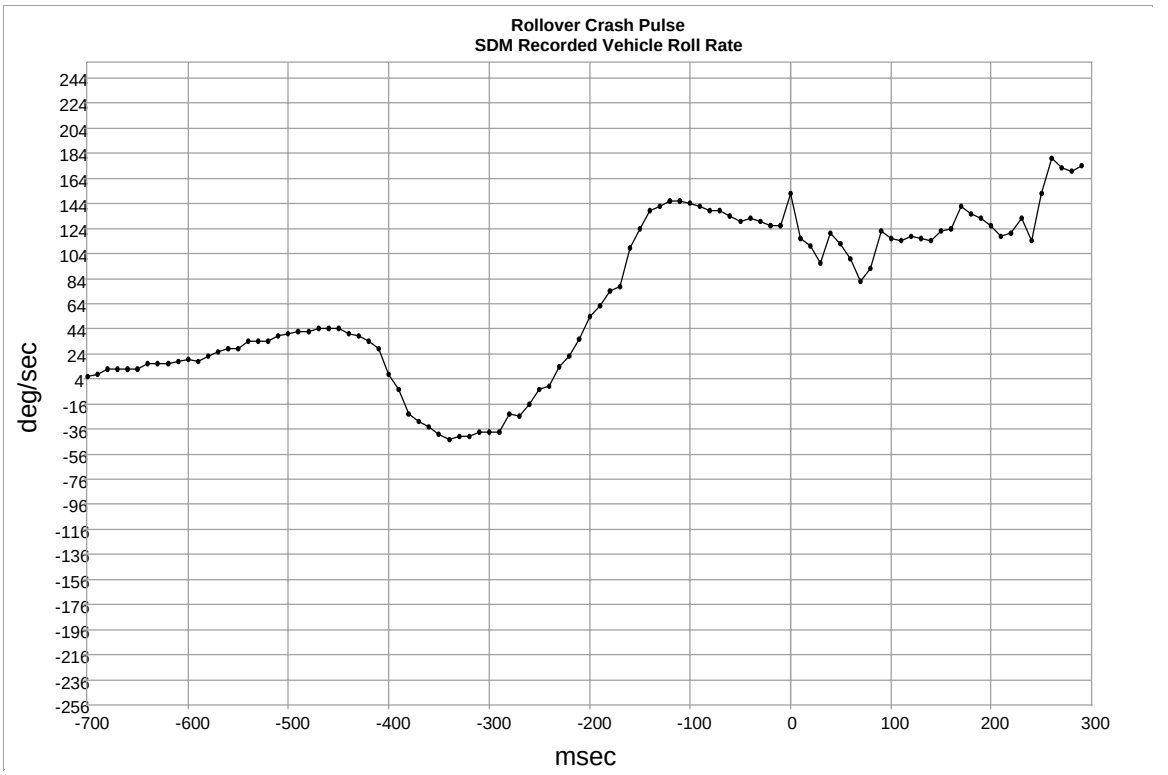
Lateral Crash Pulse (Event Record 3)
Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event)

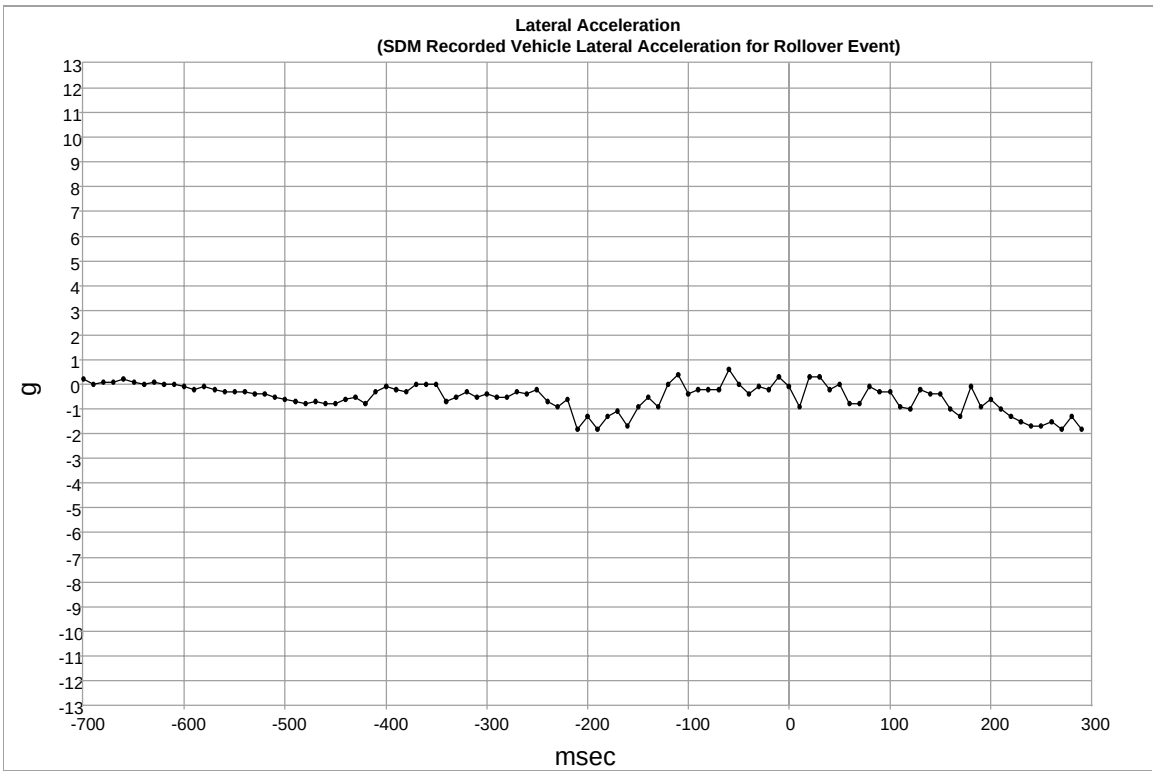
Contains No Recorded Data

Lateral Crash Pulse (Event Record 3)
Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for FSR Event)

Contains No Recorded Data

Rollover Crash Pulse (Event Record 3)





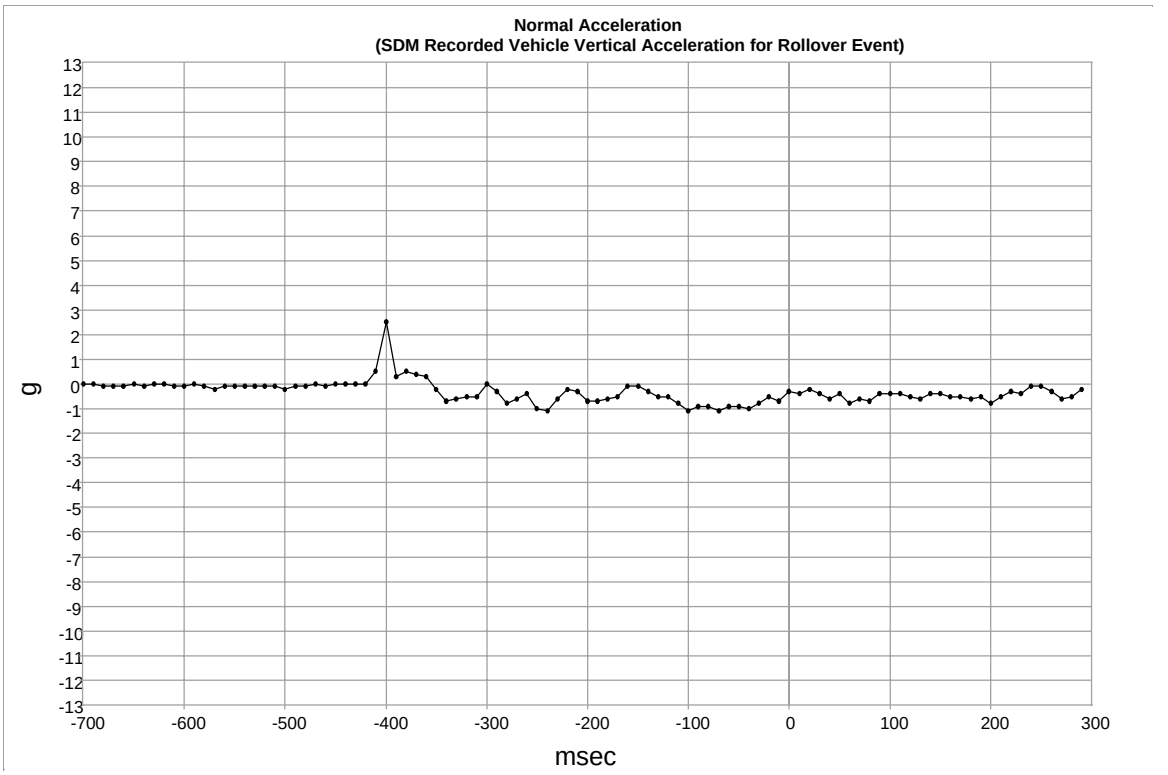
Rollover Crash Pulse (Event Record 3)

Time (msec)	SDM Recorded Vehicle Roll Rate (deg/sec)	Time (msec)	SDM Recorded Vehicle Roll Rate (deg/sec)
-700	6	-200	54
-690	8	-190	62
-680	12	-180	74
-670	12	-170	78
-660	12	-160	108
-650	12	-150	124
-640	16	-140	138
-630	16	-130	142
-620	16	-120	146
-610	18	-110	146
-600	20	-100	144
-590	18	-90	142
-580	22	-80	138
-570	26	-70	138
-560	28	-60	134
-550	28	-50	130
-540	34	-40	132
-530	34	-30	130
-520	34	-20	126
-510	38	-10	126
-500	40	0	152
-490	42	10	116
-480	42	20	110
-470	44	30	96
-460	44	40	120
-450	44	50	112
-440	40	60	100
-430	38	70	82
-420	34	80	92
-410	28	90	122
-400	8	100	116
-390	-4	110	114
-380	-24	120	118
-370	-30	130	116
-360	-34	140	114
-350	-40	150	122
-340	-44	160	124
-330	-42	170	142
-320	-42	180	136
-310	-38	190	132
-300	-38	200	126
-290	-38	210	118
-280	-24	220	120
-270	-26	230	132
-260	-16	240	114
-250	-4	250	152
-240	-2	260	180
-230	14	270	172
-220	22	280	170
-210	36	290	174

Rollover Crash Pulse (Event Record 3)

Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for Rollover Event) (g)	Time (msec)	Lateral Acceleration (SDM Recorded Vehicle Lateral Acceleration for Rollover Event) (g)
-700	0.2	-200	-1.3
-690	0.0	-190	-1.8
-680	0.1	-180	-1.3
-670	0.1	-170	-1.1
-660	0.2	-160	-1.7
-650	0.1	-150	-0.9
-640	0.0	-140	-0.5
-630	0.1	-130	-0.9
-620	0.0	-120	0.0
-610	0.0	-110	0.4
-600	-0.1	-100	-0.4
-590	-0.2	-90	-0.2
-580	-0.1	-80	-0.2
-570	-0.2	-70	-0.2
-560	-0.3	-60	0.6
-550	-0.3	-50	0.0
-540	-0.3	-40	-0.4
-530	-0.4	-30	-0.1
-520	-0.4	-20	-0.2
-510	-0.5	-10	0.3
-500	-0.6	0	-0.1
-490	-0.7	10	-0.9
-480	-0.8	20	0.3
-470	-0.7	30	0.3
-460	-0.8	40	-0.2
-450	-0.8	50	0.0
-440	-0.6	60	-0.8
-430	-0.5	70	-0.8
-420	-0.8	80	-0.1
-410	-0.3	90	-0.3
-400	-0.1	100	-0.3
-390	-0.2	110	-0.9
-380	-0.3	120	-1.0
-370	0.0	130	-0.2
-360	0.0	140	-0.4
-350	0.0	150	-0.4
-340	-0.7	160	-1.0
-330	-0.5	170	-1.3
-320	-0.3	180	-0.1
-310	-0.5	190	-0.9
-300	-0.4	200	-0.6
-290	-0.5	210	-1.0
-280	-0.5	220	-1.3
-270	-0.3	230	-1.5
-260	-0.4	240	-1.7
-250	-0.2	250	-1.7
-240	-0.7	260	-1.5
-230	-0.9	270	-1.8
-220	-0.6	280	-1.3
-210	-1.8	290	-1.8

Vertical Crash Pulse (Event Record 3)



Vertical Crash Pulse (Event Record 3)

Time (msec)	Normal Acceleration (SDM Recorded Vehicle Vertical Acceleration for Rollover Event) (g)	Time (msec)	Normal Acceleration (SDM Recorded Vehicle Vertical Acceleration for Rollover Event) (g)
-700	0.0	-200	-0.7
-690	0.0	-190	-0.7
-680	-0.1	-180	-0.6
-670	-0.1	-170	-0.5
-660	-0.1	-160	-0.1
-650	0.0	-150	-0.1
-640	-0.1	-140	-0.3
-630	0.0	-130	-0.5
-620	0.0	-120	-0.5
-610	-0.1	-110	-0.8
-600	-0.1	-100	-1.1
-590	0.0	-90	-0.9
-580	-0.1	-80	-0.9
-570	-0.2	-70	-1.1
-560	-0.1	-60	-0.9
-550	-0.1	-50	-0.9
-540	-0.1	-40	-1.0
-530	-0.1	-30	-0.8
-520	-0.1	-20	-0.5
-510	-0.1	-10	-0.7
-500	-0.2	0	-0.3
-490	-0.1	10	-0.4
-480	-0.1	20	-0.2
-470	0.0	30	-0.4
-460	-0.1	40	-0.6
-450	0.0	50	-0.4
-440	0.0	60	-0.8
-430	0.0	70	-0.6
-420	0.0	80	-0.7
-410	0.5	90	-0.4
-400	2.5	100	-0.4
-390	0.3	110	-0.4
-380	0.5	120	-0.5
-370	0.4	130	-0.6
-360	0.3	140	-0.4
-350	-0.2	150	-0.4
-340	-0.7	160	-0.5
-330	-0.6	170	-0.5
-320	-0.5	180	-0.6
-310	-0.5	190	-0.5
-300	0.0	200	-0.8
-290	-0.3	210	-0.5
-280	-0.8	220	-0.3
-270	-0.6	230	-0.4
-260	-0.4	240	-0.1
-250	-1.0	250	-0.1
-240	-1.1	260	-0.3
-230	-0.6	270	-0.6
-220	-0.2	280	-0.5
-210	-0.3	290	-0.2

Pre-Crash Data -5.0 to -0.5 sec (Event Record 3)

Times (sec)	Accelerator Pedal, % Full (Accelerator Pedal Position)	Service Brake (Brake Switch Circuit State)	Engine RPM (Engine Speed)	Engine Throttle, % Full (Throttle Position)	Speed, Vehicle Indicated (Vehicle Speed) (MPH [km/h])
-5.0	30	Off	2432	65	78 [126]
-4.5	30	Off	2432	56	79 [127]
-4.0	30	Off	2432	59	79 [127]
-3.5	30	Off	2432	57	79 [127]
-3.0	30	Off	2432	57	79 [127]
-2.5	30	Off	2432	57	79 [127]
-2.0	30	Off	2432	55	79 [127]
-1.5	30	Off	2432	56	79 [127]
-1.0	30	Off	2432	55	79 [127]
-0.5	30	Off	2432	54	79 [127]

Pre-Crash Data -5.0 to -0.5 sec (Event Record 3)

Times (sec)	System Power Mode Status	System Backup Power Mode Status	System Backup Power Mode Enabled	CommEnable Status	SDM Power Mode Status	Ignition Prolongation Timer
-5.0	Run	Run	No	Active	Run	5.0
-4.5	Run	Run	No	Active	Run	5.0
-4.0	Run	Run	No	Active	Run	5.0
-3.5	Run	Run	No	Active	Run	5.0
-3.0	Run	Run	No	Active	Run	5.0
-2.5	Run	Run	No	Active	Run	5.0
-2.0	Run	Run	No	Active	Run	5.0
-1.5	Run	Run	No	Active	Run	5.0
-1.0	Run	Run	No	Active	Run	5.0
-0.5	Run	Run	No	Active	Run	5.0

Pre-Crash Data -2.0 to -0.5 sec (Event Record 3)

Times (sec)	Cruise Control Active	Cruise Control Resume Switch Active	Cruise Control Set Switch Active	Engine Torque (lb-ft [N-m])	Reduced Engine Power Mode Indicator
-2.0	No	No	No	107 [144]	Off
-1.5	No	No	No	106 [144]	Off
-1.0	No	No	No	106 [144]	Off
-0.5	No	No	No	106 [144]	Off

Hexadecimal Data

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DPID $15
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DPID $16
08 09 0A 0D 0E 00 00

DPID $17
00 00 00 00 00 00 00

DPID $32
00 B3 1A 72 00 00 00

DPID $35
78 00 00 00 00 00 00

DID $01
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DID $03
41 54 36 34 32 32 45 30 46 38 35 34 34 37 35 33

DID $05
30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $07
41 4A 31 34 33 32 45 30 42 37 42 37 45 37 31 46

DID $09
44 41 34 34 37 30 45 30 33 44 45 45 43 30 31 36

DID $0B
44 42 34 34 37 30 45 30 41 38 44 34 42 35 31 36

DID $0D
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DID $0F
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DID $30
03 00 05 03

DID $90
32 47 4E 41 58 4B 45 56 32 4B 36 2A 2A 2A 2A 2A 2A

DID $9A
09 12

DID $B4
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DID $C1
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DID $C2
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DID $C3
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DID $CB
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DID $31

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 0070   1C 1F 20 25 24 23 23 23 23 23
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0530   8D 7A 7C 8D 7A 7C 90 7A 7C 90
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0640   76 9E 6B 76 A4 70 77 A6 72 78
0650   B5 6C 7C BD 74 7C C4 78 7A C6
0660   74 78 C8 7D 78 C8 81 75 C7 79
0670   72 C6 7B 74 C4 7B 74 C4 7B 72
0680   C2 83 74 C0 7D 74 C1 79 73 C0
0690   7C 75 BE 7B 78 BE 80 76 CB 7C
0700   7A B9 74 79 B6 80 7B AF 80 79
0710   BB 7B 77 B7 7D 79 B1 75 75 A8
0720   75 77 AD 7C 76 BC 7A 79 B9 7A
0730   79 B8 74 79 BA 73 78 B9 7B 77
0740   B8 79 79 BC 79 79 BD 73 78 C6
0750   70 78 C3 7C 77 C1 74 78 BE 77
0760   75 BA 73 78 BB 70 7A C1 6E 79
0770   B8 6C 7C CB 6C 7C D9 6E 7A D5
0780   6B 77 D4 70 78 D6 6B 7B 48 48
0790   48 48 48 48 48 48 48 48 00 00
0800   55 55 50 48 48 48 48 48 32 32
0810   32 32 32 32 32 32 32 32 00 00
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0820   00 00 00 00 00 00 00 00 00 00
0830   00 00 00 00 00 00 00 00 00 00
0840   00 00 00 00 00 00 00 00 00 00
0850   00 00 00 00 00 00 00 00 00 00
0860   00 00 00 00 00 00 00 00 00 00
0870   00 00 00 00 00 00 00 00 00 00
0880   00 00 00 41 0C E7 0B AA 01 3C
0890   06 C5 16 B1 00 00 00 00 00 00
0900   00 00 00 20 B0 01 FF FF FF FF
0910   FF FF FF FF FF FF FF FF FF FF
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0990   FF FF FF FF FF FF FF FF FF FF
1000   FF FF FF FF FF FF FF FF FF FF
1010   FF FF FF FF FF FF FF FF FF FF
1020   FF FF FF FF FF FF FF FF FF FF
1030   FF FF FF FF FF FF FF FF FF FF
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1050   FF FF FF FF FF FF FF FF FF FF
1060   FF FF FF FF FF FF FF FF FF FF
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1080   FF FF FF FF FF FF FF FF FF FF
1090   FF FF FF FF FF FF FF FF FF FF
1100   FF FF FF FF FF FF FF FF FF FF
1110   FF FF FF FF FF FF FF FF FF FF
1120   FF FF FF FF FF FF FF FF FF FF
1130   FF FF FF FF FF FF FF FF FF FF
1140   FF FF FF FF FF FF FF FF FF FF
1150   FF FF FF FF FF FF FF FF FF FF
1160   FF FF FF FF FF FF FF FF FF FF
1170   FF FF FF FF FF FF FF FF FF FF
1180   FF FF FF FF FF FF FF FF FF FF
1190   FF FF FF FF FF FF FF FF FF FF
1200   FF
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of Transportation

**National Highway
Traffic Safety
Administration**

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