U.S. Department of Transportation
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NHTSA

DOT HS 812 895

March 2020

Special Crash Investigations
Alleged Rollover Crash Investigation
Vehicle: 2016 Chevrolet Equinox
Location: South Dakota
Crash Date: June 2018

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15. Supplementary Notes

Each crash represents a unique sequence of events, and generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) 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 an alleged rollover crash involving a 2016 Chevrolet Equinox and a 1994 Mack CH600 dump truck and the fatal injuries sustained by all three occupants of both vehicles. The crash occurred in a four-leg intersection controlled by stop signs for eastbound and westbound traffic in a rural area of South Dakota in June 2018. The Chevrolet was being driven northbound by a belted 79-year-old male and was pulling a two-wheel utility trailer. A belted 71-year-old female occupied the front row right seat position. The Mack was being driven westbound by a belted 82-year-old male who entered the intersection without stopping. The front plane of the Chevrolet struck the left plane of the Mack. The Chevrolet was displaced to the left and departed the roadway on the left edge, and the trailer separated and departed the roadway on the right edge. The Mack departed the roadway on the right edge where it overturned onto its left plane. The investigation concluded no rollover event involving the Chevrolet occurred in this crash. Following the crash, all occupants from both vehicles were transported by ambulances to an area hospital. Both occupants of the Chevrolet were pronounced deceased soon after the crash and the driver of the Mack died as a result of his injuries 15 days after the crash. Both vehicles were towed from the scene due to damage.

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BACKGROUND

Figure 1. 2016 Chevrolet Equinox.

This report documents the investigation of an alleged rollover crash involving a 2016 Chevrolet Equinox (**Figure 1**) and a 1994 Mack CH600 and the fatal injuries sustained by all three occupants of the Chevrolet and the Mack truck. The crash was identified by the Special Crash Investigations (SCI) group of the National Highway Traffic Safety Administration. Dynamic Science, Inc., was directed to locate the Chevrolet and obtain images to assess its damage severity. The vehicle was located and images were obtained and forwarded to NHTSA, which assigned the case in August 2018. The police report and salvage listing indicated the vehicle sustained a rollover crash. The vehicle and scene inspections were completed in August 2018, and the investigation concluded no rollover event involving the Chevrolet occurred. The Chevrolet was supported by the Bosch Crash Data Retrieval (CDR) system. The vehicle's event data recorder (EDR) was imaged during the vehicle inspection.

The crash occurred in a four-leg intersection controlled by stop signs for eastbound and westbound traffic in a rural area of South Dakota in June 2018. The Chevrolet was being driven northbound by a belted 79-year-old male and was pulling a two-wheel utility trailer. A belted 71-year-old female occupied the front row right seat position. The Mack was being driven westbound by a belted 82-year-old male who entered the intersection without stopping. The front plane of the Chevrolet struck the left plane of the Mack. The Chevrolet was displaced to the left and departed the roadway on the left edge, and the trailer separated and departed the roadway on the right edge. The Mack departed the roadway on the right edge where it overturned onto its left plane. All three occupants from both vehicles were transported by ambulances to an area hospital. Both occupants of the Chevrolet were pronounced deceased prior to admission and the driver of the Mack died as a result of his injuries 15 days after the crash. Both vehicles were towed from the scene due to damage.

SUMMARY

Crash Site

The crash site was a four-leg intersection including a north/south roadway and an east/west roadway (**Figure 2**). The intersection was controlled by stop signs located at the northeast and

southwest corners for eastbound and westbound traffic. The north/south roadway was configured with one lane for each direction separated by a dashed yellow painted stripe and bordered by solid white painted fog lines and paved shoulders. The lanes measured 3.6 m (12.0 ft) each in width with the left shoulder measuring 1.2 m (3.9 ft) in width and the right shoulder measuring 1.6 m (5.2 ft) in width. In the pre-crash location, this roadway had a slope measuring positive 0.7 percent and a super-elevation measuring negative 0.7 percent. It was paved with asphalt in worn condition. The posted speed limit was 105 km/h (65 mph).

Figure 2. Crash site looking north.

The east/west roadway was configured with one lane for each direction separated by a solid/dashed yellow painted stripe. The lanes measured 3.5 m (11.5 ft) each in width. In the pre-crash location, this roadway had a slope measuring positive 0.5 percent and a super-elevation measuring negative 0.3 percent. It was paved with asphalt in worn condition. The posted speed limit was 89 km/h (55 mph). Conditions at the time of the crash were daylight, cloudy, and dry. A crash diagram is included at the end of this report.

Pre-Crash

The Chevrolet was traveling north in the northbound lane at an EDR-reported speed of 110 km/h (68 mph) with cruise control engaged as it entered the intersection. The Mack was traveling west in the westbound lane at a police-estimated speed of 87 km/h (54 mph). According to the police report, the Mack did not slow or stop in response to the stop sign prior to entering the intersection simultaneously with the Chevrolet. The Chevrolet's EDR report indicated the service brake was "Off" at the last sampling taken at -0.5 seconds to algorithm enable (AE).

Figure 3. 2016 Chevrolet Equinox at final rest looking west from area of departure (police photo).

Crash

The crash included three events. Initially, the front plane of the Chevrolet struck the left plane of the Mack in an angled configuration (Event 1). The Chevrolet deposited several arcing gouge marks, the longest measuring 3.4 m (11.1 ft) long near the point of impact as it was displaced to the left initiating a counterclockwise rotation. The Chevrolet's right plane struck the left plane of the Mack in a secondary side slap configuration (Event 2). The Chevrolet traveled southwest on the east/west roadway leaving a trail of fluid and dirt before departing the roadway on the south edge. It traveled in a southwest trajectory through high grass for several meters before coming to rest in an upright orientation facing southwest on the roadside at a police-estimated distance of 45 m (150 ft) from the area of impact (**Figure 3**). Gouge marks, tire tracks, and fluid spillage on the roadway and roadside suggest the vehicle was

tracking from impact to final rest. At some time during the crash, the vehicle's trailer was displaced from the hitch departing the roadway on the northwest corner and coming to rest off the roadway.

The Mack traveled through the intersection in a northwest trajectory while rotating in a clockwise direction. It departed the roadway on the northwest corner depositing a group of linear scrape marks the longest measuring 1.7 m (5.6 m) long at the area of departure and overturned left side leading (Event 3) on the roadside before coming to rest on its left plane facing east an estimated distance of 30 m (100 ft) west of the area of impact (**Figure 4**).

The Chevrolet was pulling a trailer precluding a reconstruction for Events 1 and 2. A barrier algorithm of the WinSMASH program was run for informational purposes calculating a Total delta V of 42 km/h (26 mph), Longitudinal delta V of -27 km/h (-17 mph), Lateral delta V of -32 km/h (-20 mph) and a barrier equivalent speed (BES) of 42 km/h (26 mph) for Event 1. The results appear low when compared with the vehicle's EDR-reported data. The EDR reported a maximum longitudinal delta V of -77 km/h (-48 mph) and a maximum lateral delta V of -87 km/h (-54 mph). A principle direction of force (PDOF) using EDR-reported velocity changes was calculated at 50 degrees.

Figure 4. 1994 Mack CH600 at final rest looking west from area of impact (police photo).

For the Chevrolet in Event 2, WinSMASH calculated a total delta V of 41 km/h (25 mph), longitudinal delta V of 14 km/h (9 mph), lateral delta V of -38 km/h (-24) and a BES of 41 km/h (25 mph). The results appear reasonable. The EDR captured a second crash event but did not report velocity changes.

Post-Crash

Following the crash, all three occupants from both vehicles were transported by ambulances to an area hospital. The occupants of the Chevrolet were pronounced deceased soon after the crash and the driver of the Mack died as a result of his injuries 15 days after the crash.

2016 CHEVROLET EQUINOX

Description

The 2016 Chevrolet Equinox was a 5-door sport utility vehicle (SUV) identified by the Vehicle Identification Number (VIN): 2GNALCEK9G6xxxxxx. The vehicle was manufactured in February 2016 and the odometer reading reported by the salvage lot was 61,000 km (38,000 mi). The vehicle was equipped with a 2.4-liter, 4-cylinder gasoline engine, front-wheel drive, cruise control, ABS, and tilt steering column functionality. Crash avoidance features included blind spot detection and a rear-view video system. The vehicle manufacturer recommended size 225/65R17 tires with a recommended pressure of 241 kPa (35 psi) for the front and rear. The Chevrolet was equipped with Michelin Latitude Tour tires of the recommended size on the front and rear manufactured in February 2016.

The Chevrolet was configured with two rows of seating for five occupants. The front row was equipped with bucket seats with adjustable head restraints. The seat track positions for the front row occupants of the vehicle at the time of the crash were unknown.

The Chevrolet was equipped with an aftermarket, rear-mounted Draw-Tite trailer hitch receiver rated for a maximum gross trailer weight of 2,043 kg (4,500 lb) and a maximum tongue weight of 306 kg (675 lb), and Draw-Tite ball mount trailer hitch rated for a maximum gross trailer weight of 3,405 kg (7,500 lb) and a maximum tongue weight of 341 kg (750 lb). The hitch assembly appeared unremarkable. According to the police report, the trailer separated from the Chevrolet during the crash and came to rest on the opposite side of the roadway, near the Mack. No additional data was obtained for the trailer.

Exterior Damage

The Chevrolet sustained severe damage to the front and right planes in the crash that included a front-to-side impact and a secondary, side-to-side impact with the Mack (**Figure 5**). A difference in the opposing vehicles' frame heights caused crush damage to the Chevrolet at bumper level and above bumper level on the front plane. The front bumper fascia was displaced from the vehicle and the backing bar was used to measure crush at bumper level. The upper radiator support was used to measure above bumper crush. Direct damage and the Field L were distributed from bumper corner to bumper corner and measured 113 cm (44.5 in). The Nikon Total Station and Faro Blitz programs computed crush measurements that were averaged in six increments as follows: C_1 = 23 cm (9.1 in), C_2 = 30 cm (11.8 in), C_3 = 42 cm (16.5 in), C_4 = 41 cm (16.1 in), C_5 = 66 cm (26.0 in), and C_6 = 80 cm (31.5 in). Maximum crush measured 80 cm (31.5 in) at the front right bumper corner and the Collision Deformation Classification (CDC) for the Chevrolet in Event 1 of 02FDEW5. A PDOF using EDR-reported velocity changes was calculated at 50 degrees.

Figure 5. 2016 Chevrolet Equinox front plane damage.

The Chevrolet sustained direct damage to the right plane and induced damage to the top plane caused by the secondary impact with the Mack in Event 2 (**Figure 6**). Direct damage began at the right rear bumper corner and extended forward 327 cm (128.7 in) ending at the right front fender. The damage extended vertically to the right roof side rail. The Nikon Total Station and Faro Blitz programs computed crush measurements in six increments as follows: C_1 = 12 cm (4.7 in), C_2 = 19 cm (7.5 in), C_3 = 23 cm (9.1 in), C_4 = 14 cm (5.5 in), C_5 = 26 cm (10.2 in), and C_6 = 24 cm (9.4 in).

Figure 6. 2016 Chevrolet Equinox right plane damage.

Maximum crush measured 26 cm (10.2 in) at the right A-pillar and the CDC for the Chevrolet in Event 2 was 04RDAW3. The observed PDOF was 110 degrees.

Event Data Recorder

The Chevrolet's EDR was imaged using CDR version 17.7.2 and reported using version 19.1. The report included system status, event, pre-crash and crash pulse data. The EDR captured two deployment level events, which included the front plane impact and the right plane impact. Time between events was 0.12 seconds and pre-crash was identical for both events. The pre-crash data at T-0.5 seconds for Event 1 are illustrated in the table below:

Time	Vehicle Speed (MPH [km/h])	Engine Speed (RPM)	Accelerator Pedal Position (%)	Cruise Control Active	Brake Switch Circuit State
-0.5	68 [110]	1984	0	Yes	Off

Event 1 was a deployment event in which both frontal, both IC, and the front right seat-mounted side air bags deployed and both seat belt pretensioners actuated. Event 2 was a deployment level event during which no air bags deployed and an Event Severity Status: Rollover was captured. The rollover crash pulse indicated a counterclockwise rotation at a maximum roll rate of -200 degrees/second at 80 milliseconds (ms). The rollover data suggest the vehicle was tilted sharply to the left along its longitudinal axis during Event 2. Vehicle damage and scene evidence suggest the vehicle did not complete a quarter turn and eventually returned to its upright orientation before tracking to final rest.

Interior Damage

The Chevrolet sustained interior damage resulting from impact forces, air bag deployments, occupant contacts, integrity loss, and post-crash activities. The windshield was fractured and holed, and the glazing on the right and back planes was disintegrated. The right-side doors were jammed shut and the right front door was removed by emergency responders. Five air bags deployed and both front row seat belt pretensioners actuated. Occupant contact evidence was documented on the deployed frontal air bags. Vertical and lateral intrusions were documented in the front and second rows, and a longitudinal intrusion was documented in the front row.

Intrusions documented in the front row were as follows: (vertical) left roof = 12 cm (4.7 in), middle roof = 17 cm (6.7 in), (lateral) right A-pillar = 20 cm (7.9 in), right B-pillar = 12 cm (4.7 in), right roof side rail = 20 cm (7.9 in), right seat back = 8 cm (3.1 in), and (longitudinal) left floor/toe pan = 7 cm (2.8 in). Intrusions documented in the second row were as follows: (vertical) left roof = 23 cm (9.1 in), middle roof = 25 cm (9.8 in), right roof = 29 cm (11.4 in), (lateral) right roof side rail = 31 cm (12.2 in), and right door = 27 cm (10.6 in).

Manual Restraint Systems

The front row was equipped with driver and front right passenger lap and shoulder seat belts. The driver's belt was equipped with continuous loop belt webbing, a sliding latch plate, emergency locking retractor (ELR), and an adjustable D-ring in the mid position. The front right seat belt was configured with a switchable automatic locking retractor (ALR)/ELR and the D-ring was in the full-up position. Both belts were in use at the time of the crash and occupant

loading evidence was documented. The EDR report confirmed both front row belts were buckled. The front row belts were configured with retractor seat belt pretensioners which actuated at impact with the other vehicle at 0 ms. Both belts were cut by responders.

Supplemental Restraint Systems

The Chevrolet's supplemental restraint system (SRS) included driver's and passenger's frontal air bags, seat-mounted side impact air bags and IC air bags. The frontal, IC, and right-seat-mounted air bags deployed at impact with the other vehicle. The frontal air bags revealed blood deposits and the passenger's frontal air bag exhibited abrasions on the front panel, probably caused by contact with the fractured windshield glazing. The left and right IC air bags were cut by emergency responders post-crash. The right-seat-mounted side air bag was unremarkable.

NHTSA Recalls and Investigations

A VIN search on safercar.gov last queried in January 2020 revealed no open recalls for the Chevrolet.

2016 CHEVROLET EQUINOX OCCUPANTS

Driver Demographics

Age/sex:	79 years/male
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat type:	Bucket
Seat track position:	Unknown
Manual restraint usage:	Lap and shoulder belt used
Usage source:	Vehicle inspection, EDR report
Air bags:	Frontal and IC air bag deployed, seat-mounted side impact air bag not deployed
Alcohol/drug data:	None
Egress from vehicle:	Removed due to perceived serious injuries
Transport from scene:	Ambulance to hospital
Type of medical treatment:	Unknown, declared deceased

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Fracture, open, left lower leg (ankle)	852003.2	Floor	Probable
2	Evulsion, left forearm	710800.1	Steering wheel	Possible
3	Laceration (puncture), right abdomen	510600.1	Seat belt	Probable

Source: medical records.

Driver Kinematics

The belted 79-year-old male driver was seated in an unknown posture and operating the Chevrolet with cruise control engaged. At impact with the other vehicle, his frontal air bag deployed, and he was displaced forward and to the right in response to the direction of force, loading the seat belt with his chest and the air bag with his chest and face. He stretched the shoulder portion of the pretensioned seat belt. The driver's left forearm likely contacted the steering wheel rim, causing a skin avulsion that deposited blood to the front of the air bag. His left lower leg was displaced forward contacting the floor and causing an open fracture to an unspecified bone. The vehicle was displaced sharply left, initiating a counterclockwise rotation while striking the other vehicle a second time in a side-slap configuration, displacing the driver to the right. He remained held by the seat belt in his seated position. The Chevrolet traveled off the roadway and down a sloping roadside in tall grass to final rest during which the driver was displaced in multiple directions caused by variations in surface and elevation.

When EMS arrived, they recorded his Glasgow Coma Score as 3. His medical records indicated a long extrication was involved. The records indicated his abdomen was full of blood. He was partially removed by responders who cut the safety belt. On-scene responders indicated no pulse was present. He was transported by ambulance to a local hospital where efforts at resuscitation were unsuccessful. He was pronounced deceased soon after arrival. His death was attributed to unspecified multiple injuries.

Front Row Right Occupant Demographics

Age/sex:	71 years/female
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat type:	Bucket
Seat track position:	Unknown
Manual restraint usage:	Lap and shoulder belt used
Usage source:	Vehicle inspection, EDR report
Air bags:	Frontal, seat-mounted side impact, and IC air bag deployed
Egress from vehicle:	Removed due to perceived serious injuries
Transport from scene:	Ambulance to hospital
Type of medical treatment:	Unknown, declared deceased

Front Row Right Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Crush, chest	413000.6	Critical IPC 2-point, Right IP and right door	Probable
2	Fractures, multiple right ribs NFS	450210.2	Critical IPC 2-point, Right IP and right door	Probable

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
3	Pneumothorax, right, 30%	442202.2	Critical IPC 2-point, Right IP and right door	Probable
4	Contusions, face (racoon eyes)	210402.1	Frontal air bag	Probable
5 6	Lacerations, bilateral knees, lower legs	810602.1 810602.1	Right lower IP	Probable

Source: medical records.

Front Row Right Occupant Kinematics

The belted 71-year-old female occupant was seated in an unknown posture. At impact with the other vehicle, her frontal, seat-mounted side impact, and IC air bags deployed. She was displaced forward and to the right in response to the direction of force, loading the seat belt with her chest and the frontal air bag with her chest and face, causing contusions to the face and eyes. She stretched the shoulder portion of the pretensioned seat belt. Her legs were displaced forward contacting the lower instrument panel and causing multiple lacerations to the knees and lower legs. The vehicle was displaced sharply left initiating a counterclockwise rotation while impacting the other vehicle a second time in a side slap configuration displacing the occupant to the right. The right front door likely intruded laterally reducing the occupant space. The occupant possibly bypassed the deployed frontal air bag to the right causing her chest to contact both the right aspect of the instrument panel and the right door simultaneously causing a crush injury to the chest, multiple fractures to the right ribs and a right pneumothorax. She remained held by the seat belt in her seated position and deposited blood from an unknown source to the center console. The Chevrolet traveled off the roadway and down a sloping roadside in tall grass to final rest, during which the occupant was displaced in multiple directions caused by variations in surface and elevation.

When responders arrived, the occupant was in her seated position and wearing the seat belt. She was leaning forward, unconscious, breathing, and exhibited a weak pulse. EMS measured her Glasgow Coma Score as 3. Responders removed the occupant's side door and removed her from the vehicle. She was transported by ambulance to a local hospital where she was pronounced deceased soon after arrival.

1994 MACK CH600

Vehicle Data

The 1994 Mack CH600 was a cab behind engine (CBE) model, 14,969 kg and above (33,001 lb and above) dump truck identified in the police report with the VIN: 1M1AA13Y6RWxxxxxx.The vehicle was equipped with a 6-cylinder, 12-liter engine, three axles, and air brakes.

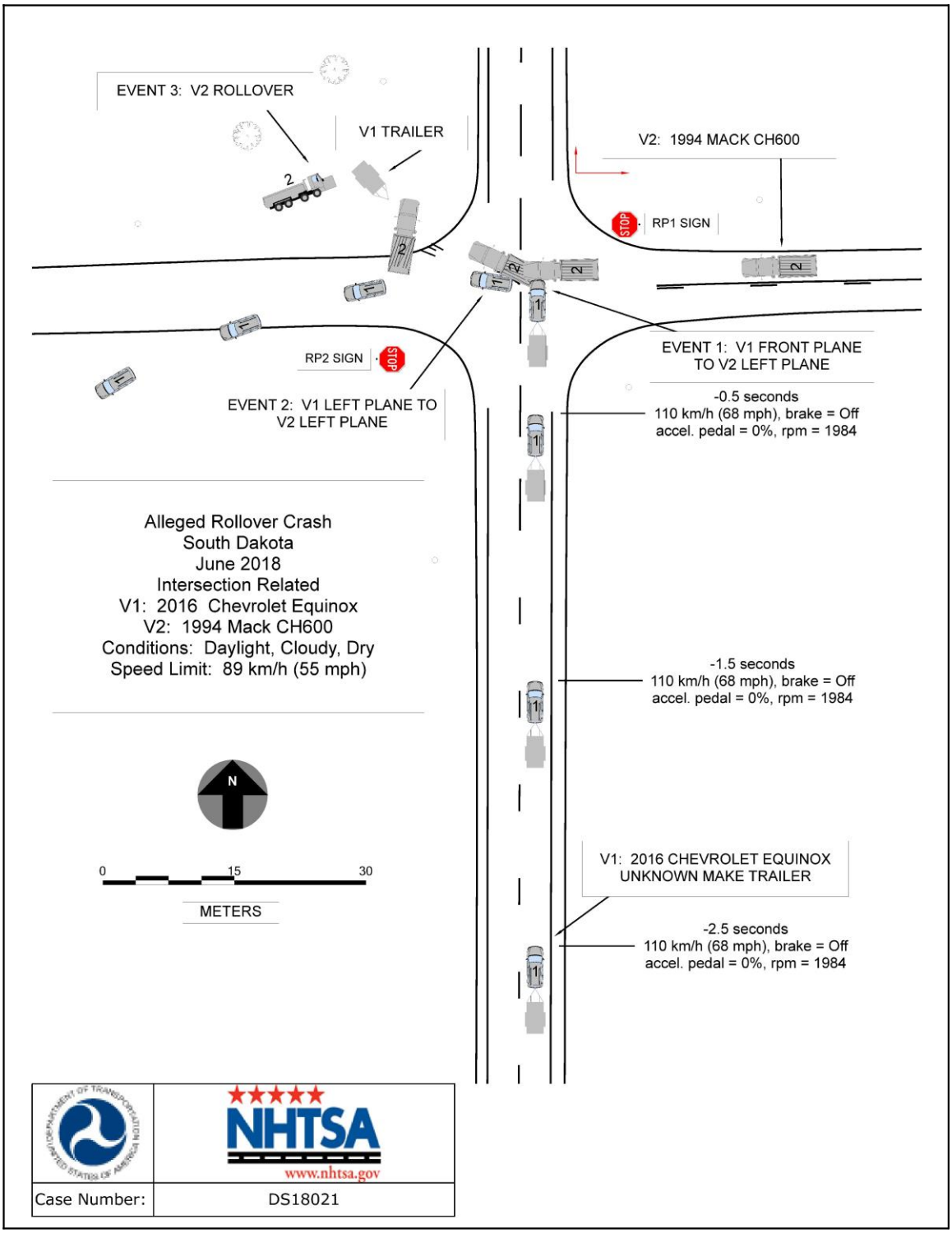
Exterior Damage

Police images indicate the Mack sustained moderate left plane damage at impact with the Chevrolet and undetermined severity damage caused during the rollover.

Occupant Data

The belted driver of the Mack was an 82-year-old male. He was transported by ambulance to a local hospital and died as a result of his injuries 15 days after the crash.

CRASH DIAGRAM



APPENDIX A: 2016 Chevrolet Equinox Event Data Recorder (EDR) Report[1]

[1] The EDR Report contained in this technical report was imaged using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report contained in the Crash View 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	2GNALCEK9G6******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	DS18021_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 17.7.2
Imaged with Software Licensed to (Company Name)	NHTSA
Reported with CDR version	Crash Data Retrieval Tool 19.1
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	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 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 record 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 deployment times for subsequent deployment type events, during the same ignition cycle, will not be recorded. Also, forced timer loops, will not be shown as being commanded to deploy. Loops without their own independent deployment calibration are called "forced timer loops." Examples of a forced timer loops are Pretensioner Deployment Loop #2 and Knee Deployment Loop.
-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.

01042_SDM10P-autoliv_r020

System Status at Time of Retrieval

Dynamic Deployment Event Counter	2
Multi-Event, Number of Events (Dynamic Event Counter)	2
Dynamic OnStar Notification Event Counter	2
Vehicle Identification Number (VIN)	2GNALCEK9G6******
Ignition Cycle, Download (Ignition Cycles at Investigation)	2443
End Model Part Number	00CF83A6
System Type	Autoliv
Software Module Identifier 1	00CF62CF
Software Module Identifier 2	01658277
Software Module Identifier 3	00CF2D7D
Manufacturing Traceability Data, Component Identifier	AS
Manufacturing Traceability Data, Part Number/Broadcast Code	9654
Manufacturing Traceability Data, Supplier Code	E
Manufacturing Traceability Data, Traceability Number	050174872
ESS # 1 Traceability Data, Component Identifier	AU
ESS # 1 Traceability Data, Part Number/Broadcast Code	0000
ESS # 1 Traceability Data, Supplier Code	E
ESS # 1 Traceability Data, Traceability Number	000000000
ESS # 2 Traceability Data, Component Identifier	AT
ESS # 2 Traceability Data, Part Number/Broadcast Code	0000
ESS # 2 Traceability Data, Supplier Code	E
ESS # 2 Traceability Data, Traceability Number	000000000
ESS # 3 Traceability Data, Component Identifier	AH
ESS # 3 Traceability Data, Part Number/Broadcast Code	0000
ESS # 3 Traceability Data, Supplier Code	E
ESS # 3 Traceability Data, Traceability Number	000000000
ESS # 4 Traceability Data, Component Identifier	AJ
ESS # 4 Traceability Data, Part Number/Broadcast Code	0000
ESS # 4 Traceability Data, Supplier Code	E
ESS # 4 Traceability Data, Traceability Number	000000000
ESS # 5 Traceability Data, Component Identifier	DA
ESS # 5 Traceability Data, Part Number/Broadcast Code	0000
ESS # 5 Traceability Data, Supplier Code	E
ESS # 5 Traceability Data, Traceability Number	000000000
ESS # 6 Traceability Data, Component Identifier	DB
ESS # 6 Traceability Data, Part Number/Broadcast Code	0000
ESS # 6 Traceability Data, Supplier Code	E
ESS # 6 Traceability Data, Traceability Number	000000000
ESS # 7 Traceability Data, Component Identifier	00
ESS # 7 Traceability Data, Part Number/Broadcast Code	0000
ESS # 7 Traceability Data, Supplier Code	E
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	E
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	No
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)	2443
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
Center Front Row Belt Switch Circuit Status (If Equipped)	Data Not Available
Left Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Center Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Right Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Occupied
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Small 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)	655330
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	2427
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]	-48 [-77]
Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change)(msec)	186
Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h]	-54 [-87]
Time Maximum Delta-V, Lateral (Time From FSR Time Zero to Maximum Lateral SDM Recorded Vehicle Velocity Change)(msec)	478

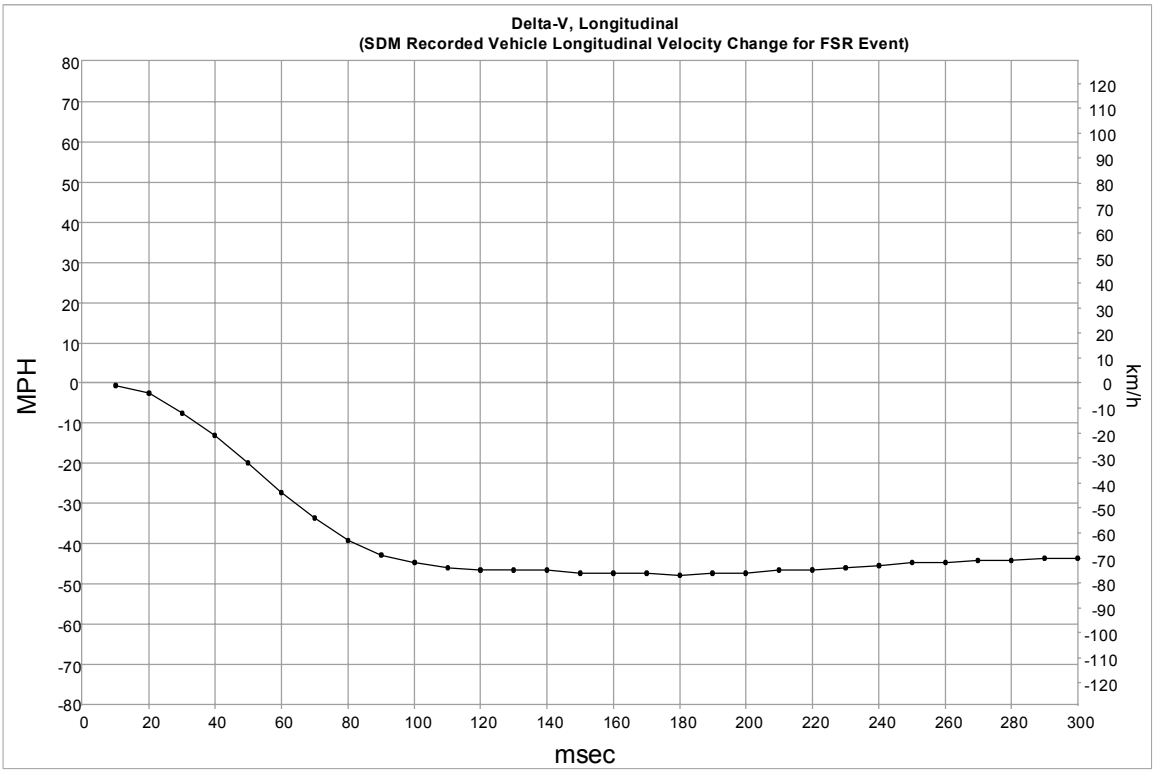
DTCs Present at Time of Event (Event Record 1)

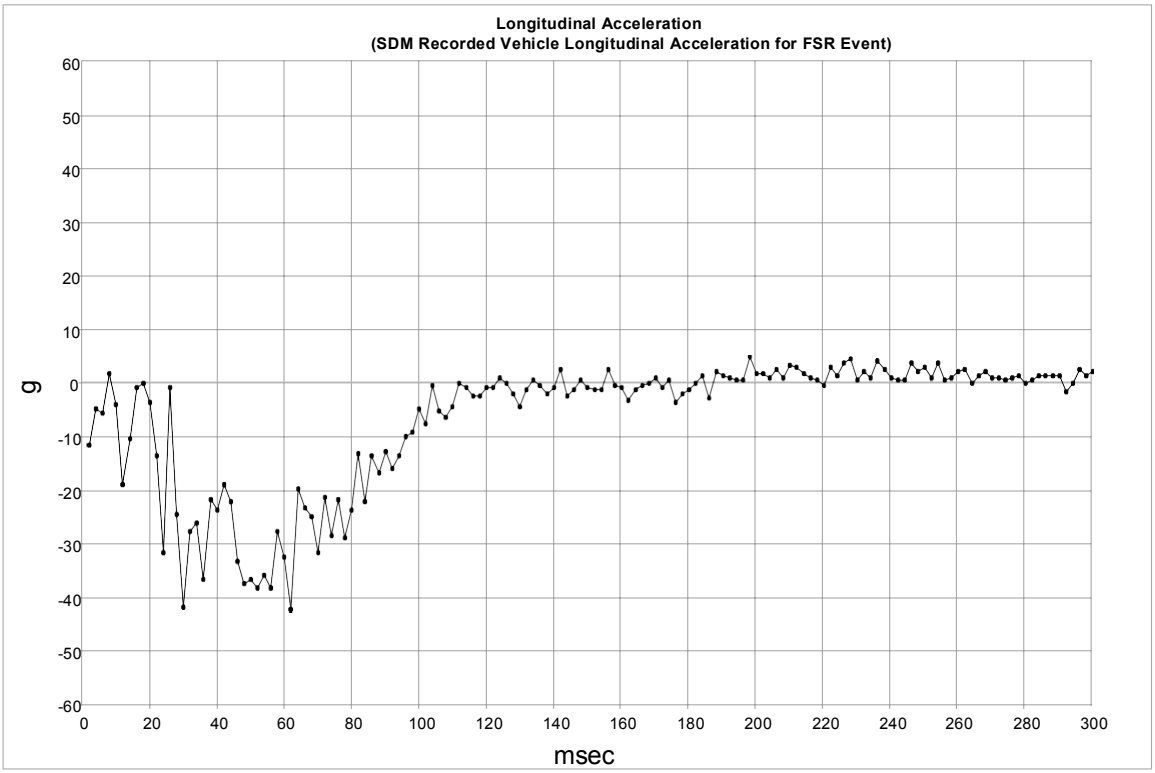
B0052-00

Event Data (Event Record 1)

Driver 1st Stage Deployment Loop Commanded	Yes
Passenger 1st Stage Deployment Loop Commanded	Yes
Driver 2nd Stage Deployment Loop Commanded	Yes
Passenger 2nd Stage Deployment Loop Commanded	Yes
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	Yes
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)	7
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	10
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)	7
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec)	12
Side air bag deployment, time to deploy, driver (Driver Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	29
Side air bag deployment, time to deploy, right front passenger (Passenger Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec)	29
Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec)	0
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)	0

Longitudinal Crash Pulse (Event Record 1)





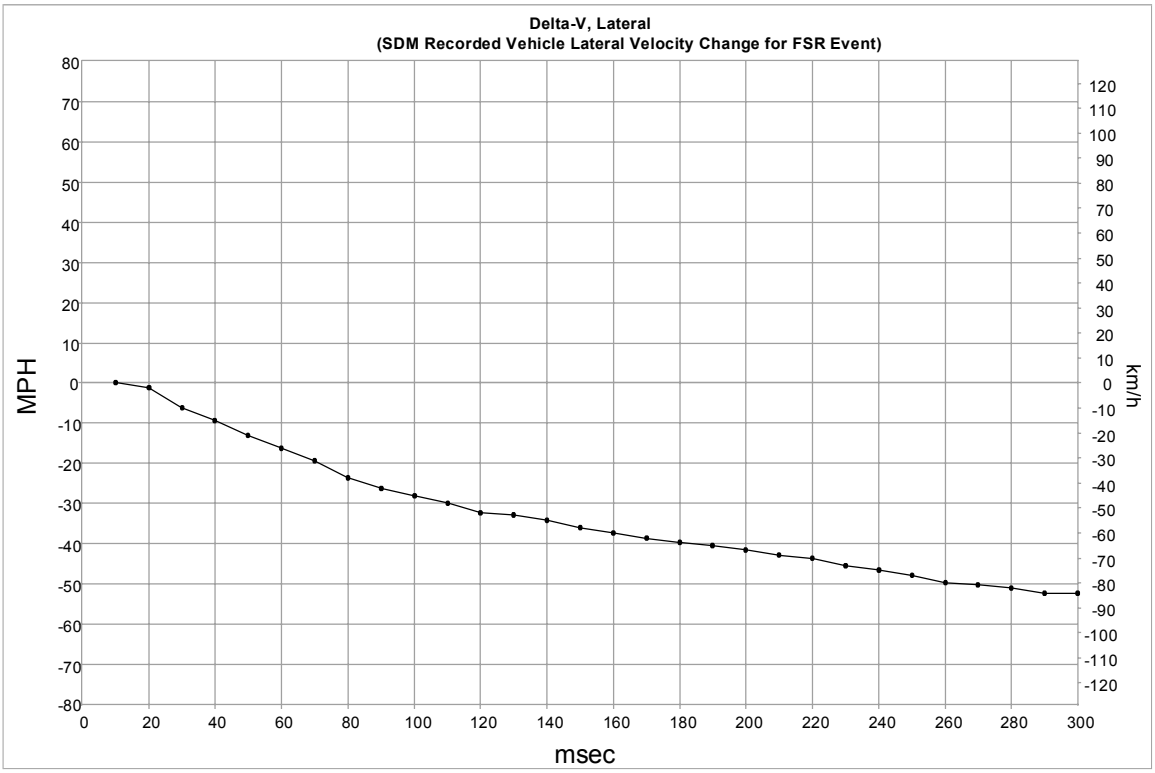
Longitudinal Crash Pulse (Event Record 1)

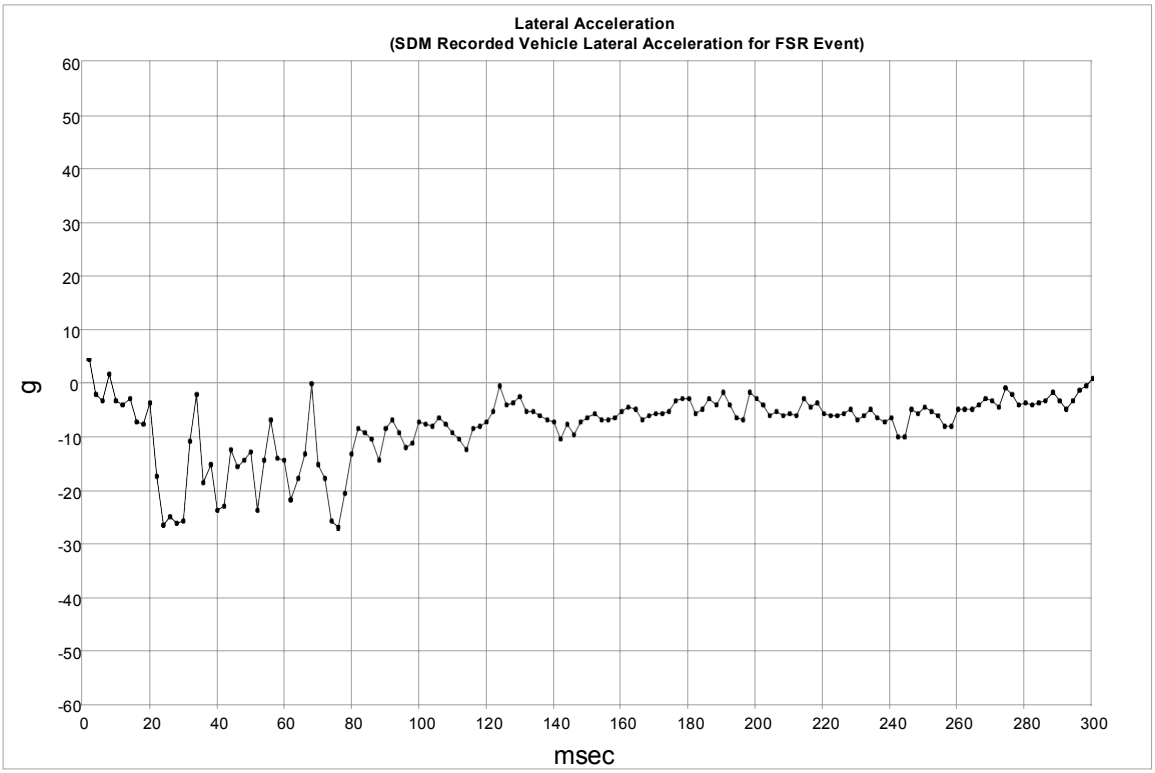
Time (msec)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (MPH)	Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (km/h)
10	-0.6	-1.0
20	-2.5	-4.0
30	-7.5	-12.0
40	-13.0	-21.0
50	-19.9	-32.0
60	-27.3	-44.0
70	-33.6	-54.0
80	-39.1	-63.0
90	-42.9	-69.0
100	-44.7	-72.0
110	-46.0	-74.0
120	-46.6	-75.0
130	-46.6	-75.0
140	-46.6	-75.0
150	-47.2	-76.0
160	-47.2	-76.0
170	-47.2	-76.0
180	-47.8	-77.0
190	-47.2	-76.0
200	-47.2	-76.0
210	-46.6	-75.0
220	-46.6	-75.0
230	-46.0	-74.0
240	-45.4	-73.0
250	-44.7	-72.0
260	-44.7	-72.0
270	-44.1	-71.0
280	-44.1	-71.0
290	-43.5	-70.0
300	-43.5	-70.0

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	-11.8	102	-7.8	202	1.4
4	-5.0	104	-0.6	204	0.6
6	-5.8	106	-5.4	206	2.2
8	1.4	108	-6.6	208	0.6
10	-4.2	110	-4.6	210	3.0
12	-19.0	112	-0.2	212	2.6
14	-10.6	114	-1.0	214	1.4
16	-1.0	116	-2.6	216	0.6
18	-0.2	118	-2.6	218	0.2
20	-3.8	120	-1.0	220	-0.6
22	-13.8	122	-1.0	222	2.6
24	-31.8	124	0.6	224	1.0
26	-1.0	126	-0.2	226	3.4
28	-24.6	128	-2.2	228	4.2
30	-41.8	130	-4.6	230	0.2
32	-27.8	132	-1.4	232	1.8
34	-26.2	134	0.2	234	0.6
36	-36.6	136	-0.6	236	3.8
38	-21.8	138	-2.2	238	2.2
40	-23.8	140	-1.0	240	0.6
42	-19.0	142	2.2	242	0.2
44	-22.2	144	-2.6	244	0.2
46	-33.4	146	-1.4	246	3.4
48	-37.4	148	0.2	248	1.8
50	-36.6	150	-1.0	250	2.6
52	-38.2	152	-1.4	252	0.6
54	-35.8	154	-1.4	254	3.4
56	-38.2	156	2.2	256	0.2
58	-27.8	158	-0.6	258	0.6
60	-32.6	160	-1.0	260	1.8
62	-42.2	162	-3.4	262	2.2
64	-19.8	164	-1.4	264	-0.2
66	-23.4	166	-0.6	266	1.0
68	-25.0	168	-0.2	268	1.8
70	-31.8	170	0.6	270	0.6
72	-21.4	172	-1.0	272	0.6
74	-28.6	174	0.2	274	0.2
76	-21.8	176	-3.8	276	0.6
78	-29.0	178	-2.2	278	1.0
80	-23.8	180	-1.4	280	-0.2
82	-13.4	182	-0.2	282	0.2
84	-22.2	184	1.0	284	1.0
86	-13.8	186	-3.0	286	1.0
88	-17.0	188	1.8	288	1.0
90	-13.0	190	1.0	290	1.0
92	-16.2	192	0.6	292	-1.8
94	-13.8	194	0.2	294	-0.2
96	-10.2	196	0.2	296	2.2
98	-9.4	198	4.6	298	1.0
100	-5.0	200	1.4	300	1.8

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	-1.2	-2.0
30	-6.2	-10.0
40	-9.3	-15.0
50	-13.0	-21.0
60	-16.2	-26.0
70	-19.3	-31.0
80	-23.6	-38.0
90	-26.1	-42.0
100	-28.0	-45.0
110	-29.8	-48.0
120	-32.3	-52.0
130	-32.9	-53.0
140	-34.2	-55.0
150	-36.0	-58.0
160	-37.3	-60.0
170	-38.5	-62.0
180	-39.8	-64.0
190	-40.4	-65.0
200	-41.6	-67.0
210	-42.9	-69.0
220	-43.5	-70.0
230	-45.4	-73.0
240	-46.6	-75.0
250	-47.8	-77.0
260	-49.7	-80.0
270	-50.3	-81.0
280	-51.0	-82.0
290	-52.2	-84.0
300	-52.2	-84.0

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	4.2	102	-7.8	202	-4.2
4	-2.2	104	-8.2	204	-6.2
6	-3.4	106	-6.6	206	-5.4
8	1.4	108	-7.8	208	-6.2
10	-3.4	110	-9.4	210	-5.8
12	-4.2	112	-10.6	212	-6.2
14	-3.0	114	-12.6	214	-3.0
16	-7.4	116	-8.6	216	-4.6
18	-7.8	118	-8.2	218	-3.8
20	-3.8	120	-7.4	220	-5.8
22	-17.4	122	-5.4	222	-6.2
24	-26.6	124	-0.6	224	-6.2
26	-25.0	126	-4.2	226	-5.8
28	-26.2	128	-3.8	228	-5.0
30	-25.8	130	-2.6	230	-7.0
32	-11.0	132	-5.4	232	-6.2
34	-2.2	134	-5.4	234	-5.0
36	-18.6	136	-6.2	236	-6.6
38	-15.4	138	-7.0	238	-7.4
40	-23.8	140	-7.4	240	-6.6
42	-23.0	142	-10.6	242	-10.2
44	-12.6	144	-7.8	244	-10.2
46	-15.8	146	-9.8	246	-5.0
48	-14.6	148	-7.4	248	-5.8
50	-13.0	150	-6.6	250	-4.6
52	-23.8	152	-5.8	252	-5.4
54	-14.6	154	-7.0	254	-6.2
56	-7.0	156	-7.0	256	-8.2
58	-14.2	158	-6.6	258	-8.2
60	-14.6	160	-5.4	260	-5.0
62	-21.8	162	-4.6	262	-5.0
64	-17.8	164	-5.0	264	-5.0
66	-13.4	166	-7.0	266	-4.2
68	-0.2	168	-6.2	268	-3.0
70	-15.4	170	-5.8	270	-3.4
72	-17.8	172	-5.8	272	-4.6
74	-25.8	174	-5.4	274	-1.0
76	-27.0	176	-3.4	276	-2.2
78	-20.6	178	-3.0	278	-4.2
80	-13.4	180	-3.0	280	-3.8
82	-8.6	182	-5.8	282	-4.2
84	-9.4	184	-5.0	284	-3.8
86	-10.6	186	-3.0	286	-3.4
88	-14.6	188	-4.2	288	-1.8
90	-8.6	190	-1.8	290	-3.4
92	-7.0	192	-4.2	292	-5.0
94	-9.4	194	-6.6	294	-3.4
96	-12.2	196	-7.0	296	-1.4
98	-11.4	198	-1.8	298	-0.6
100	-7.4	200	-3.0	300	0.6

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	0	Off	1984	54	68 [110]
-4.5	0	Off	1984	54	68 [110]
-4.0	0	Off	1984	44	68 [110]
-3.5	0	Off	1984	44	68 [110]
-3.0	0	Off	1984	45	68 [110]
-2.5	0	Off	1984	47	68 [110]
-2.0	0	Off	1984	50	68 [110]
-1.5	0	Off	1984	49	68 [110]
-1.0	0	Off	1984	48	68 [110]
-0.5	0	Off	1984	48	68 [110]

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	Yes	No	No	120 [162]	Off
-1.5	Yes	No	No	120 [162]	Off
-1.0	Yes	No	No	119 [161]	Off
-0.5	Yes	No	No	119 [162]	Off

System Status at Event (Event Record 2)

Event Record Type	Deployment
OnStar Deployment Status Data Sent	No
Complete file recorded (Event Recording Complete)	Yes
Crash Record Locked	Yes
OnStar SDM Recorded Vehicle Velocity Change Data Sent	No
Deployment Event Counter	2
Multi-Event, Number of Events (Event Counter)	2
OnStar Notification Event Counter	2
Time From Event 1 to 2 (Time Between Events) (seconds)	0.12
Ignition Cycle, Crash (Ignition Cycles at Event)	2443
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	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
Center Front Row Belt Switch Circuit Status (If Equipped)	Data Not Available
Left Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Center Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Right Row 3 Belt Switch Circuit Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Occupied
Occupant Size Right Front Passenger Child (Passenger Classification Status)	No (Small 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)	655330
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	2427
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]	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

DTCs Present at Time of Event (Event Record 2)

B0052-00

Event Data (Event Record 2)

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)	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)	Data Not Available
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)
Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event)

Contains No Recorded Data

Longitudinal Crash Pulse (Event Record 2)
Longitudinal Acceleration (SDM Recorded Vehicle Longitudinal Acceleration for FSR Event)

Contains No Recorded Data

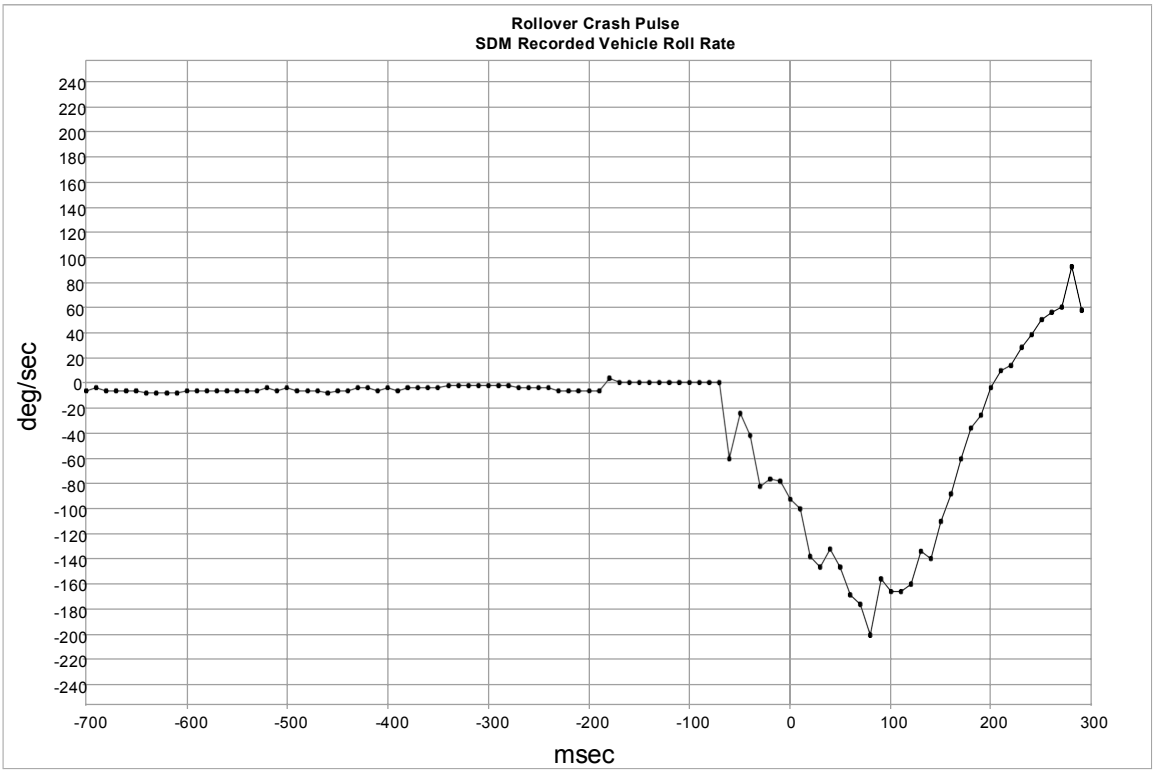
Lateral Crash Pulse (Event Record 2)
Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event)

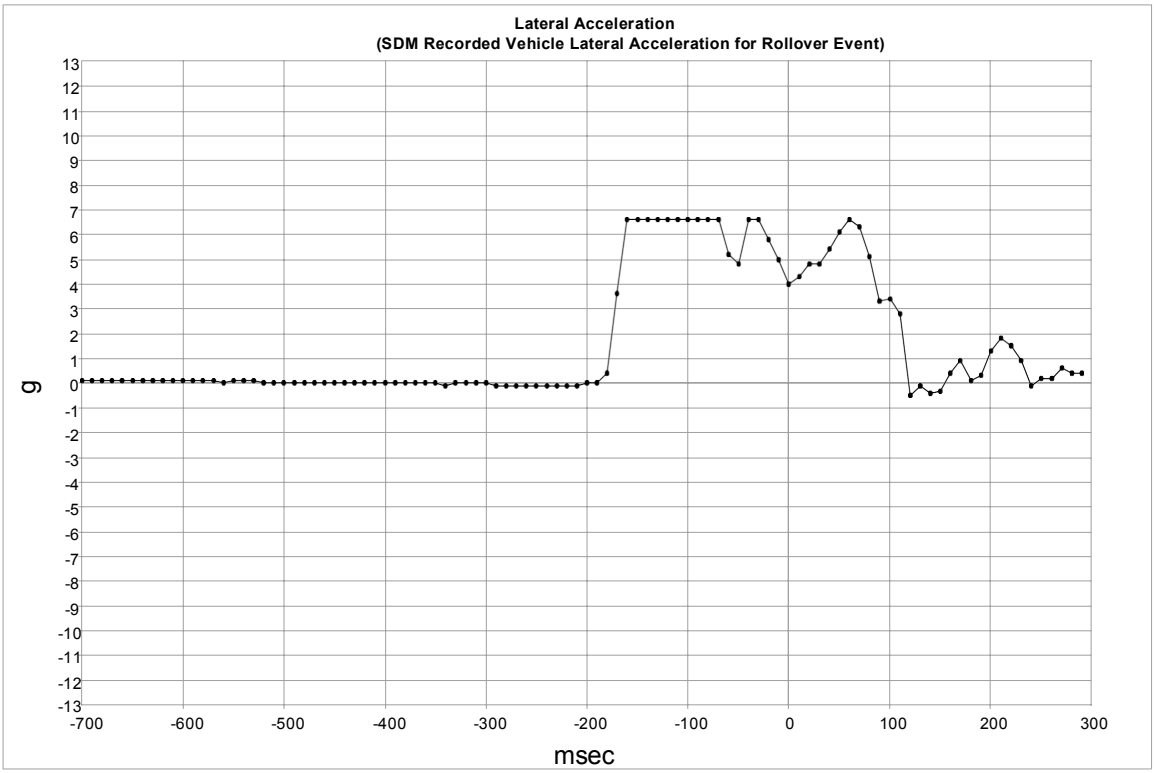
Contains No Recorded Data

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

Contains No Recorded Data

Rollover Crash Pulse (Event Record 2)





Rollover Crash Pulse (Event Record 2)

Time (msec)	SDM Recorded Vehicle Roll Rate (deg/sec)	Time (msec)	SDM Recorded Vehicle Roll Rate (deg/sec)
-700	-6	-200	-6
-690	-4	-190	-6
-680	-6	-180	4
-670	-6	-170	0
-660	-6	-160	0
-650	-6	-150	0
-640	-8	-140	0
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-600	-6	-100	0
-590	-6	-90	0
-580	-6	-80	0
-570	-6	-70	0
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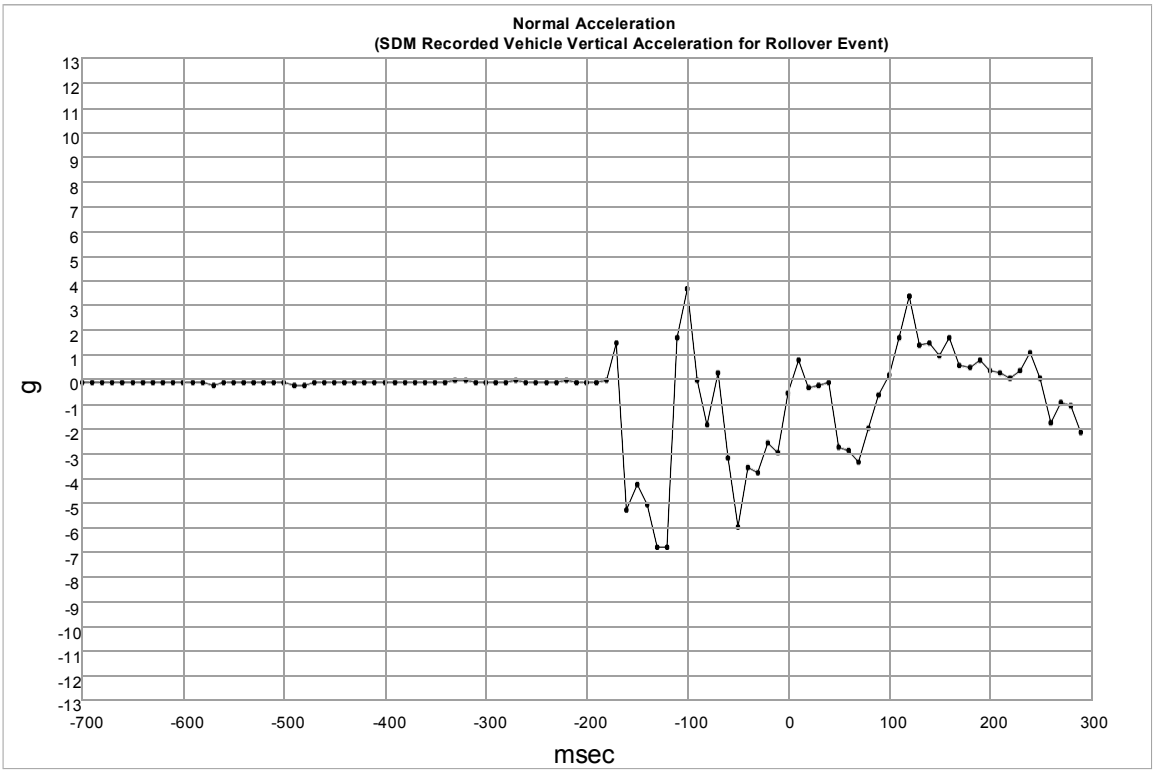
-550	-6	-50	-24
-540	-6	-40	-42
-530	-6	-30	-82
-520	-4	-20	-76
-510	-6	-10	-78
-500	-4	0	-92
-490	-6	10	-100
-480	-6	20	-138
-470	-6	30	-146
-460	-8	40	-132
-450	-6	50	-146
-440	-6	60	-168
-430	-4	70	-176
-420	-4	80	-200
-410	-6	90	-156
-400	-4	100	-166
-390	-6	110	-166
-380	-4	120	-160
-370	-4	130	-134
-360	-4	140	-140
-350	-4	150	-110
-340	-2	160	-88
-330	-2	170	-60
-320	-2	180	-36
-310	-2	190	-26
-300	-2	200	-4
-290	-2	210	10
-280	-2	220	14
-270	-4	230	28
-260	-4	240	38
-250	-4	250	50
-240	-4	260	56
-230	-6	270	60
-220	-6	280	92
-210	-6	290	58

Rollover Crash Pulse (Event Record 2)

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	0.1	-200	0.0
-690	0.1	-190	0.0
-680	0.1	-180	0.4
-670	0.1	-170	3.6
-660	0.1	-160	6.6
-650	0.1	-150	6.6
-640	0.1	-140	6.6
-630	0.1	-130	6.6
-620	0.1	-120	6.6
-610	0.1	-110	6.6
-600	0.1	-100	6.6
-590	0.1	-90	6.6
-580	0.1	-80	6.6
-570	0.1	-70	6.6
-560	0.0	-60	5.2
-550	0.1	-50	4.8
-540	0.1	-40	6.6
-530	0.1	-30	6.6
-520	0.0	-20	5.8
-510	0.0	-10	5.0
-500	0.0	0	4.0
-490	0.0	10	4.3
-480	0.0	20	4.8
-470	0.0	30	4.8
-460	0.0	40	5.4
-450	0.0	50	6.1
-440	0.0	60	6.6
-430	0.0	70	6.3
-420	0.0	80	5.1
-410	0.0	90	3.3
-400	0.0	100	3.4
-390	0.0	110	2.8
-380	0.0	120	-0.5
-370	0.0	130	-0.1
-360	0.0	140	-0.4
-350	0.0	150	-0.3
-340	-0.1	160	0.4
-330	0.0	170	0.9
-320	0.0	180	0.1
-310	0.0	190	0.3
-300	0.0	200	1.3
-290	-0.1	210	1.8
-280	-0.1	220	1.5
-270	-0.1	230	0.9
-260	-0.1	240	-0.1
-250	-0.1	250	0.2
-240	-0.1	260	0.2
-230	-0.1	270	0.6
-220	-0.1	280	0.4
-210	-0.1	290	0.4

Vertical Crash Pulse (Event Record 2)



Vertical Crash Pulse (Event Record 2)

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	0.0
-690	0.0	-190	0.0
-680	0.0	-180	0.1
-670	0.0	-170	1.6
-660	0.0	-160	-5.1
-650	0.0	-150	-4.1
-640	0.0	-140	-4.9
-630	0.0	-130	-6.6
-620	0.0	-120	-6.6
-610	0.0	-110	1.8
-600	0.0	-100	3.8
-590	0.0	-90	0.1
-580	0.0	-80	-1.7
-570	-0.1	-70	0.4
-560	0.0	-60	-3.0
-550	0.0	-50	-5.8
-540	0.0	-40	-3.4
-530	0.0	-30	-3.6
-520	0.0	-20	-2.4
-510	0.0	-10	-2.8
-500	0.0	0	-0.4
-490	-0.1	10	0.9
-480	-0.1	20	-0.2
-470	0.0	30	-0.1
-460	0.0	40	0.0
-450	0.0	50	-2.6
-440	0.0	60	-2.7
-430	0.0	70	-3.2
-420	0.0	80	-1.8
-410	0.0	90	-0.5
-400	0.0	100	0.3
-390	0.0	110	1.8
-380	0.0	120	3.5
-370	0.0	130	1.5
-360	0.0	140	1.6
-350	0.0	150	1.1
-340	0.0	160	1.8
-330	0.1	170	0.7
-320	0.1	180	0.6
-310	0.0	190	0.9
-300	0.0	200	0.5
-290	0.0	210	0.4
-280	0.0	220	0.2
-270	0.1	230	0.5
-260	0.0	240	1.2
-250	0.0	250	0.2
-240	0.0	260	-1.6
-230	0.0	270	-0.8
-220	0.1	280	-0.9
-210	0.0	290	-2.0

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	0	Off	1984	54	68 [110]
-4.5	0	Off	1984	54	68 [110]
-4.0	0	Off	1984	44	68 [110]
-3.5	0	Off	1984	44	68 [110]
-3.0	0	Off	1984	45	68 [110]
-2.5	0	Off	1984	47	68 [110]
-2.0	0	Off	1984	50	68 [110]
-1.5	0	Off	1984	49	68 [110]
-1.0	0	Off	1984	48	68 [110]
-0.5	0	Off	1984	48	68 [110]

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	Yes	No	No	120 [162]	Off
-1.5	Yes	No	No	120 [162]	Off
-1.0	Yes	No	No	119 [161]	Off
-0.5	Yes	No	No	119 [162]	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 FD 09 8B 00 00 00

DPID $35
78 00 00 00 00 00 00

DID $01
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DID $03
41 54 30 30 30 30 45 30 30 30 30 30 30 30 30

DID $05
41 48 30 30 30 30 45 30 30 30 30 30 30 30 30

DID $07
41 4A 30 30 30 30 45 30 30 30 30 30 30 30 30

DID $09
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DID $0B
44 42 30 30 30 30 45 30 30 30 30 30 30 30 30

DID $0D
30 30 30 30 30 30 45 30 30 30 30 30 30 30 30

DID $0F
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DID $30
02 00 02 02

DID $90
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DID $9A
04 01

DID $B4
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DID $C2
01 65 82 77

DID $C3
00 CF 2D 7D
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DID $CB
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DID $31

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 0050    1F 1F 1F 1F 1F 07 E3 07 E2 07
 0060    E5 07 E5 30 30 31 32 2F 2D 2C
 0070    2C 36 36 6E 6E 6E 6E 6E 6E 6E
 0080    6E 6E 6E 00 FF FD 09 7B FD 00
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 0170    34 39 35 36 36 34 37 32 37 2F
 0180    38 2E 38 2D 39 2B 39 2B 62 8A
 0190    73 7A 71 77 83 83 75 77 50 75
 0200    65 78 7D 6D 7F 6C 76 76 5D 54
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 0220    3E 7A 24 51 49 59 44 44 50 46
 0230    48 60 2C 58 22 5B 24 5F 20 44
 0240    26 5B 20 6E 3A 5C 2E 5B 16 49
 0250    4E 53 45 5E 41 7F 30 59 4A 53
 0260    38 3F 49 3C 37 4C 44 5E 5E 6A
 0270    48 68 5D 65 55 5B 5F 6A 57 6E
 0280    5D 68 66 61 68 63 73 6D 6C 6C
 0290    7E 6B 72 6F 6F 6C 74 68 7F 65
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 0330    79 6C 7C 67 80 6D 7D 6F 7C 71
 0340    7C 6E 85 6E 7E 6F 7D 72 77 74
 0350    7C 73 7E 6E 7F 70 81 71 7D 71
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0630   FF FF FF FF FF FF FF FF FF FF
0640   FF FF FF FF FF FF FF FF FF FF
0650   FF FF FF FF FF FF FF FF FF FF
0660   FF FF FF FF FF FF FF FF FF FF
0670   FF FF FF FF FF FF FF FF FF FF
0680   FF FF FF FF FF FF FF FF FF FF
0690   FF FF FF FF FF FF FF FF FF FF
0700   FF FF FF FF FF FF FF FF FF FF
0710   FF FF FF FF FF FF FF FF FF FF
0720   FF FF FF FF FF FF FF FF FF FF
0730   FF FF FF FF FF FF FF FF FF FF
0740   FF FF FF FF FF FF FF FF FF FF
0750   FF FF FF FF FF FF FF FF FF FF
0760   FF FF FF FF FF FF FF FF FF FF
0770   FF FF FF FF FF FF FF FF FF FF
0780   FF FF FF FF FF FF FF FF FF FF
0790   FF FF FF FF FF FF FF FF FF FF
0800   FF FF FF FF FF FF FF FF FF FF
0810   FF FF FF FF FF FF FF FF FF FF
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0820   FF FF FF FF FF FF FF FF FF FF
0830   FF FF FF FF FF FF FF FF FF FF
0840   FF FF FF FF FF FF FF FF FF FF
0850   FF FF FF FF FF FF FF FF FF FF
0860   FF FF FF FF FF FF FF FF FF FF
0870   FF FF FF FF FF FF FF FF FF FF
0880   FF FF FF FF FF FF FF FF FF FF
0890   FF FF FF FF FF FF FF FF FF FF
0900   FF FF FF FF FF FF FF FF FF FF
0910   FF FF FF FF FF FF FF FF FF FF
0920   FF FF FF FF FF FF FF FF FF FF
0930   FF FF FF FF FF FF FF FF FF FF
0940   FF FF FF FF FF FF FF FF FF FF
0950   FF FF FF FF FF FF FF FF FF FF
0960   FF FF FF FF FF FF FF FF FF FF
0970   FF FF FF FF FF FF FF FF FF FF
0980   FF FF FF FF FF FF FF FF FF FF
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
1040   FF FF FF FF FF FF FF FF FF FF
1050   FF FF FF FF FF FF FF FF FF FF
1060   FF FF FF FF FF FF FF FF FF FF
1070   FF FF FF FF FF FF FF FF FF FF
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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U.S. Department
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**National Highway
Traffic Safety
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