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DOT HS 813 699

March 2025

# Special Crash Investigations:
# On-Site Ambulance Crash Investigation;
# Vehicle: 2018 Ford Transit Type II Ambulance;
# Location: Texas;
# Crash Date: January 2022

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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 vehicles or their safety systems. This report and case data are based on information available to the Special Crash Investigation team on the date this report was submitted.

**16. Abstract**

This Special Crash Investigations report documents the fatal head-on, wrong-way crash of a 2018 Ford Transit Type II ambulance and 2018 Chevrolet Equinox that resulted in fatal injuries to both drivers and A-level (incapacitating) injuries to the right-front passengers of each vehicle. The ambulance was driven by a belted 31-year-old female with a belted 22-year-old male front passenger, both paramedics. The Chevrolet was driven by a 32-year-old male with a 35-year-old male front passenger. It is unknown if either was belted. The Chevrolet was traveling against traffic, in the wrong direction, when it struck the ambulance head-on. Both vehicles rolled, and the Chevrolet driver was ejected. The ambulance's passenger was transported by ambulance to a hospital where he was treated and released. The Chevrolet's passenger was transported by ambulance to a hospital and his injury and treatment information is unknown.

| 17. Key Words | 18. Distribution Statement |
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**On-Site Ambulance Crash Investigation**
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**Location: Texas**
**Crash Date: January 2022**

## Background

This Special Crash Investigations (SCI) on-site investigation documents the head-on crash of a 2018 Ford Transit Type II ambulance (Figure 1) and 2018 Chevrolet Equinox that resulted in fatal injuries to both drivers and A-level (incapacitating) injuries to the right-front passengers of each vehicle. The National Highway Traffic Safety Administration's Office of Emergency Medical Services identified the crash in January 2022 and forwarded the notification to the Crash Investigation Division, which assigned an on-site investigation to the SCI team at Crash Research & Analysis, Inc., in the same month. Legal counsel and insurance companies for both vehicles were contacted in January 2022 and authorized inspections of the vehicles in February 2022. Inspections of both vehicles and the crash scene were completed in February 2022. An interview with the ambulance's passenger was completed in March 2022.

*Figure 1. 2018 Ford Transit Type II ambulance*

The crash occurred in the left lane of a 2-lane, divided tollway in Texas in January 2022. The ambulance was traveling east in the left lane and the Chevrolet was traveling west in the same lane, against traffic, for undetermined reasons. The two vehicles struck each other head-on (Event 1). The ambulance was redirected off the roadway's south side where it rolled, right-side leading, five quarter turns (Event 2), and came to rest on its right side, facing north. After impact, the Chevrolet rotated counterclockwise and rolled (Event 3), right-side leading, one quarter turn, and came to rest in the right lane, facing southeast. The driver was ejected from the vehicle. Both vehicles were severely damaged and towed from the scene.

The ambulance was driven by a belted 31-year-old female with a belted 22-year-old male front passenger; both were paramedics traveling to pick up a patient for transport. The patient compartment was unoccupied. The Chevrolet was driven by a 32-year-old male with a 35-year-old male front passenger. It is unknown if either was belted. Both drivers were fatally injured and transported to the county medical examiner. The ambulance's front passenger was transported to a hospital where he was treated and released. The Chevrolet's passenger was transported by ambulance to a hospital. His injury and treatment information are unknown.

On-site investigation included documentation and measurement of the ambulance's exterior and interior damage and intrusion, identification of occupant contact points, and assessment of the manual and supplemental restraint systems. Additional on-site activities included exterior inspection of the Chevrolet and documentation of the crash site's physical environment using photographs and a total station mapping system. Both vehicles had event data recorder (EDR) modules; the Chevrolet's module was removed by police prior to SCI inspection. The ambulance's EDR could not be found. Requests for on-scene images and EDR files were made to the investigating police agency. The on-scene images were received but the police said that they could not image the EDR nor provide this data to the SCI team. A second request was made in December 2024 and the EDR information for the Chevrolet was provided. At that time, the police said that the Ford's EDR module was not in their possession.

## Crash Summary

### Crash Site

The crash occurred at night under artificial lighting in the eastbound lanes of a 2-lane toll expressway. The weather conditions were rain, 23 km/h (14 mph) winds from the east, and a temperature of 15 ºC (59 ºF). The expressway was straight, level, concrete, and in an east/west direction with two through lanes in each direction, each approximately 3.7 m (12 ft) wide, and separated by a concrete traffic barrier. Roadway markings consisted of a solid white edge line, dashed white lane line, and solid yellow median edge line. There were no rumble strips. The posted speed limit was 105 km/h (65 mph). A crash diagram is included at the end of this report.

### Pre-Crash

Based on an analysis of post-impact dynamics, it was determined that the ambulance was traveling east in the left eastbound lane, intending to continue straight (Figure 2). The Chevrolet was traveling west, against traffic, in the eastbound lanes, at an EDR-reported speed of 142 km/h (88 mph) in the same lane as the ambulance.

*Figure 2. East view, ambulance's approach to impact*

### Crash

The ambulance and Chevrolet struck head-on with their fronts overlapping by approximately 50 percent. The ambulance then continued forward and overrode the top of the Chevrolet. The ambulance was redirected to the right and rotated counterclockwise. It departed the south road edge, and rolled over, right-side leading, five quarter turns (Event 2). During the rollover the ambulance continued to rotate and came to final rest on its right side facing north, based on the on-scene images provided by the police. After the initial impact, the Chevrolet rotated counterclockwise and rolled over (Event 3), right-side leading, one quarter turn, and came to final rest on its right side straddling the left lane edge line, facing southeast, based on on-scene images provided by the police. At an unknown time during the crash, the Chevrolet driver was ejected from the vehicle. He came to final rest in the emergency late adjacent to the Chevrolet’s front end.

## Post-Crash

Police were notified of the crash and arrived on-scene 14 minutes later. Rescue personnel were also dispatched. The ambulance driver had fatal injuries and was pronounced deceased 28 minutes post-crash at the scene. She was transported to the county medical examiner. The front passenger had incapacitating injuries and was transported by ambulance to a hospital where he was treated and released. The Chevrolet driver was fatally injured and pronounced deceased at the scene. He was transported to the county medical examiner. The front passenger had incapacitating injuries and was transported by ambulance to a hospital. His injury and treatment status are unknown. Both vehicles were severely damaged and towed from the crash scene.

## 2018 Ford Transit Type II Ambulance

### Description

The Ford was a rear-wheel drive, high-roof van-based ambulance, manufactured in July 2018 with VIN 1FDYR2CM2JKxxxxxx. It had a 3.7-liter, 6-cylinder engine with a shiftable 6-speed transmission on a 375 cm (147.6 in) wheelbase. The Ford had a 4-wheel antilock brake system, stability and traction control, dual stage frontal air bags, and seat belt pretensioners. The front row had box-mounted seats with adjustable head restraints.

The ambulance's gross vehicle weight rating was 4,082 kg (9,000 lb). The front gross axle rating was 1,873 kg (4,130 lb) and the rear gross axle rating was 2,502 kg (5,515 lb). Its manufacturer recommended tire size P235/65R16. It had Hankook Dynapro HT tires of the recommended size on all four wheels. All tires were in good condition prior to the crash with a minimum 7 mm (9/32-inch) tread.

### NHTSA Recalls and Investigations

A search of the NHTSA recall database (www.nhtsa.gov/recall) in December 2024 revealed no recalls for this vehicle based on its VIN. A database search based on the year, make, and model found 13 recalls. Ten of these involved the seat back, and others involved the parking brake, power train, and roof hatch glass.

### Ford Ambulance Patient Compartment

The patient compartment had one right-side sliding door, double doors on the back plane for patient loading, and several storage cabinets along the left interior side of the ambulance. There was a rear-facing, box-mounted captain's chair at the forward part of the patient compartment, which had a three-point lap and shoulder belt. The two seats along the right wall had seat cushions that folded upward and 4-point harnesses. The patient compartment was not occupied at the time of the crash.

### Exterior Damage

The ambulance's front-left and front-center aspects (Figure 3) sustained severe damage during the impact with the Chevrolet's front. The direct damage began 8 cm (3.1 in) left of the centerline and extended 80 cm (31.5 in) to the left. The direct damage continued along the left sill to the rear wheel (Figure 4) as the ambulance continued over the top of the Chevrolet. The ambulance's bumper beam detached from its connections and crush measurements were taken at the ends of both frame rails. The Field L was 86 cm (33.9 in) and the maximum residual crush was 149 cm (58.7 in), occurring at the left frame rail, 73 cm (28.7 in) left of the centerline. The crush measurements were: C1 = 156 cm (61.4 in), C2 = 127 cm (50.0 in), C3 = 99 cm (39.0 in), C4 = 70 cm (27.6 in), C5 = 41 cm (16.1 in), C6 = 12 cm (4.7 in). The collision deformation classification (CDC) for this damage pattern was 12FYAW6.

*Figure 3. Front end damage*

*Figure 4. Left sill damage*

The WinSMASH program's damage algorithm calculated the ambulance's total delta V as 86 km/h (53.4 mph). The longitudinal and lateral velocity changes were -86 km/h (-53.4 mph) and 0 km/h. The calculation and results were considered a borderline reconstruction due to the severe crash configuration, which was beyond the parameters of the model.

The ambulance sustained light damage during the rollover (Event 2). Direct damage was found on the roof and remote buckling was noted on the back and right-side planes as well as grass deposits noted in the left and right planes. Maximum vertical crush was measured as 5 cm (2 in) at the left roof side rail, at the top of the A-pillar. Maximum lateral crush at the right D-pillar measured 4 cm (1.6 in). The WinSMASH program could not be used to determine velocity change since rollovers are out of scope for the program. The CDC for this damage pattern was 00TDDO1.

## Event Data Recorder

The ambulance EDR was not present at the time of SCI inspection and was assumed to be removed by the investigating police. A public information request was made in 2022 to obtain this data, which was denied. A further query in December 2024 was made and the police said that the EDR module was not removed from the vehicle after the crash.

## Interior Damage

The ambulance had significant interior damage and intrusion to the occupant compartment (Figure 5) from the impact with the Chevrolet. The left A-pillar, instrument panel, and B-pillar intruded longitudinally 42 cm (16.5 in), 35 cm (13.8 in), and 35 cm (13.8 in), respectively. Possible blood or body fluid was noted on the driver's frontal air bag, but due to the severe damage, no other discernable occupant contacts were noted in the vehicle. Rescue personnel had removed the steering column to ease occupant extrication. Damage to the patient compartment was minimal.

## Manual Restraint Systems

The front row had lap and shoulder seat belts, locking latch plates, adjustable upper anchors, and retractor-mounted seat belt pretensioners. Both upper anchors were adjusted to the full-down position. It is unknown if either pretensioner actuated.

The driver was restrained by the lap and shoulder seat belt. At the time of SCI inspection, the latch plate was found in the buckle. The lap belt was cut by rescue personnel, approximately 28 cm (11 in) from the floor anchor (Figure 6) and near the D-ring (Figure 7).

The front passenger was restrained by the lap and shoulder seat belt. The belt webbing was found intact and there were two 6 cm (2.4 in) load marks on the webbing. The load marks were 169 cm (66.5 in) and 210 cm (82.7 in) from the floor anchor (Figure 8). Load marks were also noted on the D-ring.

*Figure 5. Severe intrusion damage of ambulance's instrument panel (image taken from center of cab)*

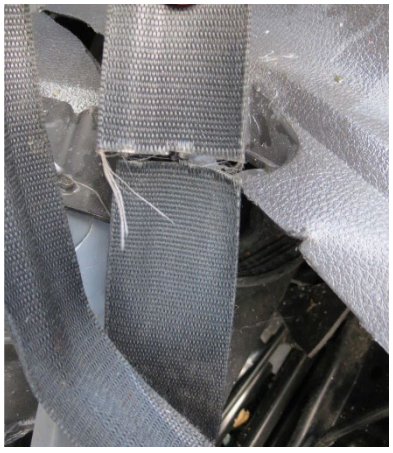


*Figure 6. Driver's lap belt cut by rescue personnel*

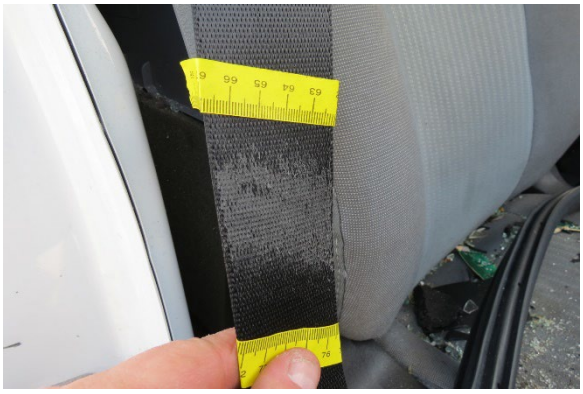


*Figure 7. Load mark on right passenger's belt webbing*

*Figure 8. Driver's seat belt webbing cut near D-ring*

## Supplemental Restraint Systems

The ambulance had dual stage driver's and passenger's frontal air bags that deployed during the crash. The driver's frontal air bag module was in the steering wheel hub. The deflated air bag measured 59 cm (23.2 in) in diameter. There was possible blood on the air bag's face, which was

also discolored, possibly from body fluid, but there was no damage and no other discernable evidence of occupant contact (Figure 9). The module cover was a two-flap configuration constructed of pliable vinyl with a horizontal tear seam. The top flap was 10 cm (3.9 in) wide and 4 cm (1.6 in) high, while the bottom flap measured 17 cm (6.7 in) across the top of the flap and 8 cm (3.1 in) across the bottom. The bottom flap was 9 cm (3.5 in) high. There was no damage or discernable contact evidence on the flaps.

The passenger's frontal air bag was in the top of the instrument panel. The deployed air bag measured 56 cm (22.0 in) in height and 40 cm (15.7 in) wide. There was a yellowish discoloration on the air bag face but there was no discernable contact evidence otherwise (Figure 10). The module cover was a two-flap configuration constructed of stiff vinyl with a horizontal tear seam. The top and bottom flaps were 32 cm (12.6 in) wide and 6 cm (2.4 in) high. There was no damage or discernable contact evidence to the flap.

*Figure 9. Discolored face of driver's frontal air bag*

*Figure 10. Deployed passenger's frontal air bag*

## 2019 Ford Transit Type II Ambulance Occupants

### Paramedic Demographics (Driver)

| | |
|---|---|
| Age/sex: | 31 years/female |
| Height: | 173 cm (68 in) |
| Weight: | 152 kg (336 lb) |
| Eyewear: | Glasses |
| Seat type: | Box-mounted (i.e., van type) |
| Seat track position: | Unknown |
| Manual seat belt use: | Lap and shoulder seat belt |
| Usage source: | Vehicle inspection, police report |
| Air bags: | Driver's frontal air bag available; deployed |
| Alcohol/drug use: | None |
| Egress from vehicle: | Occupant fatally injured prior to removal from vehicle |
| Transport from scene: | Transported to county medical examiner |
| Medical treatment: | None |

### Driver Injuries

| Inj. No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 1 | Complete laceration through the aorta at level of T3-T4 just dorsal to aortic arch | 420210.5 | Tandem IPC<br>Primary: Interior – Shoulder portion of belt restraint<br>Secondary: Left air bag – Steering wheel hub<br>Tertiary: Front – Steering wheel (combination of rim and hub/spoke) | <br>Probable<br>Possible<br>Probable |
| 2 | Laceration of left hemidiaphragm allowing portion of stomach to herniate into left pleural cavity | 440610.4 | Tandem IPC<br>Primary: Interior – Shoulder portion of belt restraint<br>Secondary: Left air bag – Steering wheel hub<br>Tertiary: Front – Steering wheel (combination of rim and hub/spoke) | <br>Probable<br>Possible<br>Probable |
| 3 | Right hemothorax, 820 ml of blood | 442200.3 | Tandem IPC<br>Primary: Interior – Shoulder portion of belt restraint | <br>Probable |

| Inj. No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| | | | Secondary: Left air bag – Steering wheel hub | Possible |
| | | | Tertiary: Front – Steering wheel (combination of rim and hub/spoke) | Probable |
| 4 | Left hemothorax, 300 ml of blood | 442200.3 | Tandem IPC | |
| | | | Primary: Interior – Shoulder portion of belt restraint | Probable |
| | | | Secondary: Left air bag – Steering wheel hub | Possible |
| | | | Tertiary: Front – Steering wheel (combination of rim and hub/spoke) | Probable |
| 5 | Rib fractures: right anterior ribs 1-7; left anterior ribs 1-6 | 450203.3 | Tandem IPC | |
| | | | Primary: Interior – Shoulder portion of belt restraint | Probable |
| | | | Secondary: Left air bag – Steering wheel hub | Possible |
| | | | Tertiary: Front – Steering wheel (combination of rim and hub/spoke) | Probable |
| 6 | Extensive hemorrhagic clot in anterior mediastinum with extrusion of right lung | 442208.2 | Tandem IPC | |
| | | | Primary: Interior – Shoulder portion of belt restraint | Probable |
| | | | Secondary: Left air bag – Steering wheel hub | Possible |
| | | | Tertiary: Front – Steering wheel (combination of rim and hub/spoke) | Probable |
| 7 | Sternum fracture, upper portion | 450804.2 | Tandem IPC | |
| | | | Primary: Interior – Shoulder portion of belt restraint | Probable |
| | | | Secondary: Left air bag – Steering wheel hub | Possible |

| Inj. No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| | | | Tertiary: Steering wheel (combination of rim and hub/spoke) | |
| 8 | Laceration of inferior vena cava as it emerges from superior portion of liver | 521202.3 | Tandem IPC<br>Primary: Interior – Shoulder portion of belt restraint<br>Secondary: Left air bag – Steering wheel hub<br>Tertiary: Front – Steering wheel (combination of rim and hub/spoke) | <br>Probable<br>Possible<br>Probable |
| 9 | Numerous lacerations of posterior surfaces of liver, NFS | 541820.2 | Isolated<br>Front – Steering wheel (combination of rim and hub/spoke) | Probable |
| 10 | Fracture of middle third of left femur, NFS | 853221.3 | Isolated IPC<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 11 | Right distal femur fracture, NFS | 853331.3 | Isolated IPC<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 12 | Right tibia shaft fracture,<br>NFS | 854221.2 | Isolated IPC<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 13 | Right fibula shaft fracture | 854471.2 | Isolated<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 14 | Left tibia shaft fracture, NFS | 854221.2 | Isolated IPC<br>Front – Left lower instrument panel (includes knee bolster) | Certain |

| Inj. No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 15 | Left fibula shaft fracture | 854471.2 | Isolated<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 16 | Multiple fractures of left foot, NFS | 852004.2 | Isolated<br>Floor – Floor (including toe pan) | Certain |
| 17 | Fractures through anterior pubic symphysis | 856151.2 | Isolated IPC<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 18 | Left radius shaft fracture | 752211.2 | Isolated IPC<br>Front – Left instrument panel | Possible |
| 19 | A 30 x 18 cm extensive laceration with degloving of skin over left leg | 814004.2 | Isolated IPC<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 20 | Diffuse scalp hemorrhage of right parietal surface | 110402.1 | Injured, unknown source | Unknown |
| 21 | Diffuse scalp hemorrhage of left parietal surface | 110402.1 | Isolated<br>Left side – Left A (A1/A2)-pillar | Probable |
| 22 | 4 x 3 cm area of red abrasions on left side of forehead; 12 x 10 cm area of linear abrasions measuring up to 2 cm long extend over left cheek, mouth, and chin | 210202.1 | Isolated<br>Left side – Left A (A1/A2)-pillar | Probable |
| 23 | Linear 2 cm abrasion on anterior neck | 310202.1 | Isolated<br>Interior – Shoulder portion of belt restraint | Probable |
| 24 | 23 x 10 cm of orange abrasions and multiple | 410402.1 | Isolated | Probable |

| Inj. No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| | round contusions over anterior chest | | Front – Steering wheel hub/spoke | |
| 25 | 23 x 10 cm of orange abrasions and multiple round contusions over anterior chest | 410202.1 | Isolated<br>Front – Steering wheel hub/spoke | Probable |
| 26 | 23 x 10 cm of orange abrasions and multiple round contusions over anterior chest extending over left and right quadrants of abdomen | 510402.1 | Isolated<br>Front – Steering wheel (combination of rim and hub/spoke) | Probable |
| 27 | 23 x 10 cm of orange abrasions and multiple round contusions over anterior chest extending over left and right quadrants of abdomen | 510202.1 | Isolated<br>Front – Steering wheel (combination of rim and hub/spoke) | Probable |
| 28 | 4.5 x 3 cm laceration on left forearm | 710602.1 | Isolated IPC<br>Front – Left instrument panel | Possible |
| 29 | 11 x 10 cm abrasion over left posterior forearm | 710202.1 | Isolated IPC<br>Front – Left instrument panel | Possible |
| 30 | Multiple pinpoint contusions present over right upper arm, measuring up to 1 cm in diameter each | 710402.1 | Isolated IPC<br>Front – Left instrument panel | Possible |
| 31 | Multiple 1 cm round contusions extend over right forearm | 710402.1 | Isolated IPC<br>Front – Left instrument panel | Possible |
| 32 | A 3 x 3 cm area of linear abrasion on right antecubital fossa | 710202.1 | Isolated IPC<br>Front – Left instrument panel | Possible |

| Inj. No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 33 | 19 x 7 cm laceration over right shin | 810602.1 | Isolated<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 34 | 8.5 x 3 cm laceration on right knee | 810602.1 | Isolated<br>Front – Left lower instrument panel (includes knee bolster) | Certain |
| 35 | 3 cm laceration on right anterior thigh | 810602.1 | Isolated<br>Front - Steering wheel rim | Probable |
| 36 | A 12 x 5 cm area of multiple contusions on right hip | 810402.1 | Isolated<br>Interior – Lap portion of belt restraint | Probable |
| 37 | A 4 x 1 cm abrasion on right anterior thigh | 810202.1 | Isolated<br>Front – Steering wheel rim | Probable |
| 38 | 24 x 2.5 cm area of red abrasions on upper portion of left thigh | 810202.1 | Isolated<br>Front – Steering wheel rim | Probable |

Source: Autopsy report (internal)

## Driver Kinematics

The driver was likely seated in a nominal upright position and was restrained by her seat belt. The frontal impact displaced her forward and she loaded the seat belt, frontal air bag, steering wheel, and instrument panel as these parts intruded longitudinally into the passenger compartment. The severe impact and driver's contact with these parts resulted in catastrophic injuries to the chest, abdomen, and lower and upper extremities. As the vehicle rolled over, right-side leading, the driver was redirected in several directions as she remained in her seat belt. It is possible she contacted these intruded parts during the rollover. The driver was pronounced deceased at the crash scene and was taken to the county medical examiner.

## Paramedic Demographics (Passenger)

| | |
|---|---|
| Age/sex: | 22 years/male |
| Height: | 173 cm (68 in) |
| Weight: | 70 kg (155 lb) |
| Eyewear: | None |
| Seat type: | Box-mounted (i.e., van type) |
| Seat track position: | Unknown |
| Manual restraint usage: | Lap and shoulder belt |
| Usage source: | Vehicle inspection, police report |
| Air bags: | Passenger's frontal air bag available; deployed |
| Alcohol/drug involvement: | Unknown if tested |
| Egress from vehicle: | Removed by EMS |
| Transport from scene: | Transported to level 2 trauma center, |
| Medical treatment: | Treated and released |

## Passenger Injuries

| Injury No. | Injury | Injury Severity AIS 2015 | Involved Physical Components (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 1 | Right eye "blowout" fracture | 251223.2 | Tandem IPC<br>Primary: Right air bag – Right instrument panel<br>Secondary: Front – Right instrument panel | Possible<br>Probable |
| 2 | Left distal radius fracture | 752311.2 | Isolated IPC<br>Front – Right instrument panel | Probable |
| 3 | Left ear hearing loss injury | 240209.1 | Injured, unknown source | Unknown |
| 4 | Left knee joint injury, NFS | 874099.1 | Isolated<br>Front – Right lower instrument panel (includes knee bolster) | Probable |
| 5 | 1 inch laceration to inside of left elbow | 710602.1 | Isolated IPC<br>Front – Right instrument panel | Possible |

Source: Occupant interview

### Passenger Kinematics

The passenger occupied the right-front seat and said during the SCI interview that he was sleeping at the time of the crash, seated in an upright posture with his feet on the floor and hands in his lap. The frontal impact with the Chevrolet projected him forward, opposite the 12 o'clock direction of force. He had a right eye "blowout" fracture from contact with the air bag and right instrument panel and a hearing deficit from an unknown source. He had a left distal radius fracture and laceration to the inside of the left elbow from contact with the right instrument panel. He also had an unspecified left knee joint injury from contact with the right lower instrument panel. The passenger was redirected in several directions as the vehicle rolled over, right-side leading. He remained in his seat belt. He was transported by ambulance to a hospital where he was treated for approximately 12 hours and released.

## 2018 Chevrolet Equinox

### Description

The Chevrolet was a front-wheel drive, five-occupant, 4-door SUV with VIN 2GNAXJEVXJ6xxxxxx. It had a 1.5-liter, 4-cylinder engine on a 273 cm (107.5 in) wheelbase. The Chevrolet had dual stage driver's and passenger's frontal air bags, front outboard seat-mounted side impact air bags, inflatable curtain (IC) air bags, and front row seat belt pretensioners. The IC air bags were the only air bags remaining in the vehicle at SCI inspection.

### Exterior Damage

The Chevrolet's front end (Figures 11 and 12) was directly damaged during the impact with the ambulance. Direct damage began at the centerline and extended approximately 80 cm (31.5 in) to the left. The Field L was 183 cm (72.0 in) and crush measurements were taken on the two frame rails since the bumper beam had been detached from the left rail. The crush values were C1 = 172 cm (67.7 in), C2 = 144 cm (56.7 in), C3 = 117 cm (46.1 in), C4 = 89 cm (35.0 in), C5 = 61 cm (24.0 in), and C6 = 34 cm (13.4 in) with the maximum residual crush measured as 172 cm (67.7 in), occurring on the left frame rail, which was 116 cm (45.7 in) left of the centerline. The windshield was 80 cm (31.5 in) in longitudinal width and the maximum crush did not exceed this zone.

*Figure 11. Front-left oblique view of Chevrolet*

*Figure 12. Overhead view of Chevrolet frontal damage*

The WinSMASH program's damage algorithm calculated the Chevrolet's total delta V as 142 km/h (88.2 mph). The longitudinal and lateral velocity changes were -142 km/h (-88.2 mph) and 0 km/h. The calculation and results were considered a borderline reconstruction due to the severe crash configuration, which was beyond the parameters of the model. The CDC for this damage was 12FYAW6 (0°).

The Chevrolet sustained right-plane damage during the rollover. The WinSMASH program could not be used to determine velocity change since rollovers are out of scope for the program. The CDC for this damage was 00RDAO2.

## Event Data Recorder

The Chevrolet had an EDR but the module was removed by the investigating police agency. A public records request was made and declined. A further request was made in December 2024 and the EDR files for this vehicle were provided by the responding police agency in January 2025. The EDR was imaged and reported with version 24.3.576 of the Bosch Crash Data Retrieval software. The EDR reported two deployment events, both on the same ignition cycle. The EDR report is attached at the end of this report as Appendix A.

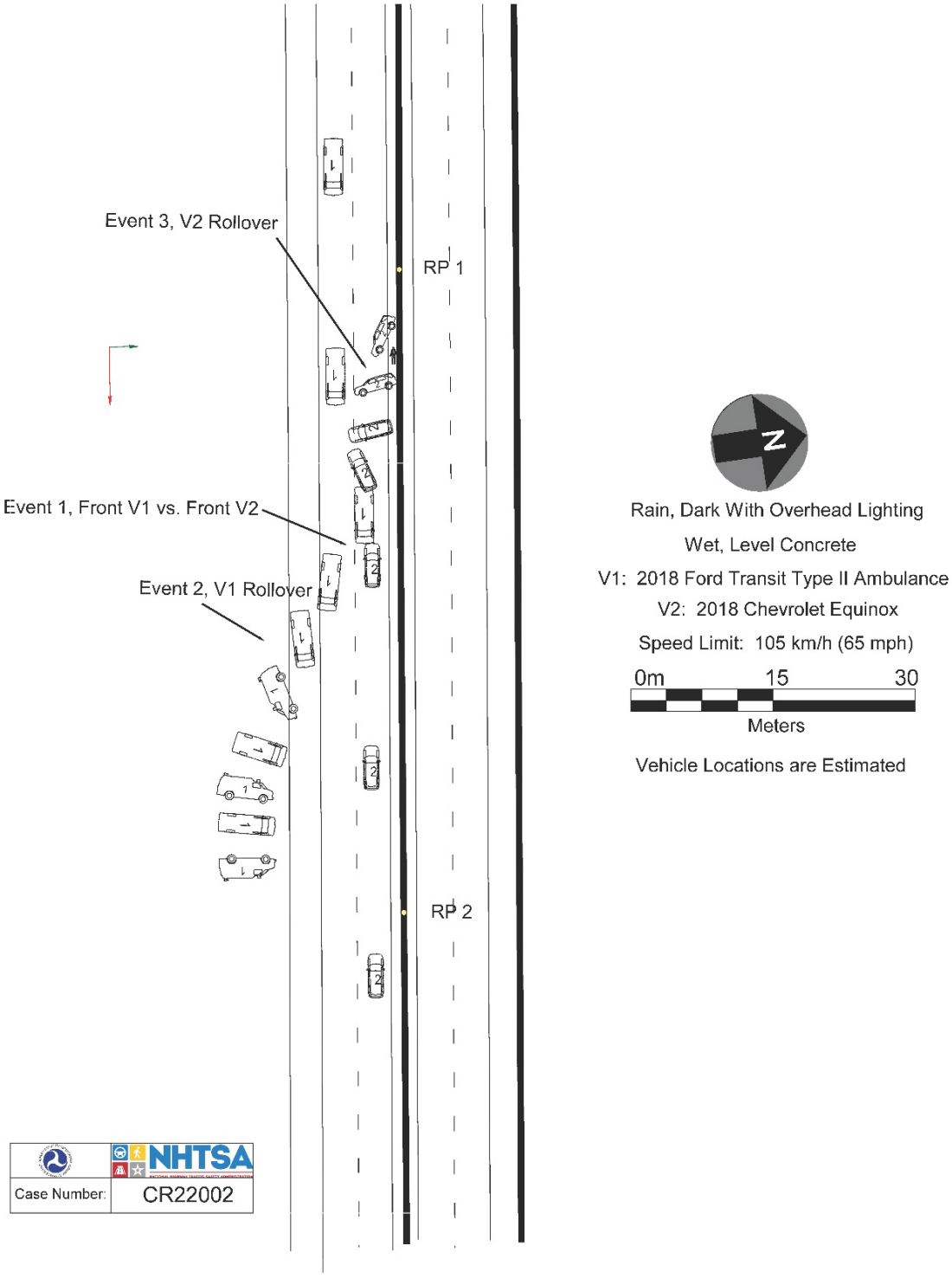
*System Status at Event (Event Record 1):* This event was recorded during the front-plane impact with the ambulance's front plane. The driver's seat belt status was "Not Buckled" and the front passenger's status was "Buckled." The supplemental inflatable restraint warning lamp status was reported as "Off." The maximum longitudinal and lateral velocity changes were reported as -76 km/h (-47 mph) and -10 km/h (-6 mph) and occurred at 194 milliseconds and 506 milliseconds after algorithm enable, respectively. Both driver's and passenger's frontal, seat-mounted side impact, and IC air bags were commanded to deploy and both pretensioners actuated. The data trouble code B0052-00 was reported, showing an air bag deployment.

*System Status at Event (Event Record 2):* This event was recorded during the right-side rollover after the initial impact. The supplemental inflatable restraint warning lamp was reported as "On." No air bags or pretensioners were commanded to deploy and three data trouble codes were reported, involving the yaw sensor, On-Star (crash reporting) sensor, and an air bag deployment.

## Occupant Data

The Chevrolet driver was ejected from the vehicle and was pronounced deceased post-crash at the scene. He was transported to the county medical examiner. The front-right passenger had police-reported A-level injuries. He was transported by ambulance to a hospital. His specific injury and treatment statuses are unknown.

## Crash Scene


Event 3, V2 Rollover
RP 1
Event 1, Front V1 vs. Front V2
Event 2, V1 Rollover
RP 2
N
Rain, Dark With Overhead Lighting
Wet, Level Concrete
V1: 2018 Ford Transit Type II Ambulance
V2: 2018 Chevrolet Equinox
Speed Limit: 105 km/h (65 mph)
0m 15 30
Meters
Vehicle Locations are Estimated
NHTSA
Case Number: CR22002

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# Appendix A: 2018 Chevrolet Equinox Event Data Recorder Report[1]

[1] The EDR report in this report was imaged using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report 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 | 2GNAXJEVXJ6xxxxxx |
| User | |
| Case Number | |
| EDR Data Imaging Date | 01/09/2025 |
| Crash Date | 01/08/2022 |
| Filename | 2GNAXJEVXJ6_ACM.CDRX |
| Saved on | Thursday, January 9 2025 at 10:26:48 |
| Imaged with CDR version | Crash Data Retrieval Tool 24.3.576 |
| Imaged with Software Licensed to (Company Name) | |
| Reported with CDR version | Crash Data Retrieval Tool 24.3.576 |
| Reported with Software Licensed to (Company Name) | |
| EDR Device Type | Airbag Control Module |
| Event(s) recovered | Deployment, Deployment |

## Comments

CDR download regarding case 2201-00237. Harris County Constable Pct. 5 case is closed

## 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 | 2 |
| Multi-Event, Number of Events (Dynamic Event Counter) | 2 |
| Dynamic OnStar Notification Event Counter | 2 |
| Vehicle Identification Number (VIN) | 2GNAXJEVXJ6252770 |
| Ignition Cycle, Download (Ignition Cycles at Investigation) | 5773 |
| End Model Part Number | 00CE36DA |
| System Type | Autoliv with integrated IMU |
| Software Module Identifier 1 | 00CE36D5 |
| Software Module Identifier 2 | 05067407 |
| Software Module Identifier 3 | 015E927A |
| Manufacturing Traceability Data, LineID | 1 |
| Manufacturing Traceability Data, ShiftID | 1 |
| Manufacturing Traceability Data, Year | 17 |
| Manufacturing Traceability Data, DayOfTheYear | 342 |
| Manufacturing Traceability Data, Serial/Lot/BatchNumber | 000036965 |
| ESS # 1 Traceability Data, Component Identifier | 00 |
| ESS # 1 Traceability Data, Part Number/Broadcast Code | 0000 |
| ESS # 1 Traceability Data, Supplier Code | 0 |
| ESS # 1 Traceability Data, Traceability Number | 000000000 |
| ESS # 2 Traceability Data, Component Identifier | 00 |
| ESS # 2 Traceability Data, Part Number/Broadcast Code | 0000 |
| ESS # 2 Traceability Data, Supplier Code | 0 |
| ESS # 2 Traceability Data, Traceability Number | 000000000 |
| 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 | 00 |
| ESS # 4 Traceability Data, Part Number/Broadcast Code | 0000 |
| ESS # 4 Traceability Data, Supplier Code | 0 |
| ESS # 4 Traceability Data, Traceability Number | 000000000 |
| ESS # 5 Traceability Data, Component Identifier | 00 |
| ESS # 5 Traceability Data, Part Number/Broadcast Code | 0000 |
| ESS # 5 Traceability Data, Supplier Code | 0 |
| ESS # 5 Traceability Data, Traceability Number | 000000000 |
| ESS # 6 Traceability Data, Component Identifier | 00 |
| ESS # 6 Traceability Data, Part Number/Broadcast Code | 0000 |
| ESS # 6 Traceability Data, Supplier Code | 0 |
| 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 | 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 | 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) | 5773 |
| 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 | No |
| Event Severity Status: Rear | No |
| Event Severity Status: Rollover | No |
| Safety Belt Status, Driver (Driver Belt Switch Circuit Status) | Not 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) | 655330 |
| Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously | 5743 |
| 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] | -47 [-76] |
| Time, Maximum Delta-V (Time From FSR Time Zero to Maximum Longitudinal SDM Recorded Vehicle Velocity Change)(msec) | 194 |
| Maximum Delta-V, Lateral (Maximum Lateral SDM Recorded Vehicle Velocity Change for FSR Event) MPH [km/h] | -6 [-10] |
| 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 | Yes |

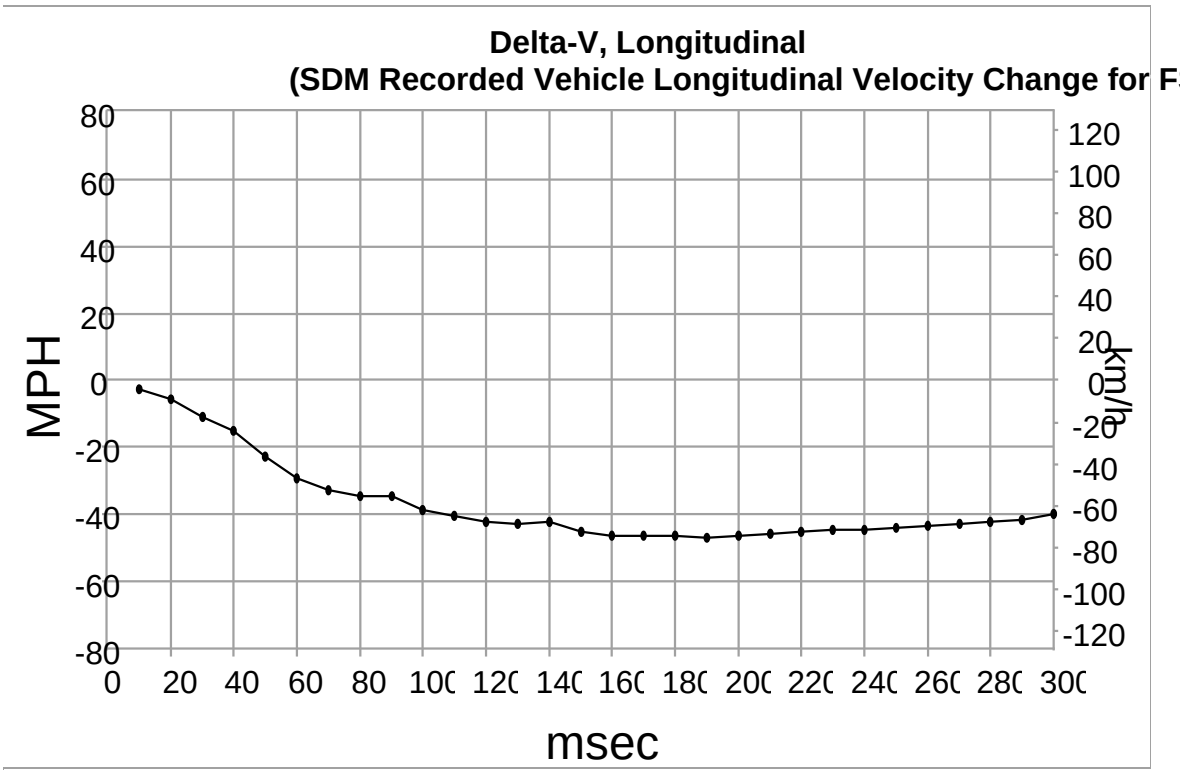
## DTCs Present at Time of Event (Event Record 1)

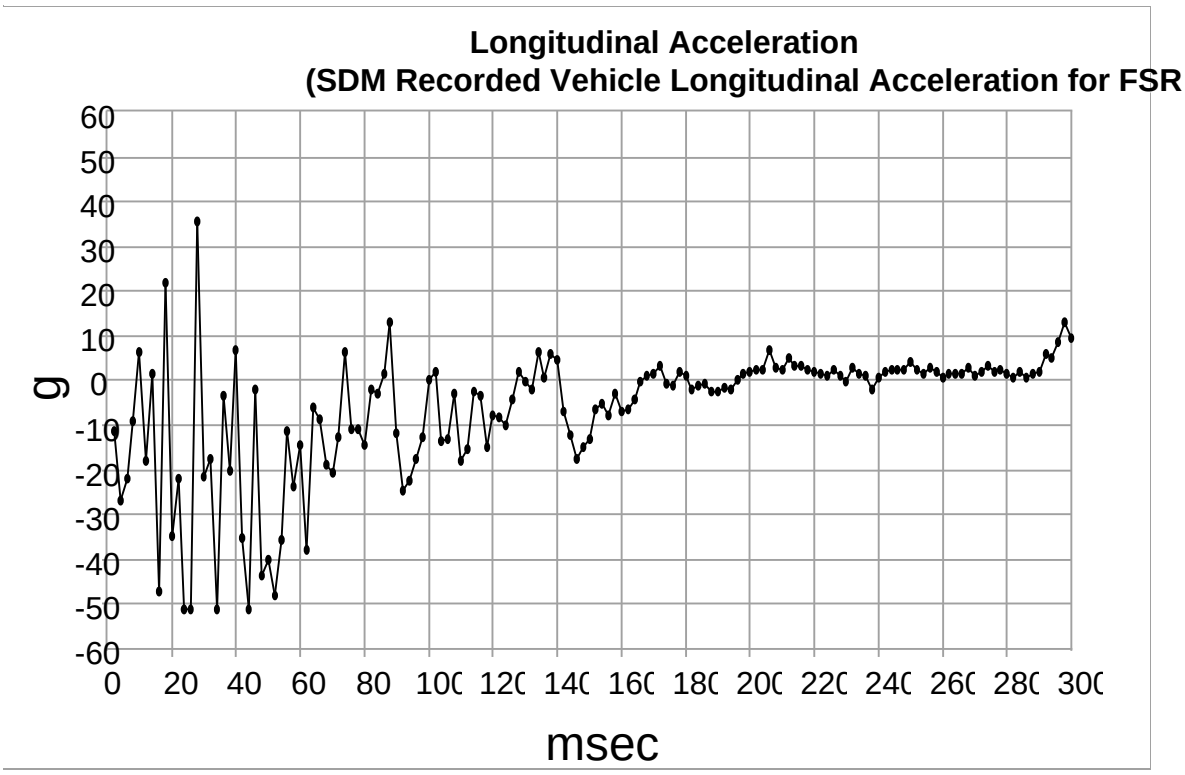
B0052-00

## 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 | 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) | 2 |
| Frontal Air Bag Deployment, Time to 2nd Stage, Driver (Driver 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec) | 5 |
| 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) | 2 |
| Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (Passenger 2nd Stage Time From Time Zero to Deployment Command Criteria Met) (msec) | 5 |
| Side air bag deployment, time to deploy, driver (Driver Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec) | 15 |
| Side air bag deployment, time to deploy, right front passenger (Passenger Thorax/Curtain Time From Time Zero to Deployment Command Criteria Met) (msec) | 15 |
| Pretensioner Deployment, Time to Fire, Driver (Driver Pretensioner Time From Time Zero to Deployment Loop #1 or Loop #2 Command Criteria Met) (msec) | 1 |
| 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) | 1 |

## Longitudinal Crash Pulse (Event Record 1)



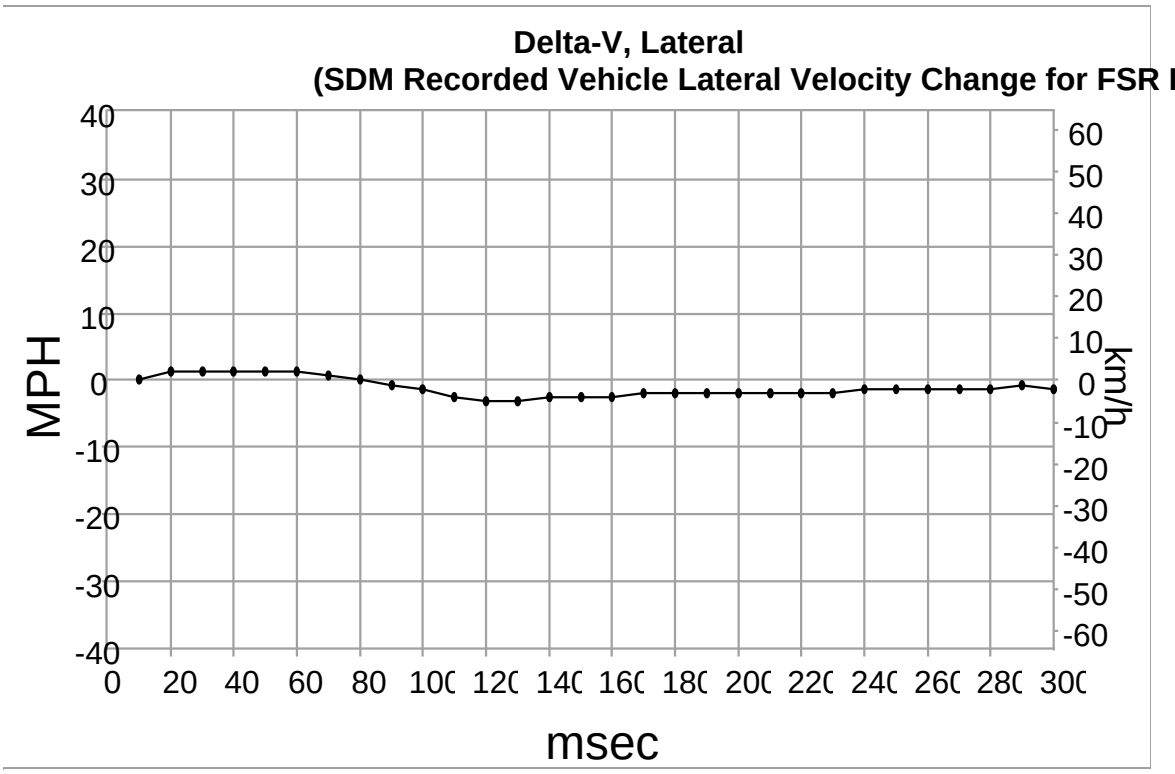
# Longitudinal Crash Pulse (Event Record 1)

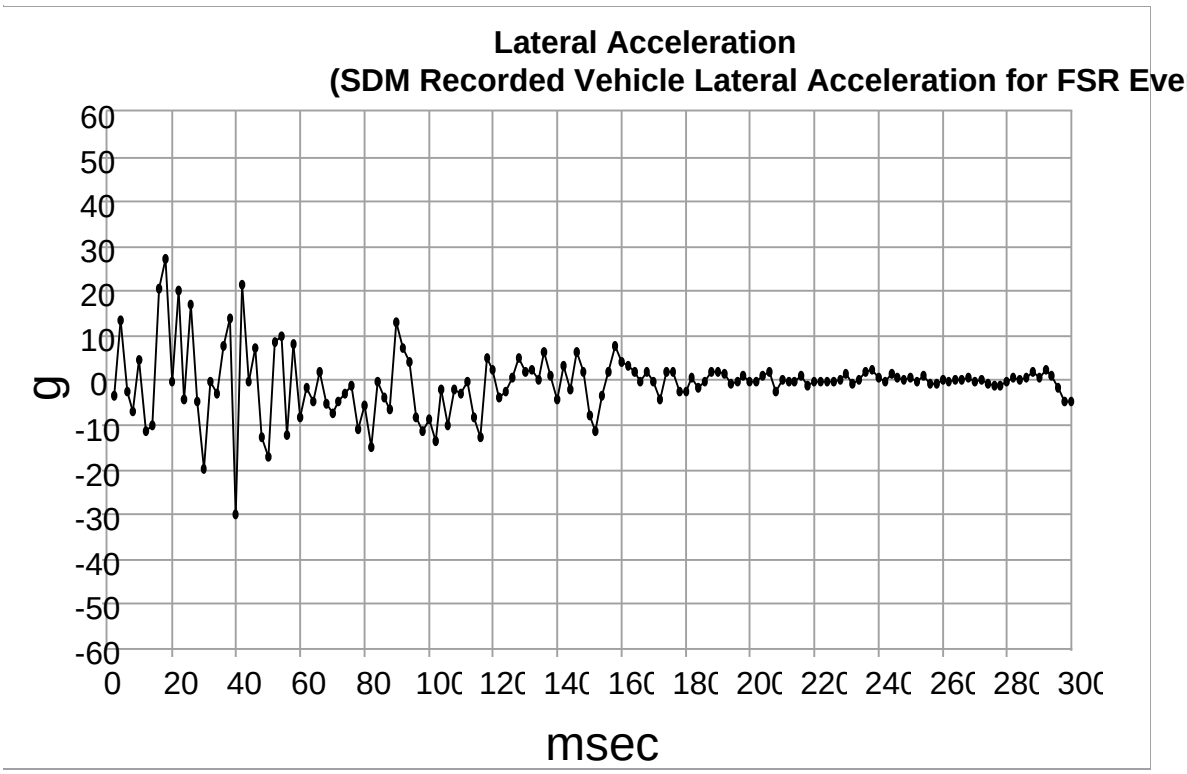
| Time (msec) | Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (MPH) | Delta-V, Longitudinal (SDM Recorded Vehicle Longitudinal Velocity Change for FSR Event) (km/h) |
|---|---|---|
| 10 | -2.5 | -4.0 |
| 20 | -5.6 | -9.0 |
| 30 | -11.2 | -18.0 |
| 40 | -14.9 | -24.0 |
| 50 | -23.0 | -37.0 |
| 60 | -29.2 | -47.0 |
| 70 | -32.9 | -53.0 |
| 80 | -34.8 | -56.0 |
| 90 | -34.8 | -56.0 |
| 100 | -38.5 | -62.0 |
| 110 | -40.4 | -65.0 |
| 120 | -42.3 | -68.0 |
| 130 | -42.9 | -69.0 |
| 140 | -42.3 | -68.0 |
| 150 | -45.4 | -73.0 |
| 160 | -46.6 | -75.0 |
| 170 | -46.6 | -75.0 |
| 180 | -46.6 | -75.0 |
| 190 | -47.2 | -76.0 |
| 200 | -46.6 | -75.0 |
| 210 | -46.0 | -74.0 |
| 220 | -45.4 | -73.0 |
| 230 | -44.7 | -72.0 |
| 240 | -44.7 | -72.0 |
| 250 | -44.1 | -71.0 |
| 260 | -43.5 | -70.0 |
| 270 | -42.9 | -69.0 |
| 280 | -42.3 | -68.0 |
| 290 | -41.6 | -67.0 |
| 300 | -39.8 | -64.0 |

## 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 | -11.4 | 102 | 2.2 | 202 | 2.6 |
| 4 | -26.6 | 104 | -13.4 | 204 | 2.6 |
| 6 | -21.8 | 106 | -13.0 | 206 | 7.0 |
| 8 | -9.0 | 108 | -3.0 | 208 | 3.0 |
| 10 | 6.6 | 110 | -17.8 | 210 | 2.6 |
| 12 | -17.8 | 112 | -15.4 | 212 | 5.0 |
| 14 | 1.4 | 114 | -2.6 | 214 | 3.4 |
| 16 | -47.0 | 116 | -3.4 | 216 | 3.4 |
| 18 | 21.8 | 118 | -15.0 | 218 | 2.6 |
| 20 | -34.6 | 120 | -7.8 | 220 | 2.2 |
| 22 | -21.8 | 122 | -8.2 | 222 | 1.4 |
| 24 | -51.0 | 124 | -9.8 | 224 | 1.0 |
| 26 | -51.0 | 126 | -4.2 | 226 | 2.6 |
| 28 | 35.8 | 128 | 2.2 | 228 | 1.0 |
| 30 | -21.4 | 130 | -0.2 | 230 | -0.2 |
| 32 | -17.4 | 132 | -1.8 | 232 | 3.0 |
| 34 | -51.0 | 134 | 6.2 | 234 | 1.4 |
| 36 | -3.4 | 136 | 0.6 | 236 | 1.0 |
| 38 | -20.2 | 138 | 5.8 | 238 | -1.8 |
| 40 | 7.0 | 140 | 4.6 | 240 | 0.6 |
| 42 | -35.0 | 142 | -7.0 | 242 | 2.2 |
| 44 | -51.0 | 144 | -12.2 | 244 | 2.6 |
| 46 | -1.8 | 146 | -17.4 | 246 | 2.6 |
| 48 | -43.8 | 148 | -15.0 | 248 | 2.6 |
| 50 | -40.2 | 150 | -13.0 | 250 | 4.2 |
| 52 | -48.2 | 152 | -6.2 | 252 | 2.6 |
| 54 | -35.8 | 154 | -5.0 | 254 | 1.4 |
| 56 | -11.4 | 156 | -7.8 | 256 | 3.0 |
| 58 | -23.8 | 158 | -3.0 | 258 | 1.8 |
| 60 | -14.6 | 160 | -7.0 | 260 | 0.6 |
| 62 | -37.8 | 162 | -6.6 | 262 | 1.4 |
| 64 | -5.8 | 164 | -4.2 | 264 | 1.4 |
| 66 | -8.6 | 166 | -0.2 | 266 | 1.4 |
| 68 | -19.0 | 168 | 1.0 | 268 | 3.0 |
| 70 | -20.6 | 170 | 1.4 | 270 | 1.0 |
| 72 | -12.6 | 172 | 3.4 | 272 | 1.8 |
| 74 | 6.2 | 174 | -0.6 | 274 | 3.4 |
| 76 | -11.0 | 176 | -1.0 | 276 | 2.2 |
| 78 | -11.0 | 178 | 1.8 | 278 | 2.6 |
| 80 | -14.6 | 180 | 1.0 | 280 | 1.4 |
| 82 | -2.2 | 182 | -1.8 | 282 | 0.6 |
| 84 | -3.0 | 184 | -1.0 | 284 | 1.8 |
| 86 | 1.4 | 186 | -0.6 | 286 | 0.6 |
| 88 | 13.0 | 188 | -2.6 | 288 | 1.4 |
| 90 | -11.8 | 190 | -2.6 | 290 | 2.2 |
| 92 | -24.6 | 192 | -1.4 | 292 | 5.8 |
| 94 | -22.2 | 194 | -1.8 | 294 | 5.0 |
| 96 | -17.4 | 196 | 0.2 | 296 | 8.6 |
| 98 | -12.6 | 198 | 1.4 | 298 | 13.0 |
| 100 | 0.2 | 200 | 2.2 | 300 | 9.4 |

## 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 | 1.2 | 2.0 |
| 40 | 1.2 | 2.0 |
| 50 | 1.2 | 2.0 |
| 60 | 1.2 | 2.0 |
| 70 | 0.6 | 1.0 |
| 80 | 0.0 | 0.0 |
| 90 | -0.6 | -1.0 |
| 100 | -1.2 | -2.0 |
| 110 | -2.5 | -4.0 |
| 120 | -3.1 | -5.0 |
| 130 | -3.1 | -5.0 |
| 140 | -2.5 | -4.0 |
| 150 | -2.5 | -4.0 |
| 160 | -2.5 | -4.0 |
| 170 | -1.9 | -3.0 |
| 180 | -1.9 | -3.0 |
| 190 | -1.9 | -3.0 |
| 200 | -1.9 | -3.0 |
| 210 | -1.9 | -3.0 |
| 220 | -1.9 | -3.0 |
| 230 | -1.9 | -3.0 |
| 240 | -1.2 | -2.0 |
| 250 | -1.2 | -2.0 |
| 260 | -1.2 | -2.0 |
| 270 | -1.2 | -2.0 |
| 280 | -1.2 | -2.0 |
| 290 | -0.6 | -1.0 |
| 300 | -1.2 | -2.0 |

## 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 | -3.4 | 102 | -13.4 | 202 | -0.2 |
| 4 | 13.4 | 104 | -2.2 | 204 | 1.0 |
| 6 | -2.6 | 106 | -9.8 | 206 | 1.8 |
| 8 | -7.0 | 108 | -1.8 | 208 | -2.6 |
| 10 | 4.6 | 110 | -3.0 | 210 | 0.2 |
| 12 | -11.4 | 112 | -0.2 | 212 | -0.2 |
| 14 | -9.8 | 114 | -8.2 | 214 | -0.2 |
| 16 | 20.6 | 116 | -12.6 | 216 | 1.0 |
| 18 | 27.4 | 118 | 5.0 | 218 | -1.0 |
| 20 | -0.2 | 120 | 2.6 | 220 | -0.2 |
| 22 | 20.2 | 122 | -3.8 | 222 | -0.2 |
| 24 | -4.2 | 124 | -2.6 | 224 | -0.2 |
| 26 | 17.0 | 126 | 0.6 | 226 | -0.2 |
| 28 | -4.6 | 128 | 5.0 | 228 | 0.2 |
| 30 | -19.8 | 130 | 2.2 | 230 | 1.4 |
| 32 | -0.2 | 132 | 2.6 | 232 | -0.6 |
| 34 | -3.0 | 134 | 0.2 | 234 | 0.2 |
| 36 | 7.8 | 136 | 6.6 | 236 | 1.8 |
| 38 | 13.8 | 138 | 1.0 | 238 | 2.6 |
| 40 | -29.8 | 140 | -4.2 | 240 | 0.6 |
| 42 | 21.4 | 142 | 3.4 | 242 | -0.2 |
| 44 | -0.2 | 144 | -1.8 | 244 | 1.4 |
| 46 | 7.4 | 146 | 6.6 | 246 | 0.6 |
| 48 | -12.6 | 148 | 1.8 | 248 | 0.2 |
| 50 | -17.0 | 150 | -7.8 | 250 | 0.6 |
| 52 | 8.6 | 152 | -11.4 | 252 | -0.2 |
| 54 | 9.8 | 154 | -3.4 | 254 | 1.0 |
| 56 | -12.2 | 156 | 2.2 | 256 | -0.6 |
| 58 | 8.2 | 158 | 7.8 | 258 | -0.6 |
| 60 | -8.2 | 160 | 4.2 | 260 | 0.2 |
| 62 | -1.4 | 162 | 3.4 | 262 | -0.2 |
| 64 | -4.6 | 164 | 1.8 | 264 | 0.2 |
| 66 | 1.8 | 166 | -0.2 | 266 | 0.2 |
| 68 | -5.0 | 168 | 1.8 | 268 | 0.6 |
| 70 | -7.4 | 170 | -0.2 | 270 | -0.2 |
| 72 | -4.6 | 172 | -4.2 | 272 | 0.2 |
| 74 | -3.0 | 174 | 2.2 | 274 | -0.6 |
| 76 | -1.0 | 176 | 1.8 | 276 | -1.0 |
| 78 | -11.0 | 178 | -2.6 | 278 | -1.0 |
| 80 | -5.4 | 180 | -2.6 | 280 | -0.2 |
| 82 | -15.0 | 182 | 0.6 | 282 | 0.6 |
| 84 | -0.2 | 184 | -1.4 | 284 | 0.2 |
| 86 | -3.8 | 186 | -0.2 | 286 | 0.6 |
| 88 | -6.2 | 188 | 2.2 | 288 | 2.2 |
| 90 | 13.0 | 190 | 2.2 | 290 | 0.6 |
| 92 | 7.4 | 192 | 1.4 | 292 | 2.6 |
| 94 | 4.2 | 194 | -0.6 | 294 | 1.0 |
| 96 | -8.2 | 196 | -0.2 | 296 | -1.4 |
| 98 | -11.4 | 198 | 1.0 | 298 | -4.6 |
| 100 | -8.6 | 200 | -0.2 | 300 | -4.6 |

## 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 | 38 | Off | 2816 | 75 | 88 [ 142] |
| -4.5 | 39 | Off | 2816 | 76 | 88 [ 142] |
| -4.0 | 39 | Off | 2752 | 75 | 89 [ 143] |
| -3.5 | 39 | Off | 2752 | 75 | 89 [ 143] |
| -3.0 | 39 | Off | 2752 | 75 | 89 [ 143] |
| -2.5 | 26 | Off | 2752 | 37 | 89 [ 143] |
| -2.0 | 23 | Off | 2752 | 38 | 89 [ 143] |
| -1.5 | 20 | Off | 2752 | 37 | 89 [ 143] |
| -1.0 | 19 | Off | 2752 | 36 | 88 [ 142] |
| -0.5 | 18 | Off | 2752 | 35 | 88 [ 142] |

## 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 | 67 [ 90] | Off |
| -1.5 | No | No | No | 60 [ 81] | Off |
| -1.0 | No | No | No | 56 [ 76] | Off |
| -0.5 | No | No | No | 49 [ 67] | 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) | 0.16 |
| Ignition Cycle, Crash (Ignition Cycles at Event) | 5773 |
| Algorithm Active:  Frontal | Yes |
| Algorithm Active:  Side | No |
| 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) | Not 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) | On |
| SIR Warning Lamp ON/OFF Time Continuously (seconds) | 0 |
| Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously | 1 |
| 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 |
| High Voltage Disable Notification Sent | Yes |
| Deployment Commanded in Energy Reserve Mode | Yes |

## DTCs Present at Time of Event (Event Record 2)

| |
|---|
| C0196-00 |
| B101D-00 |
| 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 | 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 | No |
| 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) | 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

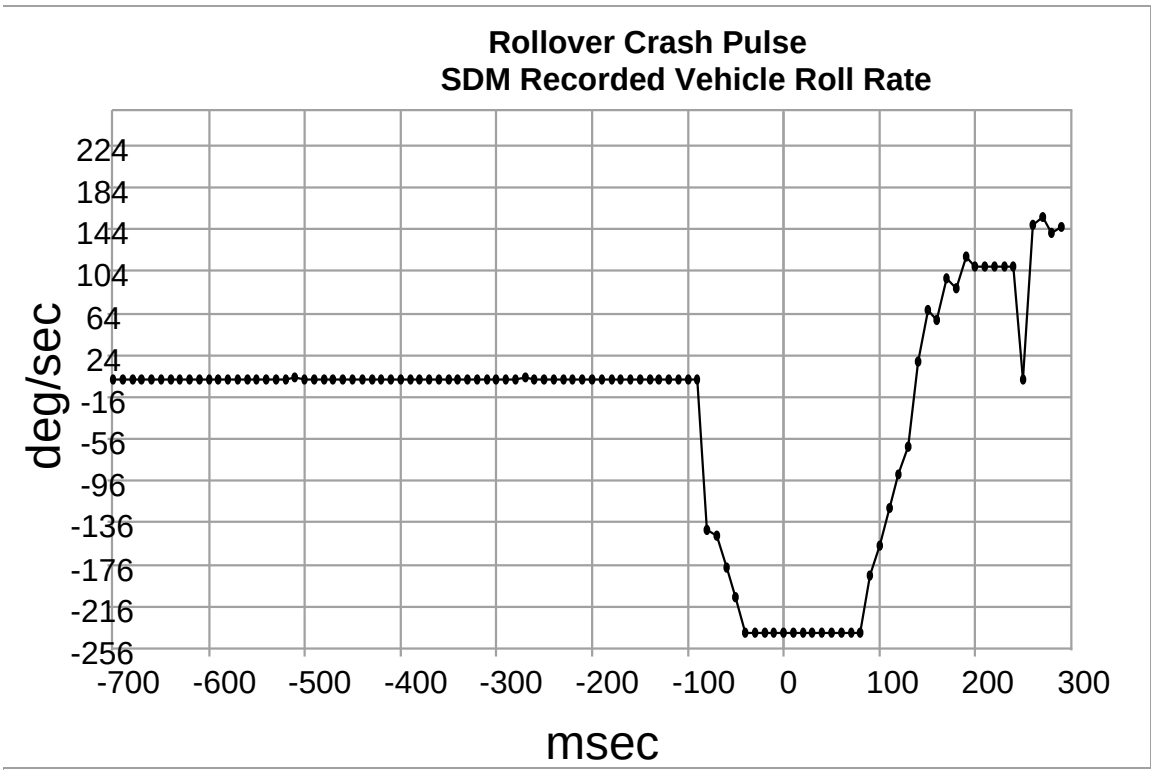
## Lateral Crash Pulse (Event Record 2)
## Delta-V, Lateral (SDM Recorded Vehicle Lateral Velocity Change for FSR Event)

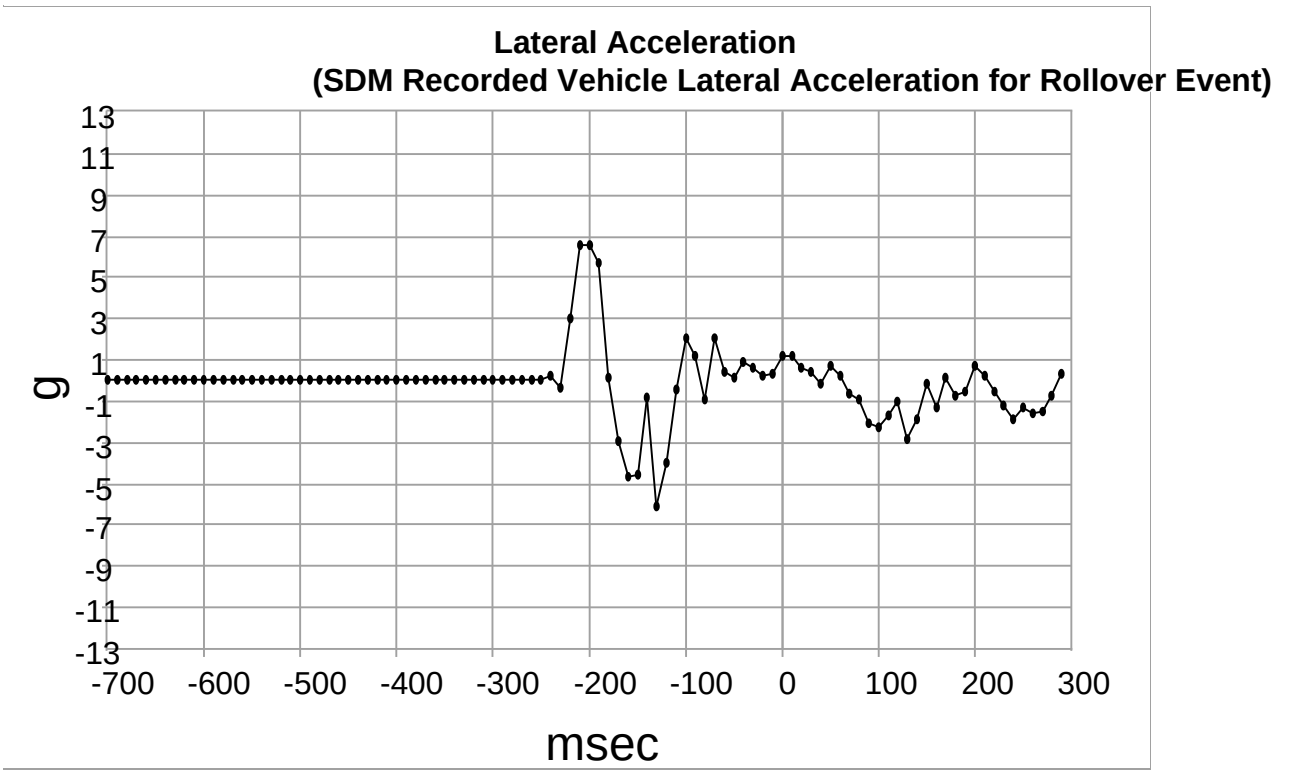
Contains No Recorded Data

## 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)



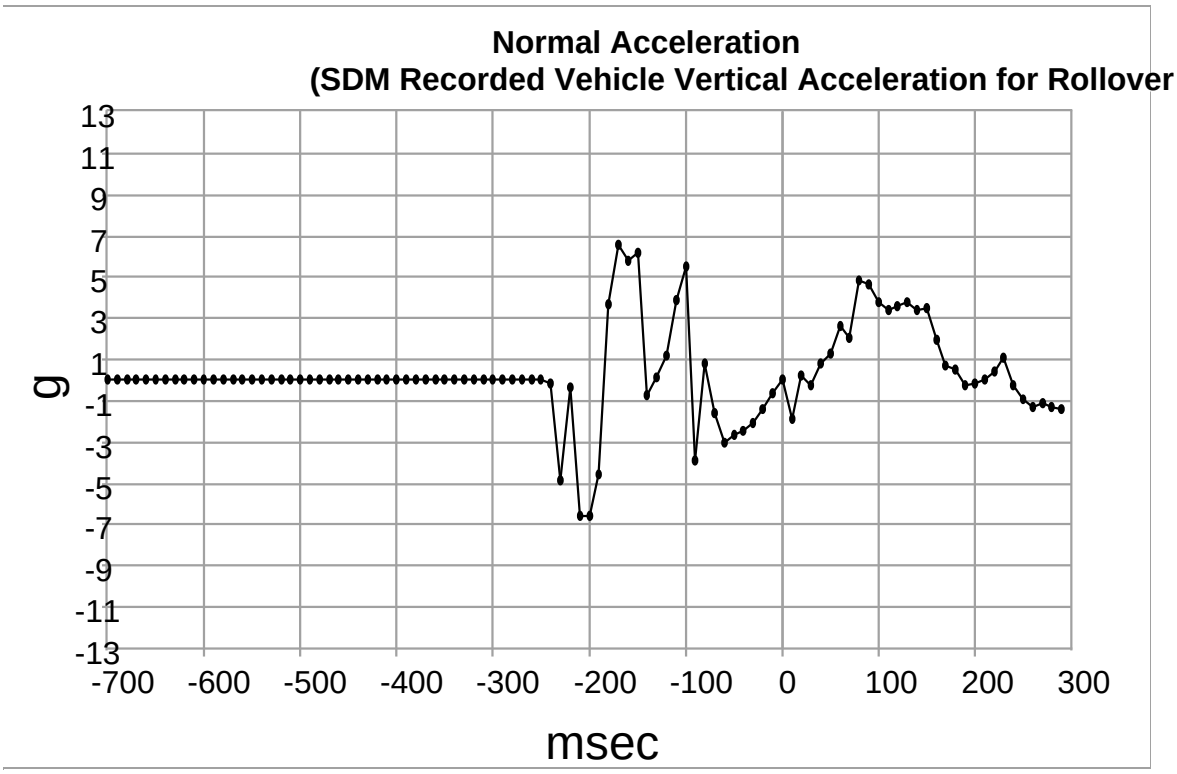
## Rollover Crash Pulse (Event Record 2)

| Time (msec) | SDM Recorded Vehicle Roll Rate (deg/sec) | Time (msec) | SDM Recorded Vehicle Roll Rate (deg/sec) |
|---|---|---|---|
| -700 | 0 | -200 | 0 |
| -690 | 0 | -190 | 0 |
| -680 | 0 | -180 | 0 |
| -670 | 0 | -170 | 0 |
| -660 | 0 | -160 | 0 |
| -650 | 0 | -150 | 0 |
| -640 | 0 | -140 | 0 |
| -630 | 0 | -130 | 0 |
| -620 | 0 | -120 | 0 |
| -610 | 0 | -110 | 0 |
| -600 | 0 | -100 | 0 |
| -590 | 0 | -90 | 0 |
| -580 | 0 | -80 | -142 |
| -570 | 0 | -70 | -148 |
| -560 | 0 | -60 | -178 |
| -550 | 0 | -50 | -206 |
| -540 | 0 | -40 | -240 |
| -530 | 0 | -30 | -240 |
| -520 | 0 | -20 | -240 |
| -510 | 2 | -10 | -240 |
| -500 | 0 | 0 | -240 |
| -490 | 0 | 10 | -240 |
| -480 | 0 | 20 | -240 |
| -470 | 0 | 30 | -240 |
| -460 | 0 | 40 | -240 |
| -450 | 0 | 50 | -240 |
| -440 | 0 | 60 | -240 |
| -430 | 0 | 70 | -240 |
| -420 | 0 | 80 | -240 |
| -410 | 0 | 90 | -186 |
| -400 | 0 | 100 | -158 |
| -390 | 0 | 110 | -122 |
| -380 | 0 | 120 | -90 |
| -370 | 0 | 130 | -64 |
| -360 | 0 | 140 | 18 |
| -350 | 0 | 150 | 68 |
| -340 | 0 | 160 | 58 |
| -330 | 0 | 170 | 98 |
| -320 | 0 | 180 | 88 |
| -310 | 0 | 190 | 118 |
| -300 | 0 | 200 | 108 |
| -290 | 0 | 210 | 108 |
| -280 | 0 | 220 | 108 |
| -270 | 2 | 230 | 108 |
| -260 | 0 | 240 | 108 |
| -250 | 0 | 250 | 0 |
| -240 | 0 | 260 | 148 |
| -230 | 0 | 270 | 156 |
| -220 | 0 | 280 | 140 |
| -210 | 0 | 290 | 146 |

## 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 | 0.0 | -200 | 6.6 |
| -690 | 0.0 | -190 | 5.7 |
| -680 | 0.0 | -180 | 0.1 |
| -670 | 0.0 | -170 | -2.9 |
| -660 | 0.0 | -160 | -4.7 |
| -650 | 0.0 | -150 | -4.6 |
| -640 | 0.0 | -140 | -0.8 |
| -630 | 0.0 | -130 | -6.1 |
| -620 | 0.0 | -120 | -4.0 |
| -610 | 0.0 | -110 | -0.4 |
| -600 | 0.0 | -100 | 2.1 |
| -590 | 0.0 | -90 | 1.2 |
| -580 | 0.0 | -80 | -0.9 |
| -570 | 0.0 | -70 | 2.1 |
| -560 | 0.0 | -60 | 0.4 |
| -550 | 0.0 | -50 | 0.1 |
| -540 | 0.0 | -40 | 0.9 |
| -530 | 0.0 | -30 | 0.6 |
| -520 | 0.0 | -20 | 0.2 |
| -510 | 0.0 | -10 | 0.3 |
| -500 | 0.0 | 0 | 1.2 |
| -490 | 0.0 | 10 | 1.2 |
| -480 | 0.0 | 20 | 0.6 |
| -470 | 0.0 | 30 | 0.4 |
| -460 | 0.0 | 40 | -0.1 |
| -450 | 0.0 | 50 | 0.7 |
| -440 | 0.0 | 60 | 0.2 |
| -430 | 0.0 | 70 | -0.6 |
| -420 | 0.0 | 80 | -0.9 |
| -410 | 0.0 | 90 | -2.1 |
| -400 | 0.0 | 100 | -2.3 |
| -390 | 0.0 | 110 | -1.7 |
| -380 | 0.0 | 120 | -1.0 |
| -370 | 0.0 | 130 | -2.8 |
| -360 | 0.0 | 140 | -1.9 |
| -350 | 0.0 | 150 | -0.1 |
| -340 | 0.0 | 160 | -1.3 |
| -330 | 0.0 | 170 | 0.1 |
| -320 | 0.0 | 180 | -0.7 |
| -310 | 0.0 | 190 | -0.5 |
| -300 | 0.0 | 200 | 0.7 |
| -290 | 0.0 | 210 | 0.2 |
| -280 | 0.0 | 220 | -0.5 |
| -270 | 0.0 | 230 | -1.2 |
| -260 | 0.0 | 240 | -1.9 |
| -250 | 0.0 | 250 | -1.3 |
| -240 | 0.2 | 260 | -1.6 |
| -230 | -0.3 | 270 | -1.5 |
| -220 | 3.0 | 280 | -0.7 |
| -210 | 6.6 | 290 | 0.3 |

## 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 | -6.6 |
| -690 | 0.0 | -190 | -4.6 |
| -680 | 0.0 | -180 | 3.7 |
| -670 | 0.0 | -170 | 6.6 |
| -660 | 0.0 | -160 | 5.8 |
| -650 | 0.0 | -150 | 6.2 |
| -640 | 0.0 | -140 | -0.7 |
| -630 | 0.0 | -130 | 0.1 |
| -620 | 0.0 | -120 | 1.2 |
| -610 | 0.0 | -110 | 3.9 |
| -600 | 0.0 | -100 | 5.5 |
| -590 | 0.0 | -90 | -3.9 |
| -580 | 0.0 | -80 | 0.8 |
| -570 | 0.0 | -70 | -1.6 |
| -560 | 0.0 | -60 | -3.0 |
| -550 | 0.0 | -50 | -2.6 |
| -540 | 0.0 | -40 | -2.4 |
| -530 | 0.0 | -30 | -2.1 |
| -520 | 0.0 | -20 | -1.4 |
| -510 | 0.0 | -10 | -0.6 |
| -500 | 0.0 | 0 | 0.0 |
| -490 | 0.0 | 10 | -1.9 |
| -480 | 0.0 | 20 | 0.2 |
| -470 | 0.0 | 30 | -0.2 |
| -460 | 0.0 | 40 | 0.8 |
| -450 | 0.0 | 50 | 1.3 |
| -440 | 0.0 | 60 | 2.6 |
| -430 | 0.0 | 70 | 2.1 |
| -420 | 0.0 | 80 | 4.8 |
| -410 | 0.0 | 90 | 4.7 |
| -400 | 0.0 | 100 | 3.8 |
| -390 | 0.0 | 110 | 3.4 |
| -380 | 0.0 | 120 | 3.6 |
| -370 | 0.0 | 130 | 3.8 |
| -360 | 0.0 | 140 | 3.4 |
| -350 | 0.0 | 150 | 3.5 |
| -340 | 0.0 | 160 | 2.0 |
| -330 | 0.0 | 170 | 0.7 |
| -320 | 0.0 | 180 | 0.5 |
| -310 | 0.0 | 190 | -0.2 |
| -300 | 0.0 | 200 | -0.1 |
| -290 | 0.0 | 210 | 0.0 |
| -280 | 0.0 | 220 | 0.4 |
| -270 | 0.0 | 230 | 1.1 |
| -260 | 0.0 | 240 | -0.2 |
| -250 | 0.0 | 250 | -0.9 |
| -240 | -0.1 | 260 | -1.3 |
| -230 | -4.8 | 270 | -1.1 |
| -220 | -0.3 | 280 | -1.3 |
| -210 | -6.6 | 290 | -1.4 |

## 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 | 38 | Off | 2816 | 75 | 88 [ 142] |
| -4.5 | 39 | Off | 2816 | 76 | 88 [ 142] |
| -4.0 | 39 | Off | 2752 | 75 | 89 [ 143] |
| -3.5 | 39 | Off | 2752 | 75 | 89 [ 143] |
| -3.0 | 39 | Off | 2752 | 75 | 89 [ 143] |
| -2.5 | 26 | Off | 2752 | 37 | 89 [ 143] |
| -2.0 | 23 | Off | 2752 | 38 | 89 [ 143] |
| -1.5 | 20 | Off | 2752 | 37 | 89 [ 143] |
| -1.0 | 19 | Off | 2752 | 36 | 88 [ 142] |
| -0.5 | 18 | Off | 2752 | 35 | 88 [ 142] |

## 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 | 67 [ 90] | Off |
| -1.5 | No | No | No | 60 [ 81] | Off |
| -1.0 | No | No | No | 56 [ 76] | Off |
| -0.5 | No | No | No | 49 [ 67] | Off |

## Hexadecimal Data

```
DPID $11
FF F0 00 FC C0 7C 00

DPID $15
01 02 03 04 05 06 07

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

DPID $17
00 00 00 00 00 00 00

DPID $32
00 FD 16 8D 00 00 00

DPID $35
78 00 00 00 00 00 00

DID $01
30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $03
30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30

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

DID $07
30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $09
30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $0B
30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30

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

DID $0F
30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $30
02 00 02 02

DID $90
32 47 4E 41 58 4A 45 56 58 4A 36 32 35 32 37 37 30

DID $9A
09 12

DID $B4
31 31 31 37 33 34 32 30 30 30 30 33 36 39 36 35

DID $C1
00 CE 36 D5

DID $C2
05 06 74 07

DID $C3
01 5E 92 7A
```

DID $CB
00 CE 36 DA

DID $31

```
 0000   A5 EC 01 00 01 01 0F 16 8D FF
 0010   FF 00 00 00 0E EB C3 00 00 00
 0020   1C FC FC F0 20 60 FC 40 12 13
 0030   14 17 1A 27 27 27 27 26 00 00
 0040   00 00 00 00 00 2B 2B 2B 2B 2B
 0050   2B 2B 2B 2C 2C 07 26 07 38 07
 0060   42 07 55 23 24 25 26 25 4B 4B
 0070   4B 4C 4B 8E 8E 8F 8F 8F 8F 8F
 0080   8F 8E 8E 00 FF FD 16 6F FD 00
 0090   00 00 00 00 00 00 00 00 00 00
 0100   00 00 00 00 00 00 00 00 00 00
 0110   00 00 00 80 52 00 33 61 75 FD
 0120   02 05 02 05 0F 0F 01 01 7B 7F
 0130   76 81 6D 81 67 81 5A 81 50 81
 0140   4A 80 47 7F 47 7E 41 7D 3E 7B
 0150   3B 7A 3A 7A 3B 7B 36 7B 34 7B
 0160   34 7C 34 7C 33 7C 34 7C 35 7C
 0170   36 7C 37 7C 37 7D 38 7D 39 7D
 0180   3A 7D 3B 7D 3C 7E 3F 7D 63 77
 0190   3D A1 49 79 69 6E 90 8B 53 63
 0200   83 67 0A B3 B6 C4 29 7F 49 B2
 0210   00 75 00 AA D9 74 4A 4E 54 7F
 0220   00 78 77 93 4D A2 91 35 28 B5
 0230   00 7F 7B 92 12 60 1B 55 07 95
 0240   26 98 63 61 44 94 5B 6B 21 7C
 0250   71 74 6A 84 50 73 4C 6D 60 74
 0260   8F 78 64 7D 64 64 5B 72 7A 5A
 0270   78 7F 83 76 A0 70 62 A0 42 92
 0280   48 8A 54 6B 60 63 80 6A 85 5E
 0290   5E 7A 5F 67 78 7B 53 78 59 7F
 0300   79 6B 77 60 5A 8C 6C 86 6B 76
 0310   67 79 75 81 85 8C 7F 85 7B 86
 0320   8F 80 81 90 8E 82 8B 75 6E 88
 0330   61 7B 54 90 5A 84 5F 6C 70 63
 0340   73 77 6C 85 78 93 6E 8A 6F 88
 0350   75 84 7F 7F 82 84 83 7F 88 75
 0360   7E 85 7D 84 84 79 82 79 7B 81
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 0390   86 82 91 84 87 79 86 80 8C 7F
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DID $32

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0710   07 7C 85 07 84 8A 07 7F 97 07
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DOT HS 813 699
March 2025

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**


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