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Special Crash Investigations: On-Site Rollover Crash Investigation; Vehicle: 2018 Honda CR-V; Location: California; Crash Date: April 2022

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

16. Abstract

This report documents the on-site investigation of a nighttime rollover crash of a 2018 Honda CR-V after a crash with a 1998 Ford Expedition in California in 2022. The Honda driver was a belted 71-year-old female with two belted 16-year-old female passengers in the second row. The Ford driver was a belted 59-year-old male. The Honda entered an intersection and was T-boned by the Ford when it ran a stop sign, causing the rollover. The Honda driver sustained severe injuries and was transported and hospitalized for 21 days. The two second-row Honda occupants were declared deceased on-scene. The Ford driver sustained police-reported "A" (suspected serious) injuries and was transported and hospitalized for an unknown duration. Police determined he was driving under the influence of alcohol and the Ford's headlights were switched off.

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Special Crash Investigations
On-Site Rollover Crash Investigation
Case No. DS22017
Vehicle: 2018 Honda CR-V
Location: California
Crash Date: April 2022

Background

This report documents the on-site investigation of a fatal rollover crash selected by the SCI group of the National Highway Traffic Safety Administration. The police crash report was selected by the Crash Report Sampling System. SCI forwarded the police crash report (PCR) to the SCI team in July 2022 with instructions to locate and submit vehicle images prior to initiating the investigation. The vehicle was a 2018 Honda CR-V (Figure 1) and the other vehicle was a 1998 Ford Expedition (Figure 2). The team submitted images obtained from the investigating police department to NHTSA in July 2022 and the case was assigned the following day. The two vehicles were on police evidence holds and the local district attorney's office assisted in arranging vehicle inspections held in May 2023 with the investigating police officer present. The Honda had an air bag control module (ACM) with event data recorder (EDR) capability supported by the Bosch CDR tool. Police removed the Honda's ACM from the vehicle and provided SCI with a copy of the EDR report in CDRx format in May 2023. The 1998 Ford Expedition did not have an ACM supported by the Bosch tool.

The crash occurred at night in April 2022 in a four-way intersection in California. Conditions were dark with artificial lighting from one overhead streetlamp, and dry with clear visibility. The Honda driver was a belted 71-year-old female and the two fatally injured passengers were her belted 16-year-old granddaughter and a 16-year-old female classmate in the second row. The Ford driver was a belted 59-year-old male. Traveling eastbound, the Honda entered the intersection. Traveling southbound, the Ford entered the intersection without stopping for the stop sign. The front plane of the Ford struck the left plane of the Honda and impact forces redirected the Honda to the southeast corner where it departed the roadway. After striking a fence with the right plane, the Honda overturned and came to rest on its right plane. The Honda driver sustained severe injuries and was transported and hospitalized for 21 days. The two second-row Honda occupants were fatally injured and declared deceased on-scene. The Ford driver sustained police-reported "A" (suspected serious) injuries and was transported and hospitalized for an unknown duration. Police determined he was driving under the influence of alcohol and the Ford's headlights were switched off. Both vehicles had disabling damage and were towed to a police evidence lot.

Figure 1. 2018 Honda CR-V

Figure 2. 1998 Ford Expedition

Summary

Crash Site

The crash site was the four-leg intersection of two undivided roadways with posted speed limits of 89 km/h (55 mph). The east/west roadway had two asphalt lanes separated by a double solid yellow painted stripe and was bordered by solid white painted fog lines and paved shoulders (Figure 3). The centerline and fog lines had milled-in rumble strips. Approaching the intersection eastbound, the roadway curved slightly right at a radius of 504 m (1,654 ft). This roadway was level and had a superelevation of -4 percent. The north/south roadway had two asphalt lanes separated by a double solid yellow painted stripe and was bordered by solid white painted fog lines and paved shoulders (Figure 4). Approaching the intersection southbound, the roadway was straight and level. The pavement for both roadways was in traveled and polished condition, and the painted lane lines appeared to be in good condition. A single overhead streetlamp was located on the northeast corner. On-scene police photos suggest the area including the intersection was quite dark with only minimal lighting provided by the streetlamp. The intersection was controlled with posted stop signs and white painted stop lines for northbound and southbound traffic. Signs posted beneath the stop signs read “cross traffic does not stop.” A “stop sign ahead” sign was posted 115 m (377 ft) north of the intersection on the right shoulder of the southbound lane. An “intersection ahead” sign was posted 120 m (394 ft) west of the intersection on the right shoulder of the eastbound lane. A crash diagram is included at the end of this report.

Figure 3. Crash site looking east to the intersection, path of 2018 Honda CR-V

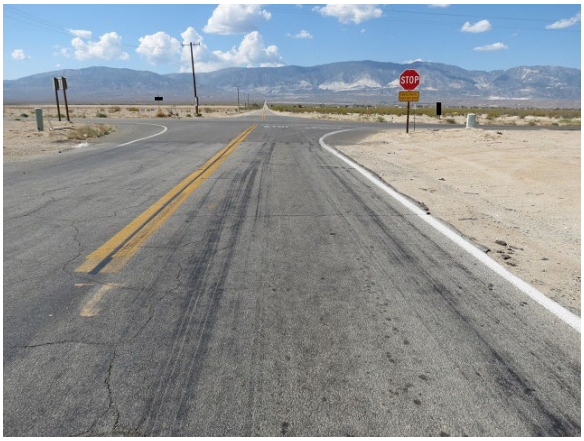

Figure 4. Crash site looking south to the intersection, path of 1998 Ford Expedition

Pre-Crash

The Honda was traveling eastbound at an EDR-reported (Event Record 1) speed of 96 km/h (60 mph) at algorithm enable (AE). Cruise control was off, and the accelerator pedal position was 46% full at T -1.0 to T -0.5 seconds. The service brake was off, and steering input was 0° at T -1.0 to T -0.5 seconds. Steering input was -15° at AE. The Honda entered the intersection at an 80° angle relative to the angle of the southbound lane and trajectory of the Ford. The Honda driver's daughter stated during an interview that the Honda driver was not distracted, did not observe the Ford approaching, and did not recall taking evasive action prior to impact. Following the crash, police noted the Ford's headlamp switch was in the "off" position, suggesting the headlamps were not in use prior to impact.

The Ford entered the intersection traveling southbound at a police-calculated impact speed of 108.5 km/h (67.4 mph). Police found no evidence to suggest the Ford driver braked prior to impact.

Crash

The crash included four events. The Ford's front plane struck the Honda's left plane (Event 1). For the Honda, this was an air bag deployment-level event. The calculated directions of force were 290° for the Honda and 20° for the Ford. Based on EDR data and vehicle damage, this was the highest delta V event for the Honda. The initial impact was followed by a secondary side-slap when the Ford rotated counterclockwise, and its right plane struck the Honda's left plane (Event 2). This contact was captured by the Honda's EDR (Event 2). The calculated directions of force were 260° for the Honda and 80° for the Ford. Based on EDR data, this was the second highest delta V event for the Honda. Impact forces displaced the Honda to the right, and following disengagement of the two vehicles, the Honda departed the roadway on the southeast corner. After traveling off-road in a yaw for approximately 10 m (33 ft), the vehicle's right plane struck a barbed wire fence (Event 3), which yielded. On the field side of the fence, the Honda's right-side tires engaged a dirt and sand embankment, causing the vehicle to initiate a right-side-leading trip rollover (Event 4). After rolling one quarter-turn, the vehicle came to rest on its right plane and facing west on the roadside. The estimated rollover distance was 6 m (20 ft).

The Ford traveled in a post-impact, southbound trajectory while rotating counterclockwise and departed the roadway on the southeast corner, where it came to rest facing north on the roadside.

For the Honda in Event 1, WinSMASH calculated a total delta V of 55 km/h (34 mph), longitudinal delta V of -19 km/h (-12 mph), and lateral delta V of 51 km/h (32 mph). The Honda's EDR (Event 1) captured a maximum longitudinal delta V of -20 km/h (-12 mph) and a maximum lateral delta V of 61 km/h (38 mph). The EDR-reported values were used to calculate a total delta V of 64 km/h (40 mph).[1]

For the Ford in Event 1, WinSMASH calculated a total delta V of 42 km/h (26 mph), longitudinal delta V of -40 km/h (-25 mph), and lateral delta V of -15 km/h (-9 mph). The WinSMASH results for both vehicles fit the model and appeared reasonable.

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[1] $\Delta Vt=\sqrt{\Delta Vx^2+\Delta Vy^2}$

For the Honda in Event 2, the vehicle's EDR captured a maximum longitudinal delta V of 6 km/h (4 mph) and a maximum lateral delta V of 32 km/h (20 mph). The EDR-reported values were used to calculate a total delta V of 32 km/h (20 mph).

Post-Crash

Following the crash, the Honda was at rest on its right side. The Honda driver was incapacitated by injuries and the second-row occupants were deceased due to injuries. Emergency responders cut the left side pillars near the roof of the Honda and cut out most of the windshield during efforts to remove the driver from the vehicle. She was transported by ambulance and hospitalized for 21 days. The two second-row occupants were pronounced deceased on-scene. The Ford driver was transported by ambulance to a hospital where he was admitted for an unknown duration. Police determined he was driving under the influence of alcohol. Both vehicles sustained disabling damage and were towed to a police evidence lot.

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2018 Honda CR-V

Vehicle Description

The 2018 Honda CR-V was identified using the VIN 2HKRW5H36JHxxxxxx. The manufacture date was May 2018, and the odometer reading is unknown. The most recent odometer reading on a vehicle history report was 97,478 km (60,570 mi) in October 2021. The Honda was a 4-door compact utility vehicle with a rear hatch and two rows of seats for five occupants. It had a 4-cylinder, 2.4-liter gasoline engine with front-wheel drive. The vehicle manufacturer recommended size P235/65R17 tires. It had Yokohama YK-HTC tires of the recommended size manufactured in 2020-2021. The Honda had a standard antilock braking system, electronic stability control, traction control, and a backup camera. The front row had bucket seats with adjustable head restraints and the back row had a split bench seat with folding backs and adjustable head restraints. The driver's seat cushion and seat back were deformed. According to the interviewee, the seat track setting was the middle position, and according to the EDR report, it was not in the foremost position. The steering column had tilt and telescoping functionality. At inspection, it was full-up and full-forward. The interviewee stated it was likely set to the center and mid-point position.

Exterior Damage

The Honda sustained direct and induced damage to the front, back, right, left, and top planes. Event 1 caused direct damage to the left side plane beginning at the left rear axle and extending forward 295 cm (116.1 in) to the left front bumper corner. Vertically, direct damage extended from the sill to above the beltline. Crush measurements to the left plane taken at mid-door level were calculated as follows. C1 = 0 cm, C2 = 7 cm (2.8 in), C3 = 41 cm (16.1 in), C4 = 44 cm (17.3 in), C5 = 12 cm (4.7 in), and C6 = 0 cm. Maximum crush was 47 cm (18.5 in) and was located on the left B-pillar, 100 cm (39.4 in) forward of the left rear axle. The collision deformation classification (CDC) for the Honda in Event 1 was 10LYAW3 (Figures 5 and 6). Event 2 caused unknown minor damage to the left plane that was overlapped and masked by prior damage. The estimated CDC for Event 2 was 09L99W99. The door/sill differential measured at the left side second-row door was 18 cm (7.1 in).

Figure 5. Left plane damage, 2018 Honda CR-V

Figure 6. Left plane damage, 2018 Honda CR-V

The Honda sustained minor damage to the right plane when it struck a barbed wire fence in Event 3. Some of the damage was overlapped and masked by subsequent rollover damage. The estimated CDC for Event 3 was 03RDEW1.

The vehicle sustained minor crush to the greenhouse in the one quarter-turn rollover in Event 4. Maximum lateral crush was located at the right D-pillar and measured 4 cm (1.6 in). Maximum vertical crush was located on the right forward roof near the A-pillar and measured 10 cm (3.9 in). The CDC for the Honda in Event 4 was 00RDAO3.

The Honda had post-crash damage caused by emergency responders during extrication efforts. The left pillars were cut through and the roof appeared to have been raised on the left side. The left side doors had been sprung after being jammed shut.

Rollover Discussion

The Honda had a NHTSA rollover rating[2] of 4 stars (of a possible 5 stars). A rollover resistance test was used to measure the risk of rollover in a single-vehicle, loss-of-control scenario; the results for this vehicle was a rollover risk of 16.3 percent.

The Insurance Institute for Highway Safety gave the vehicle a "good" (highest) rating for roof strength.[3] The test vehicle was a 2017 Honda CR-V LX all-wheel drive model, and the rating applies to 2017-2022 models. During testing, the peak strength-to-weight ratio recorded at any time before the roof is crushed 5 inches is the key measurement of roof strength. A good rating requires a strength-to-weight ratio of at least 4. The roof must withstand a force of at least 4 times the vehicle's weight before the plate crushes the roof by 5 inches. The strength-to-weight ratio for this vehicle was 5.33.

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

- Front-row seat belt retractor pretensioners. Based on EDR data, the pretensioners actuated prior to the rollover event.
- IC air bags, with a minimum inflation duration of 6 seconds. Based on EDR data, the left and right IC air bags deployed prior to the rollover event.

Event Data Recorder

The Honda had an SRS control unit with EDR capability. Police removed the control unit from the vehicle and performed a bench top, direct-to-module download using the Bosch CDR tool version 21.4.1. Following their investigation, they provided SCI with a copy of the EDR report in *.CDRx format. Bosch CDR tool version 23.1.2 was used to report the data, and the complete EDR report is included in Appendix A of this technical report.

According to the data limitations, the SRS control unit typically records only one event. Two events can be recorded if the T0 (time zero) values for each event occur within 5 seconds of each other, and a non-deployment event can be recorded and locked if it occurs within 5 seconds of a deployment event. Such was the case in this crash. Crash Event 1 was captured as a deployment event and crash Event 2 was captured as a non-deployment event. For both EDR events, ignition cycles at crash were 5,849. The EDR report included deployment, pre-crash, and post-crash data.

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[2] www.nhtsa.gov/vehicle/2018/HONDA/CR-V/SUV/FWD#safety-ratings-rollover

[3] www.iihs.org/ratings/vehicle/honda/cr-v-4-door-suv/2018

The fence impact and rollover event were not captured. The control unit had capability to record rollover data, but it appears no rollover data was captured due to the maximum number of locked events having been recorded prior to the rollover event.

Interior Damage

The Honda had interior damage caused by impact forces, integrity loss, air bag deployments and occupant contacts. Glazing disintegration caused integrity loss on the left, right, and back planes. The windshield was fractured during the crash and cut away during post-crash activities; the back and side glass was disintegrated except for the right rear side glass that was intact. The left side doors were jammed shut. Four air bags deployed and the driver's seat belt pretensioner actuated. The driver's seat and the second-row left seat were deformed due to left side lateral intrusion (Figures 7 and 8). The center console in the front row was deformed and displaced. The front row was reduced by lateral intrusion of the left door, rear lower quadrant (22 cm [8.7 in]); the left B-pillar (22 cm [8.7 in]); the left sill (22 cm [8.7 in]); and the left roof side rail (4 cm [1.6 in]). The second row was reduced by lateral intrusion of the left door, forward upper quadrant (30 cm [11.8 in]); the left C-pillar (3 cm [1.3 in]); the left sill (30 cm [11.8 in]); and the left roof side rail (7 cm [2.8 in]). A blood deposit on the deployed right IC air bag resulted from an occupant contact from the second-row right occupant.

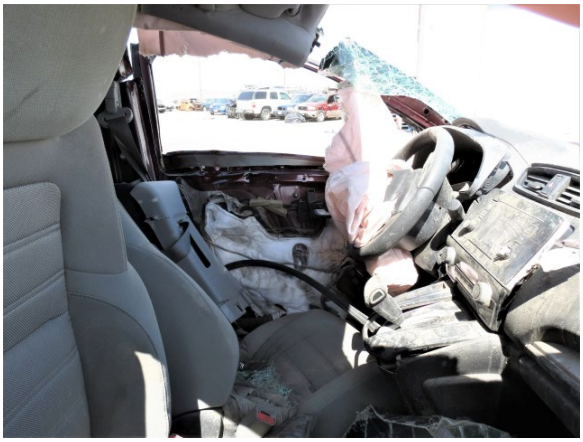

Figure 7. Interior damage, 2018 Honda CR-V

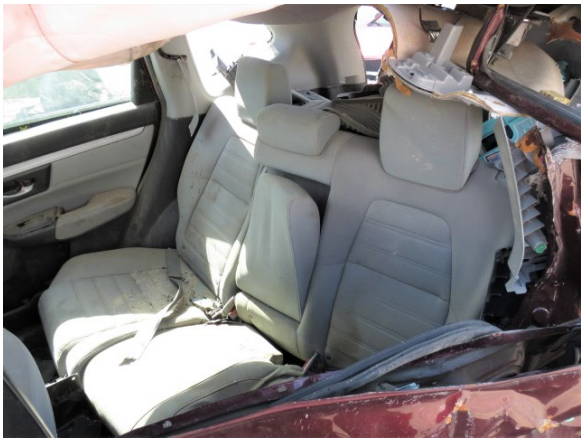

Figure 8. Interior damage, 2018 Honda CR-V

Manual Restraint Systems

The Honda had lap and shoulder seat belts for all seat positions. Based on the police crash report, EDR report, vehicle inspection, and interview, all occupants were belted. The driver's seat belt pretensioner actuated in Event 1, locking the belt in the used position. The shoulder portion of the belt had scuff marks caused by occupant loading. The second-row left and right position belts were cut by emergency responders during efforts to remove the occupants. At inspection, the belts were found lying on the seat cushions and the latch plates were found inserted into the buckles. Both second-row occupants' autopsy reports documented seat belt abrasions present on their torsos.

Supplemental Restraint Systems

The Honda had driver's and passenger's frontal, front outboard seat-mounted side-impact, and combination side-impact/roll-sensing IC air bags for both rows. The air bags were original

equipment and had not been recalled, serviced, or replaced. A vehicle history report indicated the Honda was a single-owner vehicle without prior crashes or air bag maintenance and this was confirmed by the surrogate driver interviewee. Four of the six available air bags deployed in this crash, including the driver's frontal and outboard seat-mounted air bags, and both IC air bags. Per the EDR report, the air bags deployed during Event 1. The IC air bags had a minimum inflation duration of six seconds, suggesting they remained inflated during the rollover event. The left IC air bag was cut during post-crash activities and the right IC air bag had blood deposits from a second-row right occupant contact. The driver's air bags were not damaged.

NHTSA Recalls and Investigations

At the time of the crash, no incomplete recalls existed for this vehicle. VIN-based NHTSA recall searches queried in May 2023 and November 2024 revealed two incomplete recalls - NHTSA Recall Number 23V-158/Manufacturer Recall Number FDG (March 9, 2023), and NHTSA Recall Number 23V-158/Manufacturer Recall Number QDB (March 9, 2023) The recalls were related to driver and front passenger seat belt buckles and the investigation determined the recall issues were unrelated to the crash.

2018 Honda CR-V Occupants

Driver Demographics

Age/sex:	71 years/female
Height:	170 cm (67 in)
Weight:	70 kg (154 lb)
Eyewear:	None
Seat type:	Bucket with adjustable head restraint
Seat track position:	Middle
Manual restraint usage:	Lap and shoulder belt available, used
Usage source:	Vehicle inspection, EDR report, police crash report
Air bags:	Frontal, seat-mounted, and IC air bags available; all deployed
Alcohol/drug data:	None, according to police crash report and medical records
Egress from vehicle:	Removed due to perceived serious injuries
Transport from scene:	Ambulance to hospital
Type of medical treatment:	Admitted 21 days

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Laceration, spleen, grade IV	544226.4	Tandem: Left air bag and left door panel	Probable
2	Hemopneumothorax, left	442205.3	Tandem: Left air bag and left door panel	Probable
3	Fractures, left ribs L4, L5, L7-L12	450203.3	Tandem: Left air bag and left door panel	Probable
4	Subarachnoid hemorrhage, right cerebrum, associated with LOC ≤ 6 hours	140694.2	Left roof side rail	Possible
5	Contusion, left lung	441407.2	Tandem: Left air bag and left door panel	Probable
6	Laceration, left kidney, grade I	541622.2	Tandem: Left air bag and left door panel	Probable
7	Laceration NFS, liver	541820.2	Center console	Possible

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
8	Fracture, pelvic ring, bilateral pubic rami, left sacrum, stable	856151.2	Critical 2-point: Left door panel and center console	Probable
9	Fracture, pelvis, left acetabulum;	856200.2	Tandem: Left air bag and left door panel	Probable
10	Abrasion, right hand	710202.1	Left IP	Possible
11	Abrasion, right knee	810202.1	Left lower IP	Possible

Source: medical records

Driver Kinematics

The belted Honda driver was seated in a normal posture. She did not see the Ford approaching from her left. She was actively steering and accelerating through the intersection when the Honda was struck on the left plane (occupant compartment sector). At impact, the driver's frontal, outboard seat-mounted side-impact, and IC air bags deployed and her seat belt pretensioner actuated. The left door panel, left B-pillar, and left sill each intruded laterally, reducing the occupant space and deforming the driver's seat cushion and seat back; the side glass disintegrated. The driver was displaced to the left in response to impact forces. Her head contacted the deployed IC air bag, and possibly extended through the window frame and contacted the exterior of the other vehicle. She sustained a subarachnoid hemorrhage to the right cerebrum, associated with a loss of consciousness. Her thorax, abdomen, and pelvis contacted the left door panel, causing injuries to the chest, abdomen, and pelvis. She sustained a hemopneumothorax and contusion to the left lung, fractures to 8 left ribs, lacerations to the liver and left kidney, multiple fractures to the pelvic ring, and a fracture to the left acetabulum. She was held partially in her seated position by the pretensioned belt while the Honda was displaced to the right and departed the roadway on the right edge. Once off-road, the Honda traveled in a right-side-leading yaw while striking a wire fence with its right plane. The driver remained in her seat while the vehicle tripped right side leading and came to rest on its right side. Emergency responders cut a hole in the vehicle's windshield and removed the driver through the opening. During extrication efforts, she was conscious but not speaking. The driver was transported by ambulance to a hospital and then transferred to another hospital. She was admitted for 21 days, then transferred to a rehabilitation facility for 7 days, and continued seeking follow-up treatment as of June 2023. She returned to work in January 2023.

Second-Row Left Occupant Demographics

Age/sex:	16 years/female
Height:	163 cm (64 in)
Weight:	58 kg (128 lb)
Eyewear:	Contact lenses
Seat type:	Split bench with folding backs
Seat track position:	Not adjustable
Manual restraint usage:	Lap and shoulder belt available, used
Usage source:	Vehicle inspection, EDR report, police crash report
Air bags:	IC air bag available, deployed
Egress from vehicle:	Pronounced deceased prior to removal
Transport from scene:	None
Type of medical treatment:	None

Second-Row Left Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Transection, cervical spinal cord with hemorrhage in spinal canal; fracture, C1; dislocation, atlanto-occipital	610236.6	Tandem: Left IC air bag and other vehicle exterior (hood)	Possible
2	Subdural hemorrhage, left and right cerebrum	140651.3	Tandem: Left IC air bag and other vehicle exterior (hood)	Possible
3	Contusions, bilateral lungs NFS	441410.3	Left door panel	Probable
4	Hemothorax, right chest; 400 ml blood in pleural cavity	442200.3	Left door panel	Probable
5	Hemothorax, left chest; 200 ml blood in pleural cavity	442200.3	Left door panel	Probable
6	Lacerations, left lung	441430.3	Left door panel	Probable
7	Fractures, anterior right ribs R3-R5, posterior R1-R2	450203.3	Other occupant	Possible
8	Subarachnoid hemorrhage, diffuse coverage, cerebrum	140693.2	Tandem: Left IC air bag and other vehicle exterior (hood)	Possible
9	Fracture NFS, mid maxilla	250800.2	Tandem:	Possible

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
			Left IC air bag and other vehicle exterior (hood)	
10	Laceration, pericardium	441602.2	Left door panel	Possible
11	Fracture, mid right clavicle	750621.2	Other occupant	Possible
12	Fracture, distal left clavicle	750731.2	Left door panel	Probable
13	Fracture, right radius	752251.2	Other occupant	Possible
14	Subcutaneous hemorrhage, left frontal scalp	110402.1	Other vehicle exterior (hood)	Possible
15	Petechial hemorrhages, palpebral conjunctive both eyes	240416.1	Other vehicle exterior (hood)	Possible
16	Abrasions and dicing lacerations, left face; forehead, upper and lower lips, chin	210202.1	Flying glass	Possible
17	Fractures, teeth; upper lateral incisor	251404.1	Other vehicle exterior (hood)	Possible
18	Fracture NFS, left mandible	250600.1	Other vehicle exterior (hood)	Possible
19	Laceration, tongue	243400.1	Other vehicle exterior (hood)	Possible
20	Contusions, chest	410402.1	Shoulder seat belt	Possible
21	Abrasions, upper arm and forearm, right	710202.1	Flying glass	Possible
22	Abrasions, anterior right thigh and lower leg	810202.1	Other occupant	Possible
23	Abrasions, anterior left thigh	810202.1	Left door panel	Probable
24	Abrasions, upper arm and forearm, left	710202.1	Flying glass	Possible

Source: autopsy

Second-Row Left Occupant Kinematics

The belted occupant was seated in a normal posture. At impact with the other vehicle, the left IC air bag deployed, and the occupant was displaced to the left in response to the direction of force. The left door, C-pillar, and sill intruded laterally reducing the occupant space. The side glass disintegrated. Her left torso, hip, and lower extremities contacted the left door panel. Her head and neck continued to be displaced to the left, contacted the deployed IC air bag, and passed through the window frame. This movement caused a hyperflexion resulting in a transection of the spinal cord, fracture to the cervical spine at C1, and dislocation of the atlanto-occipital joint. Her head likely contacted the exterior (front plane, hood) of the other vehicle, causing head and facial injuries including subdural and subarachnoid hemorrhages of the cerebrum, and fractures to the maxilla and mandible. Door contact caused injuries to the chest and abdomen including contusions to both lungs, lacerations to the left lung, hemothoraces, fracture to the left clavicle, and a laceration to the pericardium. Injuries included hemorrhages to both eye conjunctives and the frontal scalp, laceration to the tongue, fractures to teeth, and abrasions and dicing lacerations to the left face, forehead, upper and lower lips, and chin. The second-row right occupant was displaced to the left and contacted the left occupant, causing injuries including fractures to the right clavicle, right ribs R1-R5, right radius, and abrasions to the right thigh and lower leg. The Honda was displaced to the right and departed the roadway where it overturned right side leading and came to rest on its right side. Emergency responders found the occupant belted and unresponsive and she was pronounced deceased on-scene prior to her removal from the vehicle. The official cause of death was blunt force injuries.

Second-Row Right Occupant Demographics

Age/sex:	16 years/female
Height:	165 cm (65 in)
Weight:	64 kg (142 lb)
Eyewear:	None
Seat type:	Split bench with folding backs
Seat track position:	Not adjustable
Manual restraint usage:	Lap and shoulder belt available, used
Usage source:	Vehicle inspection, EDR report, police crash report
Air bags:	IC air bag available, deployed
Egress from vehicle:	Pronounced deceased prior to removal
Transport from scene:	None
Type of medical treatment:	None

Second-Row Right Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Fractures, basilar skull; sphenoid, petrous part of both temporal bones and both occipital bones	150200.3	Other occupant	Possible
2	Subdural hemorrhage, left and right cerebrum	140651.3	Other occupant	Possible
3	Intraventricular hemorrhage, cerebrum	140678.2	Other occupant	Possible
4 5	Contusions, colon and jejunum-ileum	540810.2 541410.2	Lap seat belt	Probable
6	Laceration, mesentery	542020.2	Lap seat belt	Probable
7	Subgaleal hemorrhage left frontal, temporal, and parietal scalp	110402.1	Other occupant	Possible
8	Abrasions, right eyelid, nose, lower lip	210202.1	Other occupant	Possible
9	Fracture, posterior left rib L12	450201.1	Shoulder seat belt	Possible
10	Abrasion, extending right upper chest to left upper abdomen	410202.1	Shoulder seat belt	Probable
11	Abrasions, left and right hips	810202.1	Lap seat belt	Probable
12	Contusions, posterior left upper arm	710402.1	Other occupant	Possible
13	Abrasions, dorsal left hand	710202.1	Other occupant	Possible
14	Abrasions and contusions, left and right thighs, knees, and lower legs	810202.1	Front row seat back	Possible
15	Contusion, extending right upper chest to left upper abdomen	410402.1	Shoulder seat belt	Probable
16	Laceration with contusion, left eyelid and eyebrow	210600.1	Other occupant	Possible
17	Contusion, right eyelid	210402.1	Other occupant	Possible
18	Contusion, inner lip	210402.1	Other occupant	Possible

Source: autopsy

Second-Row Right Occupant Kinematics

The belted occupant was seated in a normal posture. At impact with the other vehicle, the occupant was displaced to the left in response to the direction of force and the right IC air bag deployed. The occupant's pelvis and lower extremities were held partially in place by the lap seat belt while her head, neck, upper extremities, and torso continued to be displaced to the left until they contacted the second-row left occupant. The inter-occupant contact caused injuries ranging in AIS severity from serious to minor including fractures to the basilar skull, subdural and intraventricular hemorrhages to the cerebrum, fractures to the left and right vault skull, and multiple hemorrhages to the scalp. The occupant's abdomen loaded the lap portion of the seat belt causing injuries including contusions to the colon and jejunum-ileum, laceration to the mesentery, and abrasions to the left and right pelvis. As she rotated clockwise around the belt, she loaded the shoulder portion of the seat belt causing a fracture to the left rib L12 and abrasions extending from the right upper chest to the left upper abdomen. Her lower extremities contacted the front-row seat backs causing abrasions and contusions to the left and right thighs, knees, and lower legs. The Honda was displaced to the right and departed the roadway on the southeast corner where it overturned right side leading and came to rest on its right side. The occupant was displaced to the right where she came to rest against the right door panel and deployed right IC air bag. Emergency responders found the occupant belted and unresponsive and she was pronounced deceased on-scene prior to her removal from the vehicle. The official cause of death was blunt force trauma of the head.

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1998 Ford Expedition

Vehicle Description

The 1998 Ford Expedition was identified by police using the VIN 1FMRU17L2WLxxxxxx. The manufacture date was August 1998, and the odometer reading was unknown. The Ford was a 4-door large utility vehicle with an 8-cylinder, 5.4-liter gasoline engine, hydraulic brakes and rear-wheel drive. The vehicle manufacturer recommended size P255/70R16 tires. At inspection, it had size Goodyear Wrangler SR-A tires of the recommended size manufactured in 2019 and aftermarket Calli aluminum wheels.

Exterior Damage

The Ford sustained direct and induced damage to the front, right, left, and top planes. The front steel bumper was crushed, both frame rails were shifted left, and the grille and trim were missing. The left front fender was crushed and the left front door was buckled. The right front fender was crushed and the right side had direct damage from the right A-pillar to the right rear bumper corner. The hood had direct damage on the leading edge and the sheet metal was buckled. Event 1 was a frontal impact causing direct damage distributed from bumper corner to bumper corner of the front plane. Crush measurements taken at bumper level were calculated as follows. C1 = 64 cm (25.2 in), C2 = 53 cm (20.9 in), C3 = 49 cm (19.3 in), C4 = 44 cm (17.3 in), C5 = 37 cm (14.6 in), and C6 = 25 cm (9.8 in). Maximum crush was located at the front left bumper corner. The CDC for the Ford in Event 1 was 01FDEW3 (Figures 9 and 10). Event 2 caused minor crush damage and scrapes to the sheet metal. The CDC for the Ford in Event 2 was 03RYEW1.

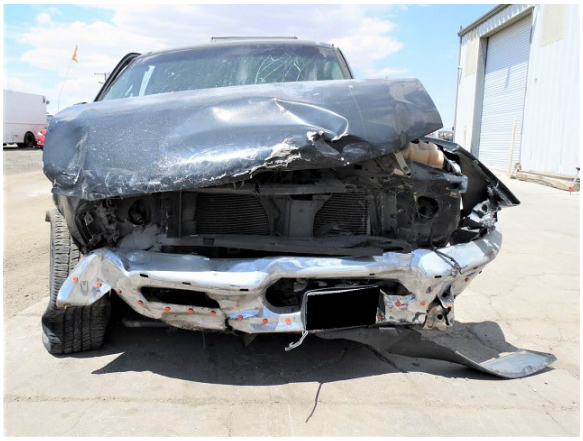


Figure 9. Exterior damage, 1998 Ford Expedition

Figure 10. Exterior damage, 1998 Ford Expedition

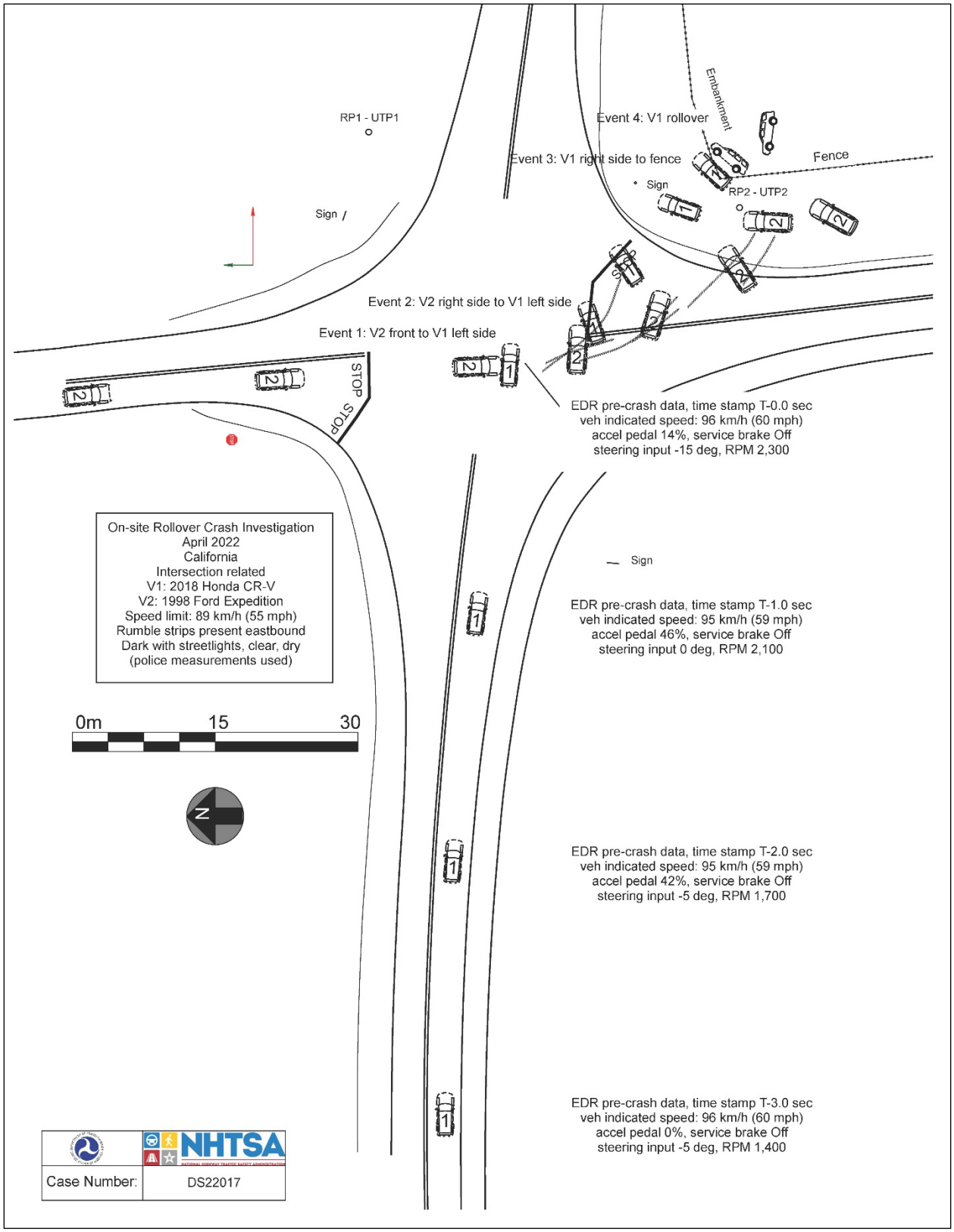
Occupant Data

The Ford driver was a belted 59-year-old male who sustained police-reported “A” severity injuries, was transported, and hospitalized for an unknown duration. Police determined he was driving under the influence of alcohol.

NHTSA Recalls and Investigations

VIN-based NHTSA recall searches queried in May 2023 and November 2024 revealed one incomplete recall for this vehicle originating in March 2000 relating to a trailer hitch assembly. The investigation determined the recall issue was unrelated to the crash.

Crash Diagram



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Appendix A: Event Data Recorder Report – 2018 Honda CR-V[4]

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

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

CDR File Information

User Entered VIN	2HKRW5H36JH******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	DS22017_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 21.4.1
Imaged with Software Licensed to (Company Name)	California Highway Patrol
Reported with CDR version	Crash Data Retrieval Tool 23.1.2
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	2

Comments

No comments entered.

Data Limitations

General Information:

These limitations are intended to assist you in reading the event data that has been imaged from the vehicle's SRS control unit. They contain general information and are not specific to this particular event. Event data should be considered in conjunction with other available physical evidence from the vehicle and scene.

Honda and Acura passenger vehicles designated as 2013 or later model year production are designed to be compatible with the Bosch CDR tool. Only some 2012 model year vehicles are compatible with the Bosch CDR tool.

Recorded Crash Events:

Data for front, side, rear and rollover events can be recorded as either non-deployment or deployment events. Both types of events can contain pre-crash and crash data.

- A non-deployment event is recorded if the change in longitudinal or lateral velocity equals or exceeds 8km/h over a 150ms timeframe or another type of non-reversible deployable restraint device other than a front, side, or side curtain airbag (e.g. seatbelt pretensioner) is commanded to deploy. Except as indicated below, non-deployment events are not locked into memory and can be over-written by subsequent non-deployment or deployment events.
- A deployment event is recorded if front airbag(s), side airbag(s), or side curtain airbag(s) are commanded to deploy. Deployment events are locked into memory and cannot be over-written.

The SRS control unit typically records only one event. Two events can be recorded if the T0 (time zero) values for each event occur within 5 seconds of each other. Therefore, a non-deployment event can be recorded and locked if it occurs within 5 seconds of a deployment event.

T0 is established by whichever of the following occurs first: (1) the change in longitudinal velocity at the SRS control unit equals or exceeds 0.8km/h over a 20ms timeframe; or (2) the change in lateral velocity at the SRS control unit equals or exceeds 0.8km/h over a 5ms timeframe; or (3) the occupant restraint control algorithm is activated; or (4) a commanded deployment of any type of non-reversible deployable restraint device (e.g. airbag or seatbelt pretensioner). If the time to deploy equals 0, then the command to deploy occurred at T0 or the device was not commanded to deploy during the event.

TEnd (end of event) is established by whichever of the following occurs first: (1) the change in longitudinal and lateral Delta V equals or falls below 0.8km/h over a 20ms timeframe; or (2) the occupant restraint control algorithm resets; or (3) time from T0 exceeds 300ms.

Data:

- Data recorded by the SRS control unit and imaged by the CDR tool is displayed relative to T0, not the time at which the vehicle made contact with another vehicle or object.
- Pre-crash data is recorded at 2 samples per second within the 5 seconds before T0. The sampling point at 0.0 is taken at T0 and is asynchronous with the other sample points. The time between -0.5 and 0.0 is not recorded and is between 1 and 500ms.
- Delta V data is recorded at 100 samples per second from T0 to 250ms or T0 to TEnd plus 30ms.
- Acceleration data is recorded at 100 samples per second from T0 to 250ms.
- Delta V, longitudinal reflects the change in velocity that the SRS control unit experienced in the longitudinal direction during the recorded portion of the event and is not the speed the vehicle was traveling before the event.
- Depending on the severity of the event and the accelerometer characteristics, saturation of the SRS control unit longitudinal or lateral accelerometers may occur, decreasing the recorded Delta V value.

- Time, accelerometer range exceeded is recorded if saturation of the SRS control unit longitudinal, lateral and/or normal (vertical) accelerometer occurs. The recorded data is the time at which the sensor range is first exceeded.
- The maximum recording capability of Deployment Command Data is 254ms or 255ms depending on vehicle model. A recorded value of 254ms or 255ms may indicate that the recording maximum was exceeded. In this case, the deployment command may have occurred between the recorded time and TEnd.
- Speed, vehicle indicated data is the speed indicated to the driver by the speedometer, not actual vehicle ground speed. Data accuracy can be affected by various factors, including but not limited to the following:
    - Significant changes in tire size from the factory setting
    - Wheel lockup or spin
    - Data latency or filtering and hysteresis within the speedometer module
- Accelerator pedal position, percent full is the ratio of accelerator pedal position compared to the fully depressed position.
- PCM (Powertrain Control Module) derived accelerator pedal position, percent full may differ from the accelerator pedal position, percent full under circumstances such as brake override activation or cruise control system engagement. These circumstances are based on vehicle equipment application and vary by model.
- Steering input angle is recorded in 5 degree increments.
- Side air bag suppression system status, right front passenger is recorded when the vehicle is equipped with the Occupant Position Detection System (OPDS).
- Occupant size classification, right front passenger airbag suppressed data is recorded as yes (suppressed) if the front passenger seat weight sensor system determined the passenger seat was empty or occupied by a child-size occupant.
- EV mode data records the vehicle powertrain status, not a driver selected operation mode. EV mode is recorded as On when the vehicle is moving and the internal combustion engine is not operating. EV mode may be recorded as On or Off when the vehicle is stopped.
- If power to the SRS control unit is lost during an event, all or part of the data may not be recorded.

Roll Rate Data:
- Vehicle roll rate data is recorded separately from the non-deployment and deployment events as described above. Therefore, the T0 for the roll rate data may differ from the T0 for the other data in this report.
- Roll rate recording trigger (T0) is established by whichever of the following occurs first: (1) a rollover algorithm ON judgment (SRS control unit decision to command deployment);, or (2) a change in relative roll angle at the SRS control unit equal to or exceeding 30 degrees (roll angle is not measured, but is calculated from the roll rate data); or (3) the rollover algorithm is activated.
- Once a recording trigger has been met, roll rate data is recorded for one rollover event at 10 samples per second from 1 second before to 2 seconds after T0. If a roll angle trigger is satisfied without a rollover algorithm ON judgment, the recorded roll rate data is unlocked and can be over-written by a subsequent rollover event. Roll rate data triggered by or recorded during a rollover algorithm ON judgment is locked into memory and cannot be over-written.
- If roll rate is detected at the SRS control unit during a non-deployment or deployment event but the recording trigger has not been satisfied, no roll rate data will be recorded. A graph of roll rate data will only be present in this report if roll rate data is recorded.

Data Element Sign Convention:
Except as noted below, all data is displayed in SAE J211 sign convention. The following table provides an explanation of the sign notation for data elements that may be included in this CDR report. All directional references to sign notation are from the perspective of the driver when seated in the vehicle facing the direction of forward vehicle travel.

Data element name	Positive sign indicates
Longitudinal Acceleration	Forward direction acceleration
Delta-V, Longitudinal	Forward direction acceleration
Lateral Acceleration	Left to right direction acceleration
Delta-V, Lateral	Left to right direction acceleration
Normal (Vertical) Acceleration	Downward direction acceleration
Vehicle Roll Rate*	See roll rate graph and data (if recorded)
Steering Input Angle*	Left Turn

*Not SAE J211 sign convention

Data Source:
All recorded data is measured and calculated within the SRS control unit except for the following parameters (if applicable) which are transmitted via the vehicle's communication network to the SRS control unit:
- Speed, vehicle indicated
- Accelerator pedal position, percent full
- Service brake
- ABS activity
- Stability control
- Steering input angle
- Engine RPM
- PCM derived accelerator pedal position, percent full
- EV mode
- Forward Collision Warning
- Collision Mitigation Braking System information
- Lane Keeping Assist System information
- Lane Departure Warning
- Road Departure Mitigation information
- Cruise Control status
- Adaptive Cruise Control status

Depending on vehicle feature content, capability, or conditions described above, the following items may not be recorded. If these items are not recorded, they will not be present in this document.
- EV mode

- Forward Collision Warning
- Collision Mitigation Braking System information
- Lane Keeping Assist System information
- Lane Departure Warning
- Road Departure Mitigation information
- Cruise Control status
- Adaptive Cruise Control status

Hexadecimal Data:
All data that has been specified for imaging is shown in the hexadecimal data section of this report. However, not all of this data is translated by the CDR tool. The SRS control unit may contain additional data that is not retrievable by the CDR tool.

Data Imaging:
If the SRS control unit is imaged outside of the vehicle, ensure that it is not moved, tilted or turned while connected to the CDR tool. Also, after imaging is complete, wait 3 minutes after removing the CDR tool before moving the SRS control unit. Not following this guideline could cause current non-deployment event data to be overwritten and a new event to be recorded. Current fault status could also be altered if the SRS control unit is imaged outside of the vehicle.

04002_HondaSRS_GEN2_r002

System Status at Retrieval

EDR Version	1.3.4.0

System Status at Event (Event Record 1)

Multi-Event, Number of Events (1, 2)	1
Complete File Recorded (Yes/No)	Yes
Ignition Cycle, Download	5850
Maximum Delta-V, Longitudinal (MPH [km/h])	-12 [-20]
Time, Maximum Delta-V, Longitudinal (msec)	55.0
Maximum Delta-V, Lateral (MPH [km/h])	38 [61]
Time, Maximum Delta-V, Lateral (msec)	120.0
Time, Maximum Delta-V, Resultant (msec)	120.0
Time, Accelerometer Range Exceeded, Longitudinal (msec)	0
Time, Accelerometer Range Exceeded, Lateral (msec)	0
Time, Accelerometer Range Exceeded, Normal (msec)	12.0

Deployment Command Data (Event Record 1)

Pretensioner Deployment, Time to Fire, Driver (msec)	2
Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Lap Pretensioner Deployment, Time to Fire, Driver (msec)	19
Lap Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to Deploy First Stage, Driver (msec)	15
Frontal Air Bag Deployment, Time to Deploy First Stage, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (msec)	0
Safety Belt Adaptive Load Limiter, Time to Initiation, Right Front Passenger (msec)	0
Side Air Bag Deployment, Time to Deploy, Driver (msec)	2
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	0
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Driver Side (msec)	2
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Right Side (msec)	0
Frontal Air Bag Deployment, 2nd Stage Disposal, Right Front Passenger (Yes/No)	No

Pre-Crash Data -1 sec (Event Record 1)

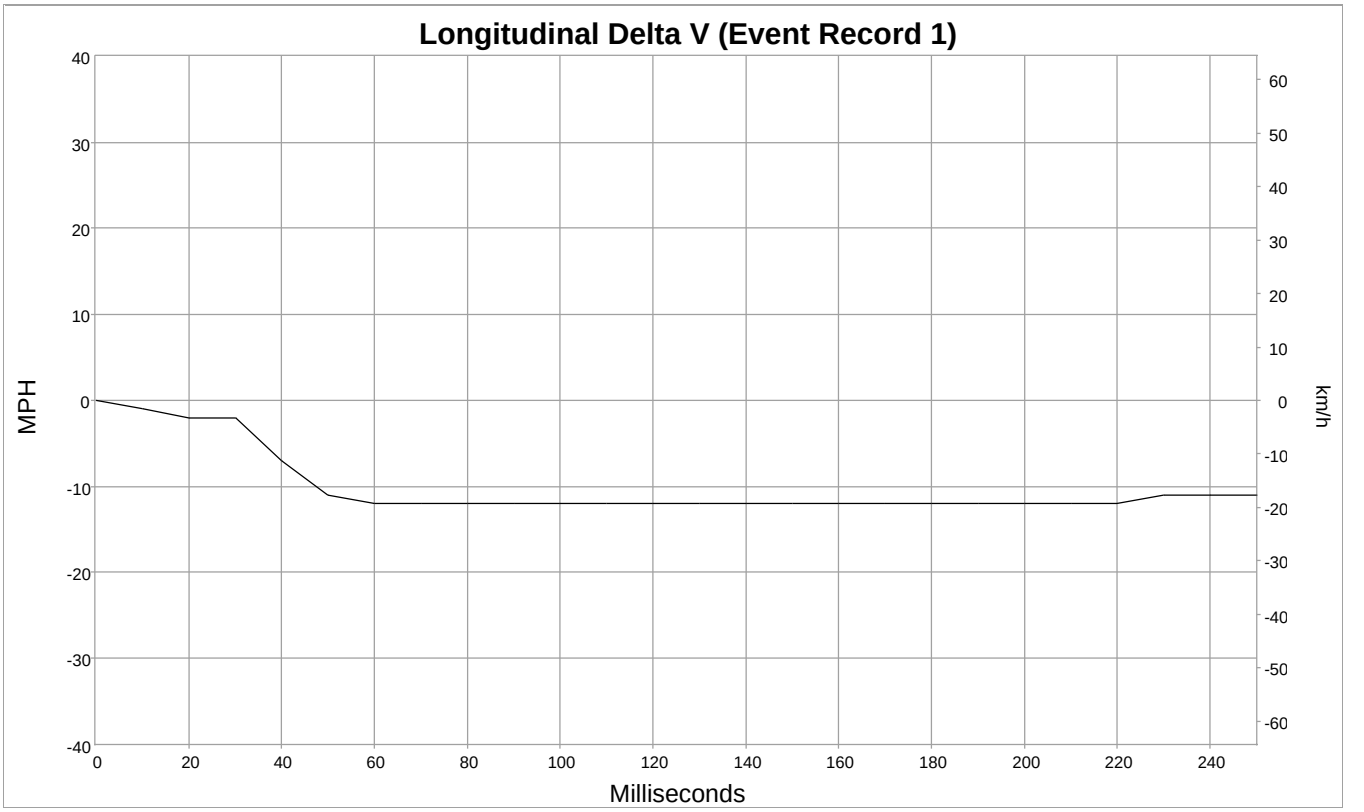
Safety Belt Status, Driver	On
Safety Belt Status, Right Front Passenger	Off
Seat Track Position Switch, Foremost, Status, Driver	No
Occupant Size Classification, Right Front Passenger Airbag Suppressed (Yes/No)	Yes
Frontal Air Bag Warning Lamp (On, Off)	Off
Ignition Cycle, Crash	5849

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 1 of 2

Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal Position, % full	Service Brake (On, Off)	ABS Activity (On, Off)	Stability Control (On, Off, Engaged)	Steering Input (deg)	Engine RPM	PCM Derived Accelerator Pedal Position, % full
-5.0	62 [99]	0	On	Off	On Non-Engaged	-5	1,500	0
-4.5	60 [97]	0	On	Off	On Non-Engaged	-10	1,500	0
-4.0	60 [97]	0	Off	Off	On Non-Engaged	-10	1,500	0
-3.5	60 [96]	0	Off	Off	On Non-Engaged	-5	1,400	0
-3.0	60 [96]	0	Off	Off	On Non-Engaged	-5	1,400	0
-2.5	59 [95]	36	Off	Off	On Non-Engaged	-5	1,400	27
-2.0	59 [95]	42	Off	Off	On Non-Engaged	-5	1,700	31
-1.5	59 [95]	42	Off	Off	On Non-Engaged	0	1,900	32
-1.0	59 [95]	46	Off	Off	On Non-Engaged	0	2,100	34
-0.5	59 [95]	46	Off	Off	On Non-Engaged	0	2,200	35
0.0	60 [96]	14	Off	Off	On Non-Engaged	-15	2,300	12

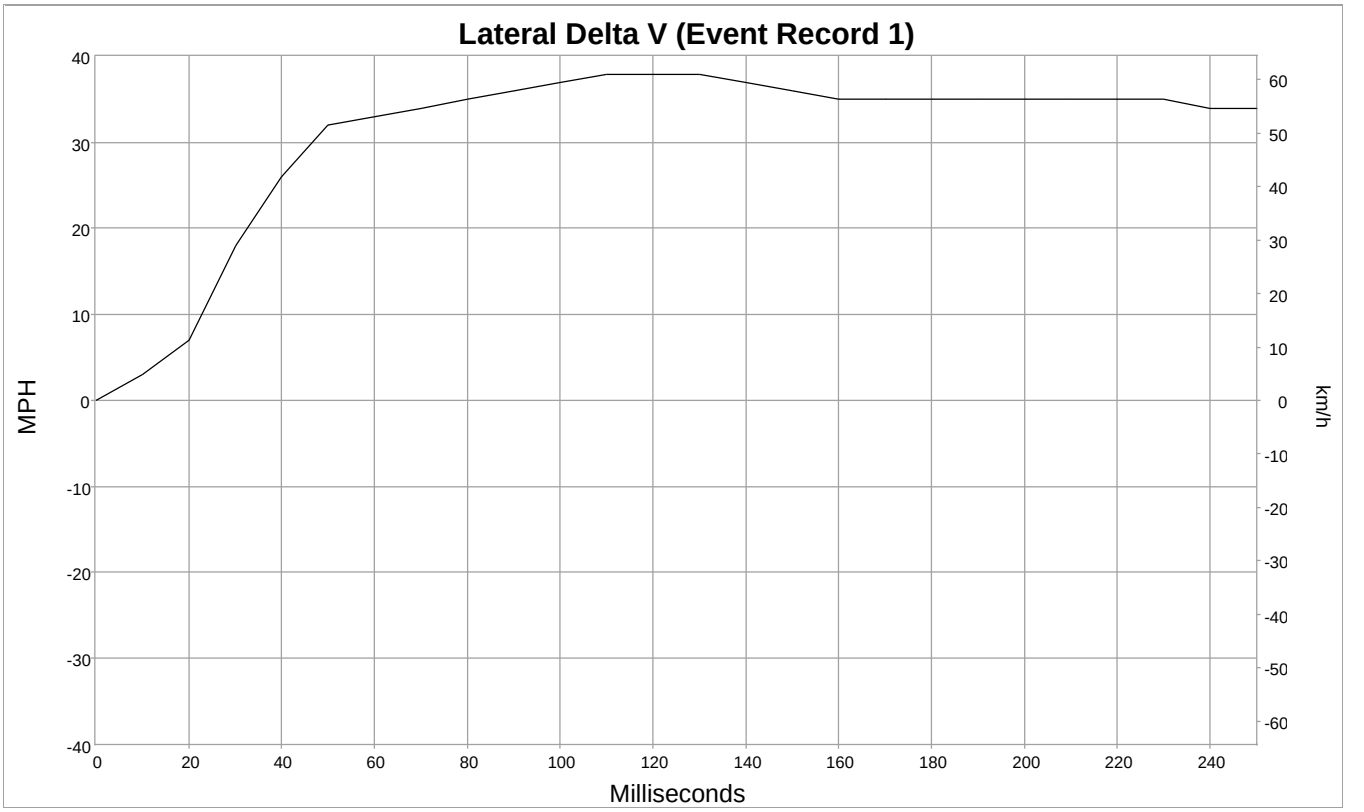
Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 2 of 2

Time Stamp (sec)	Adaptive Cruise Control (On/Off)	Lane Keeping Assist (On/Off)	Cruise Control (Not Engaged/ Engaged)	Cruise Control (On/Off)
-5.0	Off	Off	Not Engaged	Off
-4.5	Off	Off	Not Engaged	Off
-4.0	Off	Off	Not Engaged	Off
-3.5	Off	Off	Not Engaged	Off
-3.0	Off	Off	Not Engaged	Off
-2.5	Off	Off	Not Engaged	Off
-2.0	Off	Off	Not Engaged	Off
-1.5	Off	Off	Not Engaged	Off
-1.0	Off	Off	Not Engaged	Off
-0.5	Off	Off	Not Engaged	Off
0.0	Off	Off	Not Engaged	Off



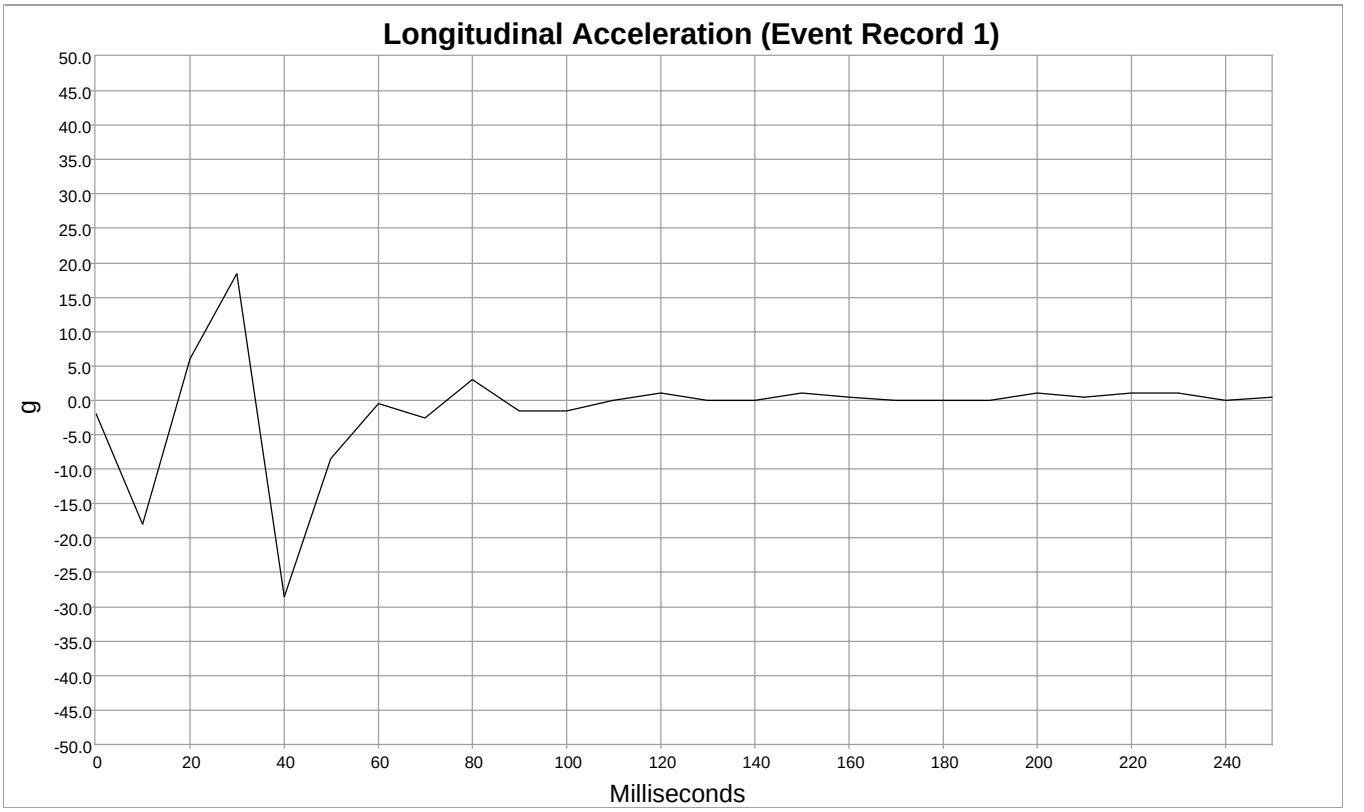
Longitudinal Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	-1 [-1]
20	-2 [-3]
30	-2 [-3]
40	-7 [-12]
50	-11 [-18]
60	-12 [-20]
70	-12 [-19]
80	-12 [-20]
90	-12 [-19]
100	-12 [-19]
110	-12 [-19]
120	-12 [-19]
130	-12 [-19]
140	-12 [-19]
150	-12 [-19]
160	-12 [-19]
170	-12 [-19]
180	-12 [-19]
190	-12 [-19]
200	-12 [-19]
210	-12 [-19]
220	-12 [-19]
230	-11 [-18]
240	-11 [-18]
250	-11 [-18]



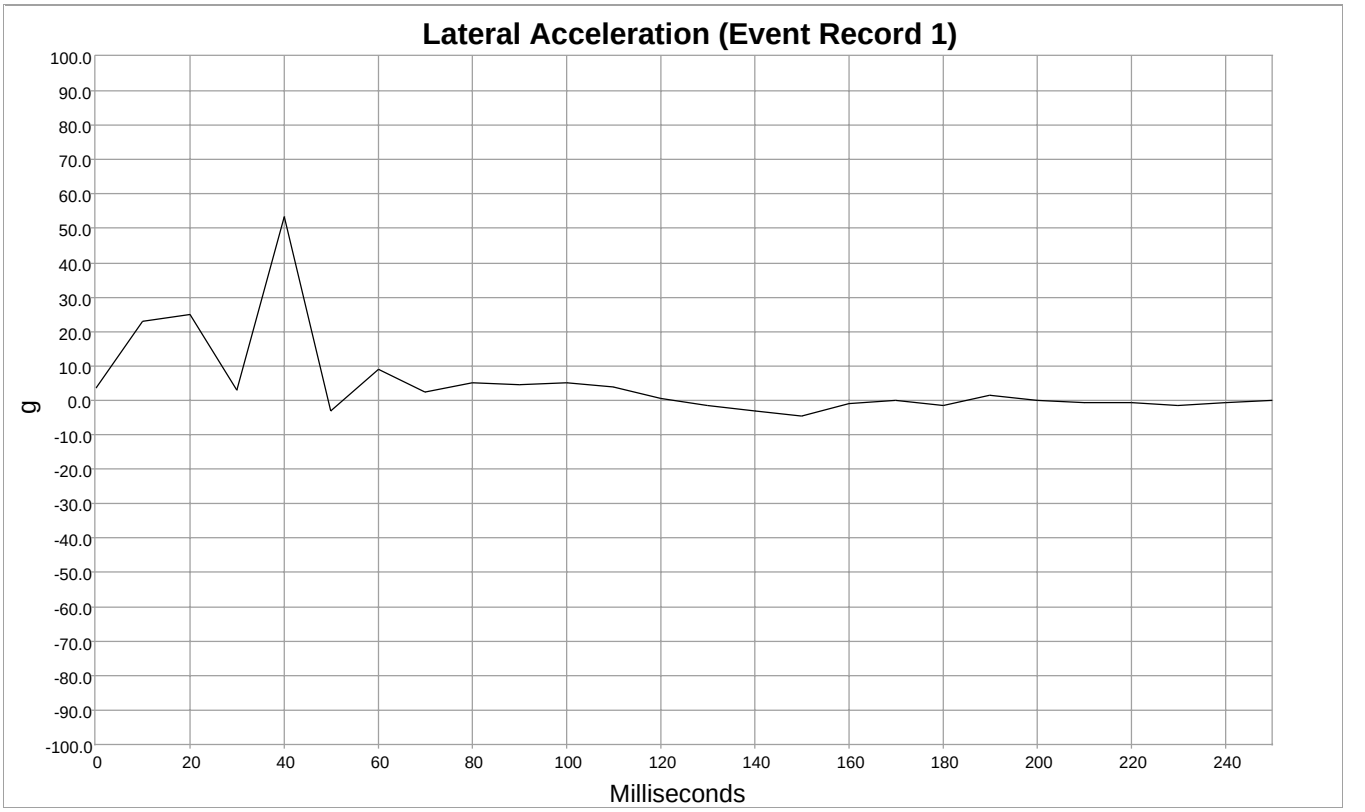
Lateral Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	3 [5]
20	7 [12]
30	18 [29]
40	26 [42]
50	32 [52]
60	33 [53]
70	34 [54]
80	35 [56]
90	36 [58]
100	37 [60]
110	38 [61]
120	38 [61]
130	38 [61]
140	37 [59]
150	36 [58]
160	35 [57]
170	35 [57]
180	35 [57]
190	35 [56]
200	35 [56]
210	35 [56]
220	35 [56]
230	35 [56]
240	34 [55]
250	34 [55]



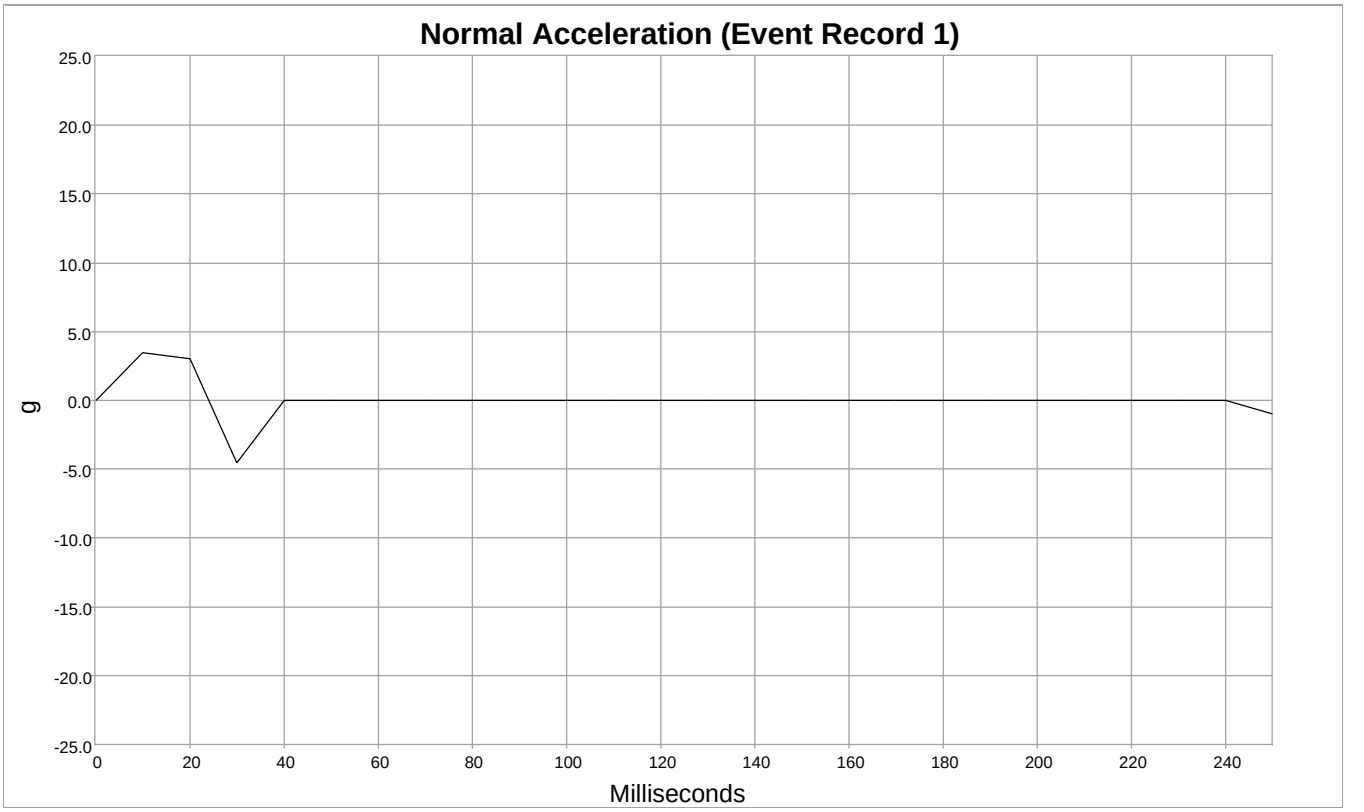
Longitudinal Acceleration (Event Record 1)

Time (msec)	g
0	-2.0
10	-18.0
20	6.0
30	18.5
40	-28.5
50	-8.5
60	-0.5
70	-2.5
80	3.0
90	-1.5
100	-1.5
110	0.0
120	1.0
130	0.0
140	0.0
150	1.0
160	0.5
170	0.0
180	0.0
190	0.0
200	1.0
210	0.5
220	1.0
230	1.0
240	0.0
250	0.5



Lateral Acceleration (Event Record 1)

Time (msec)	g
0	3.5
10	23.0
20	25.0
30	3.0
40	53.5
50	-3.0
60	9.0
70	2.5
80	5.0
90	4.5
100	5.0
110	4.0
120	0.5
130	-1.5
140	-3.0
150	-4.5
160	-1.0
170	0.0
180	-1.5
190	1.5
200	0.0
210	-0.5
220	-0.5
230	-1.5
240	-0.5
250	0.0



Normal Acceleration (Event Record 1)

Time (msec)	g
0	0.0
10	3.5
20	3.0
30	-4.5
40	0.0
50	0.0
60	0.0
70	0.0
80	0.0
90	0.0
100	0.0
110	0.0
120	0.0
130	0.0
140	0.0
150	0.0
160	0.0
170	0.0
180	0.0
190	0.0
200	0.0
210	0.0
220	0.0
230	0.0
240	0.0
250	-1.0

System Status at Event (Event Record 2)

Multi-Event, Number of Events (1, 2)	2
Complete File Recorded (Yes/No)	Yes
Ignition Cycle, Download	5850
Time from Event 1 to 2 (sec)	0.6
Maximum Delta-V, Longitudinal (MPH [km/h])	4 [6]
Time, Maximum Delta-V, Longitudinal (msec)	225.0
Maximum Delta-V, Lateral (MPH [km/h])	20 [32]
Time, Maximum Delta-V, Lateral (msec)	282.5
Time, Maximum Delta-V, Resultant (msec)	287.5
Time, Accelerometer Range Exceeded, Longitudinal (msec)	0
Time, Accelerometer Range Exceeded, Lateral (msec)	0
Time, Accelerometer Range Exceeded, Normal (msec)	205.0

Deployment Command Data (Event Record 2)

Pretensioner Deployment, Time to Fire, Driver (msec)	0
Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Lap Pretensioner Deployment, Time to Fire, Driver (msec)	0
Lap Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to Deploy First Stage, Driver (msec)	0
Frontal Air Bag Deployment, Time to Deploy First Stage, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to 2nd Stage, Right Front Passenger (msec)	0
Safety Belt Adaptive Load Limiter, Time to Initiation, Right Front Passenger (msec)	0
Side Air Bag Deployment, Time to Deploy, Driver (msec)	0
Side Air Bag Deployment, Time to Deploy, Right Front Passenger (msec)	0
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Driver Side (msec)	0
Side Curtain/Tube Air Bag Deployment, Time to Deploy, Right Side (msec)	0
Frontal Air Bag Deployment, 2nd Stage Disposal, Right Front Passenger (Yes/No)	No

Pre-Crash Data -1 sec (Event Record 2)

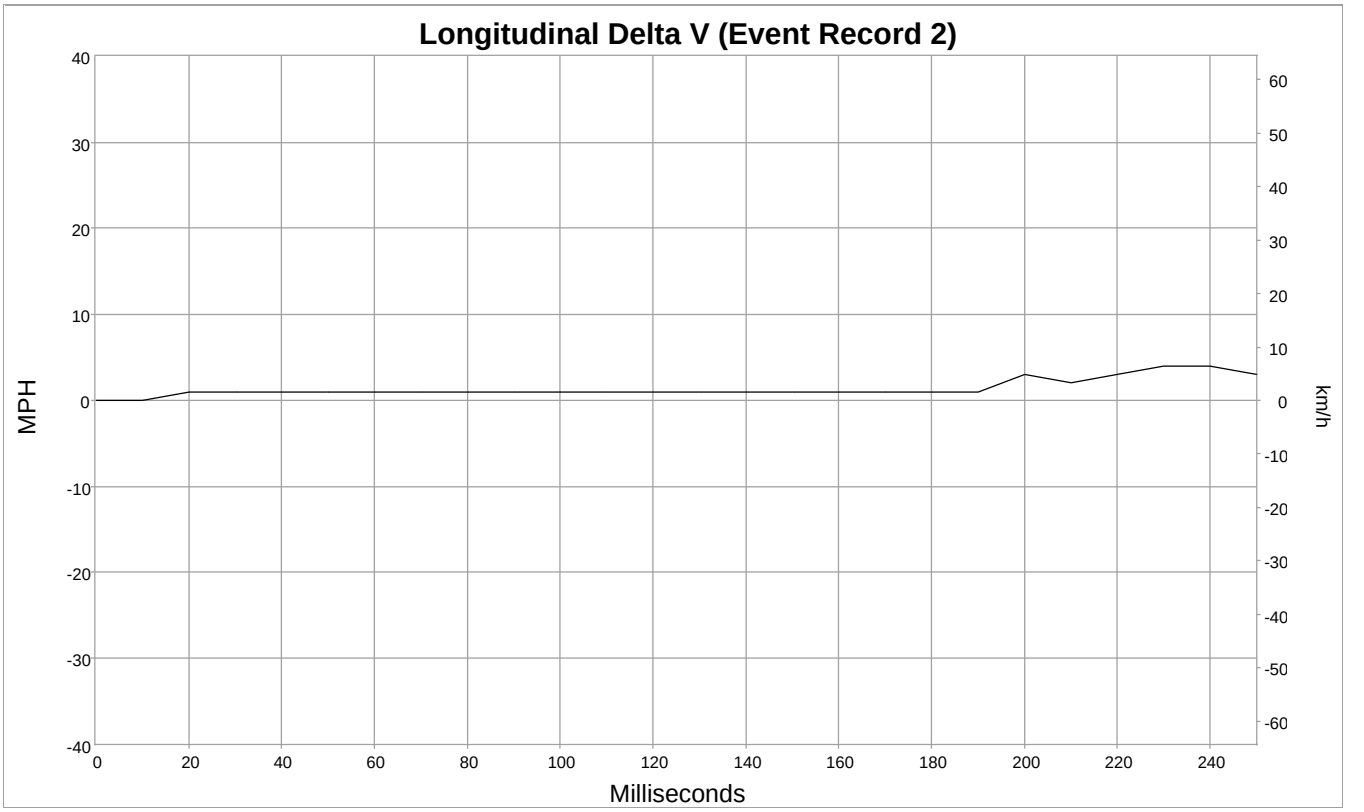
Safety Belt Status, Driver	On
Safety Belt Status, Right Front Passenger	Off
Seat Track Position Switch, Foremost, Status, Driver	No
Occupant Size Classification, Right Front Passenger Airbag Suppressed (Yes/No)	Yes
Frontal Air Bag Warning Lamp (On, Off)	On
Ignition Cycle, Crash	5849

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 2) - Table 1 of 2

Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal Position, % full	Service Brake (On, Off)	ABS Activity (On, Off)	Stability Control (On, Off, Engaged)	Steering Input (deg)	Engine RPM	PCM Derived Accelerator Pedal Position, % full
-5.0	60 [97]	0	On	Off	On Non-Engaged	-10	1,500	0
-4.5	60 [97]	0	Off	Off	On Non-Engaged	-10	1,500	0
-4.0	60 [96]	0	Off	Off	On Non-Engaged	-5	1,400	0
-3.5	60 [96]	0	Off	Off	On Non-Engaged	-5	1,400	0
-3.0	59 [95]	36	Off	Off	On Non-Engaged	-5	1,400	27
-2.5	59 [95]	42	Off	Off	On Non-Engaged	-5	1,700	31
-2.0	59 [95]	42	Off	Off	On Non-Engaged	0	1,900	32
-1.5	59 [95]	46	Off	Off	On Non-Engaged	0	2,100	34
-1.0	59 [95]	46	Off	Off	On Non-Engaged	0	2,200	35
-0.5	59 [95]	99	Off	On	On Non-Engaged	-5	2,200	99
0.0	59 [95]	99	Off	On	On Non-Engaged	-5	2,200	99

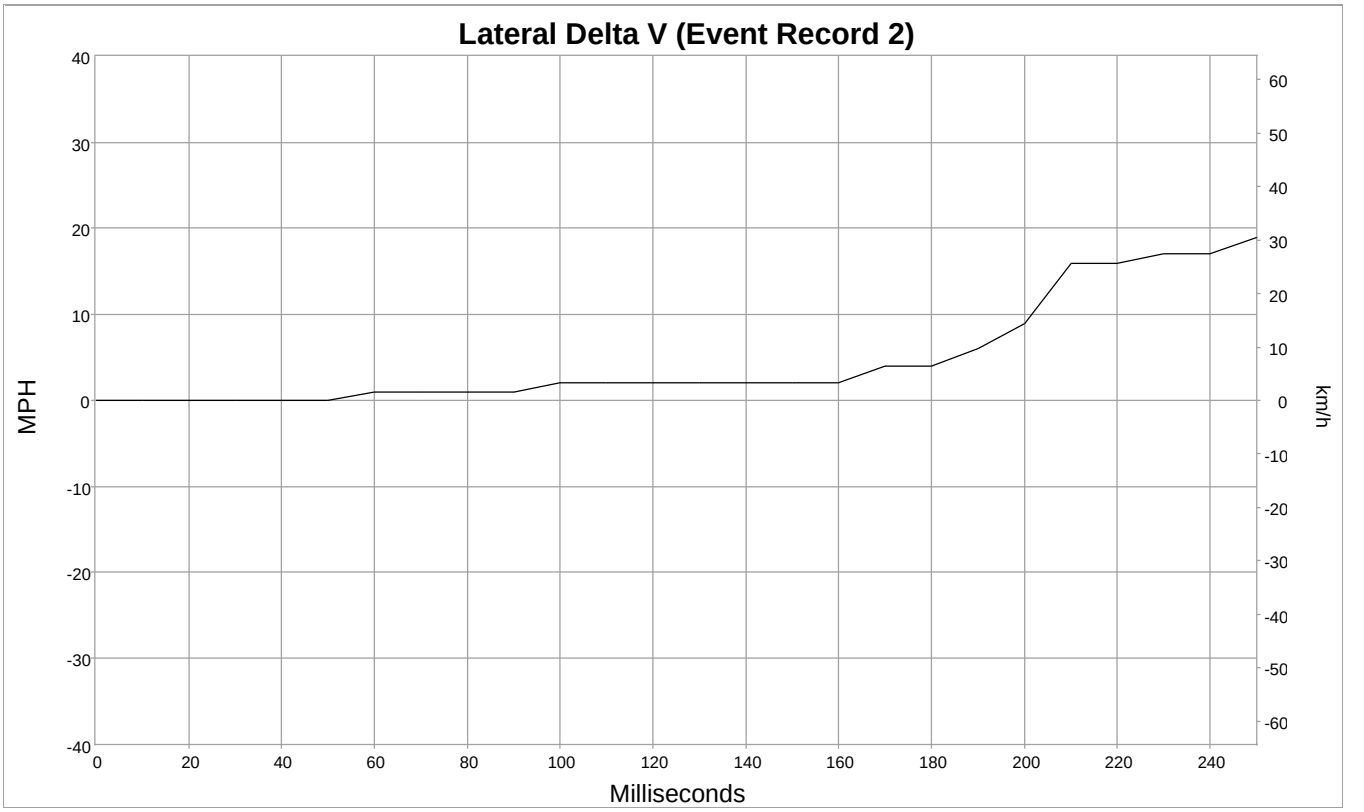
Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 2) - Table 2 of 2

Time Stamp (sec)	Adaptive Cruise Control (On/Off)	Lane Keeping Assist (On/Off)	Cruise Control (Not Engaged/ Engaged)	Cruise Control (On/Off)
-5.0	Off	Off	Not Engaged	Off
-4.5	Off	Off	Not Engaged	Off
-4.0	Off	Off	Not Engaged	Off
-3.5	Off	Off	Not Engaged	Off
-3.0	Off	Off	Not Engaged	Off
-2.5	Off	Off	Not Engaged	Off
-2.0	Off	Off	Not Engaged	Off
-1.5	Off	Off	Not Engaged	Off
-1.0	Off	Off	Not Engaged	Off
-0.5	Off	Off	Not Engaged	Off
0.0	Off	Off	Not Engaged	Off



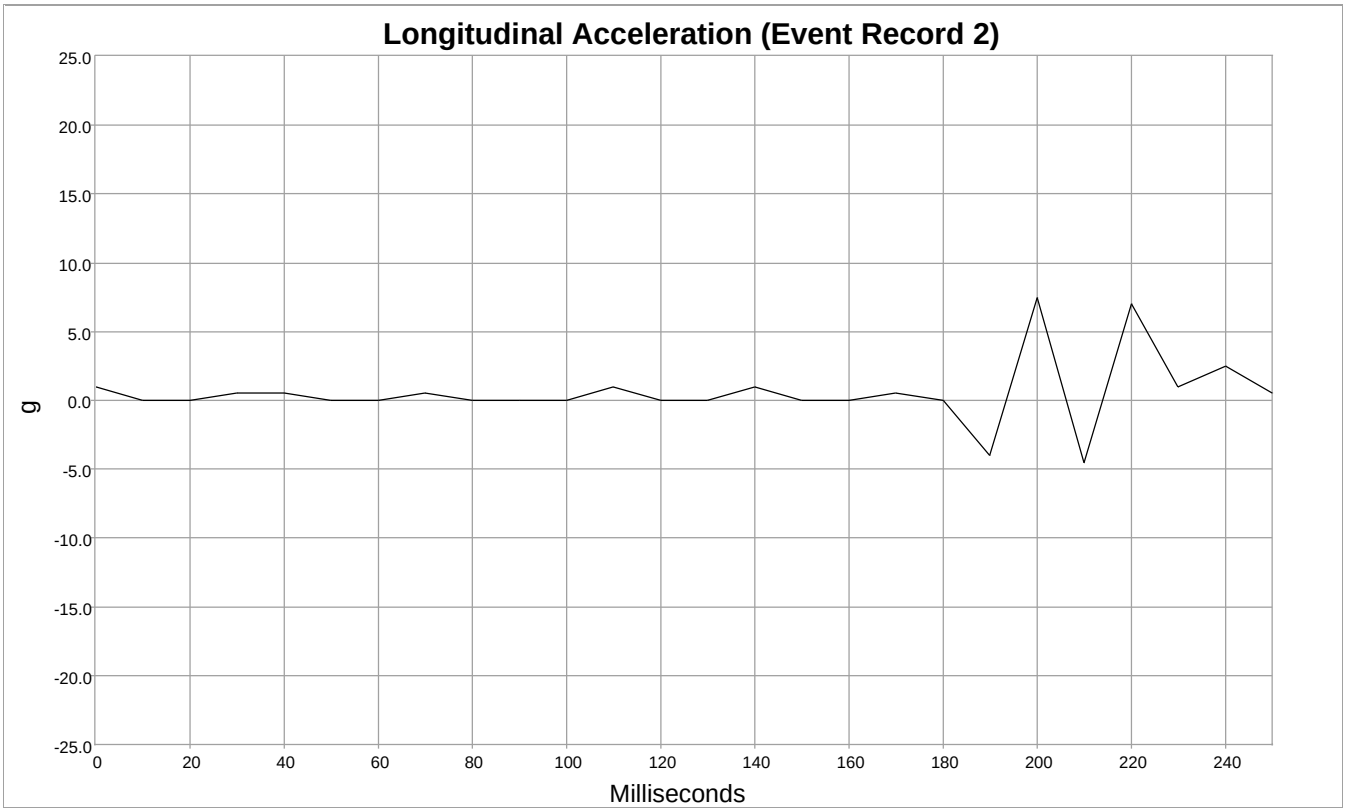
Longitudinal Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	1 [1]
30	1 [1]
40	1 [1]
50	1 [1]
60	1 [1]
70	1 [1]
80	1 [1]
90	1 [1]
100	1 [1]
110	1 [1]
120	1 [1]
130	1 [1]
140	1 [2]
150	1 [2]
160	1 [2]
170	1 [2]
180	1 [2]
190	1 [2]
200	3 [5]
210	2 [3]
220	3 [5]
230	4 [6]
240	4 [6]
250	3 [5]



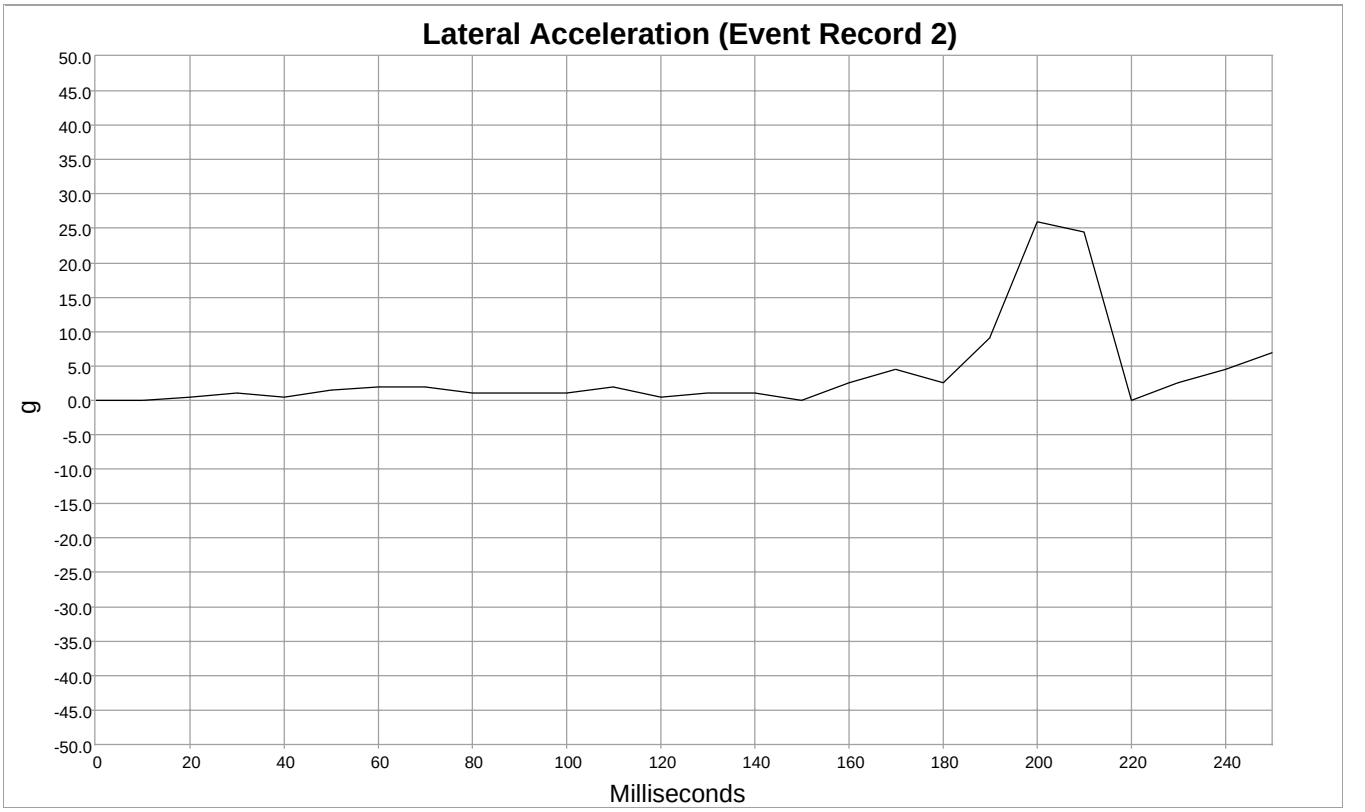
Lateral Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	0 [0]
30	0 [0]
40	0 [0]
50	0 [0]
60	1 [1]
70	1 [1]
80	1 [2]
90	1 [2]
100	2 [3]
110	2 [3]
120	2 [3]
130	2 [3]
140	2 [4]
150	2 [4]
160	2 [4]
170	4 [6]
180	4 [7]
190	6 [10]
200	9 [15]
210	16 [25]
220	16 [26]
230	17 [27]
240	17 [28]
250	19 [30]



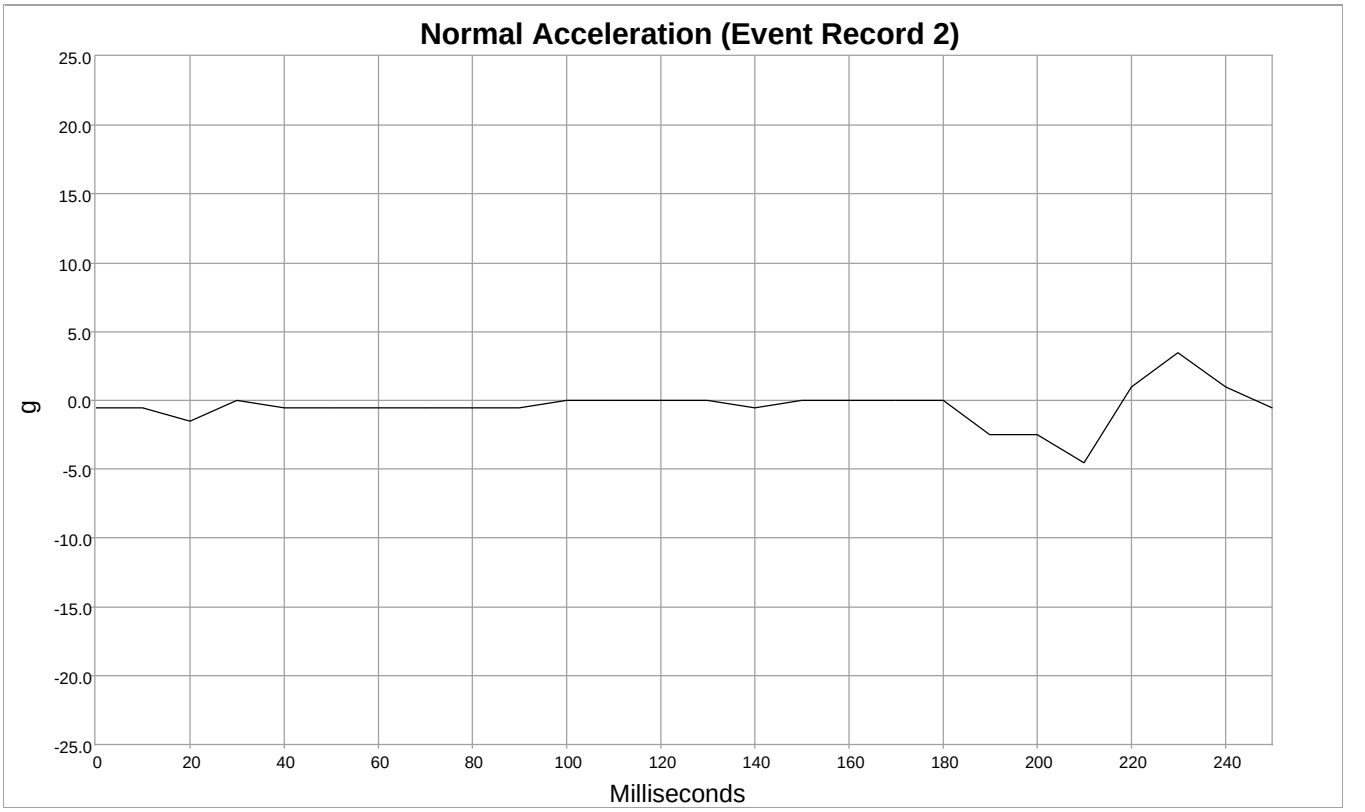
Longitudinal Acceleration (Event Record 2)

Time (msec)	g
0	1.0
10	0.0
20	0.0
30	0.5
40	0.5
50	0.0
60	0.0
70	0.5
80	0.0
90	0.0
100	0.0
110	1.0
120	0.0
130	0.0
140	1.0
150	0.0
160	0.0
170	0.5
180	0.0
190	-4.0
200	7.5
210	-4.5
220	7.0
230	1.0
240	2.5
250	0.5



Lateral Acceleration (Event Record 2)

Time (msec)	g
0	0.0
10	0.0
20	0.5
30	1.0
40	0.5
50	1.5
60	2.0
70	2.0
80	1.0
90	1.0
100	1.0
110	2.0
120	0.5
130	1.0
140	1.0
150	0.0
160	2.5
170	4.5
180	2.5
190	9.0
200	26.0
210	24.5
220	0.0
230	2.5
240	4.5
250	7.0



Normal Acceleration (Event Record 2)

Time (msec)	g
0	-0.5
10	-0.5
20	-1.5
30	0.0
40	-0.5
50	-0.5
60	-0.5
70	-0.5
80	-0.5
90	-0.5
100	0.0
110	0.0
120	0.0
130	0.0
140	-0.5
150	0.0
160	0.0
170	0.0
180	0.0
190	-2.5
200	-2.5
210	-4.5
220	1.0
230	3.5
240	1.0
250	-0.5

Hexadecimal Data

DID #	Data
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$8020	01 03 00 00 00 00 00 00 00 00 00 00 00 00 00 FC
$8021	AA 00 01 02 00 06 00 00 00 00 00 4D 16 DA AA AA
$8022	AA 00 CC 68 E6 00 00 00 02 00 00 00 13 00 00 00 00 0F 00 00 00 00 00 00 00 02 00 00 00 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 13
$8023	AA 00 CC 68 E6 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 3B
$8024	AA 00 FF 00 00 40 43 02 12 12 11 00 16 D9 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 AE
$8025	AA 00 FF 00 00 40 43 02 12 12 11 11 16 D9 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 9D
$8026	AA 01 FC 50 35 00 00 00 11 00 30 00 00 00 00 00 63 00 FF 0F 00 01 00 00 00 11 00 10 00 00 00 00 61 00 FE 0F 00 01 00 00 00 11 00 10 00 00 00 00 61 00 FE 0F 00 00 00 00 00 11 00 10 00 00 00 00 60 00 FF 0E 00 00 00 00 00 11 00 10 00 00 00 00 60 00 FF 0E 00 00 00 00 00 11 00 10 00 00 00 00 5F 1B FF 0E 24 00 00 00 00 11 00 10 00 00 00 00 5F 1F FF 11 2A 00 00 00 00 11 00 10 00 00 00 00 5F 20 00 13 2A 00 00 00 00 11 00 10 00 00 00 00 5F 22 00 15 2E 00 00 00 00 11 00 10 00 00 00 00 5F 23 00 16 2E 00 00 00 00 11 00 10 00 00 00 00 60 0C FD 17 0E 00 00 00 00 11 00 10 00 00 00 C8
$8027	AA 01 FC 50 35 00 00 00 11 00 30 00 00 00 00 00 61 00 FE 0F 00 01 00 00 00 11 00 10 00 00 00 00 61 00 FE 0F 00 00 00 00 00 11 00 10 00 00 00 00 60 00 FF 0E 00 00 00 00 00 11 00 10 00 00 00 00 60 00 FF 0E 00 00 00 00 00 11 00 10 00 00 00 00 5F 1B FF 0E 24 00 00 00 00 11 00 10 00 00 00 00 5F 1F FF 11 2A 00 00 00 00 11 00 10 00 00 00 00 5F 20 00 13 2A 00 00 00 00 11 00 10 00 00 00 00 5F 22 00 15 2E 00 00 00 00 11 00 10 00 00 00 00 5F 23 00 16 2E 00 00 00 00 11 00 10 00 00 00 00 5F 63 FF 16 63 04 00 00 00 11 00 10 00 00 00 00 5F 63 FF 16 63 04 00 00 00 11 00 10 00 00 00 4C
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$8029	AA 00 00 00 01 01 01 01 01 01 01 01 01 01 01 01 02 02 02 02 02 02 05 03 05 06 06 05 00 00 00 00 00 00 00 00 00 00 00 00 06 5A 00 00 00 00 00 C0
$802A	AA 00 00 05 0C 1D 2A 34 35 36 38 3A 3C 3D 3D 3D 3B 3A 39 39 39 38 38 38 38 38 37 37 00 00 00 00

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$802B           AA 00 00 00 00 00 00 00 01 01 02 02 03 03 03 03
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$802E           AA 01 07 2E 32 06 6B FA 12 05 0A 09 0A 08 01 FD
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$802F           AA 01 00 00 01 02 01 03 04 04 02 02 02 04 01 02
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$803F           AA 01 00 31 80 80 00 00 00 00 00 00 00 00 00 00
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$8013           AA 01 C4 2F 80 00 00 00 00 01 00 00 00 00 00 00
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               00 00 00 00 00 00 00 00

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               00 00 00 00 00 00 00 00

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               04 A2 00 02 91 02 11 00 00 00 00 00 00 00 00 B4
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               A0 01 03 00 00 00 00 00 00 00 00 00 00 00 00 00
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                00 00 00 00 00 FF 00 FF 00 FF 00 00 00 FF 01 00
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$8065           AA 00 CF FF F0 CC 00 30 00 00 00 00 00 00 00 00
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              02 07 84 84 00 00 00 00 00 00 00 00 00 00 00 0C
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              02 00 84 84 00 00 00 00 00 00 00 00 00 00 00 0C
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              01 FA 84 84 00 00 00 00 00 00 00 00 00 00 00 0C
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$F181          37 37 39 35 39 2D 54 4C 41 2D 4C 32 35 30 00 00
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**National Highway
Traffic Safety
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