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Special Crash Investigations On-Site Crash Avoidance Technology Investigation Vehicle: 2016 Honda Civic LX Location: Arizona Crash Date: October 2016

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicles or their safety systems.

This report and associated case data are based on information available to the Special Crash Investigation team on the date this report was published.

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This report documents the on-site investigation of the crash avoidance system in a 2016 Honda Civic LX involved in a front-to rear crash.

16. Abstract

This report documents the on-site investigation of the crash avoidance system in a 2016 Honda Civic LX involved in a front-to-rear crash. The investigation was intended to determine what role the crash avoidance system had on the crash. The vehicle was equipped with Honda's Collision Mitigation Braking System (CMBS) with forward collision warning (FCW). The crash occurred on a state roadway in Arizona. The Honda was being driven southbound by a belted 20-year-old female. The first other vehicle was a 2015 RAM 1500 traveling in the same lane and in front of the Honda. The second other vehicle was a 2010 Dodge Journey traveling in the lane to the right of the RAM and Honda. According to the driver of the RAM, a non-contact vehicle traveling ahead of his vehicle swerved in front of him and he began braking. The driver of the Honda braked but could not stop the vehicle in time and the front plane of the Honda struck the rear plane of the RAM. The RAM was displaced forward and to the right into the adjacent lane. The right front of the RAM struck the left plane of the Dodge. According to the Honda's Event Data Recorder (EDR), the system provided a warning and engaged the braking system. The driver did not recall seeing, hearing or feeling any warnings prior to the crash. She did recall braking and steering to the left.

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Table of Contents

On-Site Crash Avoidance Technology Investigation
SCI Case Number DS16027
Vehicle: 2016 Honda Civic LX
Location: Arizona
Crash Date: October 2016

BACKGROUND

Figure 1. 2016 Honda Civic

This report documents the on-site investigation of the crash avoidance system in a 2016 Honda Civic LX involved in a front-to-rear crash (**Figure 1**). The investigation was intended to determine what role the crash avoidance system had on the crash. This crash was identified by the Special Crash Investigations (SCI) group of the National Highway Traffic Safety Administration during a vehicle inspection training session in December 2016. The vehicle was equipped with Honda's Collision Mitigation Braking System (CMBS) with forward collision warning (FCW). According to the Honda's event data recorder (EDR), the system provided a warning and engaged the braking system. The driver did not recall seeing, hearing, or feeling any warnings prior to the crash. She did recall braking and steering to the left.

SCI obtained a police report and obtained permission to inspect the vehicle in December 2016, and the case was assigned that same day. The inspection was completed in December 2016. The Honda was supported by the Bosch Crash Data Retrieval (CDR) system and the vehicle's EDR was imaged by SCI.

The crash occurred in a morning in October 2016 on a state roadway in Arizona. The Honda was being driven southbound by a belted 20-year-old female. The first other vehicle was a 2015 RAM 1500 being driven by a belted 22-year-old male, traveling in the same lane and in front of the Honda. The second other vehicle was a 2010 Dodge Journey being driven by a belted 72-year-old male The Dodge was traveling in the lane to the right of the RAM and Honda. According to the driver of the RAM, a non-contact vehicle traveling ahead of his vehicle swerved in front of him and he began braking. The driver of the Honda braked but could not stop the vehicle in time and the front plane of the Honda struck the rear plane of the RAM. The RAM was displaced forward and to the right into the adjacent lane. The right front of the RAM struck the left plane of the Dodge.

The Honda and RAM were towed due to damage. The Dodge was driven from the scene.

The driver of the Honda sustained police reported “C” (possible) injuries. The drivers of the RAM and Dodge did not sustain any police reported injuries.

SUMMARY

Crash Site

This crash occurred in the southbound lanes of a 5-lane divided state highway (**Figure 2**). The asphalt roadway was straight and level. It was bordered on the left by a paved shoulder and a concrete barrier and on the right by a paved shoulder and wall. The roadway was configured with a high occupancy vehicle (HOV) lane on the left and four southbound travel lanes on the right. The posted speed limit was 105 km/h (65 mph). The weather at the nearest reporting station was 29.3 °C (84.9 °F), 10 percent humidity, 16 km (10 miles) visibility, clear conditions, and the winds were calm. A crash diagram is included at the end of this report.

Figure 2. Southbound approach

Pre-Crash

At 5.0 seconds prior to algorithm enable (AE) the Honda was traveling southbound in the fourth lane from right at an EDR-reported speed of 128 km/h (80 mph). The RAM 1500 was traveling in front of and in the same lane as the Honda. The Dodge was traveling in the lane to the right of the RAM and Honda. A non-contact vehicle was initially traveling ahead of the Dodge and in the same lane. The driver of the non-contact vehicle lost control of the vehicle and it entered the same lane as the RAM and Honda. This vehicle struck the barrier at some point. The driver of the RAM braked as the non-contact vehicle entered his travel lane. At 1.5 seconds prior to AE the FCW system issued a warning and the CMBS engaged the brakes. At 0.5 seconds, the service brakes were reported as “On” and the speed had been reduced to 105 km/h (65 mph).
Just prior to impact, the driver steered to the left with a 10-degree steering angle and speed remained at 105 km/h (65 mph). The Honda’s EDR-reported pre-crash data are presented in the following table:

Time (sec)	Speed km/h (mph)	Accelerator Pedal Position, %	Service Brake	Stability Control	Steering Input (deg)	Engine RPM
-5.0	128 (80)	16	Off	On non-engaged	-5	2,100

-4.5	128 (80)	8	Off	On non-engaged	-5	2,100
-4.0	128 (80)	11	Off	On non-engaged	-5	2,100
-3.5	128 (80)	13	Off	On non-engaged	-5	2,100
-3.0	128 (80)	18	Off	On non-engaged	-5	2,100
-2.5	128 (80)	18	Off	On non-engaged	-5	2,100
-2.0	128 (80)	17	Off	On non-engaged	-5	2,100
-1.5	128 (80)	0	Off	On non-engaged	0	2,000
-1.0	127 (79)	0	On	On non-engaged	0	1,800
-0.5	105 (65)	0	On	On non-engaged	0	1,600
0	105 (65)	0	On	On non-engaged	10	1,400

Crash

The driver of the Honda braked but could not stop the vehicle in time and the front plane of the Honda struck the rear plane of the RAM (Event 1). The missing vehicle algorithm of the WinSMASH program calculated a total delta-V of 34 km/h (21 mph) for the Honda. The longitudinal and lateral components were -34 km/h (-21 mph) and 0 km/h, respectively. The results are borderline due to bumper rotation. The bumper rotated upward as the base of the bumper mounts gave way. The EDR in the Honda reported a maximum longitudinal delta-V of -20 km/h (-12 mph) and a maximum lateral delta-V of -2 km/h (-1 mph). The driver's frontal air bag deployed and the seat belt retractor pretensioner actuated. The WinSMASH program calculated a total delta-V of 19 km/h (12 mph) for the RAM. The longitudinal and lateral components were 19 km/h (12 mph) and 0 km/h, respectively. The RAM was displaced forward and to the right into the adjacent lane. The right front of the RAM struck the left plane of the Dodge (Event 2).

Post-Crash
The Honda and RAM were towed due to damage. The Dodge was driven from the scene.

The driver of the Honda sustained police reported "C" (possible) injuries that consisted of minor contusions and abrasions. She refused medical treatment at the scene and did not seek medical treatment later. The drivers of the RAM and Dodge did not sustain any injuries.

2016 HONDA CIVIC

Description
The 2016 Honda Civic LX was a four-door, five-passenger sedan. The Honda was identified by the Vehicle Identification Number (VIN) 19XFC2F65GExxxxxx. The vehicle was equipped with a 2.0-liter, 4-cylinder, gasoline engine coupled to a continuously variable automatic transmission, front wheel drive, 4-wheel disc brakes, and ABS. The vehicle manufacturer's recommended tire size was P215/55R16 with a cold pressure of 221 kPa (32 psi). The vehicle was equipped with Hankook Kinergy GT tires of the recommended size. The specific tire information was as follows:

Position	Measured Pressure	Measured Tread Depth	Restricted	Damage
LF	228 kPa (33 psi)	6 mm (8/32 in)	No	None
LR	228 kPa (33 psi)	6 mm (8/32 in)	No	None
RR	220 kPa (32 psi)	6 mm (8/32 in)	No	None
RF	214 kPa (31 psi)	6 mm (8/32 in)	No	None

The Honda was configured with seating for five occupants. The front row was equipped with bucket seats with adjustable head restraints. The driver's seat track position was in the full rearward position during the inspection but was in the forward of mid position at the time of the crash according to the interviewee. The second row was equipped with a bench seat.

Exterior Damage
The Honda sustained moderate front plane damage from the impact with the RAM 1500 in Event 1 (**Figure 3**). The direct damage began at the right front bumper corner and extended 66.0 cm (25.9 in) to the left. The Field L extended from bumper corner to bumper corner. The bumper was shifted upward. Fifteen

Figure 3. 2016 Honda Civic

measurements were taken at bumper backing bar level by the Nikon Total Station and the Faro Blitz program computed crush measurements in six increments as follows: C_1 = 5.0 cm (1.9 in), C_2 = 9.0 cm (3.5 in), C_3 = 13.0 cm (5.1 in), C_4 = 13.0 cm (5.1 in), C_5 = 9.0 cm (3.5 in), C_6 = 4.0 cm (1.5 in). The Collision Deformation Classification (CDC) was 12FZEW1.

Event Data Recorder (EDR)

The Honda was equipped with an air bag supplemental restraint system that had EDR capability to store deployment and non-deployment events. Both types of events can contain pre-crash and crash data. For the pre-crash data there is a 5 second buffer that records vehicle speed, accelerator pedal position, service brake status, ABS activity, stability control, steering input, engine RPM, FCW, CMBS, CMBS forward collision warning, lane departure warning, road departure mitigation (RDM), and RDM lane departure warning.

The data from the Honda's EDR was imaged using the Bosch Crash Data Retrieval Tool version 17.1 through the Data Link Connector (DLC) and reported using version 17.7.2. One event was recovered for ignition cycle 610. The Bosch CDR report is included at the end of this report and the EDR-reported data is summarized below.

The event was a deployment event that resulted from the impact to the rear plane of the Ram pickup. The maximum longitudinal delta-V was -20 km/h (-12 mph) at 197.5 milliseconds (ms) and the maximum lateral delta-V was -2 km/h (-1 mph) at 95.0 ms. The pre-crash data at time 0 was as follows:

Speed, Vehicle Indicated (MPH [km/h]):	65 [105]
Accelerator Pedal Position %:	0
Service Brake (On, Off):	On
ABS Activity (On, Off):	On
Stability Control (On, Off, Engaged):	On Non-Engaged
Steering Input (deg)[1]:	10
Engine RPM:	1,400
PCM Derived Accelerator Pedal Position, % full:	0
FCW:	Warning
CMBS:	Engaged
CMBS, Forward Collision Warning:	On
Lane Departure Warning:	Not Warning
RDM:	Not Engaged
RDM, Lane Departure Warning:	Off

[1]Positive indicates left turn

Interior Damage

The Honda sustained minor interior damage due to the air bag deployment. All the doors remained closed and operational. The right lower windshield was damaged due to contact with the hood. The remaining glazing was undamaged.

Manual Restraint Systems

The front row was equipped with driver and front right passenger lap and shoulder seat belts. The driver's belt was equipped with continuous loop belt webbing, a sliding latch plate, an emergency locking retractor (ELR), and an adjustable D-ring anchorage. The front right passenger's seat belt was equipped the same as the driver's, but had a switchable ELR/automatic locking retractor (ALR). Both front seat anchorage adjustments were in the full-down position. The front seat positions were equipped with retractor-mounted seat belt pretensioners. The driver's retractor-mounted pretensioner actuated during the crash. The second row was equipped with lap and shoulder belts for all three positions. The Honda was configured with Lower Anchors and Tethers for CHildren (LATCH) in the second row. The outboard seat positions were equipped with lower anchors and upper tether anchors.

Supplemental Restraint Systems

The Honda's supplemental restraint systems included an air bag electronic control unit, driver's and passenger's frontal air bags, front row seat-mounted side impact air bags, and front and second row side impact inflatable curtain (IC) air bags. The driver's frontal air bag deployed during the crash (**Figure 4**).

Figure 4. Driver's air bag, 2016 Honda Civic

Crash Avoidance Technology

The Honda was equipped with multiple crash avoidance technology packages, discussed below.

Collision Mitigation Braking System
This can assist when there is a possibility of the vehicle colliding with a vehicle or a pedestrian detected in front. The system can give visual, audible, and tactile alerts when a potential collision is determined, and reduce the vehicle speed to help minimize collision severity when a collision is deemed unavoidable. The system uses a camera and a millimeter wave radar to scan approximately 100 m (330 ft) in front of the vehicle.

The system activates when:

-The speed difference between the vehicle and a vehicle or pedestrian detected in front of it is about 5 km/h (3 mph) and over with a chance of a collision.
-The vehicle speed is about 100 km/h (62 mph) or less and there is a chance of a collision with an oncoming detected vehicle or a pedestrian in front.

The forward collision warning distance can be adjusted to long, normal, or short. The driver never adjusted the setting and believed normal to be the default value.

The system has three alert stages for a possible collision. Depending on the circumstances or CMBS settings, CMBS may not go through all the stages before initiating the last stage.

Stage 1: Visual and audible warning, steering wheel vibrations
Stage 2: Visual and audible warning and light brake application
Stage 3: Visual and audible warning and strong brake application

The driver did not report being aware of any form of warning. She did recall braking and steering to the left just prior to the crash. According to the EDR report, the warning system was activated and the CMBS engaged the brakes at 1.5 seconds prior to AE. The calculated deceleration rate was -4.47 m/s/s (-14.68 f/s/s). The CMBS engagement occurred at 1.5 seconds and the service brake was reported as "on" at 1.0 seconds.

The system appears to have worked as designed. The system sensed a potential collision and slowed the vehicle, which lessened the crash severity.

Lane Keeping Assist System
This provides steering input to help keep the vehicle in the middle of a detected lane and visual and tactile alerts if the vehicle is detected drifting out of its lane while driving between 45–90 mph (72–145 km/h). If the vehicle is getting too close to detected left or right side lane markings without a turn signal activated, a message appears on the driver information interface, and the steering wheel vibrates. Steering torque is also applied to help keep the vehicle in the driving lane.

Road Departure Mitigation
Alerts and helps to assist if the system determines a possibility of the vehicle unintentionally crossing over detected lane markings while driving from 45 to 90 mph (72 to 145 km/h). If the

vehicle is getting too close to detected lane markings without a turn signal activated, a message appears in the driver information interface. Steering wheel torque and vibrations are applied to help the vehicle stay in the lane. Braking may also be applied if the lane lines are solid and continuous.

If the system operates several times without detecting driver response, the system beeps to alert the driver.

LaneWatch
This checks the passenger-side rear areas in the upper display when the right turn signal is activated.

2016 HONDA CIVIC OCCUPANTS

Driver Demographics

Age/Sex:	20 years/female
Height:	152 cm (60 in)
Weight:	42 kg (92 lbs)
Eyewear:	None
Seat type:	Bucket
Seat track position:	Between mid and full forward
Manual restraint usage:	Lap and shoulder belt used
Usage source:	Interviewee, EDR
Air bags:	Steering wheel mounted frontal air bag deployed, seat-mounted side air bag and inflatable curtain air bags did not deploy
Alcohol/drug data:	None
Egress from vehicle:	Under own power
Transport from scene:	None
Type of medical treatment:	None

Driver Injuries

Inj. No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Abrasion, nose	210202.1	Driver air bag	Certain
2	Contusion, left inner forearm	710402.1	Driver air bag	Certain
3	Contusion, right inner forearm	710402.1	Driver air bag	Certain
	"Sore and stiff all over"			

Source: Interviewee

Driver Kinematics

The 20-year-old female driver was seated in an upright position and was using the manual lap and shoulder belt. The bucket seat was adjusted to between the mid and full forward position. Both of her hands were on the steering wheel. Just prior to impact, she braked and steered to the left. At impact, she was displaced forward and engaged the deployed air bag with her face. The ventral portion of her forearms were contacted by the deploying air bag. She remained in an upright position after the crash and exited the vehicle under her own power. She declined any medical treatment at that time or later.

2015 RAM 1500

Description
The 2015 RAM 1500 was a 4-door crew cab pickup. The vehicle was identified by the VIN 1C6RR6FT0FSxxxxxx. The vehicle was equipped with an 8-cylinder, 5.7-liter, gasoline engine coupled to an automatic transmission and rear-wheel drive.

Exterior Damage
The RAM sustained police-reported disabling damage to the rear plane. The vehicle was towed from the scene due to damage.

Occupant Data
The 22-year-old male driver was belted during the crash and did not sustain any injuries.

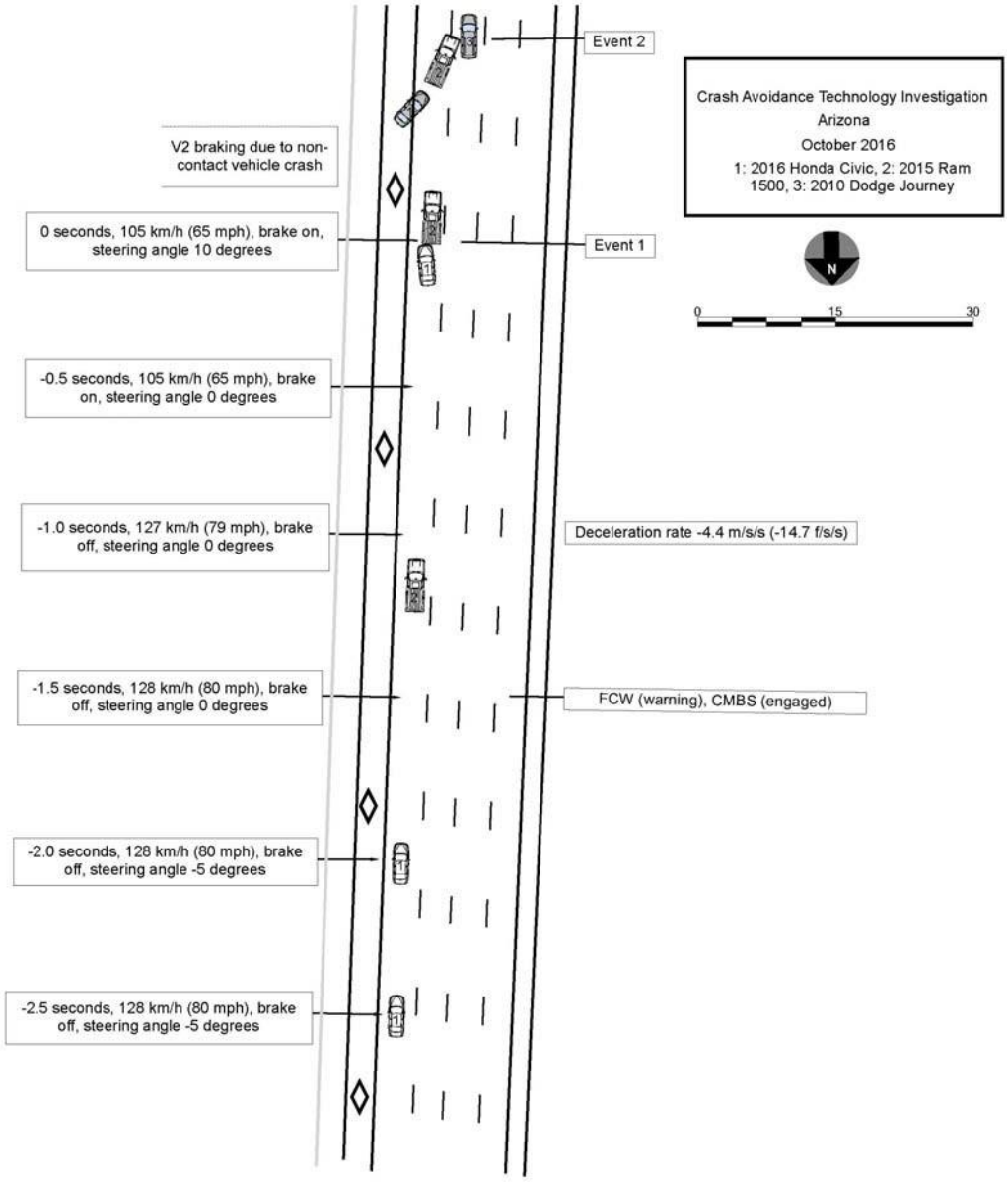
2010 DODGE JOURNEY

Description
The 2010 Dodge Journey was a sport utility vehicle (SUV). The vehicle was identified by the VIN 3D4PH5FV8ATxxxxxx. The vehicle was equipped with a 6-cylinder, 3.5-liter, gasoline engine coupled to an automatic transmission and all-wheel drive.

Exterior Damage
The Dodge sustained police-reported non-disabling damage and was driven from the scene.

Occupant Data
The 72-year-old male driver was belted during the crash and did not sustain any injuries.

CRASH DIAGRAM



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Case Number:	DS16027

APPPENDIX A. Event Data Recorder Report 2016 Honda Civic[2]

[2]The EDR report published as part of this technical report comes from the latest software version of the Bosch CDR Tool at the time of the investigation. 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	19XFC2F65GE******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	DS16027_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 17.1
Imaged with Software Licensed to (Company Name)	Company Name information was removed when this file was saved without VIN sequence number
Reported with CDR version	Crash Data Retrieval Tool 17.7.2
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
Event(s) recovered	1

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	1.3.2.0

System Status at Event (Event Record 1)

Multi-Event, Number of Events (1, 2)	1
Complete File Recorded (Yes/No)	Yes
Ignition Cycle, Download	633
Maximum Delta-V, Longitudinal (MPH [km/h])	-12 [-20]
Time, Maximum Delta-V, Longitudinal (msec)	197.5
Maximum Delta-V, Lateral (MPH [km/h])	-1 [-2]
Time, Maximum Delta-V, Lateral (msec)	95.0
Time, Maximum Delta-V, Resultant (msec)	197.5
Time, Accelerometer Range Exceeded, Longitudinal (msec)	0
Time, Accelerometer Range Exceeded, Lateral (msec)	0
Time, Accelerometer Range Exceeded, Normal (msec)	0

Deployment Command Data (Event Record 1)

Pretensioner Deployment, Time to Fire, Driver (msec)	150
Pretensioner Deployment, Time to Fire, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to Deploy First Stage, Driver (msec)	152
Frontal Air Bag Deployment, Time to Deploy First Stage, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (msec)	192
Frontal Air Bag Deployment, Time to 2nd Stage, 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, Driver (Yes/No)	No
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	610

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 1 of 3

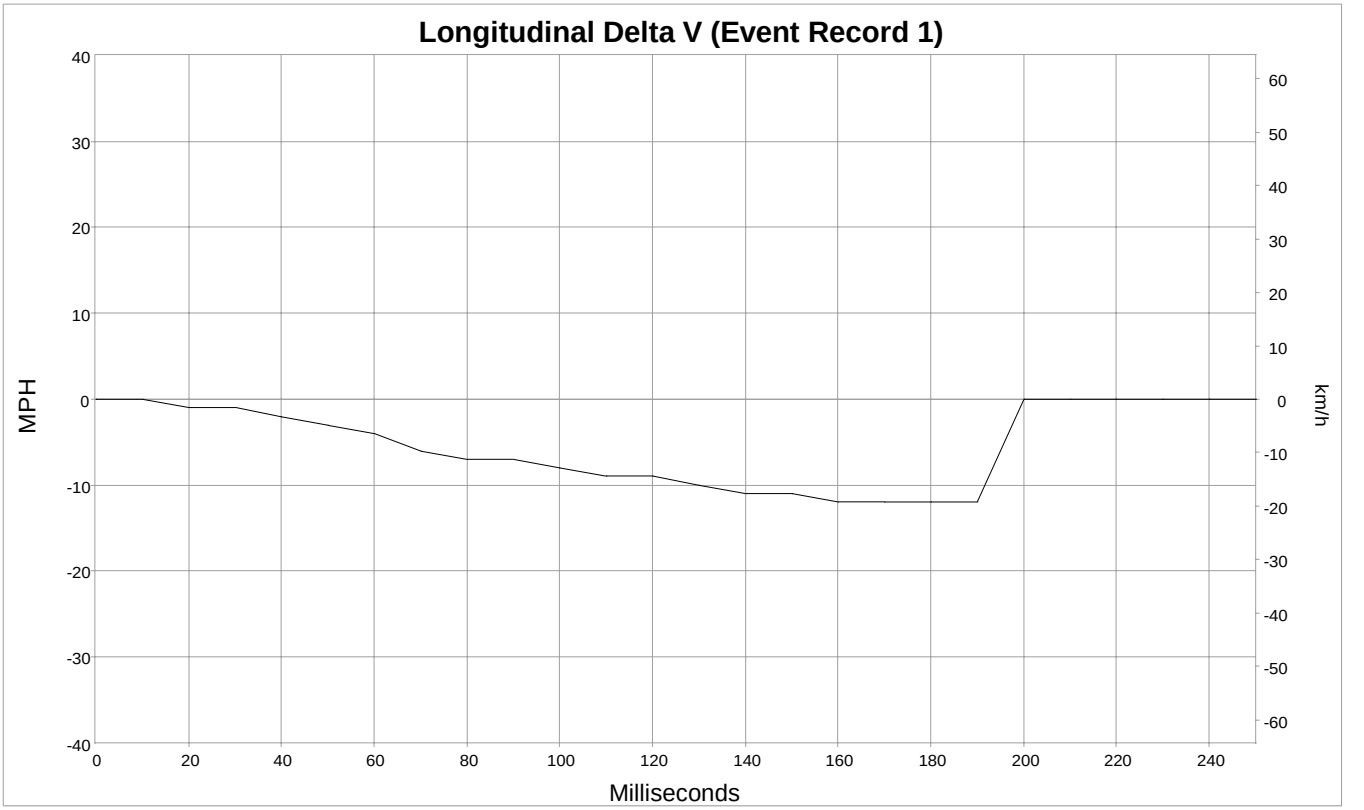
Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal Position, % full	Service Brake (On, Off)	ABS Activity (On, Off)	Stability Control (On, Off, Engaged)	Steering Input (deg)	Engine RPM
-5.0	80 [128]	16	Off	Off	On Non-Engaged	-5	2,100
-4.5	80 [128]	8	Off	Off	On Non-Engaged	-5	2,100
-4.0	80 [128]	11	Off	Off	On Non-Engaged	-5	2,100
-3.5	80 [128]	13	Off	Off	On Non-Engaged	-5	2,100
-3.0	80 [128]	18	Off	Off	On Non-Engaged	-5	2,100
-2.5	80 [128]	18	Off	Off	On Non-Engaged	-5	2,100
-2.0	80 [128]	17	Off	Off	On Non-Engaged	-5	2,100
-1.5	80 [128]	0	Off	Off	On Non-Engaged	0	2,000
-1.0	79 [127]	0	On	Off	On Non-Engaged	0	1,800
-0.5	65 [105]	0	On	On	On Non-Engaged	0	1,600
0.0	65 [105]	0	On	On	On Non-Engaged	10	1,400

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 2 of 3

Time Stamp (sec)	PCM Derived Accelerator Pedal Position, % full	Forward Collision Warning (Not Warning/ Warning)	Collision Mitigation Braking System (Not Engaged/ Engaged)	Collision Mitigation Braking System, Forward Collision Warning (On/Off)	Lane Departure Warning (Not Warning/ Warning)	Road Departure Mitigation (Not Engaged/ Engaged)	Road Departure Mitigation, Lane Departure Warning (On/Off)
-5.0	16	Not warning	Not engaged	On	Not warning	Not engaged	Off
-4.5	8	Not warning	Not engaged	On	Not warning	Not engaged	Off
-4.0	11	Not warning	Not engaged	On	Not warning	Not engaged	Off
-3.5	13	Not warning	Not engaged	On	Not warning	Not engaged	Off
-3.0	18	Not warning	Not engaged	On	Not warning	Not engaged	Off
-2.5	18	Not warning	Not engaged	On	Not warning	Not engaged	Off
-2.0	17	Not warning	Not engaged	On	Not warning	Not engaged	Off
-1.5	0	Warning	Engaged	On	Not warning	Not engaged	Off
-1.0	0	Warning	Engaged	On	Not warning	Not engaged	Off
-0.5	0	Warning	Engaged	On	Not warning	Not engaged	Off
0.0	0	Warning	Engaged	On	Not warning	Not engaged	Off

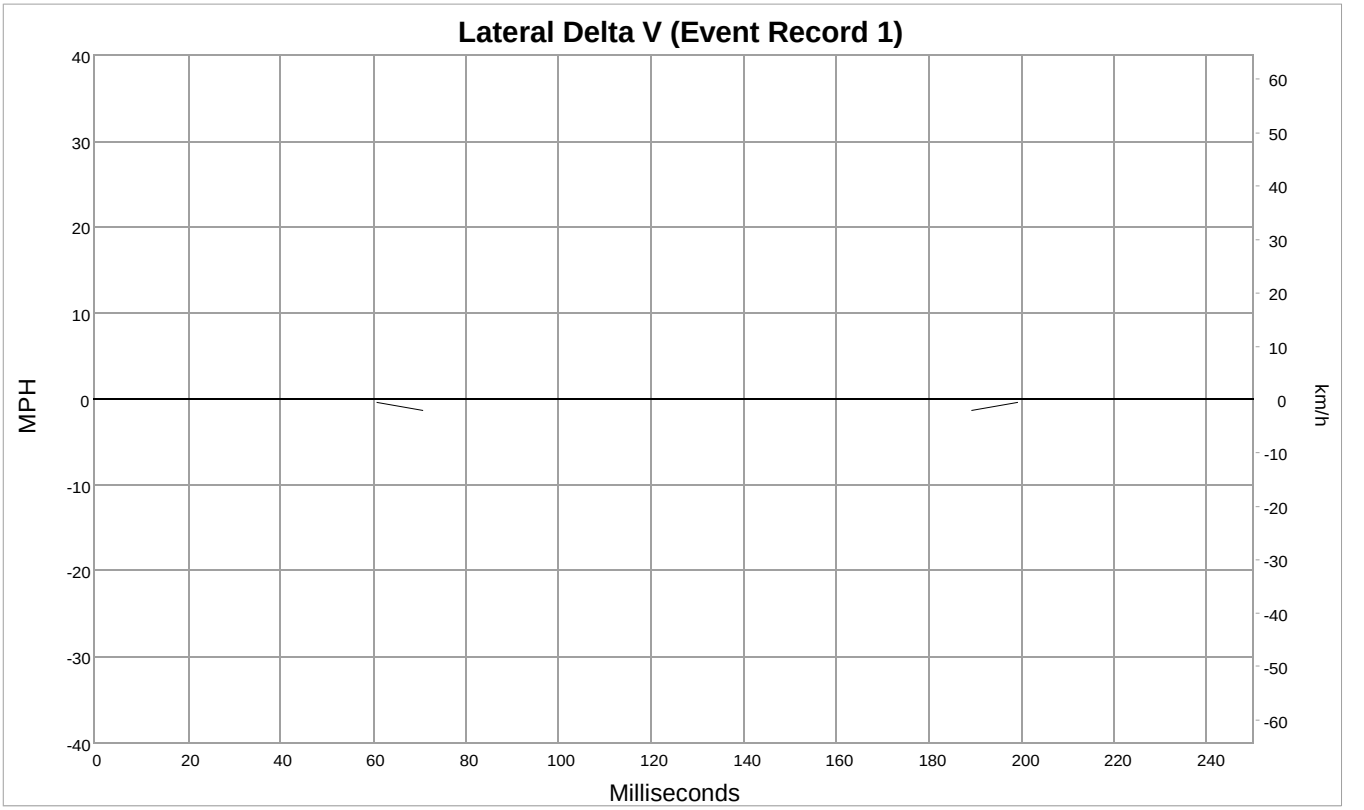
Pre-Crash Data -5 to 0 sec [2 samples/sec] (Event Record 1) - Table 3 of 3

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



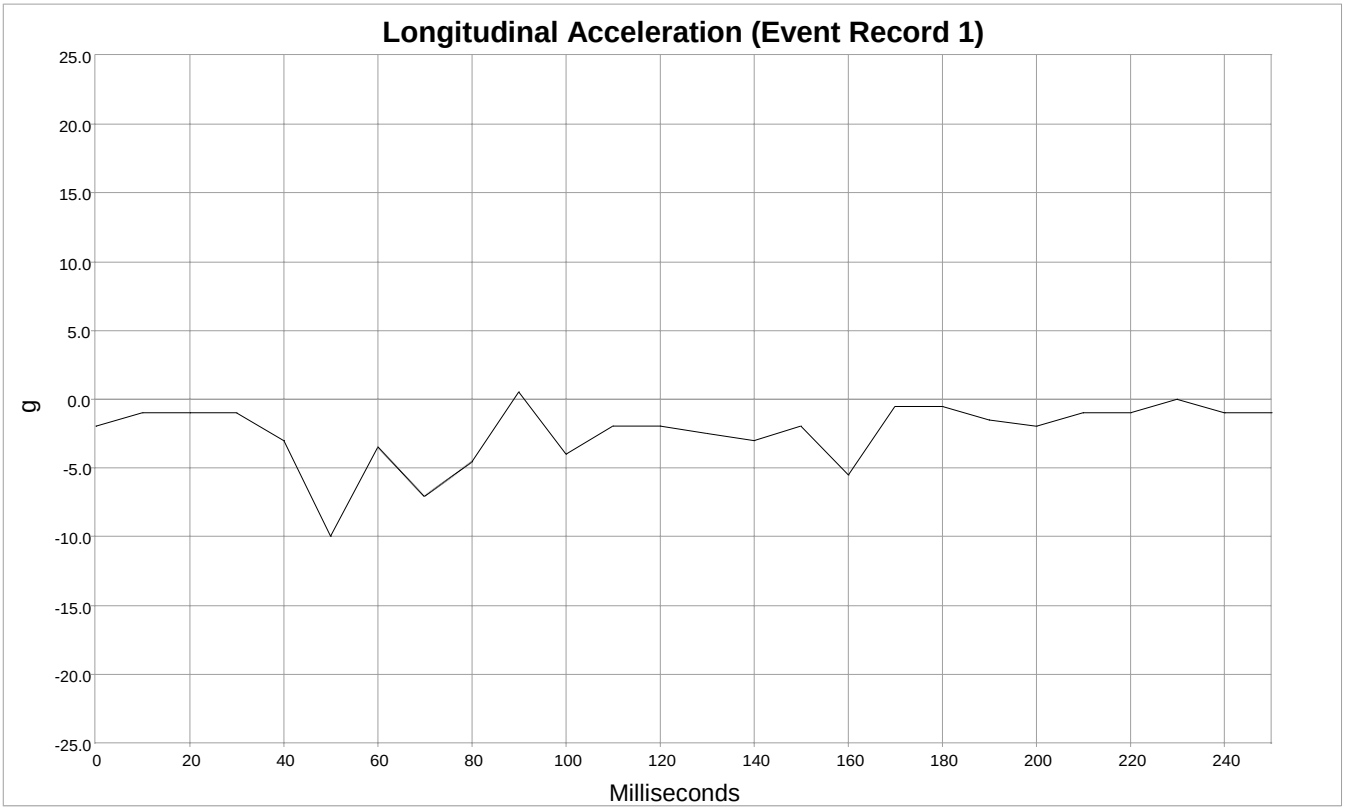
Longitudinal Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	-1 [-1]
30	-1 [-2]
40	-2 [-3]
50	-3 [-5]
60	-4 [-7]
70	-6 [-9]
80	-7 [-11]
90	-7 [-12]
100	-8 [-13]
110	-9 [-14]
120	-9 [-15]
130	-10 [-16]
140	-11 [-17]
150	-11 [-18]
160	-12 [-19]
170	-12 [-19]
180	-12 [-19]
190	-12 [-20]
200	0 [0]
210	0 [0]
220	0 [0]
230	0 [0]
240	0 [0]
250	0 [0]



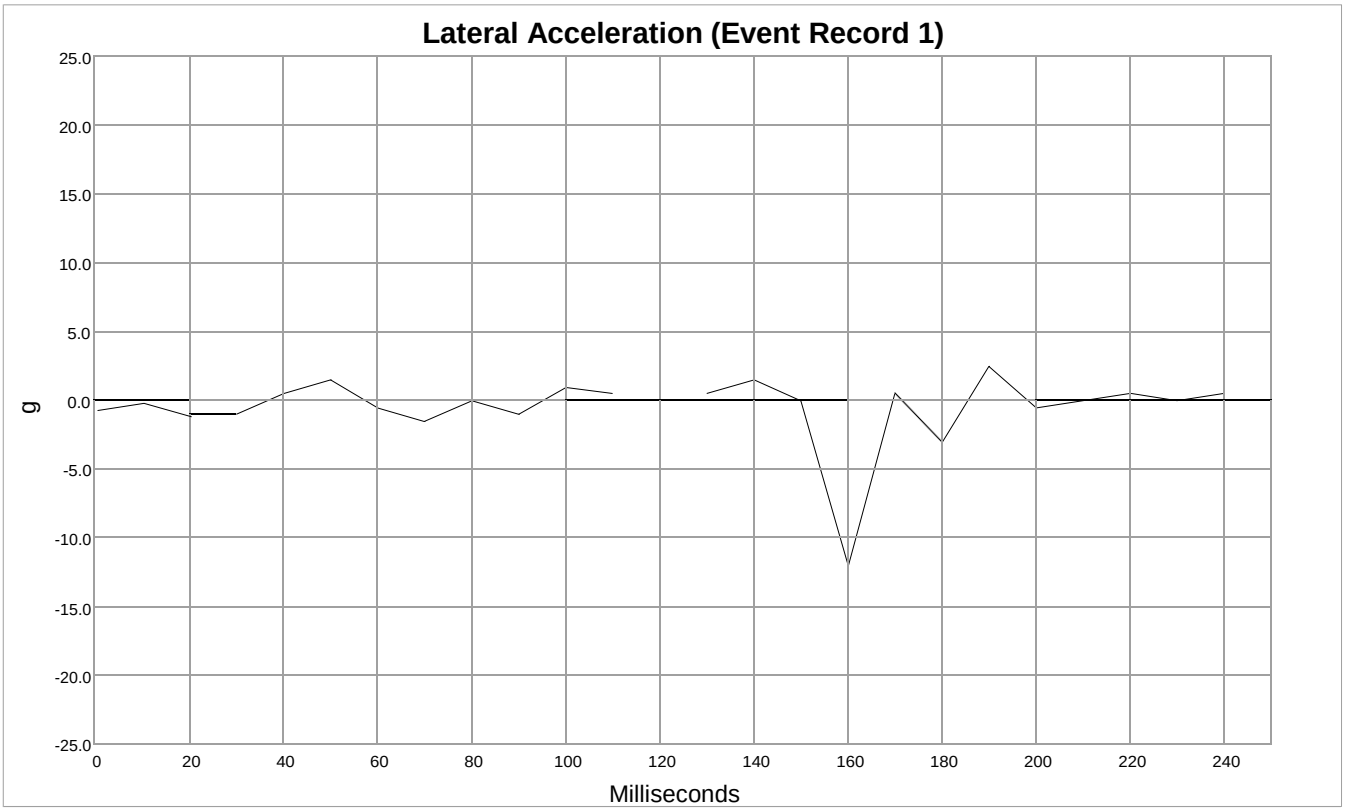
Lateral Delta V (Event Record 1)

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



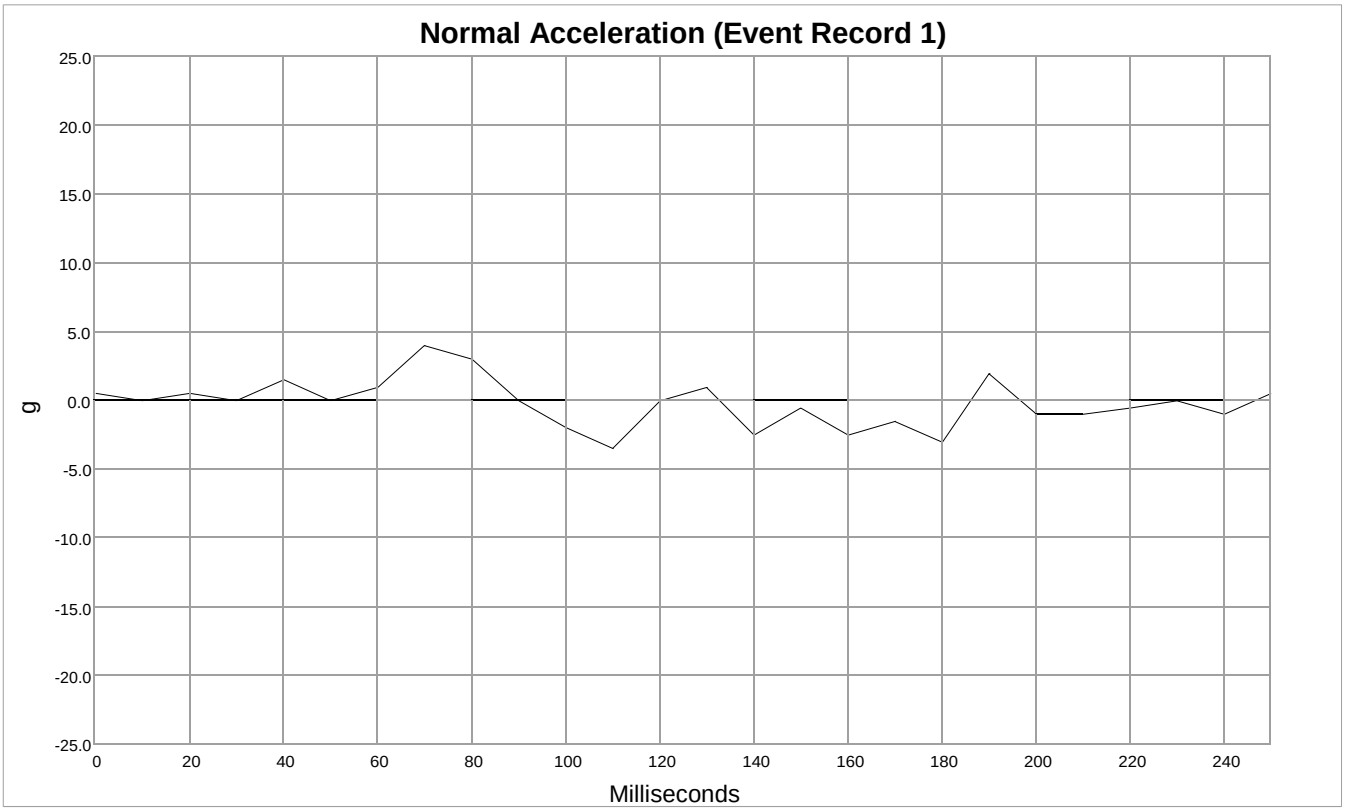
Longitudinal Acceleration (Event Record 1)

Time (msec)	g
0	-2.0
10	-1.0
20	-1.0
30	-1.0
40	-3.0
50	-10.0
60	-3.5
70	-7.0
80	-4.5
90	0.5
100	-4.0
110	-2.0
120	-2.0
130	-2.5
140	-3.0
150	-2.0
160	-5.5
170	-0.5
180	-0.5
190	-1.5
200	-2.0
210	-1.0
220	-1.0
230	0.0
240	-1.0
250	-1.0



Lateral Acceleration (Event Record 1)

Time (msec)	g
0	-0.5
10	0.0
20	-1.0
30	-1.0
40	0.5
50	1.5
60	-0.5
70	-1.5
80	0.0
90	-1.0
100	1.0
110	0.5
120	0.5
130	0.5
140	1.5
150	0.0
160	-12.0
170	0.5
180	-3.0
190	2.5
200	-0.5
210	0.0
220	0.5
230	0.0
240	0.5
250	0.5



Normal Acceleration (Event Record 1)

Time (msec)	g
0	0.5
10	0.0
20	0.5
30	0.0
40	1.5
50	0.0
60	1.0
70	4.0
80	3.0
90	0.0
100	-2.0
110	-3.5
120	0.0
130	1.0
140	-2.5
150	-0.5
160	-2.5
170	-1.5
180	-3.0
190	2.0
200	-1.0
210	-1.0
220	-0.5
230	0.0
240	-1.0
250	0.5

Hexadecimal Data

DID #	Data
$8000	21 4D 14 15 01 33 00 11 00 55 00 00 11 33 00 00
	20 0F 00 E9 02 06 22 00 00 00 00 00 00 00 00 00
	11 11 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 27
$8020	01 03 00 00 00 00 00 00 00 00 00 00 00 00 00 FC
$8021	AA 00 01 00 00 00 00 00 00 00 00 55 02 79 AA 00
$8022	AA 00 C0 78 66 00 00 00 96 00 00 00 00 00 00 00
	00 98 00 C0 00 00 00 00 00 00 00 00 00 00 00 00
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	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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$8024	AA 00 FF 00 00 40 43 02 12 12 11 00 02 62 00 00
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$8025	AA 00 FF 00 00 40 43 00 12 00 11 00 00 00 00 00
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	80 08 FF 15 08 00 00 00 01 00 00 00 00 00 00 00
	80 0B FF 15 0B 00 00 00 01 00 00 00 00 00 00 00
	80 0D FF 15 0D 00 00 00 01 00 00 00 00 00 00 00
	80 12 FF 15 12 00 00 00 01 00 00 00 00 00 00 00
	80 12 FF 15 12 00 00 00 01 00 00 00 00 00 00 00
	80 11 FF 15 11 00 00 00 01 00 00 00 00 00 00 00
	80 00 00 14 00 00 00 00 61 00 00 00 00 00 00 00
	7F 00 00 12 00 01 00 00 61 00 00 00 00 00 00 00
	69 00 00 10 00 05 00 00 61 00 00 00 00 00 00 00
	69 00 02 0E 00 05 00 00 61 00 00 00 00 00 00 F7
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$802E          AA 01 FF 00 FE FE 01 03 FF FD 00 FE 02 01 01 01
               03 00 E8 01 FA 05 FF 00 01 00 01 01 00 00 00 00
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$802F          AA 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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$8030          AA 01 01 00 01 00 03 00 02 08 06 00 FC F9 00 02
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$8031          AA 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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$8007          AA 00 00 00 00 00 00 00 0E 00 00 00 00 00 00 00
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$8004           Not Used

$8005           AA 00 FE F0 F0 F0 DE 01 DE 01 E0 00 00 00 00 00
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                FF 92 00 61 00 00 00 00 06 9F 06 CE 00 00 00 00
                00 2C 00 01 B9 FE 74 00 00 00 00 00 00 00 00 A8
                04 AB 00 02 88 02 22 00 00 00 00 00 00 00 00 A3
                01 02 02 00 00 00 00 00 00 00 00 00 00 00 00 00
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$8008           Not Used

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**National Highway
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