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Special Crash Investigations On-Site Child Restraint System Crash Investigation Vehicle: 2015 Honda Odyssey Location: New Jersey Crash Date: March 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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16. Abstract This report documents the on-site investigation of a child restraint system (CRS) used to restrain a 5-month-old female in the second row of a 2015 Honda Odyssey. The Honda was involved in a multiple-event crash when it departed the roadway, struck numerous trees, and initiated a rollover of three quarter-turns. During the crash sequence, supplemental restraint systems that included a driver's Certified Advanced 208-Compliant (CAC) frontal air bag, front row right-seat-mounted air bag, and both dual-sensing (side impact and rollover) inflatable curtain (IC) air bags were deployed. An unbelted 28-year-old female driver and the infant female occupied the Honda at the time of the crash. The infant was restrained in the CRS by its integral 5-point harness system; however, the CRS itself was unsecured in the vehicle's second row. That is, the CRS was not secured using either its Lower Anchors and Tethers for Children (LATCH) equipment or any of the vehicle's manual restraint systems. Post-crash, the first-arriving witness found the CRS loose in the second row of the Honda with the infant restrained in the CRS. The infant was removed from the CRS and vehicle and transported by ambulance to a local hospital for police-reported possible (C-level) injuries. The driver sustained fatal injuries and was pronounced deceased at the crash scene.			
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CASE NO: CR16008
ON-SITE CHILD RESTRAINT SYSTEM CRASH INVESTIGATION
VEHICLE: 2015 HONDA ODYSSEY
LOCATION: NEW JERSEY
CRASH DATE: MARCH 2016

BACKGROUND

This report documents the on-site investigation of a child restraint system (CRS) used to restrain a 5-month-old infant female in the second row of a 2015 Honda Odyssey. The Honda (**Figure 1**) was involved in a multiple- event crash when it departed the roadway, struck numerous trees, and initiated a rollover of three quarter-turns. During the crash sequence, supplemental restraint systems that included a driver's Certified Advanced 208-Compliant (CAC) frontal, front row right-seat-mounted, and both dual-sensing (side impact and rollover) inflatable curtain (IC) air bags were deployed. An unbelted 28-year-old female driver and the infant female occupied the Honda at the time of the crash. The infant was restrained in the CRS by its integral 5-point harness system; however, the CRS itself was unsecured in the vehicle's second row. That is, the CRS was not secured using either its Lower Anchors and Tethers for Children (LATCH) equipment or any of the vehicle's manual restraint systems. Post-crash, the first-arriving witness found the CRS loose in the second row of the Honda with the infant restrained in the CRS. The infant was removed from the CRS and the vehicle and transported by ambulance to a local hospital for police-reported possible (C-level) injuries. The driver sustained fatal injuries and was pronounced deceased at the crash scene.

Figure 1: On-scene view of the Honda during recovery (*image obtained from an online news source*).

The crash was identified by the Crash Investigation Division (CID) of the National Highway Traffic Safety Administration, which provided notification to the Special Crash Investigations (SCI) team in March 2016. The SCI team located the vehicle and achieved cooperation to inspect the Honda at a local tow yard. The on-site portion of this investigation took place during March 2016. The inspection of the Honda consisted of the documentation of its exterior and interior damage, an assessment of the manual and supplemental restraint systems, and the identification of occupant contact points. The CRS, which remained in the vehicle, was examined for occupant loading and crash-related damage. During the vehicle inspection process, data was imaged from the Honda's event data recorder (EDR) using the Bosch Crash Data Retrieval (CDR) scan tool and software. The crash site was also inspected and was documented using a Nikon Nivo 5+M total station.

SUMMARY

Crash Site

The crash occurred on a two-lane road during daylight. At the time of the crash, the National Weather Service reported the conditions as clear and dry with a temperature of 24 ºC (75 ºF), humidity at 27 percent and south/southwesterly winds of 11 km/h (6.9 mph).

The local roadway consisted of two 3.7 m (12.1 ft) wide travel lanes, oriented north-south. It was bordered by a 4.1 m (13.5 ft) west shoulder and a 3.7 m (12.1 ft) east shoulder. The north and southbound travel lanes were separated by a double-solid yellow centerline, with painted solid white lines delineating the outboard edges of the travel lanes. All surfaces were asphalt, with 10 cm (4 in) raised concrete curbs that served as the roadway edges. Speed was regulated by a posted limit of 72 km/h (45 mph).

The crash occurred in the southbound direction on the local roadway in the area of a right curve. The curve, which had a measured curve radius of 466 m (1,529 ft), began in an area (**Figure 2**) where the local roadway was intersected from the west by a driveway into a residential subdivision. The roadway itself was essentially level. However, in the vicinity of the crash site, a landscaped berm extended parallel to the roadway beyond the east shoulder. Numerous species of shrubbery and mature coniferous and deciduous trees inhabited the length of the berm. On the downslope side of the berm was a chain link fence that protected an open-cut, depressed grass area that led up to another subdivision of residential homes. A significant elevation drop of 5.1 m (16.7 ft) existed from the maximum height of the berm to the ground level of the open grass area. A crash diagram is included at the end of this technical report on **Page 24**.

Figure 2: South-facing view of the local roadway for the Honda's pre-crash travel trajectory.

Pre-Crash

The 28-year-old female operated the Honda in a southerly direction on the two-lane roadway. Prior to her travel in the vehicle, the driver had secured the 5-month-old infant into the Doona infant CRS using its integral multi-point harness system. Despite use of the CRS harness, the driver did not secure the CRS itself in the Honda and simply placed it unsecured on the second row bench seat. Due to its unsecured state and the circumstances of the crash, the specific position and orientation of the CRS in the Honda could not be determined. The driver was also unbelted despite the availability of a 3-point lap and shoulder seat belt system for manual restraint.

As the Honda traveled south on the two-lane roadway, the driver accelerated the vehicle to high speed. According to the data imaged from the Honda's EDR, the accelerator pedal was depressed fully (100-percent) 5 seconds prior to algorithm enable (AE). At that pre-crash interval, the Honda was traveling 176 km/h (109 mph). It reached a maximum pre-crash speed of 178 km/h (111 mph) 4.5 seconds prior to AE, then coasted without driver input for the remaining pre-crash data samples leading up to AE. The recorded speed at 0.5 seconds prior to AE was 165 km/h (103 mph).

Figure 3: View of the southbound trajectory of the Honda on approach to its east roadside departure.

During the Honda's high-speed pre-crash travel, the driver maintained a southbound trajectory. She allowed the vehicle to travel left, from its travel lane, over the double-solid yellow centerline through the northbound travel lane, and onto the east shoulder of the roadway (**Figure 3**). There was no evidence of any avoidance action by the driver prior to the crash. Law enforcement investigation of the crash ultimately determined that the driver made suicidal statements prior to the crash, her family reported that she was suffering from ongoing emotional instability and psychological issues, and a handwritten suicide note was recovered during their investigation.

Crash

The first crash event occurred as the left front tire of the Honda struck and overrode the raised curb of the east roadway edge (Event 1). This impact was evidenced by a tire mark on the concrete surface of the curb. The Honda proceeded on its errant trajectory as it departed the roadway (**Figure 4**) and sideswiped shrubbery on its left aspect (Event 2). The Honda then began to ramp up the berm as it struck the curb with its right front tire (Event 3). SCI reconstruction of the crash and analysis of the imaged EDR data determined that the initial left front curbstrike was the source of AE. According to the vehicle's imaged EDR data, the combination of the initial ramp of the vehicle along the upslope of the berm and the subsequent right front curbstrike resulted in the respective deployment of the driver's CAC frontal, front row right-seat-mounted, and right IC air bags in the Honda. An in-depth analysis of the imaged EDR data can be found in the *Event Data Recorder* section of this report.

Figure 4: View of the southbound Honda's errant east roadside departure, with yellow cones highlighting the Honda's tire marks.

As the Honda maintained its errant high-speed trajectory, it struck shrubbery, branches, and trees of varying sizes and diameters (Events 4 to 17). It also became airborne as it progressed over the elevated berm and continued through the east roadside. During this multiple-event sequence, the Honda sheared numerous trees and branches along the berm. This created a visible path through the vegetation of the east roadside that evidenced the Honda's crash trajectory (**Figure 5**). Analysis of the impacts determined that the Honda initiated a slight counterclockwise rotation about its vertical axis while airborne and as it progressed down the far side of the berm.

Figure 5: South-facing view of the berm and the Honda's crash trajectory, with sheared tree debris in the foreground and a visible path through the trees in the background.

Figure 6: North-facing lookback view at the Honda's final rest location toward the elevated berm and its destructive path through the roadside.

The Honda proceeded down the opposing slope of the berm, through a fence, and into the expansive depressed grass area. It achieved a left-side-leading attitude due to its counterclockwise rotation. This caused the left front tire/wheel to furrow into the soft soil surface, which tripped the vehicle into a rollover sequence about its longitudinal axis (Event 18). The resulting left-side-leading rollover consisted of three uninterrupted quarter-turns. The Honda came to final rest on its right plane and oriented such that its front plane was facing southwester. **Figure 6** depicts the final rest position of the Honda in a north-facing lookback view from the open grass area near the residential subdivision. Yellow cones in the foreground highlight the position of front and back planes of the Honda at final rest (left to right, respectively), while yellow cones on the downslope of the berm highlight the furrow mark from the left front tire. The location of the Honda's final rest position was 22.3 m (73.2 ft) east of the road edge and 68.0 m (223.1 ft) south of the initial roadside departure.

While the severity of each crash event should not be overlooked or misconstrued, the sheer quantity of those events was beyond the scope of individual descriptive analysis for the purposes of this SCI investigation and technical report. The impact events are summarized in the following Table.

Impact Event Number	Primary Vehicle Damage Plane(s)	Struck Object or Event Type
1	Left front tire/wheel	Raised curb of east roadway edge
2	Front/left planes	Shrubbery (1” diameter branches)
3	Right front tire/wheel	Raised curb of east roadway edge
4	Front plane	Large diameter (12”) coniferous tree
5	Front plane	Large diameter (6”) coniferous tree
6	Front plane	Shrubbery (1” diameter branches)
7	Front plane	Large diameter (7”) coniferous tree
8	Right plane	Large diameter (12”) coniferous tree
9	Front/left planes	Branches (1” diameter) of deciduous tree
10	Front/left planes	Branches (1” diameter) of deciduous tree
11	Front/left/top planes	Branches (3” diameter) of coniferous tree
12	Front/left/top planes	Branches (3” diameter) of coniferous tree
13	Front plane	Large diameter (7”) deciduous tree
14	Front plane	Large diameter (13”) deciduous tree
15	Front/right planes	Branches (<6” diameter) of deciduous tree
16	Left plane	Chain-link fence
17	Left plane	Branches (2” diameter) of deciduous tree
18	Top plane	Rollover (ground)

Table 1: *Summary of the Honda’s Crash Events*

Post-Crash

Following the numerous impact events and rollover, the Honda was at final rest on its right plane in the expansive depressed grass area. A witness to the crash alerted the emergency response system and then approached the overturned vehicle to offer aid to occupants. This witness found the unbelted driver unresponsive and slumped in an awkward position against the right front door. As the witness attempted to assess the condition of the driver, he overheard the infant crying in the second row of the vehicle. He then observed the CRS lying unsecured in an upside-down position against the deployed right IC air bag, in the area of the second row right glazing. The witness righted the CRS, cut the straps of its integral harness system, and removed the infant from the vehicle while awaiting the arrival of emergency response personnel.

Firefighters, law enforcement, and emergency medical services (EMS) personnel then arrived at the crash scene. EMS personnel determined that the driver was deceased and did not render any medical care. However, the infant was transported by ambulance to a local hospital for the evaluation and treatment of police-reported C-level (possible) injuries. The child was released in hours without any documented injuries. An autopsy of the driver’s body was declined by the family. No law enforcement examination of her body was requested.

2015 HONDA ODYSSEY

Description

The 2015 Honda Odyssey was a 4-door minivan equipped with the EX-L trim package. It was manufactured in December 2014, and was identified by the VIN 5FNRL5H69FBxxxxxx. At the time of the SCI vehicle inspection, its odometer read 37,643 km (23,390 mi). The Honda (**Figure 7**) was powered by a 3.5-liter V-6 gasoline engine with a 6-speed automatic transmission. It was equipped with 4-wheel power-assisted disc brakes with antilock brakes. The Honda's gross vehicle weight rating was placarded at 2,730 kg (6,019 lb), with gross axle weight ratings of 1,320 kg (2,910 lb) front and 1,450 kg (3,198 lb) rear. The vehicle manufacturer's recommended tire size and pressure were P235/65R17 and 230 kPa (33 PSI) for all four axle positions.

Figure 7: Left front oblique view of the Honda Odyssey at the time of the SCI vehicle inspection.

At the time of the crash, the Honda was equipped with original aluminum-alloy wheels and Continental ContiPro Contact all-season radial ply tires of the recommended size. The tires had matching Tire Identification Numbers of A387 3VM, and all had 6 mm (7/32 in) of tread. Only the right front tire remained inflated at the time of the SCI inspection; the left front, left rear, and right rear were all flat. Both left side tires had cuts in their sidewalls, while the right side tires were undamaged. None of the tires were restricted.

The interior of the Honda was configured with three rows for the seating of up to eight total occupants (2/3/3). All seats in the Honda were leather-surfaced. The driver and front row right seats were both forward-facing bucket seats with electronic seat track, seatback recline, and lumbar adjustments. Both seats were equipped with a folding armrest on their respective inboard aspects, with adjustable head restraints mounted in the seat backs. At the time of the SCI vehicle inspection, the driver's seat was adjusted to a middle track position with the seatback slightly reclined and the head restraint 4 cm (1.6 in) upward. The second and third rows of the Honda both consisted of three-passenger bench seats with folding seat backs and adjustable head restraints. At the time of the SCI inspection, the third row seat backs were folded forward. All seat positions in the Honda were equipped with 3-point lap and shoulder seat belt systems for manual restraint, with exception of the second row center position. This seat position was equipped with a lap belt only.

Supplemental restraints in the Honda was provided by front seat belt retractor pretensioners, a CAC frontal air bag system, front seat-mounted side-impact air bags, and IC air bags. Additional safety systems included a crash avoidance (CA) system that incorporated lane departure warning (LDW) and forward collision warning (FCW). These systems are discussed in the *Crash Avoidance Systems* section of this report on **Page 16**.

Exterior Damage

Damage to the Honda associative to the multiple event crash was visible on all planes. The sheer quantity of events prevented descriptive analysis of the vehicle's damage specific to each individual impact. Therefore, the damage to the Honda is described as follows and categorized by vehicle plane. A separate analysis linking each crash event to the specific damage plane(s) and describing the associated damage using the Collision Deformation Classification (CDC) is summarized in **Table 3**.

Front plane damage to the Honda consisted of the disintegration of both headlight assemblies and the separation of the bumper fascia, grille, and surrounding front plane trim. There was moderate longitudinal deformation to the bumper beam and underlying engine compartment components, and the vehicle's hood was partially separated and awkwardly deformed. Several distinct U-shaped patterns of deformation were visible to the front bumper beam, associative to multiple impacts with large and small diameter trees. **Figure 8** depicts the Honda and the SCI documentation of its damage. A residual crush profile was documented using a Nikon Nivo 5.M+ total station mapping system and a direct and induced damage (Field-L) width of 120 cm (47.2 in) across the entire width of the exposed front bumper beam. It is important to note that this profile represented the total damage sustained by the front bumper beam as a cumulative result of the numerous frontal events. The resultant measurements included: C1 = 9 cm (3.5 in), C2 = 22 cm (8.7 in), C3 = 39 cm (15.4 in), C4 = 35 cm (13.8 in), C5 = 37 cm (14.6 in), and C6 = 25 cm (9.8 in). Maximum crush was located at the C3 measurement location, immediately left of the vehicle's centerline.

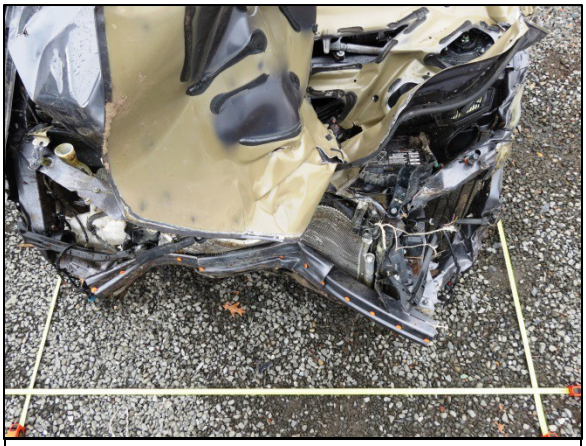


Figure 8: Overhead perspective view of the Honda's front plane deformation pattern.

The residual crush profile was used in conjunction with the damage algorithm of the WinSMASH model to calculate a vehicle velocity change (delta-V). The total calculated delta-V was 39 km/h (24 mph), with respective longitudinal and lateral components of -39 km/h (-24 mph) and 0 km/h. The reader is cautioned that this calculated delta-V serves only for comparative analysis purposes, because the residual crush to the front plane of the Honda used to calculate the delta-V was the result of a combination of numerous impacts rather than a singular crash event. The overlapping nature of the damage prevented attribution of deformation to specific events, thus making delta-V analysis of the individual impacts inaccurate.

Figure 9: View of the damage to the Honda's left plane

Damage to the left plane was biased to the forward aspect of the Honda (**Figure 9**). Rearward displacement of the left front tire/wheel measured 6 cm (2.4 in). The left front fender and mirror were sheared from the vehicle, with deformation to the left lower A-pillar and left front door. This deformation had jammed the left front door closed, and it was removed post-crash by emergency response personnel using hydraulic rescue tools. Inoperability of the vehicle's electric system prevented operation of the left rear sliding door at the time of the SCI inspection. There were surface scratches, abrasions, and minor deformation to the left roof side rail from ground contact during the rollover sequence. The remainder of the damage to the left plane consisted of minor longitudinal surface scratches and abrasions to the body panels and deflection of the rear bumper fascia from the numerous sideswipes with trees during the crash.

Figure 10: The Honda's damaged right plane.

The right plane of the Honda (**Figure 10**) exhibited damage from the rollover and impacts with multiple trees/vegetation. The right front fender was deformed, and the right front tire/wheel was rotated CW and displaced rearward approximately 8 cm (3.1 in). At least one swiping tree impact produced deformation to the right front door, right B-pillar, and right rear sliding door, evidenced by brown-colored abrasions and bark/tree fiber captured in the body seams. As a result of this damage, both right doors were jammed shut. Post-crash, the right front door was forced open. During that process, the exterior door skin of the right front door was sheared completely off. Rollover deformation was visible to the right rear sliding door, right quarter panel, and right roof side rail, consisting primarily of minor lateral deformation with minor surface scratches and abrasions.

Significant damage was sustained by the forward aspect of the Honda's top plane as a result of the multiple event crash sequence. The most significant damage consisted of longitudinal deformation to the windshield header and roof structure above the front row of the Honda. Specifically, the windshield header was sheared from its juncture with the left upper A-pillar and left roof side rail. In conjunction with this separation, the header and roof structure between the windshield header and the opening of the sunroof were crushed longitudinally such that nearly the entire opening of the sunroof was collapsed.

Figure 11: Overhead view of the Honda's top plane damage.

Figure 11 depicts an overhead view of the Honda and the significant longitudinal deformation sustained by the windshield header, roof, and sunroof opening. This deformation produced significant intrusion, which is discussed in the *Interior Damage* section below. In the deformed state, a U-shaped damage pattern was centered in an area where the windshield header was engaged against the headrest of the driver's seat position. The total depth of this longitudinal crush was estimated to be approximately 51 cm (20 in).

SCI analysis determined that this damage pattern (**Figure 12**) was the result of direct contact and engagement with a large diameter tree and most likely was associated with Event 4. Specifically, at least one of the large diameter trees struck by the Honda's front plane and sheared at or near the height of the initial contact (bumper beam height). The sheared upper section of the tree subsequently contacted and deformed the windshield header/roof structure as the Honda maintained its forward momentum. The remainder of the damage to the top plane of the Honda consisted of minor deformation, induced buckling, and surface scratches/abrasions that were attributable to the multiple swiping impacts with tree branches and the rollover.

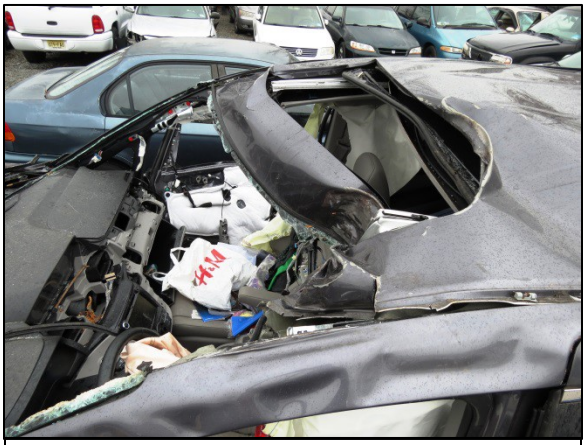


Figure 12: Deformation pattern to the Honda's windshield header and roof structure associated with engagement of the vehicle with a sheared section of large diameter tree.

There was no apparent damage or deformation to the Honda's back plane. A lack of power to the central locking system prevented release of the electric lock for the rear liftgate at the time of the SCI inspection. However, due to the lack of back plane damage, it was presumed to be operational.

Descriptive analysis of the damage associated with each individual impact and crash event was beyond the scope of this technical report due to the quantity of events, overlapping nature of the damage patterns, and inherent degree of uncertainty resulting from the combination of the aforementioned. For the purposes of this SCI reconstruction, the damage sustained by the Honda is described by a Collision Deformation Classification (CDC) for each crash event and listed relative to the respective primary damage planes and impact/object type. This data can be found in **Table 2** below.

Event Number	Primary Vehicle Damage Planes	Struck Object or Event Type	Collision Deformation Classification
1	Left front tire/wheel	Raised curb of east roadway edge	12FLWN3
2	Front/left planes	Shrubbery (1” diameter branches)	12FLAS9
3	Right front tire/wheel	Raised curb of east roadway edge	12FRWN3
4	Front plane	Large diameter (12”) coniferous tree	12FCEN99
5	Front plane	Large diameter (6”) coniferous tree	12FREN99
6	Front plane	Shrubbery (1” diameter branches)	12FDEW99
7	Front plane	Large diameter (7”) coniferous tree	12F99999
8	Right plane	Large diameter (12”) coniferous tree	01RPAW3
9	Front/left planes	Branches (1” diameter) of deciduous tree	00FLAS9
10	Front/left planes	Branches (1” diameter) of deciduous tree	00FLAS9
11	Front/left/top planes	Branches (3” diameter) of coniferous tree	00FLAS9
12	Front/left/top planes	Branches (3” diameter) of coniferous tree	00FLAS9
13	Front plane	Large diameter (7”) deciduous tree	12F99999
14	Front plane	Large diameter (13”) deciduous tree	12F99999
15	Front/right planes	Branches (<6” diameter) of deciduous tree	00FRAS9
16	Left plane	Chain-link fence	00LDAW99
17	Left plane	Branches (2” diameter) of deciduous tree	00LF9999
18	Top plane	Rollover (ground)	00TDDO3

Table 2: *Summary of the Honda’s damage specific to the individual crash events*

Event Data Recorder

The 2015 Honda Odyssey was equipped with a supplemental restraint systems (SRS) control unit that was mounted beneath the center instrument stack. The SRS control unit had EDR capabilities to record data for front, side, rear, and rollover events. The SCI investigator connected to the SRS control unit via the vehicle’s diagnostic link connector (DLC) and provided back- power through the instrument-panel-mounted fuse block. Data was then imaged from the Honda’s EDR during the SCI inspection using the Bosch Crash Data Retrieval hardware and software version 16.4. The imaged data was later read using software version 17.7.1 for the following described analysis, and is included at the end of this technical report as **Appendix A**.

The SRS control unit monitored the diagnostic functions of the vehicle’s restraint systems (air bags and seat belt pretensioners) and controlled the deployment/actuation of those devices dependent upon crash event severity. Its EDR functionality typically would record only one event. However, it had the capacity to record up to two events as long as both events occurred in a 5-second sample interval. Events were recorded as either deployment or non-deployment event types.

By definition, a “deployment” event included only those in which the “front, side, or side curtain” air bags were commanded to deploy. A “non-deployment” event type encompassed any event that surpassed the minimum velocity change threshold of 8 km/h (5 mph) over a 150 millisecond

interval that did not qualify as a deployment event type. Non-deployment event types could be overwritten by subsequent events of either type, whereas an event classified as deployment became locked to memory and could not be overwritten.

For all events, crash data reporting the vehicle velocity change (delta-V) could be recorded for up to 250 milliseconds at a sample rate of 100 times per second. Recording of crash data could end before the 250-millisecond interval if the change in the data equaled or fell below 0.8 km/h (0.5 mph) over a 20-millisecond interval. Of important note, saturation of the SRS control unit longitudinal or lateral accelerometers could occur dependent upon the severity of the event and the characteristics of the accelerometer/crash conditions. In such cases, this could decrease the delta-V values recorded.

Associative to the recording of each event type, the SRS control unit could also record a 5-second pre-crash interval buffer. Data points captured by the pre-crash buffer included vehicle speed, accelerator pedal position, service brake status, engine RPM, and the accelerator pedal position derived from the powertrain control module (PCM). Due to the sample interval of the pre-crash buffer, the recording of each data interval sample was relative to AE (or time zero). This should not be confused with, and is not definitively, the time at which the vehicle made contact with another vehicle or object.

The data imaged from the Honda's EDR contained two recorded deployment events. They occurred 0.1 seconds apart on ignition cycle 2,612, and were labeled consecutively as Event Records 1 and 2. Based on the SCI interpretation of the data, the evidence documented during the SCI crash site inspection, and the SCI reconstruction of the crash, the recorded events contained in the Honda's EDR data were determined to be related to the respective deceleration associated with the vehicle's ramp up the traffic-side of the elevated berm (Event Record 1) and the right front tire/wheel curbstrike (SCI Event 3, Event Record 2).

The deployment commands captured in the recorded event records did not include a command for the Honda's left IC air bag, despite the fact that it was deployed at the time of the SCI vehicle inspection. This discrepancy is explained by the limitations of the EDR's recording capabilities, as the event that precipitated the curtain air bag deployment command occurred after the two available event record recording slots were already filled by locked deployment events. Therefore, due to the limitations of the Honda's EDR (which included the locking of deployment events to memory and its capability to record no more than two events), none of the subsequent crash events could be recorded. As a result, the numerous tree impacts and rollover sequence could not be recorded by the Honda's EDR and were not reported in the imaged EDR data.

For both recorded events, the seat belt status reported for the driver and the right front passenger were "Off," indicative that neither of the latch plates for the front row seat belt systems were engaged in their respective buckles. This confirmed that the driver was not restrained by the seat belt system at the time of the crash.

Complete recording of the events was reported, and no system diagnostic trouble codes were reported prior to the recorded events. Both event records contained pre-crash buffer data that was identical, with exception to the final data sample at time zero. The discrepancy in the data indicated at time zero for the respective event records did not appear to coincide with the reported time between events, and could not be explained. The pre-crash buffer data is reported in **Table 3** below.

Time	Vehicle Speed	Accelerator Pedal	Service Brake	Engine RPM	PCM Derived Acc. Pedal Position
-5	176 km/h (109 mph)	100%	Off	5,800	100%
-4.5	178 km/h (111 mph)	43%	Off	4,600	43%
-4	176 km/h (109 mph)	0%	Off	4,100	0%
-3.5	174 km/h (108 mph)	0%	Off	4,000	0%
-3	170 km/h (106 mph)	0%	Off	2,800	0%
-2.5	171 km/h (106 mph)	0%	Off	2,900	0%
-2	170 km/h (106 mph)	0%	Off	2,900	0%
-1.5	168 km/h (104 mph)	0%	Off	2,900	0%
-1	166 km/h (103 mph)	0%	Off	2,800	0%
-0.5	165 km/h (103 mph)	0%	Off	2,800	0%
0.0 (ER 1)	162 km/h (101 mph)	0%	On	2,700	0%
0.0 (ER 2)	117 km/h (73 mph)	0%	Off	2,000	0%

Recorded for Event Record 1 was the deployment command for the driver's CAC frontal air bag. The first stage was commanded at 76 milliseconds, while the second stage was at 106 milliseconds. Only 100 milliseconds of longitudinal delta-V data was recorded, with a maximum of -9 km/h (-6 mph) at 95 milliseconds. The maximum lateral delta-V of -1 km/h (-1 mph) was recorded at 27.5 milliseconds. For the second record, deployment of the right front side air bag and the right curtain air bag was commanded at 21 milliseconds. The maximum longitudinal delta-V was -1 km/h (-1 mph), while the maximum lateral delta-V was zero. It is possible that the lack of delta-V severity may have been associated with an issue described by the limitations, where decreased delta-V values could be recorded dependent upon the severity of the event and the possible saturation of the accelerometers relative to the crash.

Interior Damage

Damage to the interior of the Honda consisted of component intrusion, occupant contact, supplemental restraint system deployment, and post-crash activities. The intrusions were associated with the numerous impacts on the front, left, and right planes with multiple large and small diameter trees. A focal area of intrusion was observed to the windshield header, associative to contact and engagement with a sheared section of at least one large diameter tree.

In its damaged state, the interior aspect of the windshield header was engaged against the face of the driver's adjustable head restraint. It is certain that the trees that produced this damage also fractured and penetrated the windshield glazing, and undoubtedly also contacted the driver's head and face. **Figure 13** depicts the intruded windshield header. The maximum intruded depth measured 53 cm (21 in) longitudinally. The only other measurable intrusion in the Honda was the 13 cm (5.1 in) lateral intrusion of the right B- pillar near floor level. The deformed pillar was engaged against the rear aspect of the back of the front right seat and seat track.

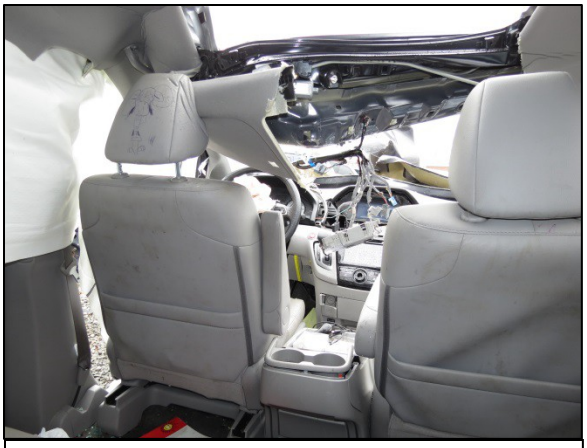


Figure 13: Intruded windshield header engaged against the driver's adjustable head restraint in the Honda.

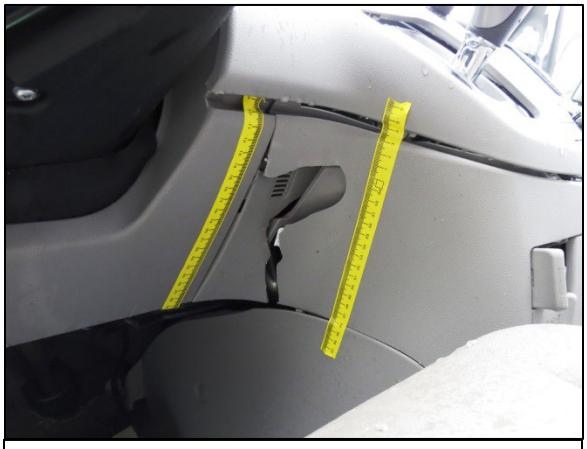


Figure 14: Fractured instrument panel to the right of the steering column from the Honda driver's right knee.

Occupant contact was visible in the front row, attributable to the driver's kinematics. There was a large fracture and indentation to the right aspect of the left lower instrument panel/left aspect of the center instrument stack (**Figure 14**). This contact resulted from loading by the driver's right knee during the multiple front plane impacts at the beginning of the crash sequence. The driver also certainly contacted the windshield header with her head and face as it intruded. However, there was no visible contact to the header, due largely in part to its engagement against the head restraint that prohibited thorough inspection. It was likely that the driver contacted the center stack, roof, right door components, and several of the deployed air bags during the multiple event and rollover crash. However, there was no discernable evidence of that contact on any of the other interior components. It should be noted that the right door panel, trim and fascia from the right upper A- pillar, the fascia of the right upper instrument panel, and the right front door panel were completely separated and not with the vehicle.

The laminated windshield was completely fractured and probably holed from the struck trees and branches. Post-crash, it was removed from the vehicle by emergency response personnel. The partially-opened left front, fixed backlight, fixed third row right, closed second row right, closed front row right, and partially-opened sunroof glazing were all disintegrated by external forces and vehicle deformation during the multiple event crash sequence. The second row left and third row left glazing were intact and undamaged at the time of the SCI vehicle inspection.

Manual Restraint Systems

The Honda was equipped with manual 3-point lap and shoulder seat belts for seven of the eight designated seat positions, with the eighth system consisting of a lap belt only. The lone lap belt system was located at the second row center position. All 3-point seat belt systems used continuous loop webbing with sliding latch plates. The driver's seat belt retracted onto an emergency locking retractor (ELR), while the remaining systems were equipped with switchable ELR/automatic locking retractors (ALR). Both left and right systems for the first and second rows of the Honda were configured with adjustable D-rings. At the time of the SCI inspection, the driver's D-ring was adjusted fully upward, while the remaining three were adjusted fully downward.

During the SCI post-crash inspection of the seat belt systems, it was determined that none of the manual restraint systems were in use at the time of the crash. The driver's seat belt was found with minimal historical use indicators of surface scratching on the latch plate. It was stowed loosely against the B-pillar, and both extended and retracted freely onto the ELR retractor. The retractor pretensioner did not actuate in the crash, as confirmed by the imaged EDR data. The lack of pretensioner actuation was attributed to the "unbuckled" status of the seat belt system at the time of the crash, as was recorded by the EDR.

It should be noted that although the front row right position was unoccupied at the time of the crash and the respective seat belt system was not in use, the SCI Investigator observed that the retractor of the front row right position was locked in position and the belt webbing would not extend from the retractor. This was due to deformation of the right B-pillar. Similar to the driver's seat belt system, there was minor historical wear present on the front row right latch plate.

The second row left and right seat belt systems, as well as all three third row seat belt systems, freely extended and retracted onto their respective retractors. Subtle historical wear was noted to the latch plates, with no crash related loading evidence present. The second row center lap belt was positioned under the seat and was not readily available for use. Due to its position in the vehicle, it was determined that this belt system was not available for restraint of the CRS prior to the crash. There was no evidence on any of the Honda's seat belt systems to suggest usage of a manual seat belt system to secure the CRS in the vehicle at the time of the crash. This supported the SCI conclusion that the CRS was placed loosely in the vehicle by the driver prior to the crash.

Supplemental Restraint Systems

The Honda was equipped with multiple air bags to provide supplemental restraint for its occupants. The first of these systems was a Certified Advanced 208-Compliant (CAC) frontal air bag system that was available for the driver and front row right positions. It consisted of a steering wheel hub-mounted driver air bag and a top instrument panel-mounted front right passenger air bag.

The CAC system also incorporated seat belt buckle switch sensors, a front right occupant presence (weight) sensor, and front seat belt retractor pretensioners. Additional occupant protection in the Honda was provided by front seat-mounted side impact air bags and roof side rail-mounted dual-sensing (side impact and rollover) IC air bags. Only the driver's CAC frontal, front right seat- mounted, and both IC air bags deployed during the multiple event crash sequence.

The driver's CAC frontal air bag (**Figure 15**) deployed from the module without damage or occupant contact to the module cover flaps. In its deflated state, the air bag measured 64 cm (25.2 in) in overall diameter. There was a 16 cm (6.3 in) diameter center stitch pattern, to which internal tethers were affixed. Small 4 cm (1.6 in) diameter vents were located on the rear aspect of the air bag at the 10 and 2 o'clock positions. There was no discernable occupant contact or crash-related damage to the driver's CAC frontal air bag. However, despite the lack of physical evidence, the driver certainly contacted the air bag during the crash sequence.

Figure 15: View of the Honda's deployed CAC driver air bag at the time of the SCI vehicle inspection.

Figure 16: Deployed front row right seat-mounted side impact air bag in the Honda.

The front row right seat-mounted side impact air bag deployed through 56 cm (22.0 in) of stitching on the leading outboard aspect of the seatback (**Figure 16**). It was oval in overall shape, and measured approximately 58 cm (22.8 in) in overall height and 30 cm (11.8 in) in overall width. There were three 3 cm (1.2 in) diameter vents on the leading edge of the air bag. There was no discernable occupant contact or crash-related damage to the front row right side impact air bag.

The IC air bags deployed from the roof side rails through the edge of the headliner and provided protection for all outboard positions of the Honda. In their deflated states, the IC air bags measured 256 cm (100.8 in) in overall length. They were affixed to their respective upper A-pillars by a 15 cm (5.9 in) fabric tether. A similar 5 cm (2.0 in) tether was located at the D-pillars. Vertical coverage of the IC air bags measured 60 cm (23.6 in) at the front row positions, 58 cm (22.8 in) at the B-pillars, 56 cm (22.0 in) at the second row positions, 52 cm (20.5 in) at the C-pillars, and 50 cm (19.7 in) at the third row positions.

Figure 17: View of the Honda's deployed left IC air bag for the third and second row seat positions.

Figure 18: Deployed right IC air bag for the second row position in the Honda.

It should be noted that the left IC air bag had been cut post-crash from the A-pillar tether up and along the roof side rail to the front row (driver's position). Similarly, the right IC air bag had been cut from the A-pillar tether to the B-pillar, and the complete cut section was missing from the vehicle. There was no discernable occupant contact to any of the remaining portion of either of the Honda's IC air bags. **Figure 17** depicts the left IC air bag, while **Figure 18** depicts the right IC air bag.

Crash Avoidance Systems

The Honda was equipped with crash avoidance (CA) systems that included safety and driver assistance features to help improve vehicle safety performance and mitigate potential involvement in crash events. Specific components of the Honda's safety equipment included daytime running lights, dusk-sensing headlights, tire pressure monitoring system (TPMS), Electronic Stability Control (ESC), Electronic Traction Control (ETC), emergency braking assist, lane departure warning (LDW), and forward collision warning (FCW). It should be noted that no data concerning the CA systems or their performance was recorded by the vehicle's EDR.

The Honda's headlights were automatically on during normal daytime operation, and could sense when the sun had set and override any manual deactivation of the daytime running lights to turn the headlights on. Tire pressures were monitored via a direct TPMS, which provided illumination of a warning light when low pressure was detected at one of the four wheel positions. The ESC and ETC systems helped to avoid and mitigate loss of control in adverse conditions where wheel- speed variability was detected. When the driver provided rapid and forceful input on the brake pedal, the vehicle could sense the panic maneuver and electronically control increased pressure on the braking system to prevent lock-up and achieve maximum braking effectiveness.

The Honda's FCW system used a camera to detect objects in the vehicle's travel path and alert the driver of the potential for a crash event. According to the manufacturer's literature, the system functioned only under vehicle operation at speeds greater than 16 km/h (10 mph). The camera was mounted to the windshield in front of the rearview mirror.

In the event that an object was detected and the system determined that the potential for a collision was present, three forms of warning were provided to alert the driver. This included flashing of a head-up display, continuous flashing of the FCW indicator lamp in the instrument cluster, and a continuous audible beeping. A disclaimer warned that the FCW system may not function under certain conditions, and referenced the vehicle's owner manual.

Figure 19: View of the Honda's LDW system button mounted in the instrument panel to the left of the steering column.

The Honda's LDW system utilized the same camera as the FCW system. According to the manufacturer, it functioned only at speeds between a minimum of 64 km/h (40 mph) and a maximum of 145 km/h (90 mph). The system was able to detect markings that delineated the travel lanes and assess the ability of the vehicle to maintain the lane. If the vehicle began to deviate from the detected lane without driver activation of the turn signal indicator, the system determined that the move was unintentional and provided a warning to the driver. The warning consisted of the illumination of the warning icon in the multi-informational display (MID) and continuous audible beeping. Once activated, the warning could be cleared by returning to the travel lane or depressing the LDW button on the left aspect of the left instrument panel (**Figure 19**).

In the incident crash, the evidence showed that the driver operated the Honda at high speeds and drove the vehicle off-road without any avoidance attempt. The law enforcement investigation found further evidence to suggest that the driver intended to crash the Honda in a suicidal attempt to achieve a fatal outcome for herself and the child occupant. Because of the fatal outcome of the driver and the lack of data concerning the CA systems in the imaged EDR data, it remains unknown if the FCW or LDW functioned prior to the crash. However, even if the Honda's CA systems functioned properly, the driver was in a premeditated state of mind to crash the vehicle and ignored any warning from the CA systems that she may have received. The SCI Investigation determined that the driver of the Honda had broad visibility of the roadway and did not face any adverse roadway or environmental conditions during her operation of the vehicle. Furthermore, she had more than sufficient time to provide braking and/or steering input, but made no attempt to avoid the crash.

Child Restraint Systems

The CRS involved in this crash was a Simple Parenting Doona infant CRS. It was manufactured in China on July 22, 2015. This particular CRS was designed to fold open into a stroller. It was also available with a base for vehicle installation using the LATCH equipment.

The Doona Infant CRS (**Figure 20**) was used for the seating of the 5-month-old female at the time of the crash. It was equipped with the LATCH base, which was also manufactured in July 2015. According to the placarding on the CRS, it was designed for use in a rear-facing orientation only with children weighing 1.8 to 15.8 kg (4 to 35 lb) and less than 81 cm (32 in) in height. Labeling on the CRS stated, "DO NOT USE AFTER 07/2021." According to a review of the manufacturer's website as of the date of this technical report, there were no recalls posted concerning this specific Doona Infant CRS.

Figure 20: The Doona Infant CRS at the time of the SCI inspection.

The CRS was found unsecured in the second row of the Honda at the time of the SCI vehicle inspection. The fabric of the CRS was removed and the CRS shell was inspected for crash-related loading evidence and damage; none was detected. The harness straps were adjusted to their middle slot adjustment position, and the lower buckle strap was routed through its path. An inspection of the harness revealed historical use. The webbing was gathered in the belt path of the retainer clip (**Figure 21**). Both harness straps were cut and the latch plates remained engaged in the buckle of the CRS (**Figure 22**). This evidence indicated that the 5-month-old child was restrained by the integral harness of the CRS at the time of the crash.

Figure 21: Webbing gathered in the retainer clip of the Doona Infant CRS.

Figure 22: Latch plates of the CRS harness' engaged in the buckle at the time of the SCI inspection.

The Honda was equipped with a LATCH system in all three second row positions that consisted of 280 mm (11 in) standard-spaced lower anchors with tether anchors located in the middle rear aspect of the respective seat backs. Inspection of the CRS' LATCH base determined that there was no crash-related loading evidence to the LATCH equipment.

Positioning the CRS in the Honda's second row revealed that the LATCH equipment appeared to be adjusted to the appropriate length to achieve securement of the CRS in the vehicle when used. However, there was no evidence that the LATCH equipment was in use at the time of the crash. The lack of securement of the CRS in the vehicle permitted its displacement about the vehicle's interior during the multiple events of the crash. The folding stroller/carry handle was observed to be folded open in the carry position at the time of inspection. A fracture of the handle measuring 12 cm (4.7 in) in length was observed to the top left corner of the handle (**Figure 23**). It was determined that this damage most likely occurred during the final stages of the crash as the CRS was directed toward the right side of the vehicle as the Honda completed its rollover sequence. The CRS was found post-crash by a witness to the crash who stopped to render aid. This witness found the CRS upside down in the second row right area of the Honda, on top of the deployed right IC air bag. There was no other remarkable damage to the CRS or its base.

Figure 23: Fracture to the handle of the Doona CRS.

A second CRS was also found in the Honda at the time of the SCI vehicle inspection. This CRS was an Evenflo Maestro harnessed booster CRS, manufactured in the United States on April 29, 2014. The Evenflo booster CRS (**Figure 24**) was identified by the model number 31021270C. It was equipped with the LATCH system and was designed for use in a forward-facing orientation with a harness for children weighing 10 to 22.6 kg (22 to 50 lb) and whose height was 71 to 127 cm (28 to 50 in). Once the child exceeded the weight threshold, it could be used as a booster CRS for children up to 45 kg (100 lb). Labeling on the booster CRS stated that it expires in April 2020. As of the date of this technical report, there was one active recall concerning this specific Evenflo Maestro CRS. The recall was identified by the NHTSA number 14C003000 and concerned difficulty in releasing the buckle of the harness system, such that the latch could become stuck in the buckle and unable to be released. The CRS was not believed to have been serviced for this recall. However, there was no damage to the harnessed booster CRS, and it was not occupied at the time of the crash. Due to the fatal outcome of the driver, the specific pre-crash positioning of the harnessed booster CRS and its level of securement in the Honda remains unknown.

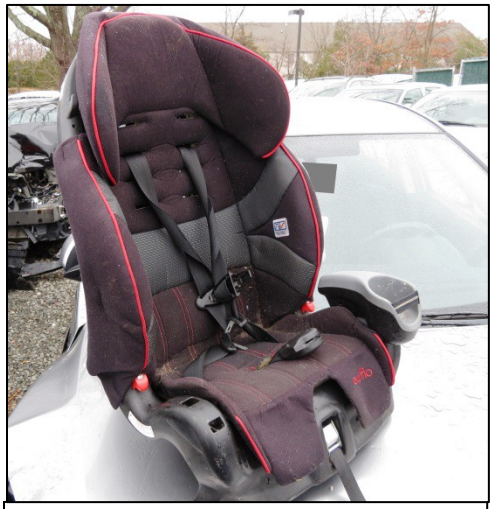


Figure 24: Evenflo Maestro harnessed booster CRS found in the Honda at the time of the SCI vehicle inspection. Note that this CRS was not occupied at the time of the crash.

2015 HONDA ODYSSEY OCCUPANT DATA

Driver Demographics

Age/Sex:	28 years/female
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat Type:	Forward-facing bucket seat with adjustable head restraint
Seat Track Position:	Middle
Manual Restraint Usage:	3-point lap and shoulder seat belt system available; Not used
Usage Source:	SCI vehicle inspection, EDR report
Air Bags:	Driver's CAC frontal, front seat-mounted side impact, and left IC air bags available; CAC frontal and left IC air bags deployed
Alcohol/Drug Involvement:	Unknown
Egress From Vehicle:	Fatal prior to removal from vehicle
Transport From Scene:	None
Type of Medical Treatment:	Pronounced deceased at the crash scene

Driver Injuries

Injury No.	Injury	AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Died of internal head injury, NFS	100999.9	Windshield header	Certain
3	Laceration of the forehead, NFS	210600.1	Windshield header	Certain
3	Abrasion to the forehead, NFS	210202.1	Windshield header	Certain

Source – Police crash report (PAR)

Driver Kinematics

The 28-year-old female driver of the Honda was seated in the forward-facing bucket seat of the Honda, with the seat track adjusted to the middle position, the seat back slightly reclined, and the head restraint adjusted 4 cm (1.6 in) above the seat back. She was not restrained by the available 3-point lap and shoulder seat belt system, as evidenced from the lack of loading on the seat belt system, the post-crash position of the driver's body, and the data imaged from the Honda's EDR. It should be noted that no post-crash examination of the driver's body was performed by any party beyond the documentation on the police crash report (PAR), as the driver's family declined an autopsy. Therefore, there was no medical documentation available, and specific injuries sustained by the driver as a result of the crash remain unknown.

At the onset of the crash, the driver initiated a forward trajectory. The driver's frontal air bag deployed during the initial events, and the driver loaded the deployed air bag with her face and torso during the numerous frontal engagements. This loading prevented direct contact with the steering wheel assembly, and as such, there was no deformation of the steering wheel rim or

compression of the energy absorbing steering column from the driver loading through the frontal air bag. During the numerous frontal crash events, the driver's right knee and lower leg contacted and fractured the left aspect of the instrument panel between the steering column and the center instrument stack.

As the Honda continued its forward trajectory, the frontal crash forces associated with the multiple events coupled with the forward pre-crash position of the driver probably held the driver in her seated position. At least one of the large-diameter trees struck and sheared by the Honda contacted and engaged the windshield and windshield header, which produced severe deformation to the header. The trees and windshield header intruded longitudinally into the occupant compartment at the driver's position. These objects undoubtedly contacted the head and face of the driver, and were likely the source of the injuries documented by law enforcement. However, there was no evidence of associated occupant contact visible at the time of the SCI inspection because the windshield header was engaged against the driver's head rest and a portion of the headliner was missing from the vehicle.

The Honda rotated slightly counterclockwise during the first portion of the crash sequence, before subsequent impacts at the right front corner and along the right plane of the Honda reversed its rotation to CW. This likely did not affect the driver's kinematics due to her forward pre-crash positioning and her engagement with frontal components in the vehicle's interior. The Honda then progressed along the downslope of the berm and penetrated the fence, then initiated the left side-leading rollover. The unrestrained driver was directed to the right as the Honda rolled onto its top plane and came to rest on its right plane. This displaced the driver entirely from her position into the front row right position of the overturned vehicle.

Arriving witnesses and emergency response personnel found the driver at final rest gathered in an awkward position in the area of the right upper A-pillar, right roof side rail, right front door, and deployed right IC air bag. According to the law enforcement documentation, significant blood evidence was present on multiple surrounding components. It should be noted that these components had been removed and were not with the vehicle at the time of the SCI vehicle inspection.

No vital life signs were displayed by the driver, and she was pronounced deceased at the crash site by EMS personnel. Other than the limited injury documentation on the PAR, no autopsy or post-crash examination of her body was performed at the request of the family. Due to the lack of medical record and/or injury documentation, specific injuries sustained by the driver and her exact cause of death remain unknown.

Second Row Center Occupant Demographics

Age/Sex:	5 months/female
Height:	Unknown
Weight:	Unknown
Eyewear:	None
Seat Type:	Infant CRS placed on forward-facing bench seat
Seat Track Position:	Not adjustable
Manual Restraint Usage:	CRS' integral multi-point harness; CRS unsecured in vehicle
Usage Source:	SCI vehicle inspection, observations of the first arriving witness
Air Bags:	IC air bags available; Deployed
Alcohol/Drug Involvement:	None
Egress From Vehicle:	Removed from the CRS by the first-arriving witness
Transport From Scene:	Ambulance to a local hospital
Type of Medical Treatment:	Evaluated and released

Second Row Center Occupant Injuries

Injury No.	Injury	AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Facial contusion, NFS	210402.1	Right roof side rail	Probable

Source – Police crash report (PAR)

Second Row Center Occupant Kinematics

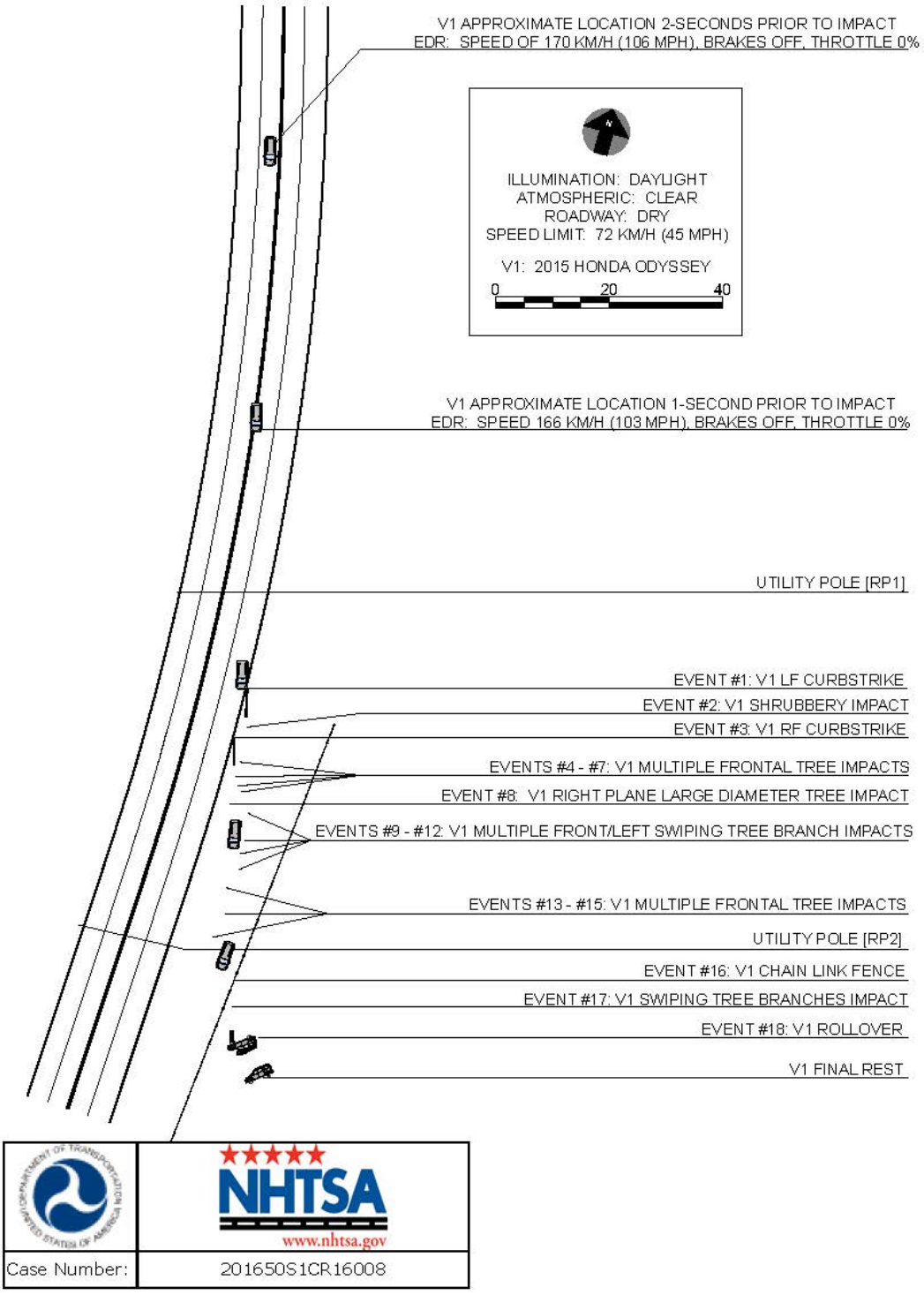
The 5-month old infant was positioned in the Doona infant CRS and was restrained by its integral 5-point harness system. Although the CRS was equipped with the LATCH system and was compatible with the LATCH system in the Honda, it was unsecured in the vehicle and instead had been placed loosely in an unknown position in the Honda's second row. That is, the CRS was neither belted in the vehicle nor secured via LATCH equipment. The exact seat position in the Honda and orientation of the CRS at the time of the crash remains unknown. The folding carry handle of the CRS was extended upward in the carry position.

During the multiple frontal crash events, the infant and CRS initiated a forward trajectory and loaded the back surface of the front row seat backs. It should be noted that the dimensions of the infant CRS were far larger than the dimensional opening that existed between the front row seat backs. Despite the certainty of engagement by the CRS with the front row seat backs, there was no observed contact evidence to the seat backs or corresponding damage to the CRS. The CRS likely remained forward against the front row seat backs for the majority of the multiple frontal crash events.

It likely was not until the rollover sequence that the CRS became displaced laterally toward the right plane as the vehicle came to final rest. The CRS contacted the right roof side rail and deployed IC air bag. This fractured the handle of the CRS, but the infant remained protected by the shell of the CRS and secured in it. She probably experienced minor contact with the roof side rail, which produced a facial contusion. There was no evidence of this contact discernable at the time of the SCI inspection.

The first arriving witness to the vehicle post-crash heard the cries of the infant and found the CRS lying unsecured against the right roof side rail surface of the Honda, face down. This witness righted the infant CRS, cut the harness straps, and subsequently removed the infant entirely from the CRS and vehicle. Once at the crash scene, EMS personnel assumed care of the infant and transported her by ambulance to a local hospital. She was examined and released in hours of the crash. Although there were no injuries to the child documented by her medical records, law enforcement indicated that the child had sustained a minor facial contusion. As indicated, the facial contusion probably resulted from contact with right plane components during the rollover sequence.

CRASH DIAGRAM



Appendix A:
2015 Honda Odyssey Event Data Recorder Report[1]

[1] *The event data recorder report published as part of this technical report and the CDR report contained in the associated CISSWEB application may differ. The CDRx file is provided in the Crash Viewer and the reader can run the CDRx file with the latest software version of the Bosch CDR tool reader (www.boschdiagnostics.com/cdr/software-downloads).*

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	5FNRL5H69FB******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CR16008_V1_ACM.CDRX
Saved on	Tuesday, March 15 2016 at 13:48:14
Imaged with CDR version	Crash Data Retrieval Tool 16.4
Reported with CDR version	Crash Data Retrieval Tool 17.7.1
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

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.
- ABS activity
- Stability control
- Steering input angle
- PCM derived accelerator pedal position, percent full
- Side air bag suppression system status, right front passenger

- Vehicle roll rate
- Normal acceleration
- Time, accelerometer range exceeded (longitudinal, lateral or normal)
- EV mode

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.

04001_HondaSRS_GEN1_r002

System Status at Retrieval

EDR Version	1.2.2.0

System Status at Crash Judgment

Frontal Air Bag Suppression System Status, Right Front Passenger at 1st Front Crash Judgment	Actuation Prohibited
Frontal Air Bag Suppression System Status, Right Front Passenger at 2nd Front Crash Judgment	Actuation Prohibited
Frontal Air Bag Suppression System Status, Right Front Passenger at Left Side Crash Judgment	No Crash Judgment
Frontal Air Bag Suppression System Status, Right Front Passenger at Right Side Crash Judgment	Actuation Prohibited
Frontal Air Bag Suppression System Status, Right Front passenger at Roll Over Judgment	No Crash Judgment

System Status at Event (Event Record 1)

Multi-Event, Number of Events (1, 2)	1
Complete File Recorded (Yes/No)	Yes
Ignition Cycle, Download	2615
Maximum Delta-V, Longitudinal (MPH [km/h])	-6 [-9]
Time, Maximum Delta-V, Longitudinal (msec)	95.0
Maximum Delta-V, Lateral (MPH [km/h])	-1 [-1]
Time, Maximum Delta-V, Lateral (msec)	27.5
Time, Maximum Delta-V, Resultant (msec)	95.0
Time, Accelerometer Range Exceeded, Longitudinal (msec)	78.0
Time, Accelerometer Range Exceeded, Lateral (msec)	81.0
Time, Accelerometer Range Exceeded, Normal (msec)	18.0

Deployment Command Data (Event Record 1)

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
Frontal Air Bag Deployment, Time to Deploy First Stage, Driver (msec)	76
Frontal Air Bag Deployment, Time to Deploy First Stage, Right Front Passenger (msec)	0
Frontal Air Bag Deployment, Time to 2nd Stage, Driver (msec)	106
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, nth Stage Disposal, Driver (Yes/No)	No
Frontal Air Bag Deployment, nth Stage Disposal, Right Front Passenger (Yes/No)	No

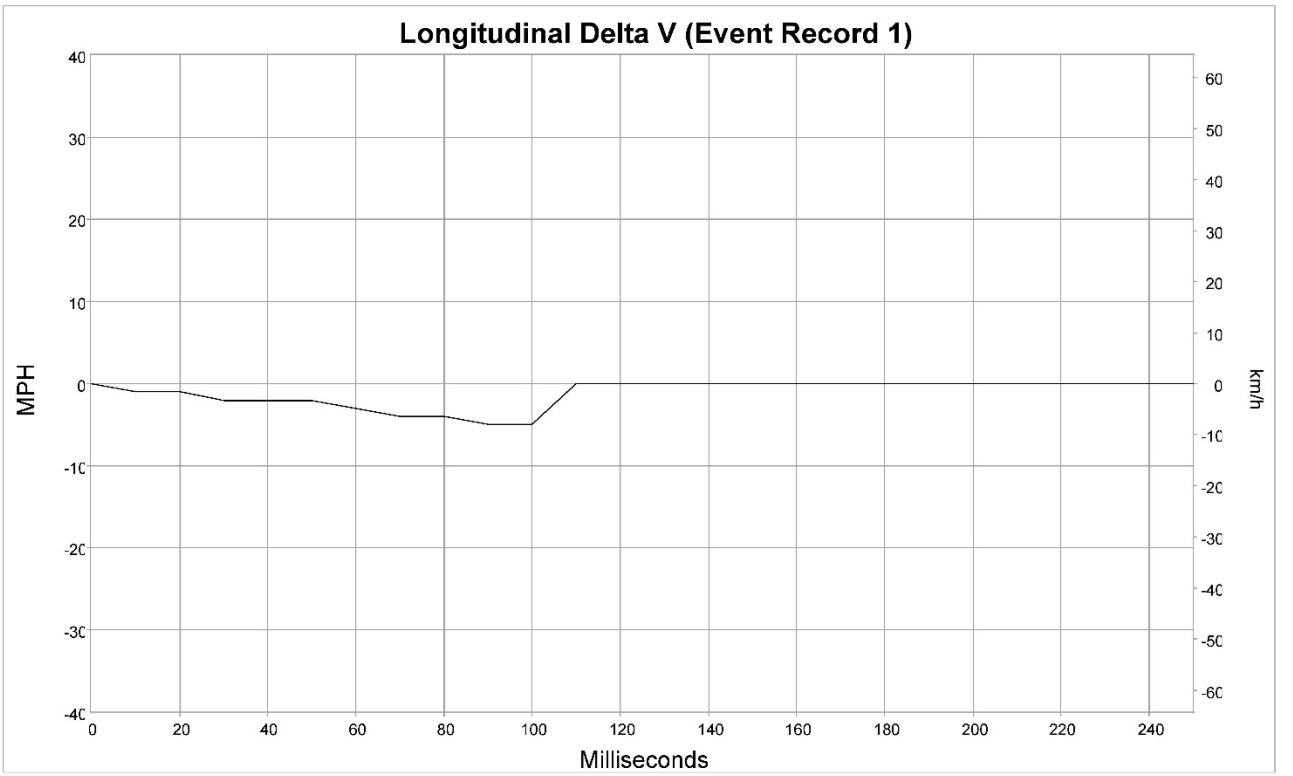
Pre-Crash Data -1 sec (Event Record 1)

Safety Belt Status, Driver	Off
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	2612

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

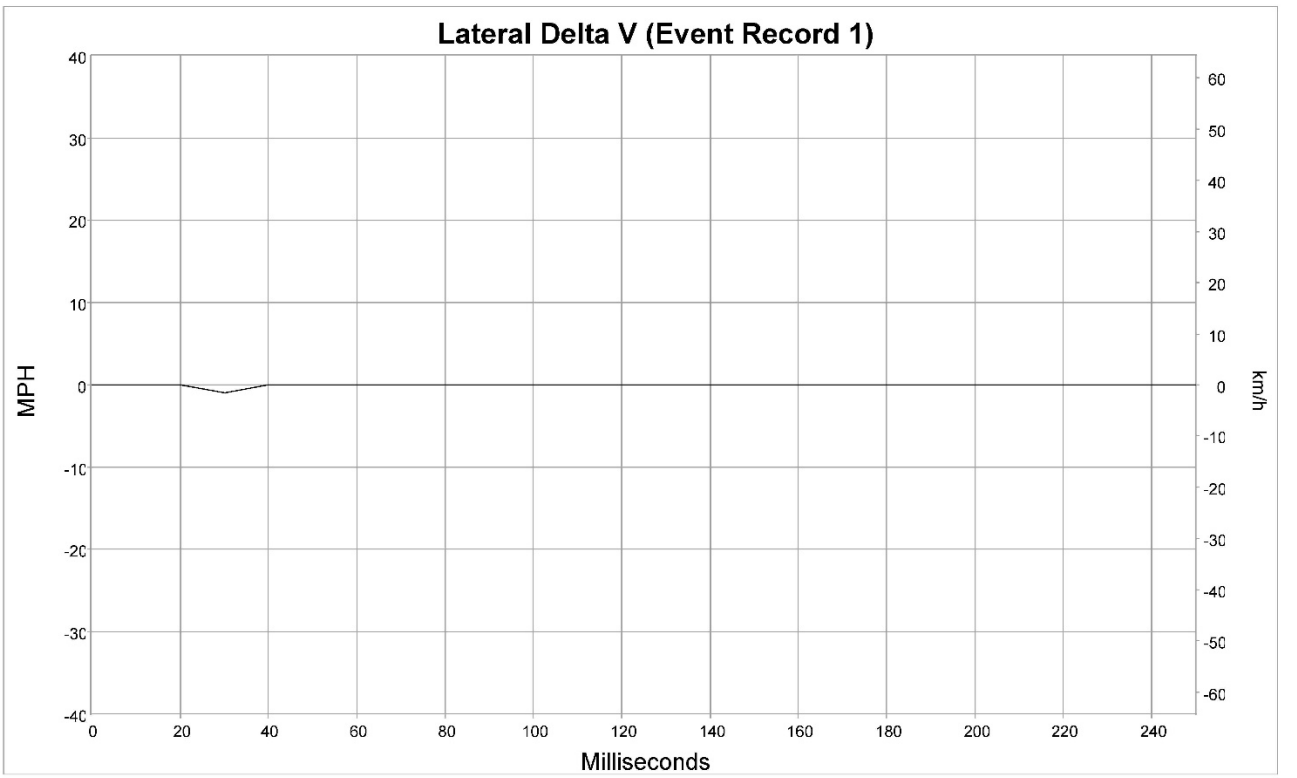
(the most recent sampled values are recorded prior to the event)

Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal Position, % full	Service Brake (On, Off)	Engine RPM	PCM Derived Accelerator Pedal Position, % full
-5.0	109 [176]	100	Off	5,800	100
-4.5	111 [178]	43	Off	4,600	43
-4.0	109 [176]	0	Off	4,100	0
-3.5	108 [174]	0	Off	4,000	0
-3.0	106 [170]	0	Off	2,800	0
-2.5	106 [171]	0	Off	2,900	0
-2.0	106 [170]	0	Off	2,900	0
-1.5	104 [168]	0	Off	2,900	0
-1.0	103 [166]	0	Off	2,800	0
-0.5	103 [165]	0	Off	2,800	0
0.0	101 [162]	0	On	2,700	0



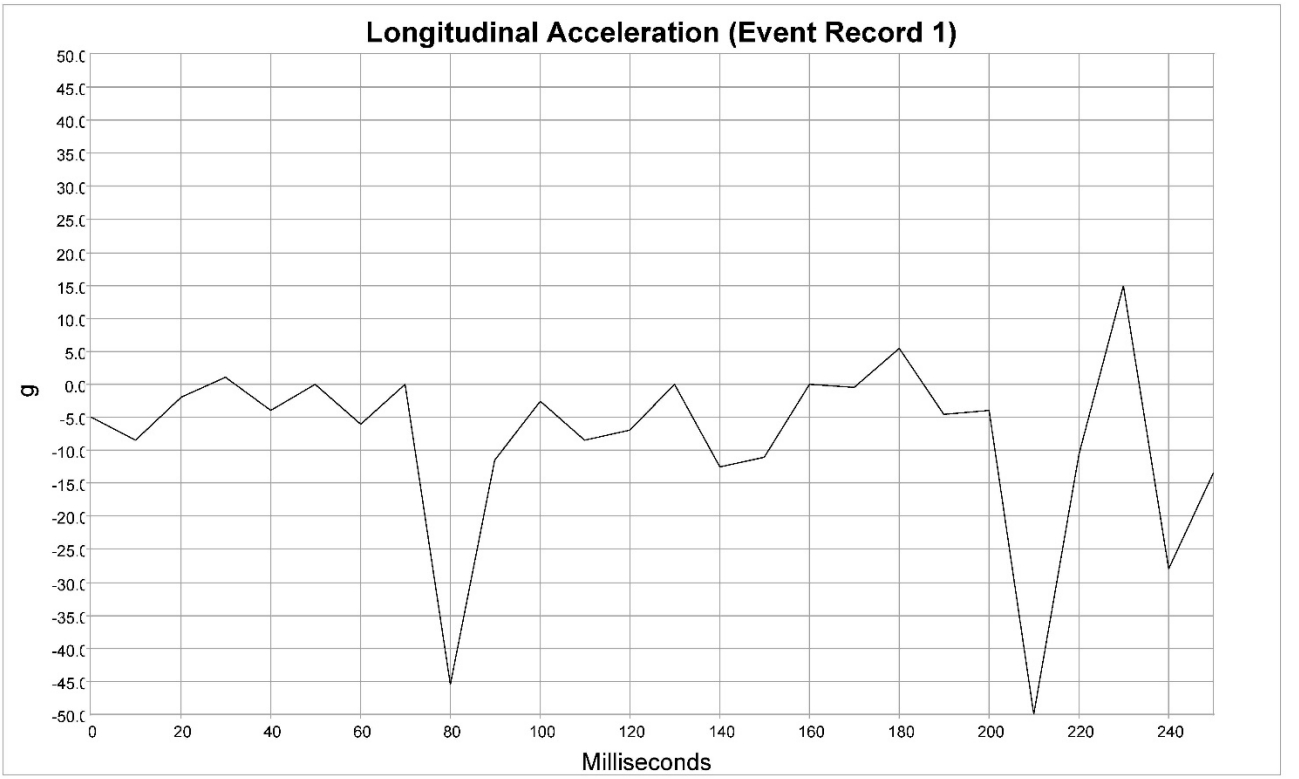
Longitudinal Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	-1 [-1]
20	-1 [-2]
30	-2 [-3]
40	-2 [-4]
50	-2 [-4]
60	-3 [-5]
70	-4 [-6]
80	-4 [-6]
90	-5 [-8]
100	-5 [-8]
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	0 [0]



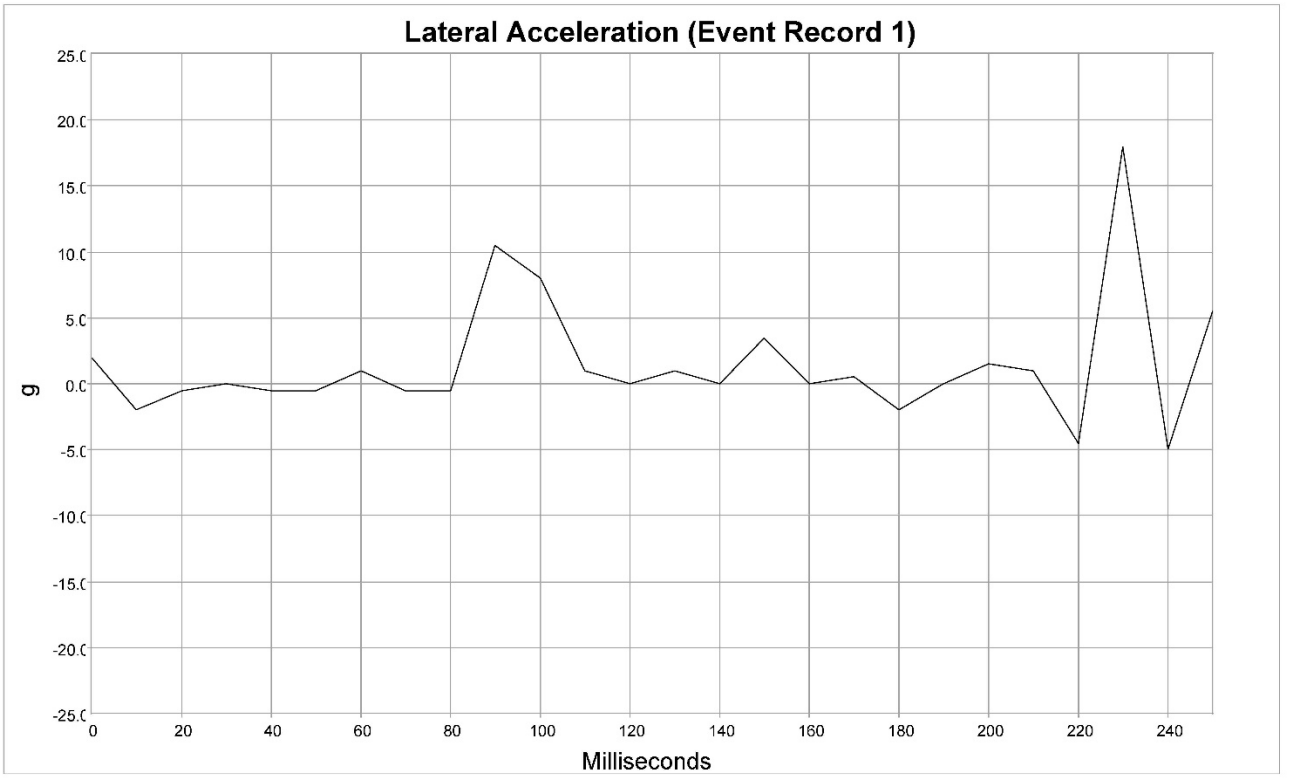
Lateral Delta V (Event Record 1)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	0 [0]
30	-1 [-1]
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	0 [0]



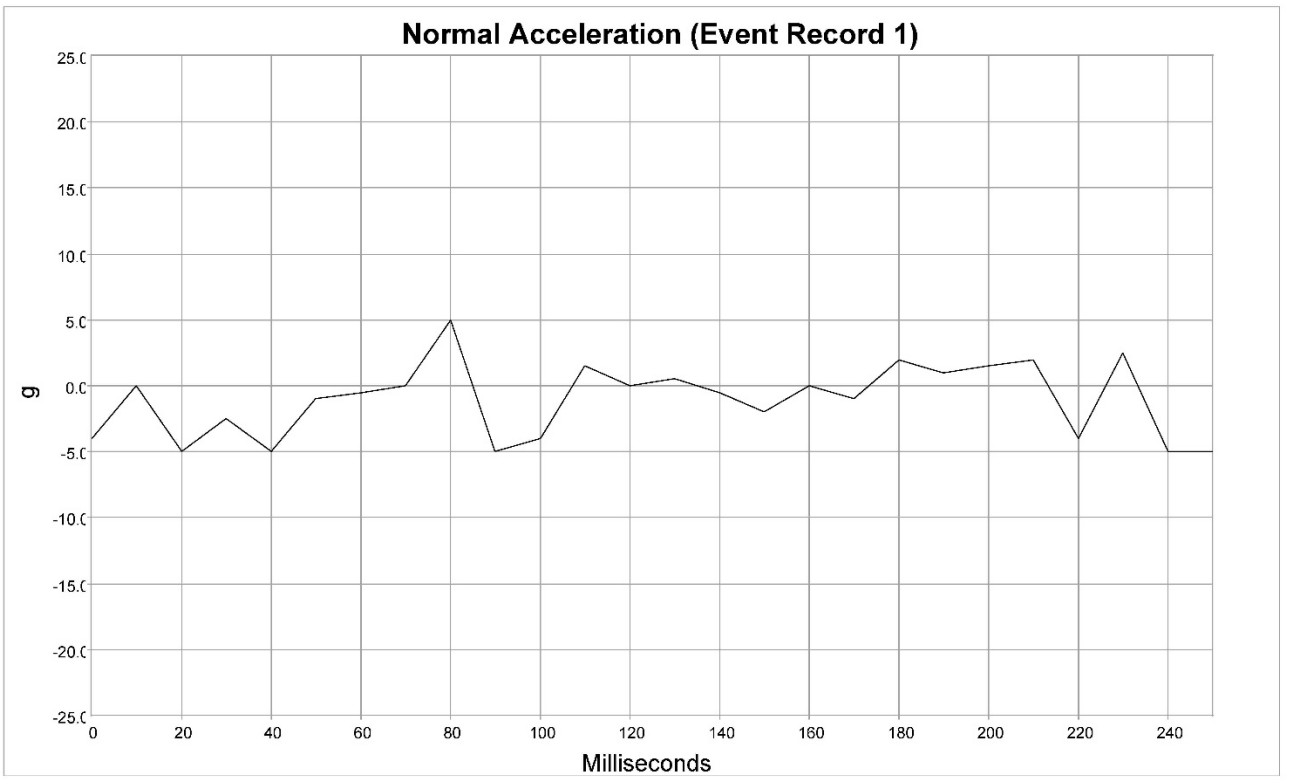
Longitudinal Acceleration (Event Record 1)

Time (msec)	g
0	-5.0
10	-8.5
20	-2.0
30	1.0
40	-4.0
50	0.0
60	-6.0
70	0.0
80	-45.5
90	-11.5
100	-2.5
110	-8.5
120	-7.0
130	0.0
140	-12.5
150	-11.0
160	0.0
170	-0.5
180	5.5
190	-4.5
200	-4.0
210	-50.0
220	-10.5
230	15.0
240	-28.0
250	-13.5



Lateral Acceleration (Event Record 1)

Time (msec)	g
0	2.0
10	-2.0
20	-0.5
30	0.0
40	-0.5
50	-0.5
60	1.0
70	-0.5
80	-0.5
90	10.5
100	8.0
110	1.0
120	0.0
130	1.0
140	0.0
150	3.5
160	0.0
170	0.5
180	-2.0
190	0.0
200	1.5
210	1.0
220	-4.5
230	18.0
240	-5.0
250	5.5



Normal Acceleration (Event Record 1)

Time (msec)	g
0	-4.0
10	0.0
20	-5.0
30	-2.5
40	-5.0
50	-1.0
60	-0.5
70	0.0
80	5.0
90	-5.0
100	-4.0
110	1.5
120	0.0
130	0.5
140	-0.5
150	-2.0
160	0.0
170	-1.0
180	2.0
190	1.0
200	1.5
210	2.0
220	-4.0
230	2.5
240	-5.0
250	-5.0

System Status at Event (Event Record 2)

Multi-Event, Number of Events (1, 2)	2
Complete File Recorded (Yes/No)	Yes
Ignition Cycle, Download	2615
Time from Event 1 to 2 (sec)	0.1
Maximum Delta-V, Longitudinal (MPH [km/h])	-1 [-1]
Time, Maximum Delta-V, Longitudinal (msec)	30.0
Maximum Delta-V, Lateral (MPH [km/h])	0 [0]
Time, Maximum Delta-V, Lateral (msec)	17.5
Time, Maximum Delta-V, Resultant (msec)	30.0
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 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
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, Driver (msec)	0
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)	21
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)	21
Frontal Air Bag Deployment, nth Stage Disposal, Driver (Yes/No)	No
Frontal Air Bag Deployment, nth Stage Disposal, Right Front Passenger (Yes/No)	No

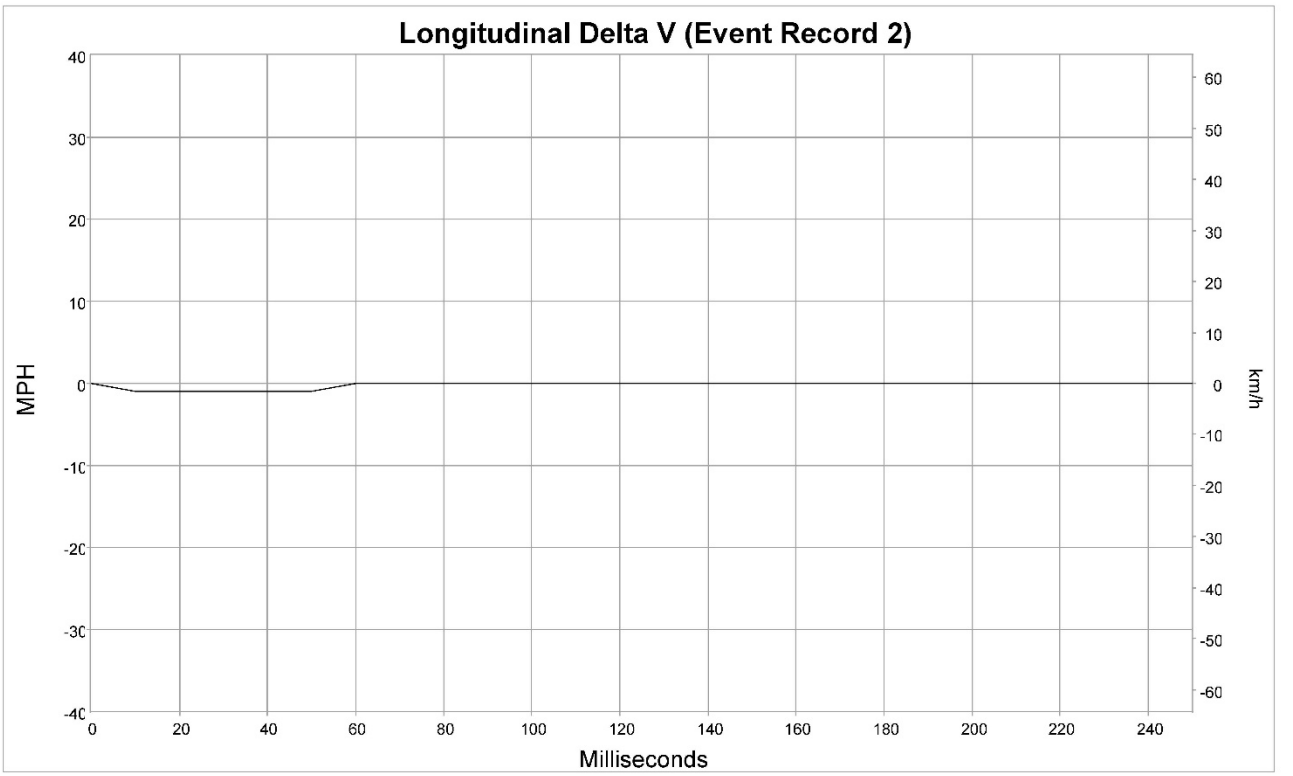
Pre-Crash Data -1 sec (Event Record 2)

Safety Belt Status, Driver	Off
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	2612

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

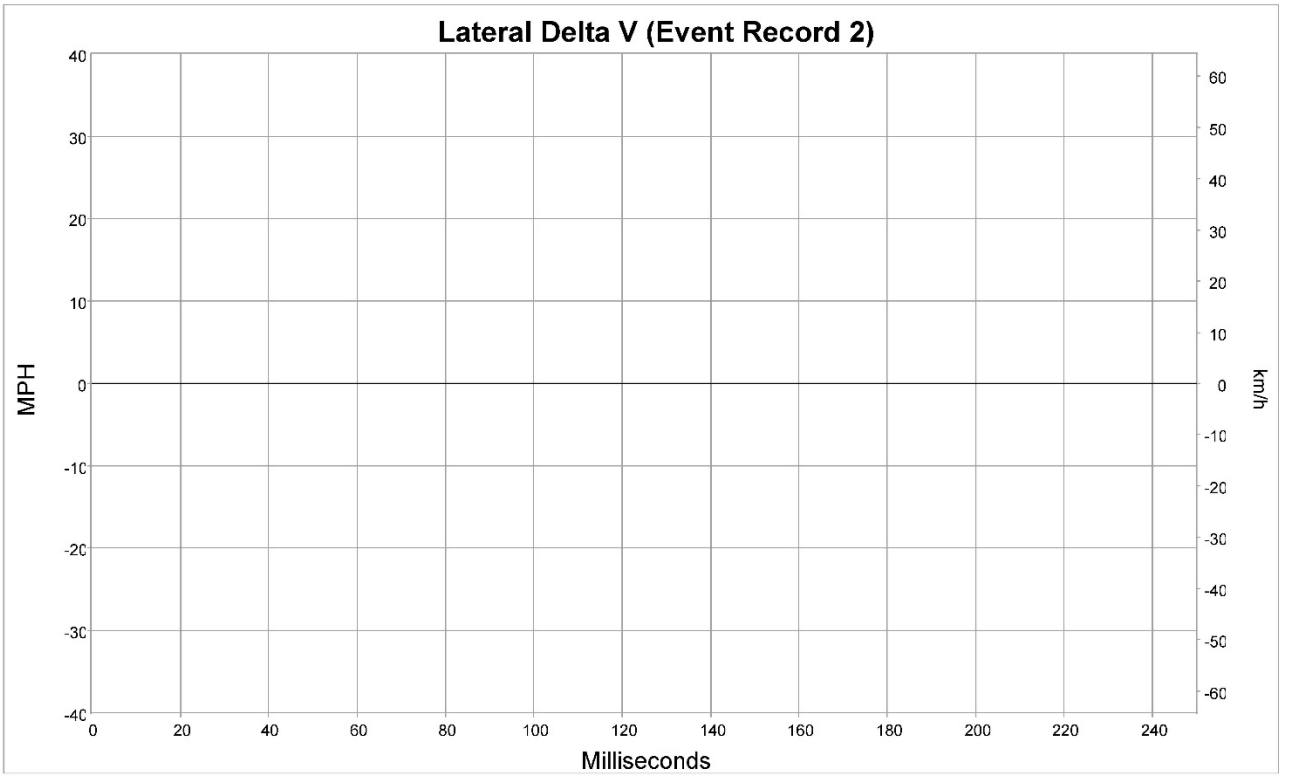
(the most recent sampled values are recorded prior to the event)

Time Stamp (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal Position, % full	Service Brake (On, Off)	Engine RPM	PCM Derived Accelerator Pedal Position, % full
-5.0	109 [176]	100	Off	5,800	100
-4.5	111 [178]	43	Off	4,600	43
-4.0	109 [176]	0	Off	4,100	0
-3.5	108 [174]	0	Off	4,000	0
-3.0	106 [170]	0	Off	2,800	0
-2.5	106 [171]	0	Off	2,900	0
-2.0	106 [170]	0	Off	2,900	0
-1.5	104 [168]	0	Off	2,900	0
-1.0	103 [166]	0	Off	2,800	0
-0.5	103 [165]	0	Off	2,800	0
0.0	73 [117]	0	Off	2,000	0



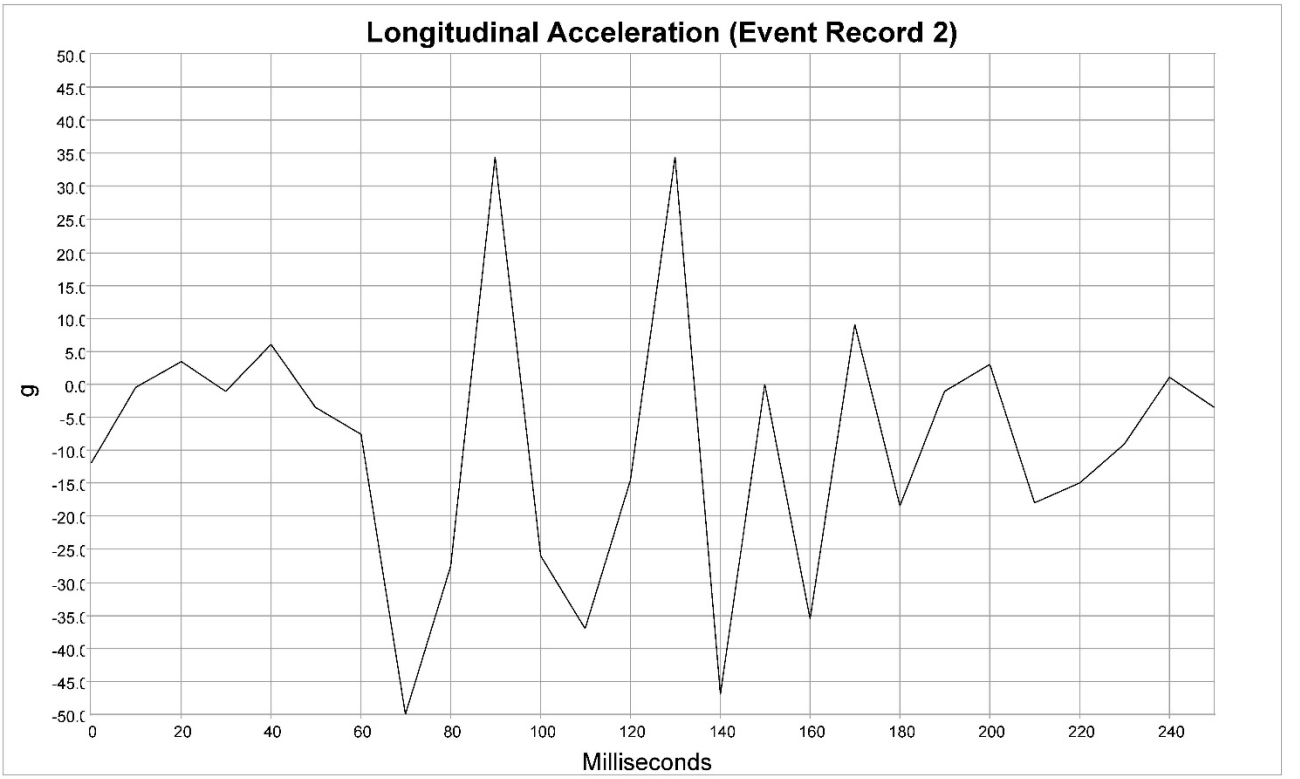
Longitudinal Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	-1 [-1]
20	-1 [-1]
30	-1 [-1]
40	-1 [-1]
50	-1 [-1]
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	0 [0]



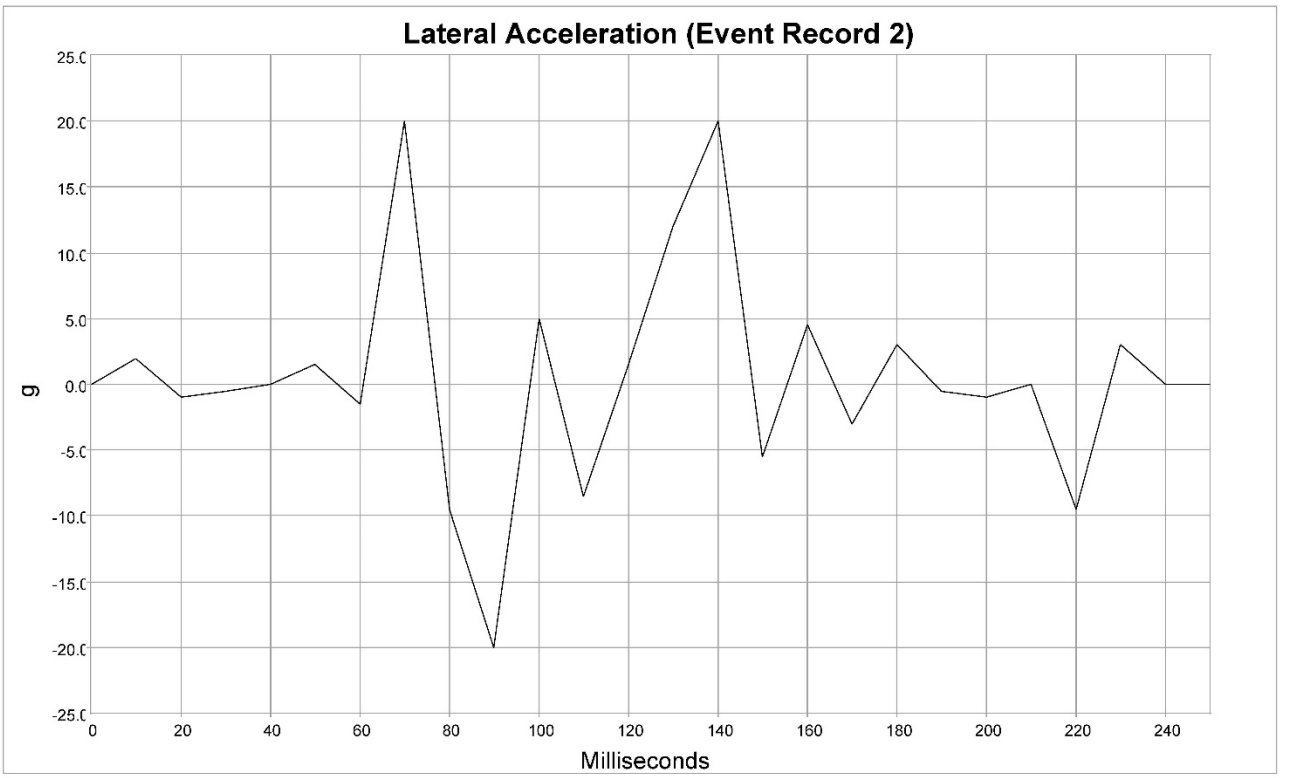
Lateral Delta V (Event Record 2)

Time (msec)	MPH [km/h]
0	0 [0]
10	0 [0]
20	0 [0]
30	0 [0]
40	0 [0]
50	0 [0]
60	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	0 [0]



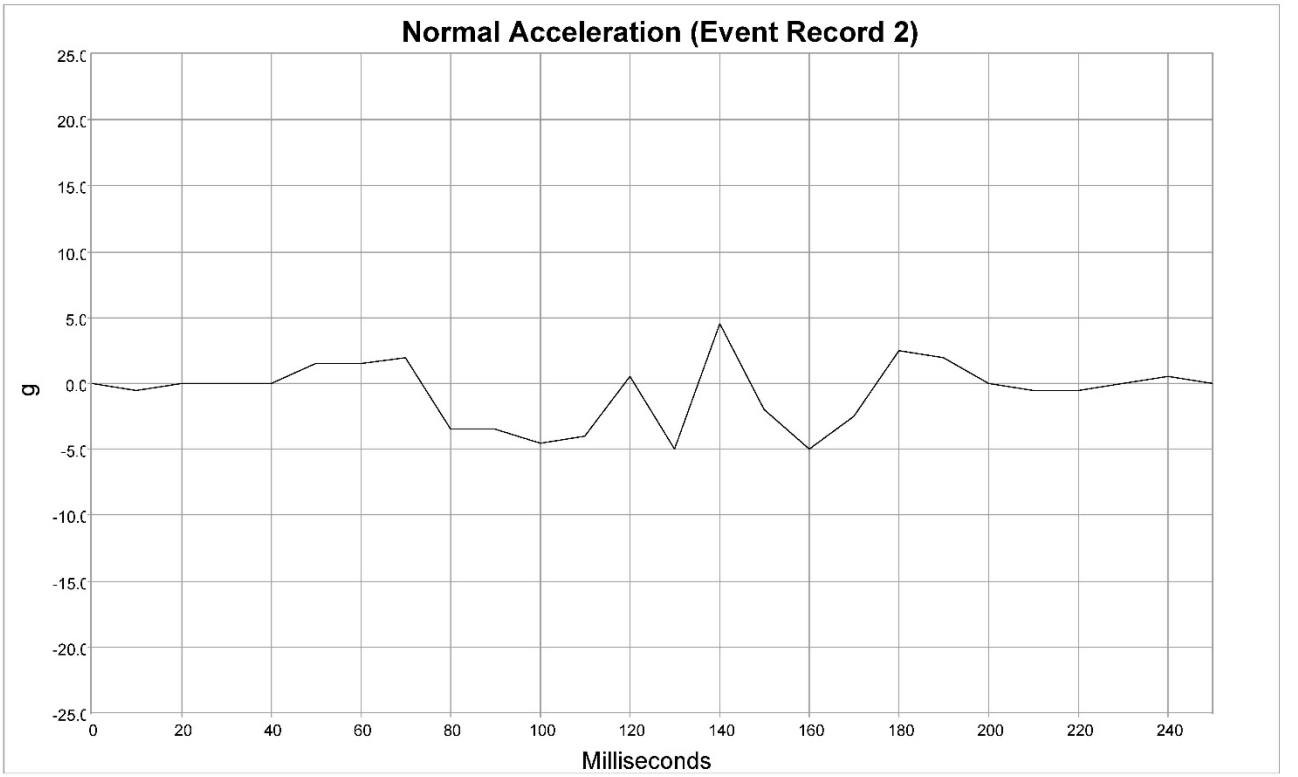
Longitudinal Acceleration (Event Record 2)

Time (msec)	g
0	-12.0
10	-0.5
20	3.5
30	-1.0
40	6.0
50	-3.5
60	-7.5
70	-50.0
80	-27.5
90	34.5
100	-26.0
110	-37.0
120	-14.5
130	34.5
140	-47.0
150	0.0
160	-35.5
170	9.0
180	-18.5
190	-1.0
200	3.0
210	-18.0
220	-15.0
230	-9.0
240	1.0
250	-3.5



Lateral Acceleration (Event Record 2)

Time (msec)	g
0	0.0
10	2.0
20	-1.0
30	-0.5
40	0.0
50	1.5
60	-1.5
70	20.0
80	-9.5
90	-20.0
100	5.0
110	-8.5
120	1.5
130	12.0
140	20.0
150	-5.5
160	4.5
170	-3.0
180	3.0
190	-0.5
200	-1.0
210	0.0
220	-9.5
230	3.0
240	0.0
250	0.0



Normal Acceleration (Event Record 2)

Time (msec)	g
0	0.0
10	-0.5
20	0.0
30	0.0
40	0.0
50	1.5
60	1.5
70	2.0
80	-3.5
90	-3.5
100	-4.5
110	-4.0
120	0.5
130	-5.0
140	4.5
150	-2.0
160	-5.0
170	-2.5
180	2.5
190	2.0
200	0.0
210	-0.5
220	-0.5
230	0.0
240	0.5
250	0.0

Hexadecimal Data

DID #	Data
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$8020	01 02 00 00 00 00 00 00 00 00 00 00 00 00 00 FD
$8021	AA 00 01 02 00 01 00 00 00 00 00 52 0A 37 AA AA
$8022	AA 00 C8 78 66 00 00 00 00 00 00 00 00 00 00 00 00 4C 00 6A 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 11 00 00 00 00 00 00 00 00 00 00 00 00 00 00 E9
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$8026	AA 00 DC 00 01 00 00 00 00 00 00 00 00 00 00 00 B0 64 00 3A 64 00 00 00 00 00 00 00 00 00 00 00 B2 2B 00 2E 2B 00 00 00 00 00 00 00 00 00 00 00 B0 00 00 29 00 00 00 00 00 00 00 00 00 00 00 00 AE 00 00 28 00 00 00 00 00 00 00 00 00 00 00 00 AA 00 00 1C 00 00 00 00 00 00 00 00 00 00 00 00 AB 00 00 1D 00 00 00 00 00 00 00 00 00 00 00 00 AA 00 00 1D 00 00 00 00 00 00 00 00 00 00 00 00 A8 00 00 1D 00 00 00 00 00 00 00 00 00 00 00 00 A6 00 00 1C 00 00 00 00 00 00 00 00 00 00 00 00 A5 00 00 1C 00 00 00 00 00 00 00 00 00 00 00 00 A2 00 00 1B 00 01 00 00 00 00 00 00 00 00 00 87
$8027	AA 00 DC 00 01 00 00 00 00 00 00 00 00 00 00 00 B0 64 00 3A 64 00 00 00 00 00 00 00 00 00 00 00 B2 2B 00 2E 2B 00 00 00 00 00 00 00 00 00 00 00 B0 00 00 29 00 00 00 00 00 00 00 00 00 00 00 00 AE 00 00 28 00 00 00 00 00 00 00 00 00 00 00 00 AA 00 00 1C 00 00 00 00 00 00 00 00 00 00 00 00 AB 00 00 1D 00 00 00 00 00 00 00 00 00 00 00 00 AA 00 00 1D 00 00 00 00 00 00 00 00 00 00 00 00 A8 00 00 1D 00 00 00 00 00 00 00 00 00 00 00 00 A6 00 00 1C 00 00 00 00 00 00 00 00 00 00 00 00 A5 00 00 1C 00 00 00 00 00 00 00 00 00 00 00 00 75 00 00 14 00 00 00 00 00 00 00 00 00 00 00 BC
$8028	AA 00 00 FF FE FD FC FC FB FA FA F8 F8 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 F7 26 00 00 00 00 00 68
$8029	AA 00 00 FF FF FF FF FF 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 FF 0C 00 00 00 00 00 50

$802A	AA 00 00 00 00 FF 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 FF 0B 00 26 00 00 00 27
$802B	AA 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 07 00 0C 00 00 00 43
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$8030	AA 01 F8 00 F6 FB F6 FE FF 00 0A F6 F8 03 00 01 FF FC 00 FE 04 02 03 04 F8 05 F6 F6 00 B4 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 DA
$8031	AA 01 00 FF 00 00 00 03 03 04 F9 F9 F7 F8 01 F6 09 FC F6 FB 05 04 00 FF FF 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 76
$8007	00 00 00 00 00 00 00 00 0E 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 F2
$803F	AA 00 90 10 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
$8011	AA 00 C4 3F 00 00 00 00 00 01 16 16 00 00 00 16 00 00 00 00 00 00 59 3C 12 7F 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 EA
$8012	AA 00 11 07 5C 02 FF 00 05 10 46 00 00 05 10 46 00 00 05 10 46 00 00 05 10 46 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 75 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
$8013	AA 00 C4 3F 00 00 00 00 00 01 16 16 00 00 00 16 00 00 00 00 00 02 59 3C 12 7F 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 E8
$8014	AA 00 11 05 EE 07 50 00 05 13 7E 00 00 05 13 7E 00 00 05 13 7E 00 00 05 13 7E 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 A3 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
$8015	AA 00 C4 3F 00 00 00 00 00 01 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 00 00 00 00 52
$8016	AA 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 56
$8017	AA 00 C4 3F 00 00 00 00 00 01 16 16 00 00 00 16 00 00 00 00 00 02 59 3C 12 7F 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 E8
$8018	AA 00 B3 C2 0A 02 00 00 06 75 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 5A
$8019	AA 00 C4 3F 03 10 FC 00 00 01 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 00 00 00 00 43
$801A	AA 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 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
$801B	AA 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 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
$8001	00 00 C4 18 00 00 00 00 16 16 00 00 00 16 00 00 00 00 00 06 07 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
$8002	00 00 E0 FE F8 00 00 00 02 80 3F 00 00 00 00 00 80 54 F7 FF FF 00 2B 00 00 00 00 06 21 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
$8003	00 00 E0 00 00 0A 00 03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$8004	Not Used
$8008	Not Used
$8009	00 00 90 00 AA 00 00 AA 00 00 00 00 00 00 00 00 00 00 00 00
$8010	00 00 F8 F8 F8 F8 E0 E0 E0 E3 00 00 00 00 00 00 AF 00 01 10 04 00 00 00 6F 00 00 10 0F 00 00 00 A0 00 01 10 01 00 00 00 60 00 00 10 0F 00 00 00 00 00 00 00 00 00 00 00 AF 11 31 00 00 00 00 00 A0 11 02 00 00 00 00 00 A0 10 01 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
$801C	AA 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 56

$801F	Not Used
$8040	AA 00 F0 00 FF FC 00 00 00 00 0A 0C 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
$8041	AA 00 FE CC 00 00 00 00 00 00 17 17 18 18 17 00 1A 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
$8042	AA 00 FE 00 00 00 00 59 3C 12 7F 00 5A 80 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
$8043	AA 00 FF FF 03 00 00 02 00 02 04 02 02 01 FC 02 03 02 00 02 01 01 FC 00 00 00 00 00 00 01 FD 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$8044	AA 00 AC 00 7F 00 80 00 7E 7C 00 00 00 00 00 00 00 00 00 00
$8045	AA 00 F0 00 75 75 73 41 00 00 00 00 00 00 00 00 00 00 00 00
$8046	AA 00 C0 00 00 00 00 00 08 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
$8050	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 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$8051	43 11 FF 00 81 61 BE 00 56 21 39 00 56 25 13 00 A1 11 12 00 44 11 A4 00 46 11 AD 00 45 11 FF 00
$8052	00 13 03 03 02 13 13 12 E1 00 00 00 00 00 00 00
$8053	80 90 A8 00 00 00 00 00 00 00 00 00 00 00 00 00
$8060	Not Used
$8061	Not Used
$8062	Not Used
$8063	Not Used
$8064	Not Used
$8065	Not Used
$8066	Not Used
$E600	2E 0A
$E604	01 00 00 00
$F100	00 00 00 00
$F110	0E 37 37 39 36 30 54 4B 38 41 32 32 30 4D 32 00 00
$F112	0B 43 31 58 45 30 37 4C 45 36 32 4F 00 00 00 00

	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$F181	37 37 39 35 39 2D 54 4B 38 2D 41 32 32 30 00 00

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