

CRASH RESEARCH & ANALYSIS, INC.

Elma, NY 14059

SPECIAL CRASH INVESTIGATIONS

CASE NO: CR14063

ON-SITE AMBULANCE CRASH INVESTIGATION

**VEHICLE: 2012 FORD E-350 TYPE II AMBULANCE
AMBULANCE BODY: WHEELED COACH CRUSADER PLUS**

LOCATION: WEST VIRGINIA

CRASH DATE: SEPTEMBER 2014

Contract No. DTNH22-12-C-00269

Prepared for:

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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 are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order 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 vehicle(s) or their safety systems.

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<i>16. Abstract</i> This on-site ambulance crash investigation focused on the multiple-event crash of a 2012 Ford E-350 Type II ambulance and the injury sources to the four crew members and patient within the vehicle. The ambulance was transporting a 62-year-old male in cardiac arrest to the hospital at the time of an intersection crash with a 2012 Jeep Grand Cherokee. The front plane/right corner of the ambulance struck and then engaged the left plane/forward aspect of the Jeep. After separating from the Jeep, the ambulance departed the roadway, impacted and penetrated a guardrail, and rolled over. The ambulance rolled two-quarter turns as it fell off a 30 m (10 ft) high retaining wall coming to rest on its roof. The emergency lights and siren on the ambulance were active during the transport. The 37-year-old restrained female driver sustained police-reported B-level non-incapacitating injuries. Two unrestrained crew members in the patient compartment sustained police-reported A-level incapacitating injuries. A third unrestrained crew member sustained police-reported C-level possible injuries. The patient was deceased at the crash site; however, the Medical Examiner attributed his death to the prior cardiac arrest and his pre-existing poor health conditions. The four Jeep occupants were uninjured.			
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VEHICLE: 2012 FORD E-350 TYPE II AMBULANCE
AMBULANCE BODY: WHEELED COACH CRUSADER PLUS
CRASH DATE: SEPTEMBER 2014
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BACKGROUND

This on-site ambulance crash investigation focused on the multiple-event crash of a 2012 Ford E-350 Type II ambulance (**Figure 1**) and the injury sources to the four crew members and patient within the vehicle. The ambulance was transporting a 62-year-old male in cardiac arrest to the hospital at the time of an intersection crash with a 2012 Jeep Grand Cherokee. The front plane/right corner of the ambulance struck and then engaged the left plane/forward aspect of the Jeep. After separating from the Jeep, the ambulance departed the roadway, impacted and penetrated a guardrail, and rolled over.

The ambulance rolled two-quarter turns as it fell off a 30 m (10 ft) high retaining wall coming to rest on its roof. The emergency lights and siren on the ambulance were active during the transport.



Figure 1: On-scene image looking east at the final rest position of the ambulance. (Image supplied by an internet news service.)

The National Highway Traffic Safety Administration's (NHTSA) Office of Emergency Medical Services (EMS) identified the crash on September 23, 2014 and requested further research of the crash through NHTSA's Special Crash Investigation's (SCI) group. This on-site investigation was assigned September 24, 2014. The SCI team at Crash Research & Analysis, Inc. contacted the investigating police department and the ambulance company and secured cooperation to conduct the on-site inspection on September 30, 2014. The ambulance was transferred back to its base of operations at the conclusion of the police investigation and placed in secure storage where it was inspected. The on-site investigation took place September 30 and October 1, 2014. The 37-year-old restrained female driver sustained police-reported B-level non-incapacitating injuries. Two unrestrained crew members in the patient compartment sustained police-reported A-level incapacitating injuries. A third unrestrained crew member sustained police-reported C-level possible injuries. The patient was deceased at the crash site; however, the Medical Examiner attributed his death to the

prior cardiac arrest and his pre-existing poor health conditions. The four Jeep occupants were uninjured.

The elements of the investigation included the severity of the crash, the damage to the ambulance and its patient compartment, the cot's restraint system and its use, the cot's fastening system within the patient compartment and the injury sources for the crew and patient. The ambulance was equipped with an Event Data Recorder (EDR) which was imaged with the Bosch Crash Data Retrieval (CDR) tool during the inspection. The 2012 Jeep Grand Cherokee was inspected and its EDR data was also imaged with the Bosch CDR tool. The crash site was documented. The director of the ambulance company and the involved ambulance crew members were interviewed during the course of the on-site activities.

AMBULANCE COMPANY AND CREW

The ambulance company operated as a non-profit, career organization and had a forty-year history of providing the emergency medical and technical rescue needs of an 806 square kilometer (311 square mile) region of West Virginia. The company consisted of approximately 70 employees and operated approximately ten ambulances of various configurations (Type I, II and III). The organization offered Advanced Life Support (ALS) emergency response and transport, Basic Life Support (BLS) emergency response and transport and Technical Search and Rescue Services.

The ambulance was occupied by a crew of four. Demographic data, seat position, level of training and length of experience for each crew member are listed in the following table. Each crew member was a full-time employee and was returning to work from a rest cycle that was at least 24 hours long on the day of the crash. Each member had been on-duty approximately 5 to 6 hours when the crash occurred. All of these individuals held commercial vehicle operator licenses and had EVOC (Emergency Vehicle Operators Course) training; however, that training had been given at least five years prior. There was no recurrent driver training requirement. The driver and EMT 3 stated that they also volunteered at other local fire departments during their off-duty time.

Role	Gender	Height/Weight	Seat Position	Medical Training	Length of Employment
Driver 37-years-old	Female	168 cm/91 kg (66 in/200 lb)	1	EMT Basic	6 years
EMT 1 29-years-old	Male	188 cm/118 kg (74 in/260 lb)	5 (standing)	EMT Basic	4 years
Paramedic 27-years-old	Female	160 cm/82 kg (63 in/180 lb)	6	Paramedic	10 years
EMT 3 39-years-old	Male	196 cm/204 kg (77 in/450 lb)	9	EMT Basic	13 years

Note: Seat Position is reference to Appendix N: Ambulance Seating Diagram of the Model Minimum Uniform Crash Criteria 4th Edition (MMUCC)

CRASH SUMMARY

Crash Site

This two-vehicle multi-event crash occurred during the afternoon hours of September 2014 at the three-leg intersection of a two-lane state route and a two-lane local roadway situated in a suburban area. The police-reported environmental conditions were daylight, clear and dry. The National Weather Service reported a temperature of 23 °C (58 °F), 70% relative humidity, north-northwest winds at 11.0 km/h (6.9 mph) and overcast skies. The state route was oriented in the east/west direction and was intersected by the local roadway from the north. Each lane of the state route measured 3.2 m (10.5 ft) in width. The lanes were separated by a double yellow center line. The road edges were delineated by white fog lines. The width of the shoulders measured 0.4 m (1.4 ft). A W-beam guardrail bordered the north road edge. Adjacent to the roadside at the northeast quadrant of the intersection was a retaining wall that measured 3.1 m x 9.3 m (10 ft x 30 ft), width x length. North of the guardrail and retaining wall, the roadside terrain was 3 m (10 ft) below the road elevation. There was a large concrete culvert under the intersecting north/south local road to accommodate a small creek that flowed to the east. A stop sign and stop bar for the southbound traffic controlled the intersection. The speed limit on the state route was 89 km/h (55 mph). **Figure 2** is a west-looking view of the intersection configuration. **Figure 3** is a west-looking view back toward the intersection from the roadside in the area where the ambulance came to final rest.



Figure 2: Overall west-looking (lookback) view depicting the configuration of the intersection.



Figure 3: West-looking view toward the culvert and retaining wall from the area of the ambulance's final rest position.

The roadway physical evidence identified at the crash site consisted of tire marks which defined the locations of the vehicles at impact. The Jeep was straddling the center line attempting a left turn at the intersection and the ambulance was in the westbound lane attempting a passing maneuver. A 17 m (55.8 ft) long intermittent tire and gouge mark, attributed to the right front tire and rim of the ambulance, defined the post-impact trajectory of the vehicle. This mark began at the point of the initial impact and was located in the westbound lane. The mark was oriented to the northeast and led to the apex of the intersection's northeast corner. Eight guardrail support

posts and 16 m (52.5 ft) of W-beam guardrail that protected the 3 m (10 ft) drop-off to the culvert and creek at the northeast corner had been replaced.

Pre-Crash

The ambulance and a crew of four responded to the home of the patient who complained of respiratory distress. The 62-year old male patient had a reported weight of approximately 181 kg (400 lb) and presented himself with multiple deteriorating health issues. The patient was secured on the cot and loaded into the ambulance for transport. As the crew prepared to depart, the patient went into respiratory arrest followed two-to-three minutes later by cardiac arrest. The crew began cardio-pulmonary resuscitation (CPR), as the driver activated the emergency lights and siren and initiated transport to the hospital which was located approximately 9 km (5 miles) away.

Within the patient compartment, the male EMT 1 was unrestrained and standing at the head of the cot (MMUCC position 5) assisting with the patient's airway. The female Paramedic was unrestrained and seated on the right of the inward facing bench (MMUCC position 6) monitoring the patient's vital signs via the cardiac monitor that was located on the shelf to her immediate right at the head of the bench seat. The male EMT 3 was unrestrained and seated on the middle of the inward facing bench (MMUCC position 9) and was engaged in CPR chest compressions. The patient was lying supine on the cot with two lateral restraints; one restraint across his lower legs and one restraint across his hips. Neither the lateral chest restraint nor the shoulder harness was in use, primarily to allow for the ALS-CPR procedures.

The ambulance departed the patient's residence operated by the 26-year-old restrained female driver and was traveling east on the two-lane state route. The EDR-reported speed of the ambulance five seconds prior to Algorithm Enable (AE) was 108 km/h (67 mph). The service brakes were recorded as "*On.*" Over the next two seconds, the ambulance decelerated to a speed of 102 km/h (63 mph). The ambulance was overtaking the eastbound 2012 Jeep Grand Cherokee which was moving at a slower speed. The EDR-reported speed of the Jeep five seconds prior to AE was 48 km/h (30 mph). The recorded data indicated that the Jeep's brakes were applied and it decelerated to 35 km/h (22 mph) during the same approximate (two second) time period.

As the vehicles approached the intersection, the ambulance driver stated to the SCI investigator that she believed the Jeep was yielding to the emergency vehicle. The EDR-recorded data indicated that the Jeep had continued to decelerate with the brakes applied to a recorded speed of 30 km/h (18 mph) at two seconds prior to AE. The ambulance driver released the brakes and an application of the accelerator was recorded at two seconds prior to AE. The ambulance speed was 102 km/h (63 mph).

The intent of the Jeep driver was to turn left at the intersection and continue northbound travel. Approximately one second prior to AE, this driver released the brakes and initiated the left turn at a speed of 22 km/h (14 mph). In her belief that the Jeep was yielding, the ambulance driver initiated a passing maneuver. The passing maneuver was evidenced by the increasing magnitudes of the lateral acceleration and yaw rate measured by the stability control module which began one second prior to AE. Both vehicles crossed the centerline of the roadway. The EDR-recorded speeds of the ambulance and Jeep, at the respective AE for each vehicle, were 102 km/h (63 mph) and 22 km/h (14 mph). A **Crash Diagram** depicting the physical plant of the intersection and the vehicles' motion is included on Page 27 of this report.

Crash

The front plane/right corner of the ambulance struck and then engaged the left plane of the Jeep (Event 1). The impact began in the area of the Jeep's A-pillar and extended forward to its left corner. The principle directions of force were in the 1 o'clock sector for the ambulance and the 8 o'clock sector for the Jeep. The force of this impact caused the Jeep to rotate clockwise and the vehicles impacted in a secondary sideslap (Event 2). The tire marks (**Figure 4**) documented during the SCI scene inspection were used to locate and orient the vehicles at the times of these impacts. The EDR within the ambulance recorded the velocity change of these two events in a single crash pulse. The maximum recorded longitudinal delta-V was -10.57 km/h (-6.57 mph) at 297 milliseconds after AE. The maximum recorded lateral delta-V was -8.11 km/h (-5.04 mph) at 219 milliseconds after AE.

The vehicle-to-vehicle engagement cut the sidewall of the ambulance's front right tire. The tire aired out and the rim contacted the road surface. As the ambulance separated from the impacts to the left, it traveled through the westbound lane and departed the north side of the road at the apex of the northeast intersection corner. This trajectory was evidenced by the 17 m (55.8 ft) long intermittent tire and gouge mark (**Figures 4 and 5**).



Figure 4: East looking view of the ambulance's tire marks documented at the time of the SCI scene inspection.



Figure 5: East looking view of the ambulance's right front tire mark tire and the replaced guardrail at the apex of the intersection.

The ambulance impacted and penetrated the guardrail (Event 3, **Figure 5**) that protected the retaining wall and steep 3 m (10 ft) drop-off to the roadside creek. Eight guardrail posts were displaced by this impact. The principle direction of force was in the 12 o'clock sector. The impact force resulted in the actuation of the safety belt pretensioners and the deployment of the frontal air bags in the ambulance. The ambulance then initiated a fall-over from the end of the retaining wall and rolled over two quarter-turns (Event 4) coming to rest on its roof. The vehicle was oriented in a north/south direction. The engine compartment of the overturned ambulance was in the shallow creek. The Jeep came to rest at the mouth of the intersection, straddling the centerline of the primary roadway. The EDR-recorded longitudinal and lateral delta-V's of the Jeep were +7 km/h (+4.3 mph) and +13 km/h (+8.1 mph) at 134 milliseconds after AE.

Post-Crash

The police, fire personnel and additional EMS providers from multiple agencies responded to the crash site. A bystander, working in a business located on the south side of the road at the intersection, heard the crash and ran to the ambulance. The driver was calling for assistance from the driver seat. The bystander was able to force open the left door and he assisted the driver from the ambulance. They ran and opened the right side door. The three unrestrained crew members were displaced forward during the guardrail impact and were lying on top of one another at the forward left aspect of the overturned patient compartment. The patient was also displaced forward, out from under the cot's two lateral restraints, and was lying on top of the crew. The cot remained secured by the rail clamp and antler bracket. The bystander entered the patient compartment and with the help of other unknown responders was able to move the (deceased) patient which allowed the crew members to then disentangle themselves and exit the ambulance with assistance.

EMT 1 stated that after the ambulance came to rest he found himself entangled with the other crew members and was not able to move. He sustained multiple soft tissue contusions and abrasions (C-level injuries) and was transported by ambulance to a local hospital where he was treated and released. EMT 3 was displaced from the bench seat and came to rest on top of the Paramedic at the forward aspect of the patient compartment. He was transported by ambulance to a local hospital and then transferred to a trauma center with incapacitating (A-level) head injuries. He was released the day following the crash. The female Paramedic stated that she ended up on the ceiling with all the other occupants of the patient compartment on top of her and was unable to breath. She was removed from the vehicle and air-lifted to a trauma center for treatment of incapacitating (A-level) injuries. She was hospitalized for two nights and released. The driver was transported by ambulance to a local hospital with police reported non-incapacitating (B-level) injuries. She stated that she was examined, treated and held overnight for observation. The Medical Examiner reviewed the circumstances of the transport and the recording of the cardiac monitor and ruled that the patient's death was a result of his pre-existing poor health conditions. The patient was considered deceased prior to the crash. His death was

not crash-related and no autopsy was performed. Any crash related injuries that he may have sustained were not documented.

2012 FORD E-350 TYPE II AMBULANCE

Description

The 2012 Ford E-350 chassis (**Figure 6**) was identified by the Vehicle Identification Number (VIN): 1FDSS3EL7CDxxxxxx and was manufactured as an incomplete vehicle in June 2012. The digital odometer reading was 73,401 km (45,609 mile). The Super Duty, extended van was built on a 351 cm (138 in) wheelbase and was equipped with the Type II ambulance prep package. The rear-wheel drive vehicle had a Gross Vehicle Weight Rating (GVWR) of 4,309 kg (9,500 lb) with a front axle and rear axle rating of 1,905 kg (4,200 lb) and 2,760 kg (6,084 lb), respectively. The powertrain consisted of a 5.4-liter V-8 engine linked to a 5-speed automatic transmission. The vehicle manufacturer's recommended tire size was LT245/75R16 front and rear, with cold tire pressures of 414 kPa (60 PSI) front and 552 kPa (80 PSI) rear. The left front tire was a Firestone Transforce HT tire of the recommended size. The rear tires were Cooper Discoverer A/T tires of the recommended size. The front tire was missing. Specific tire data measured at the time of the SCI inspection was as follows:



Figure 6: Overhead front right oblique view of the Ford Type II ambulance.

Position	Measured Pressure	Measured Tread Depth	Restriction	Damage
LF	Tire Flat	9 mm (11/32 in)	No	Sidewall cut
LR	552 kPa (80.0 PSI)	6 mm (7/32 in)	No	No
RR	552 kPa (80.0 PSI)	6 mm (7/32 in)	No	No
RF	Tire Flat	Unknown	Unknown	Sidewall cut, separated from rim

The front interior of the Ford was equipped with box-mounted bucket seats with integral head restraints. The driver seat was in a full-rear track position. Safety features included 3-point lap and shoulder safety belts with buckle pretensioners for the front occupants. The driver and front right passenger positions were equipped with advanced two-stage frontal air bags. An OEM cut-off switch mounted in the center aspect of the instrument panel controlled the suppression of the front right passenger air bag. The vehicle was not equipped with side impact air bags or Inflatable Curtain (IC) air bags.

Patient Compartment

The Crusader Plus model patient compartment of the ambulance was manufactured by Wheeled Coach Industries of Winter Park, Florida and was installed on the Ford chassis in November 2012. The vehicle was received by the ambulance company in December 2012. **Figure 7** is an interior view of a similarly equipped Wheeled Coach Crusader Plus Type II ambulance ordered by the ambulance company at the same time as the focus vehicle. The patient compartment consisted of the typical Type II interior layout with a raised fiberglass roof. The layout included: double-rear entry doors for cot loading, an inward-facing three-passenger bench seat along the right side, a rear-facing Attendant's seat against the bulkhead immediately forward of the cot, double right side entry doors, multiple cabinets for storage and a pass-through to the cab compartment of the van with a sliding door. A custom cabinet and shelf was located at the forward aspect of the inward-facing bench. This unit measured 41 cm x 41 cm x 46 cm (16 in x 16 in x 18 in), width x height x depth. A 40 cm x 46 cm (15.8 in x 18 in), length x depth, area at the forward aspect of the bench seat was designed for bio-waste and sharps containers that were located under and enclosed within the bench.

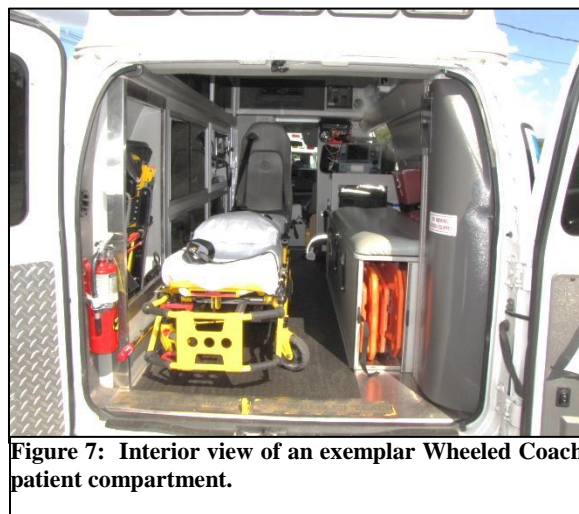


Figure 7: Interior view of an exemplar Wheeled Coach patient compartment.

Vehicle Weight and Payload

The placard within the patient compartment stated that the useful load for the ambulance was 965 kg (2,127 lb). The estimated weight of the EMS equipment and supplies onboard a Type II ambulance was 318 kg (700 lb). Thus, the available occupant load for the ambulance was 647 kg (1,427 lb). Based on the interviews of the crew members, the approximate occupant load onboard the ambulance, inclusive of the patient was 676 kg (1,490 lb). Therefore, at the time of the crash the ambulance was operating at, or slightly above, its gross weight of 4,309 kg (9,500 lb).

Exterior Damage

The front, right, top and left planes of the ambulance sustained exterior damage as a result of the multiple event crash sequence. The front plane sustained overlapping damage attributable to the Event 1 impact with the Jeep and the guardrail impact Event 3. Although not evident at the bumper level due to the overlap, the damage identified during the exterior inspection of the Jeep indicated the engagement of the ambulance began at its front right corner (**Figure 8**). The hood exhibited direct contact damage beginning 68 cm (26.8 in) right of center extending 17 cm (6.7 in) to its right edge. This damage pattern wrapped onto the right plane and extended rearward to

the mid-aspect of the right front door. The elevation of the contact damage extended 117 cm (46 in) above the ground consistent with the height of the Jeep's left plane damage. Longitudinal abrasions indicative of the vehicle-to-vehicle engagement was noted to the right fender of the ambulance. A contact abrasion to the housing of the ambulance's side mirror (front aspect) was associated to an abrasion on the Jeep's left front window glazing. The vehicles' interaction cut the front right tire and deformed the wheel rim of the ambulance. The front right rim contacted and gouged the roadway. The Collision Deformation Classification (CDC) assigned to this damage pattern was 12FRAE6.



Figure 8: Front right oblique view depicting the ambulance damage.



Figure 9: Right rear oblique view depicting the sideslap damage to the ambulance.

A 112 cm (44 in) region of sideslap damage (Event 2) was located on the right plane beginning at the right rear corner and extending forward (**Figure 9**). The pattern extended vertically 117cm (46 in). The maximum lateral crush measured less than 3 cm (1.0 in). Longitudinal abrasions flowing front-to-rear from impact with the Jeep were noted throughout the area. The taillight lens was fractured and the right end of the rear bumper was deformed rearward. The CDC of this damage pattern was 03RBEW1.

The direct contact damage on the front plane, due to the guardrail impact (Event 3), extended from bumper corner-to-bumper corner across the entire 173 cm (68 in) front plane (**Figure 10**). The deformed front bumper had separated from its frame rail mounts and was loosely hanging. Longitudinal crush was measured to the lower radiator support and was as follows: C1 = 0, C2 = 0, C3 = 13 cm (5.1 in), C4 = 8 cm (3.1 in), C5 = 4 cm (1.6 in), C6 = 17 cm (6.7 in). The residual deformation of the left frame-end measured 6 cm (2.5 in). The right frame



Figure 10: Front view of the ambulance damage.

end was undeformed. The CDC of this damage pattern was 12FDEW2. Due to the yielding properties of this impact, its analysis was beyond the scope of the WinSMASH program.

The left and top planes sustained body panel abrasions and deformation related to the two-quarter turn rollover event. The rollover event initiation was considered a fall-over. The aft aspect of the left panel sustained impact damage from ground contact (**Figure 11**). The damaged region began at the left rear corner and extended forward to the left rear axle area. Overlapping damage from recovery operations extended along the entire length of the left plane. The top plane was abraded by the overturn. The fiberglass roof remained attached and was intact. The CDC of the rollover damage was 00TDDO1.

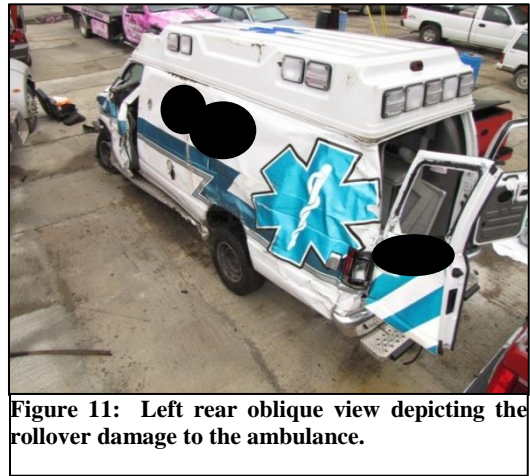


Figure 11: Left rear oblique view depicting the rollover damage to the ambulance.

The left wheelbase was reduced 8 cm (3 in). The right wheelbase was reduced 38 cm (15 in). This reduction was attributed contact with multiple guardrail support posts. These posts also engaged the ambulance body along the right sill (**Figure 12**). The sill was torn rearward to a point 51 cm (20 in) aft of the B-pillar. The left front door remained closed during the crash and was forced open by the first on-scene bystander. The right door remained latched, but the frame separated from its mounting points due to guardrail support post impacts. The right and rear doors of the ambulance were jammed shut and forced open during the emergency response.

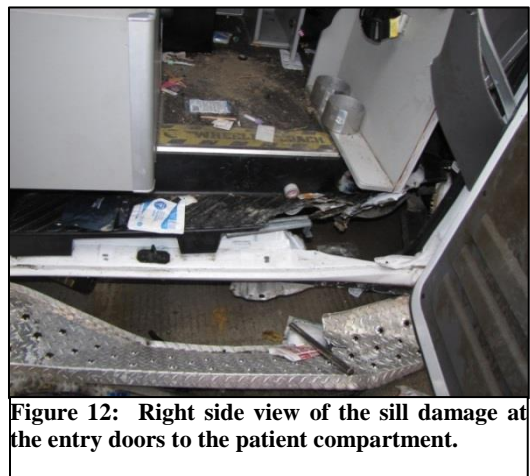


Figure 12: Right side view of the sill damage at the entry doors to the patient compartment.

Event Data Recorder

The Ford was equipped with a Restraints Control Module (RCM) that monitored and controlled the diagnostic, sensing and deployment functions of the ambulance's supplemental restraint systems. The RCM also had EDR capabilities. The EDR data was imaged at the time of the SCI inspection through the use of the Bosch Crash Data Retrieval scan tool and software version 14.0.1. The data is included as Attachment A of this report and is reported with version 16.0.1. The data was imaged using an external 12-volt supply power and a direct connection to the RCM which was located under the driver's seat. The EDR had the capacity to store two deployment events. Deployment events were locked within the module's memory and could not be overwritten. Recorded data which did not qualify as a deployable event could be overwritten by

subsequent events. The longitudinal and lateral crash pulses (delta-V) were recorded for a maximum duration of 300 milliseconds. Rollover sensor data was recorded for a maximum of 6 seconds, 1.0 seconds prior AE to 5.0 seconds after AE. Each recorded data set contained an associated five seconds of Pre-Crash data parameters which included: vehicle speed, engine RPM, accelerator pedal percent, service brake status and ABS activity. This low frequency data was recorded in 0.5-second intervals. Five seconds of Pre-Crash data from the Electronic Stability Control (ESC) module was also recorded. This high frequency ESC data was recorded in 0.1-second intervals.

The imaged EDR contained one locked frontal/rollover event and one unlocked rollover event designated the First Record and Second Record. The time between the stored events was two seconds and the recorded data sets were consistent with the multiple event crash sequence of the investigation. The data was recorded on Ignition Cycle 1632 and imaged on Ignition Cycle 1638. Each data set was completely recorded. The Pre-Crash data set of the Second Record was used in the analysis and reconstruction of the crash. Due to the two second separation between the events, the Pre-Crash data sets of the two records overlapped.

First Record

The First Record consisted of a long duration locked frontal (Deployment) and rollover event. At the time of the recording the Air Bag Warning Lamp was “Off” and there were no Diagnostic Trouble Codes (DTC’s) present. The Front Right Air Bag Suppression Switch status was “Not Active.” The driver’s safety belt was “Buckled.” The Air Bag Malfunction Indicator Lamp Telltale within the instrument cluster was “Off.” Analysis of this record was consistent with the circumstances of the Events 1 through 4 of the crash sequence.

- The frontal algorithm enabled due to the intersection impact with the Jeep (Event 1).
- The sideslap (Event 2) was observed in the polarity change of the ESC lateral acceleration. Refer to the following Pre-Crash data table.
- The EDR recorded the delta-V of Events 1 and 2 as a single (combined) impact. The recorded maximum longitudinal delta-V was -10.57 km/h (-6.57 mph) at 297 milliseconds. The maximum lateral delta-V was -8.11 km/h (-5.04 mph) at 219 milliseconds.
- The EDR data reported that the pretensioners actuated and the frontal air bags deployed at 853 milliseconds after AE and was consistent with the guardrail (Event 3). The impact acceleration was recorded and observed in the ESC longitudinal acceleration and the deployment timing was consistent with a time/distance analysis. The delta-V for this impact was not separately recorded, as it occurred beyond the 300 millisecond recording window.
- The rollover sensor data at Time Zero (0.0 seconds) was +0.05 degrees and continued with generally a positive polarity to 0.6 seconds. The rollover sensor data then began a negative polarity (Event 4) increasing to -158.78 degrees at 3.5 seconds which was


consistent with the left side leading rollover from the retaining wall to the creek bed embankment. The polarity of the roll angle was in agreement with Society of Automotive Engineers (SAE) sign convention.

Second Record

The Second Record was an unlocked event enabled by the rollover and vertical safing sensors possibly during ground contact. The Air Bag Warning Lamp was “*On*” and the DTC B1193-00 was present. This DTC was indicative of air bag deployment and locked data within the RCM requiring its replacement. The Brake, ABS and Stability Control Telltales were “*On*” which directly related to the damaged front right wheel assembly. The Driver Safety Belt was correctly recorded as “*Buckled*.” The recorded maximum longitudinal delta-V was +11.22 km/h (+6.97 mph) at 300 milliseconds. The maximum lateral delta-V was +17.69 km/h (+10.99 mph) at 300 milliseconds.

The following table is a portion of the low-frequency and high-frequency data elements as recorded in the Second Record of the EDR. A column describing the elements of particular interest has been included.

Time Relative to AE2 seconds	Speed km/h (mph)	Service Brakes	Accel. Percent	ESC Lat. g's	ESC Long. g's	Probable Action Taken or Event
-5	101.0 (62.8)	Off	0	-0.006	-0.03	
-4.9				0.056	-0.027	
-4.8				0.056	-0.005	
-4.7				0.051	0	
-4.6				0.091	-0.03	
-4.5	101.0 (62.8)	Off	15	0.017	0.007	
-4.4				0.075	0.007	
-4.3				0.017	0.019	
-4.2				0.008	-0.01	
-4.1				0.02	0.027	
-4	101.0 (62.8)	Off	21	-0.002	0.007	
-3.9				-0.012	0.041	
-3.8				-0.002	0.045	
-3.7				-0.036	0.022	
-3.6				0.036	0.032	
-3.5	101.0 (62.8)	Off	35	0.122	0.022	
-3.4				-0.02	0.045	
-3.3				0.056	0.027	

Time Relative to AE2 seconds	Speed km/h (mph)	Service Brakes	Accel. Percent	ESC Lat. g's	ESC Long. g's	Probable Action Taken or Event
-3.2				-0.082	0.045	
-3.1				0.101	0.063	Driver CCW steer
-3	102.0 (63.4)	Off	36	0.033	0.007	
-2.9				0.132	0.063	
-2.8				0.163	0.027	
-2.7				0.251	-0.022	
-2.6				0.219	-0.092	
-2.5	102.0 (63.4)	Off	5	0.348	-0.306	Brakes applied
-2.4				0.339	-0.416	Accel. lifted
-2.3				0.309	-0.526	
-2.2				0.2	-0.555	
-2.1				0.226	-0.511	AE First Record
-2	99.0 (61.5)	On	0	2	-2	Event 1
-1.9				0.4	-0.511	
-1.8				-0.182	-0.326	Event 2
-1.7				0.16	-0.135	
-1.6				0.335	-0.538	
-1.5	77.0 (47.8)	On	0	-0.282	-0.16	
-1.4				-0.061	-0.422	
-1.3				-1.383	-1.685	Event 3 impact w/
-1.2				-0.256	-2	Guardrails
-1.1				-0.948	-2	
-1	78.0 (48.5)	On	0	0.043	-2	
-0.9				0.52	-1.88	
-0.8				-0.835	-1.526	
-0.7				-1.325	-2	
-0.6				-0.614	-1.078	
-0.5	8.0 (5.0)	On	0	-0.436	-1.191	Guardrails
-0.4				-0.472	-0.299	
-0.3				-0.154	-0.601	
-0.2				-0.508	-0.27	
-0.1				-1.592	-0.089	
0	0.0 (0.0)	On	0	-0.867	-0.078	AE Second Record

The highlighted data trends indicate that as the driver approached the Jeep a CCW steer for the left passing maneuver began approximately 1.1 seconds prior to the Event 1 impact the Jeep. The steering is evidenced by the increasing positive lateral acceleration beginning at time

interval -3.1 seconds. The First Record was enabled by the impact with Jeep at time -2.1 seconds and evidenced by the lateral and longitudinal acceleration at time -2.0 seconds. The driver had released the accelerator and began to apply the brakes evidenced by the status change of these elements beginning at time -2.5 seconds.

The sideslap (Event 2) was evidenced by the change in polarity and lateral acceleration at time -1.8 seconds. The guardrail impact (Event 3) began at time -1.3 seconds as reflected in the increased magnitudes of the lateral and longitudinal accelerations. The timeline was consistent with the frontal air bag deployment time of 853 milliseconds identified in the EDR summary data. The speed of the ambulance at impact with the guardrail was approximately 77 km/h (48 mph).

Interior Damage - Cab

Inspection of the left front occupant compartment (driver's area) of the ambulance was unremarkable. There was no observed evidence of interior occupant contact points. The absence of contact points was attributed to the driver's use of the available safety systems. The driver seat was adjusted in a full-rear track position. The driver seat back angle measured 15 degrees aft of vertical. The two-spoke tilt steering wheel was adjusted to the center position. There was no steering wheel rim deformation. There was no separation of the steering column's shear capsules.

During the impact with the guardrail, the support posts penetrated the right occupant compartment at the right edge of the toe pan (**Figure 13**) and then continued along the right sill to B-pillar. The lower aspect of the door frame deformed outward creating a 41 cm (16 in) gap at the A-pillar and a 28 cm (11 in) gap at the B-pillar.



Figure 13: View of the front right interior and the damage to the right sill and door frame of the ambulance.

Manual Restraint Systems

The manual restraint systems for the driver and front right passenger positions consisted of 3-point lap and shoulder safety belts with buckle pretensioners. The front belt systems consisted of continuous loop webbing, sliding latch plates, and adjustable D-rings. The driver's restraint was equipped with an Emergency Locking Retractor (ELR). The front right restraint was equipped with a switchable ELR/Automatic Locking Retractor (ELR/ALR). Both adjustable D-rings were in the full-down position.

The driver's safety belt was found in an extended position at the time of the SCI inspection. The length of the webbing measured 180 cm (71 in) from the floor anchor to the D-ring. A small crease in the webbing, related to the location of the buckled latch plate, was observed 104 cm (41 in) above the anchor. The shoulder portion of the webbing was gathered and jammed in the forward aspect of the D-ring as a result of driver loading (**Figure 14**). Examination of the latch plate revealed evidence of historical wear. However, this vehicle was driven by multiple drivers; therefore, the latch plate wear could not be attributed to just the focus driver. The buckle pretensioner was actuated reducing the height of the buckle 95 mm (3.7 in). The driver was restrained by the safety belt based on the observations of the SCI inspection. This determination was consistent with the recorded EDR data.



Figure 14: Interior image depicting the condition of the ambulance driver's safety belt at the D-ring.

Supplemental Restraint Systems

The ambulance was equipped with advanced dual-stage driver and front right passenger air bags. The Ford E-350 was not equipped with front right occupant presence detection weight sensor for automatic suppression of the front right passenger air bag. Rather, this vehicle was equipped with an OEM cut-off switch to suppress the front right air bag deployment. At the time of the crash, the front right air bag was switched "On." Both frontal air bags deployed Stage 1 as a result of the impact with guardrail (Event 3). The deployment command occurred 853 milliseconds after AE.

The driver air bag module was located in the center of the steering wheel rim. The air bag measured 46 cm (18 in) in diameter in its deflated state. The air bag was tethered and vented by two ports at the 11 and 1 o'clock positions on the back side of the bag. The excursion of the air bag measured 25 cm (10 in). There was no occupant contact evidence visible on the face of the air bag.

The front right passenger module was a mid-mount design incorporated into the right aspect of the instrument panel. The air bag measured 71 cm x 51 cm (28 in x 20 in), width by height, in its deflated state and was not tethered. The air bag was vented by a single 5 cm (2 in) diameter port at 3 o'clock position. The excursion measured 48 cm (19 in). Examination was unremarkable for occupant contact evidence.

Patient Compartment Damage

The patient compartment was relatively undamaged by the external forces of the multi-event crash. The damage identified through the course of the SCI inspection was directly related to the

displacement of the unrestrained occupants about the compartment's interior. The occupants responded primarily to the guardrail impact and rollover (Events 3 and 4) and were displaced into the forward wall, coming to rest on top of one another on the roof. The left, back and right wall of the patient compartment was free of occupant contact evidence and/or damage.

The upper aspect of the forward wall was contacted by the occupant across its entire 120 cm (47 in) width. The panel housing the heating, ventilation and air conditioner (HVAC) vents was displaced and deformed (**Figures 15 and 16**). Blood evidence was noted at the center and right aspects. An isolated 5 cm (2 in) diameter dent to the apex of the forward panel was located at the right center aspect. The cover of the 115-volt electrical outlet was dented with associated blood evidence. The vinyl upholstery on the upper aspect of the rear-facing attendant's seat was scuffed and torn from occupant loading. The upholstery and padding surrounding belt guide/D-ring for displaced. A large area of post-crash blood evidence was noted to the padding that was applied to the forward right entry door to the patient compartment.



Figure 15: View into the patient compartment of the ambulance looking forward.



Figure 16: Close-up view of the occupant contacts at the upper aspect of the patient compartment's forward wall.

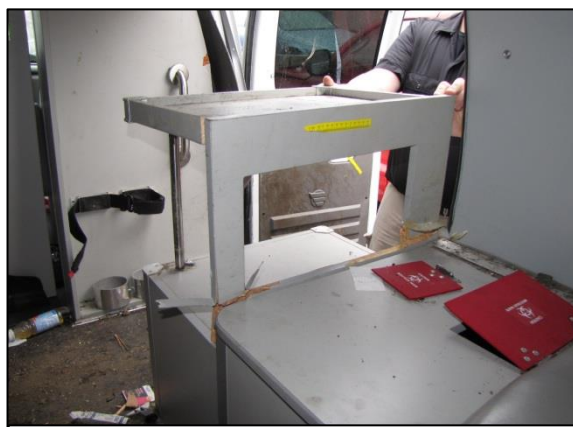


Figure 17: Image depicting the fractured custom shelf unit at the forward aspect of the patient compartment bench seat.

The custom cabinet and shelf (located at the forward aspect of the inward-facing bench) was fractured by the displaced Paramedic occupant (**Figure 17**). The unit was manufactured of 2 cm (0.75 in) plywood finished with Formica bonded with glue and wooden pegs. This shelf unit housed the cardiac monitor and various supplies that were in use at the time of the crash. The right upper arm and flank of Paramedic contacted and fractured the shelf. The fracture of her

right humerus was consistent with the contact. The cardiac monitor was displaced coming to rest on the roof. The monitor was undamaged and placed back into service post-crash.

Patient Cot and Fastener System

The patient was being transported on a Stryker Model 6082 MX-Pro R3 cot (**Figure 18**). The manually-operated cot was rated for an occupant load of 295 kg (650 lb). The cot did not appear to be damaged or deformed. The X-frame raised and lowered without binding. The IV poles and side rails were undamaged. The locking pin attached to the right longitudinal frame member did not appear to be loaded or deformed.

The cot was equipped with two lateral restraints and a set of shoulder/chest straps. The patient was restrained with the lateral straps across his lower extremities and his abdomen. A possible skin transfer was identified on the abdominal belt measuring 20 cm (8 in). The shoulder/chest harness was buckled underneath the cot and was not in use. The patient separated from the cot during the guardrail impact (Event 3).

The cot remained secure within the fastener system during the crash sequence and was suspended from the roof at final rest. The fastener system consisted of the antler bracket mounted to the patient compartment floor and the Stryker Model No: 6371 rail clamp that was mounted to the left wall (**Figure 19**). There was no deformation of the antler bracket and the stretcher wheels/frame remained engaged with the bracket throughout the crash. Post-crash, the rail clamp was jammed in the closed/locked position. At the crash site, a sledge hammer had to be used to force open the jaw of the clamp in order to remove the cot from the ambulance.

At inspection, the rail clamp was not functional and appeared deformed. The clamp was mounted to the lower wall that formed the stair chair enclosure at the left rear of the patient



Figure 18: Right side view of the ambulance cot.



Figure 19: Image of the ambulance cot rail clamp fastener.

compartment. This area had sustained induced deformation as a result of ground contact during the rollover and likely rendered the clamp inoperative.

2011 FORD OCCUPANTS

Driver Demographics

Age / Sex:	37 years / Female
Height:	168 cm (66 in)
Weight:	91 kg (200 lb)
Eyewear:	None
Seat Type:	Box-mounted bucket
Seat Track Position:	Full-rear track
Manual Restraint Usage:	3-point lap and shoulder safety belt
Usage Source:	SCI inspection, EDR
Air Bags:	Advanced dual-stage frontal available; driver and front right deployed
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Assisted from vehicle
Transport from Scene:	Ambulance to a hospital
Medical Treatment:	Hospitalized overnight for observation

Driver Injuries

Injury No.	Injury	AIS 2005/08	Injury Source	Confidence Level
1	Lower back strain, NFS	640678.1,8	Safety belt	Probable
2	Left hand lacerations, NFS (Not crash related)	710600.1,2	Post-crash egress	Probable

Source: Interview

Driver Kinematics

At the time of the crash, the driver was seated in a full-rear track position and was restrained by the 3-point lap and shoulder safety belt. The driver was operating the ambulance eastbound and was approaching the slower moving Jeep. She initiated a left passing maneuver at approximately the same time that the Jeep began to turn left. These maneuvers precipitated the crash. The EDR data indicated that the driver had applied the brakes immediately prior to the impact.

At impact with the Jeep (Event 1 and 2), the safety belt retractor locked. The driver initiated a forward trajectory and loaded the safety belt. She maintained her position within the driver seat through (probable) bracing of the steering wheel and the safety belt loading.

The right front tire of the ambulance was directly involved in the vehicle-to vehicle interaction with the Jeep and aired out. The driver lost directional control and the ambulance separated from the impacts to the left. The ambulance maintained a northeast trajectory and impacted the guardrail. The force of this impact (Event 3) caused the safety belt pretensioners to actuate and

the frontal air bags to deploy. The driver responded to the 12 o'clock direction of this impact and initiated a forward trajectory. She loaded the safety belt and deployed driver air bag and rode down the force of the impact.

The ambulance departed the retaining wall and initiated a left side leading rollover (Event 4). The driver continued to load the safety belt and probably contacted the left door due to the rollover forces. The use of the manual restraint maintained her position within the driver seat. The ambulance came to rest on its roof with the driver suspended from the safety belt. Her loading of the restraint throughout the course of the crash sequence resulted in lower back (lumbar) strain.

The bystander responding to the crash from across the street assisted the driver from the ambulance via the left front door. She ran the right side of the overturned vehicle and opened the right doors to the aid of the crew in the patient compartment. After the arrival rescue personnel, she was transported to a local hospital by ambulance for treatment and admitted overnight for observation.

EMT1 Demographics

Age / Sex:	29 years / Male
Height:	188 cm (74 in)
Weight:	118 kg (260 lb)
Eyewear:	Prescription glasses
Seat Type:	None, Standing at MMUCC Position 5
Seat Track Position:	Not applicable
Manual Restraint Usage:	None
Usage Source:	Interview
Air Bags:	None
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Assisted from vehicle
Transport from Scene:	Ambulance to a hospital
Medical Treatment:	Treated and released

EMT1 Injuries

Injury No.	Injury	AIS 2005/08	Injury Source	Confidence Level
1	Generalized whole body contusions, NFS	910400.1,0	Unknown	Unknown

Source: Interview

EMT1 Kinematics

The male EMT 1 was unrestrained and standing (MMUCC Position 5) at the head of the patient cot assisting the CPR activities by managing the patient's airway during the transport activities

leading up to the crash. The only recollection EMT 1 had of the crash sequence was experiencing an impact and being displaced forward and onto the roof.

During the ambulance's left passing maneuver (immediately prior to Event 1), EMT 1 was presumed to be bracing in order to maintain balance. At impact with the Jeep (Events 1 and 2), this EMT responded to the impact force with a forward and right trajectory (with respect to the ambulance). At impact with the guardrail (Event 3), the EMT most likely impacted the forward wall. As the ambulance initiated the left side leading rollover (Event 4), he was displaced to the left and onto the ceiling by gravitational and rollover forces.

During Events 3 and 4, EMT 1 was involved in multiple unknown occupant-to-occupant contacts. He came to rest on the ceiling at the forward left area of the patient compartment, entangled with the other displaced occupants and was not able to free himself.

EMT 1 was assisted from the ambulance by the rescue personnel and was transported to the emergency room of a local hospital. During interview, EMT 1 stated he only sustained unspecified multiple contusions as a result of the crash. He was examined and released the day of the crash

Paramedic Demographics

Age / Sex:	27 years / Female
Height:	160 cm (63 in)
Weight:	82 kg (180 lb)
Eyewear:	Prescription glasses
Seat Type:	Inward-facing bench, MMUCC Position 6
Seat Track Position:	Not adjustable
Manual Restraint Usage:	None
Usage Source:	SCI inspection, Interview
Air Bags:	None
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Assisted from vehicle
Transport from Scene:	Air lifted to a trauma center
Medical Treatment:	Hospitalized two days

Paramedic Injuries

Injury No.	Injury	AIS 2005/08	Injury Source	Confidence Level
1	Right humerus shaft fracture (x2)	751221.2,1	Shelf unit at forward aspect/right bench	Certain
2	Left wrist sprain, NFS	772410.1,2	Patient compartment ceiling	Possible

Source: Interview

Paramedic Kinematics

The female Paramedic was seated at the forward aspect of the inward-facing bench seat (MMUCC Position 6). She was not restrained by a safety belt. She was assisting in the CPR activities monitoring the patient and the cardiac monitor that was situated on the shelf unit located to her right at the forward aspect of the bench. During her interview, she only recalled experiencing an impact and then being displaced onto the roof.

This occupant likely maintained her seated position during the pre-crash maneuvers and the impacts with the Jeep (Events 1 and 2) by bracing. At impact with the guardrail (Event 3), the Paramedic initiated a trajectory toward the front of the patient compartment and slid along the bench seat. Due to her inward-facing orientation, she impacted and fractured the shelf unit with her right arm. The impact with the shelf resulted in the humerus fracture. Dimensionally, the seated occupant's humerus was in alignment with this component. The Paramedic also experienced occupant-to-occupant contact with EMT 3 during this impact.

The rollover displaced the Paramedic to the ceiling. She stated that at final rest she was lying on her stomach (face down) with her arms at her side and her feet toward the back plane of the patient compartment. The other displaced occupants reportedly came to rest on top of her body restricting her breathing. The Paramedic was assisted from the ambulance and air-lifted to a trauma center. She was admitted and hospitalized for two days.

EMT3 Demographics

Age / Sex:	39 years / Male
Height:	196 cm (77 in)
Weight:	204 kg (450 lb)
Eyewear:	None
Seat Type:	Inward-facing bench, MMUCC Position 9
Seat Track Position:	Not adjustable
Manual Restraint Usage:	None
Usage Source:	SCI inspection, interview
Air Bags:	None
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Assisted from vehicle
Transport from Scene:	Ambulance to a trauma center
Medical Treatment:	Hospitalized one day

EMT3 Injuries

Injury No.	Injury	AIS 2005/08	Injury Source	Confidence Level
1	Occipital skull fracture	150400.2,6	Forward Patient Compartment Wall	Probable
2	Right ear laceration, NFS	210600.1,1	Unknown	Unknown

Source: Interview

EMT3 Kinematics

The male EMT 3 was seated at the mid-aspect of the inward-facing bench seat (MMUCC Position 9). He was not restrained by a safety belt and was involved with the patient providing CPR compressions. Due to these activities and in combination with bracing, the EMT 3 most likely maintained his position on the bench during the pre-crash maneuvers and the impacts with the Jeep (Events 1 and 2).

At impact with the guardrail (Event 3), EMT 3 responded with a trajectory toward the front of the patient compartment and slid along the bench seat. He contacted and loaded the left flank of the Paramedic as she loaded the shelf unit. EMT 3 was then displaced to the ceiling and into the forward wall evidenced by the deformation of the panel that housed the HVAC vents. His impact to the forward wall was the probable cause of the occipital fracture.

EMT 3 came to rest on top of the Paramedic and entangled with EMT 1. He was assisted from the patient compartment and transported by ambulance to a trauma center. He was admitted and hospitalized for one day.

Patient Demographics

Age / Sex:	62 years / Male
Height:	Unknown
Weight:	181 kg (400 lb)
Eyewear:	Unknown
Seat Type:	Lying supine on a cot, MMUCC Position 8
Seat Track Position:	Not adjustable
Manual Restraint Usage:	Two lateral restraints
Usage Source:	SCI inspection, interview
Air Bags:	None
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Fatal prior to being removed from vehicle
Transport from Scene:	Ambulance to a County facility, no autopsy performed.
Medical Treatment:	None

Patient Injuries

The Medical Examiner reviewed the vital signs and data from the cardiac monitor that were recorded during the transport which indicated that the patient was in asystole for several minutes prior to the crash and life signs were only being maintained due to CPR activities. The patient was ruled deceased by pre-existing medical conditions. It was not determined if he sustained any crash related injuries. No autopsy was performed.

Patient Kinematics

The patient was lying supine (flat) on the cot and was restrained by two lateral straps during the transport. The lateral straps were across his lower extremities and at the hip. He was in cardiac

arrest and the ambulance crew was applying CPR procedures. The patient probably did not respond to the vehicle's pre-crash maneuver's and impacts with the Jeep due to the use of the lateral restraints and his interaction with EMT 3. At impact with the guardrail, (Event 3), the patient initiated a forward trajectory and slid out from under the lateral restraints. A possible tissue transfer was noted to the lateral strap located at the patient's hips. The patient became unrestrained and most likely contacted EMT 1. During the rollover (Event 4), the unrestrained patient was displaced to the left and onto the ceiling. He came to rest on top of the Paramedic and EMT 1.

He was removed from the ambulance by rescue personnel and was pronounced deceased. He was transported to a County Facility by ambulance. The Medical Examiner reviewed circumstances of the transport and the data recording from the cardiac monitor and ruled that the patient's death resulted from his preexisting conditions and was not crash related. No autopsy was performed.

2012 JEEP GRAND CHEROKEE

Description

The 2012 Jeep Grand Cherokee (**Figure 20**) was identified by the Vehicle Identification Number (VIN): 1C4RJFAG5CCxxxxxx. The digital odometer reading was 71,334 km (44,326 miles). The rear-wheel drive sport utility vehicle was built on a 292 cm (115 in) wheelbase and was equipped with the Laredo trim package. The Jeep had a GVWR of 2,948 kg (6,500 lb) with a front axle and rear axle rating of 1,452 kg (3,200 lb) and 1,678 kg (3,700 lb), respectively. The powertrain consisted of a 3.6-liter V-6 gasoline engine linked to a 5-speed automatic transmission. Additional features included Traction Control, Electronic Stability Control (ESC), and a Tire Pressure Monitoring System (TPMS). The brakes were front/rear disc with electronic brakeforce distribution and emergency brake assist. The vehicle manufacturer's recommended tire size was P245/70R17 front and rear, with cold tire pressures of 228 kPa (33 PSI). All four tires were Goodyear Fortera HL tires of the recommended size. Specific tire data measured at the time of the SCI inspection was as follows:

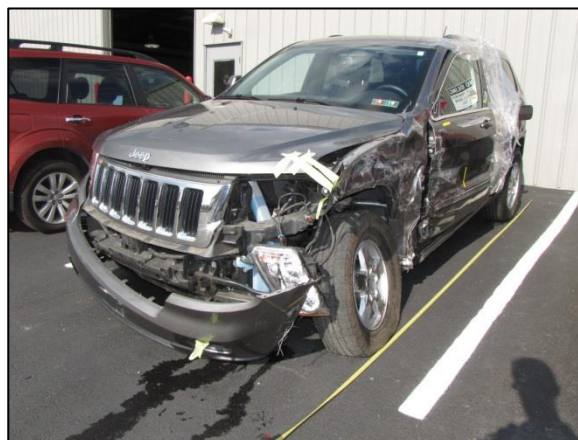


Figure 20: Front left oblique view of the Jeep Grand Cherokee.

Position	Measured Pressure	Measured Tread Depth	Restriction	Damage
LF	Tire Flat	4 mm (5/32 in)	No	Sidewall cut
LR	228 kPa (33 PSI)	4 mm (5/32 in)	No	None

Position	Measured Pressure	Measured Tread Depth	Restriction	Damage
RR	228 kPa (33 PSI)	2 mm (3/32 in)	No	None
RF	228 kPa (33 PSI)	4 mm (5/32 in)	No	None

The interior of the Jeep was equipped with front bucket seats with Active Head Restraints (AHR) and a split-folding second row bench seat for the seating of five occupants. Manual safety features included 3-point lap and shoulder safety belts for all five seat positions. The front safety belts were equipped with retractor pretensioners. The supplemental restraint systems consisted of Certified Advanced-208 Compliant air bags for the driver and front right passenger, front seat-mounted side impact air bags and roof side rail-mounted IC air bags.

Exterior Damage

The Jeep sustained two regions of impact damage to its left plane that were directly related to Events 1 and 2. The impact damage related to Event 1 began at the mid-aspect of the left front door 175 cm (68.8 in) forward of the rear axle reference point and extended forward 193 cm (76 in) to the front left corner (**Figure 21**). The door plane and left fender exhibited longitudinal abrasions consistent with the right plane/forward aspect damage identified on the ambulance. The left fender separated in the impact preventing lateral crush documentation. The estimated maximum crush within the contact pattern was approximately 8 cm (3 in) at the front left corner. The vehicle's structural support inboard of the fender was not damaged. The front bumper fascia was separated at its left aspect. The sidewall of the left front tire was punctured and direct contact damage was noted to the left front wheel rim. An abrasion was noted to the left front door frame and left front window glazing caused by contact from the housing of the ambulance's right mirror. The CDC assigned to this damage pattern was 08LYAW2.



Figure 21: Left side view depicting the damage to the Jeep as a result of Event 1.

Both the driver's and front right passenger's AHR actuated as a result of the crash (**Figure 22**). The padded portion of the restraint translated forward to help protect the occupant's head and neck from excessive rearward acceleration and motion. The manufacturer's literature stated that this spring-loaded device was actuated by the electronic release of the latch mechanism internal to the device and was controlled by the Air Bag control Module during a rear-impact event. The AHR could be manually reset and was reusable.



Figure 22: View depicting the actuated active head restraint in the Jeep.

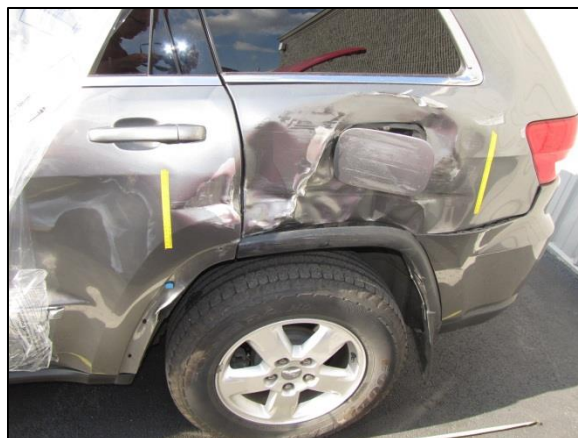


Figure 23: Left view depicting the sideslap damage to the Jeep.

A region of sideslap damage (Event 2) on the left quarter-panel surrounded the right rear wheel opening (**Figure 23**). The direct contact damage began 46 cm (18.2 in) aft of the right rear axle and ended 35 cm (13.8 in) forward of the axle reference. The maximum crush within the region was 5 cm (2 in). The CDC describing this damage pattern was 09LZEW1.

All of the Jeep's doors remained closed during the crash and were operational at inspection. There was no change in the Jeep's wheelbase dimensions. The windshield, backlight and all side glazing were undamaged.

Event Data Recorder

The Jeep was equipped with an Air Bag control Module (ACM) that controlled the diagnostic, sensing and deployment of the vehicle's air bag systems. The ACM also has EDR capabilities. The EDR data was imaged at the time of the SCI inspection by software version 14.0.1 of the Bosch CDR tool via a connection to the Diagnostic Link Connector and on-board 12-volt electrical power. The imaged data is reported with software version 16.0.1 and is included at the end of this report as Attachment B.

This EDR was capable of recording both Non-Deployment and Deployment events. The minimum velocity change (delta-V) to qualify a Non-Deployment event was 8 km/h (5 mph) and the event was not considered severe enough to warrant the deployment of a supplemental restraint device. Deployment events by definition deployed a supplemental restraint device. The EDR had the capacity to store up to five events. Each event was characterized by the recording of the bi-directional acceleration and angular rate crash pulse data and an associated five second pre-crash data buffer which described various vehicle performance parameters. These performance parameters were recorded in 0.1-second intervals. A review of the imaged data indicated that a single event labeled the Most Recent Event was recorded with pre-crash data consistent with Event 1 of the crash sequence.

The recorded circumstance, termed the “*Most Recent Event*”, was an Active Head Restraint Deployment event. The active head restraints for both the driver and front right passenger actuated. At the time of the event, the Air Bag Warning Lamp was “*Off*.” The driver and front right passenger safety belts were “*Buckled*.” The crash occurred on Ignition Cycle 4,674 and the recorded odometer reading was 71,334 km (44,325 miles). The event was completely recorded.

The data was imaged on Ignition Cycle 4,684. The maximum recorded longitudinal and lateral delta-Vs were +7 km/h (+4.3 mph) and +13 km/h (+8.1 mph), respectively, at 134 milliseconds after AE. The delta-V data and direction of force were consistent with the Event 1 impact with the ambulance. A listing of selected vehicle performance and operation parameters is provided in the following table.

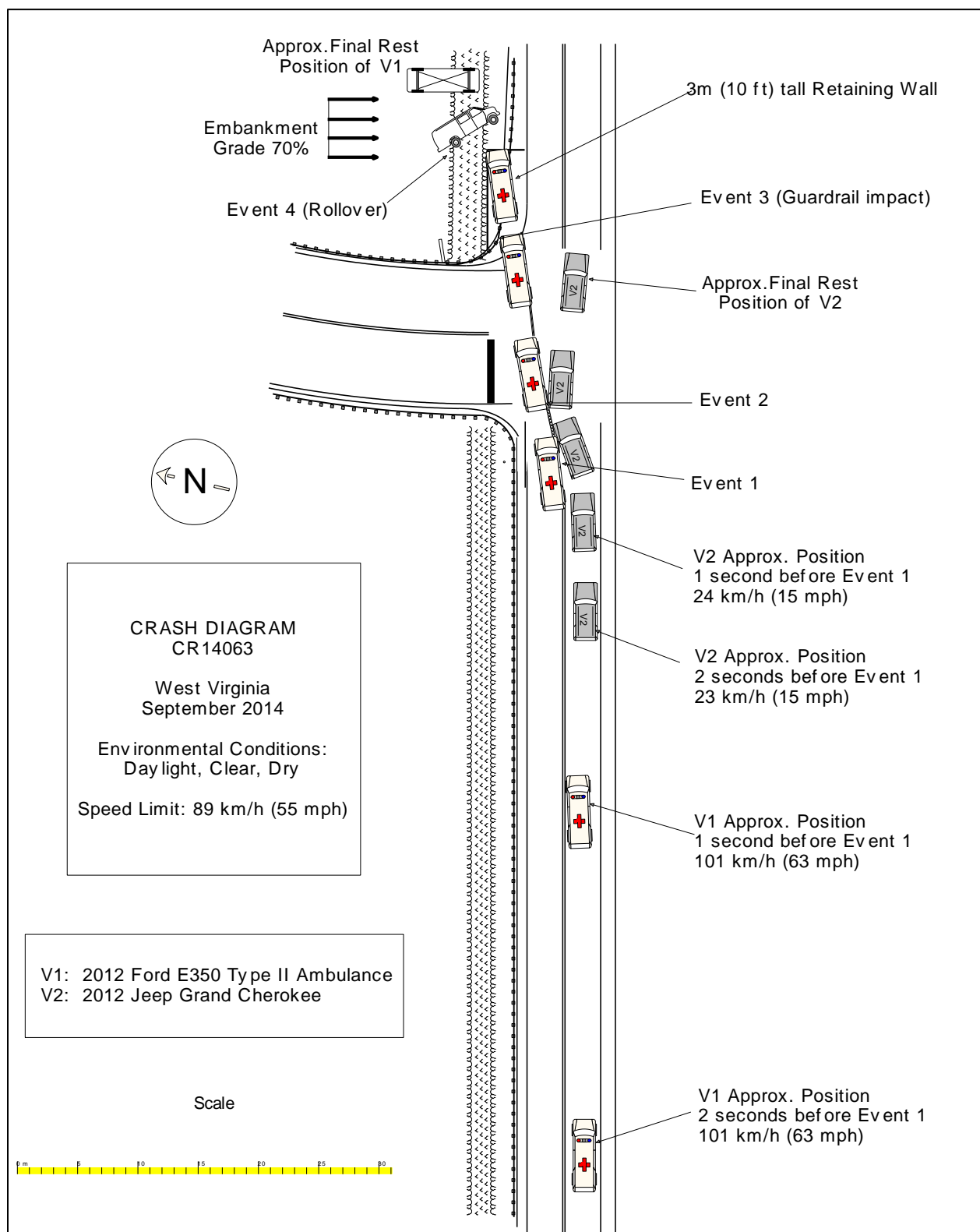
Time Relative to AE seconds	Speed km/h (mph)	Engine Throttle Percent	Service Brakes	Brake Lamp On	Steering Input (Deg.)
-5	47 (30)	1.6	On	Yes	1
-4.5	44 (27)	1.6	On	Yes	0
-4.0	41 (25)	1.6	On	Yes	0
-3.5	37 (23)	2.0	On	Yes	-1
-3.0	35 (22)	2.0	On	Yes	1
-2.5	33 (20)	2.0	On	Yes	8
-2.0	30 (18)	2.0	On	Yes	15
-1.5	26 (16)	2.0	On	Yes	29
-1.0	23 (23)	2.4	Off	No	118
-0.5	23 (14)	1.6	Off	No	157
-0.1 (AE)	22 (14)	1.6	Off	No	167

Note: Positive steering wheel angles indicated a left turn (CCW rotation of Steering Wheel)

The recorded data trends indicated that the Jeep approached the intersection with the throttle closed and the service brakes applied. The vehicle decelerated from 47 km/h (30 mph) to 22 km/h (14 mph) at AE. A shallow left turn (CCW steering) was initiated 2.5 seconds prior to AE. The brakes were reported as released 1.0 second prior to AE with an increasing left steer. Refer to Attachment B for further detail.

Occupant Data

The Jeep was occupied by four unknown individuals. The police report indicated that they were not injured in the crash.

CRASH DIAGRAM

ATTACHMENT A

2012 Ford E-350 Event Data Recorder (EDR) 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	1FDSS3EL7CD*****
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CR14063_V1_ACM.CDRX
Saved on	Tuesday, September 30 2014 at 14:31:19
Collected with CDR version	Crash Data Retrieval Tool 14.0.1
Reported with CDR version	Crash Data Retrieval Tool 16.0.1
EDR Device Type	Airbag Control Module
ACM Adapter Detected During Download	Yes
Event(s) recovered	locked frontal event rollover event unlocked event

Comments

No comments entered.

The retrieval of this data has been authorized by the vehicle's owner, or other legal authority such as a court order or search warrant, as indicated by the CDR tool user on Tuesday, September 30 2014 at 14:31:19.

Data Limitations

Restraints Control Module Recorded Crash Events:

Deployment Events cannot be overwritten or cleared from the Restraints Control Module (RCM). Once the RCM has deployed any airbag device, the RCM must be replaced. The data from events which did not qualify as deployable events can be overwritten by subsequent events. The RCM can store up to two deployment events.

Airbag Module Data Limitations:

- Restraints Control Module Recorded Vehicle Forward Velocity Change reflects the change in forward velocity that the sensing system experienced from the point of algorithm wake up. It is not the speed the vehicle was traveling before the event. Note that the vehicle speed is recorded separately five seconds prior to algorithm wake up. This data should be examined in conjunction with other available physical evidence from the vehicle and scene when assessing occupant or vehicle forward velocity change.
- Event Recording Complete will indicate if data from the recorded event has been fully written to the RCM memory or if it has been interrupted and not fully written.
- If power to the Airbag Module is lost during a crash event, all or part of the crash record may not be recorded.
- For 2011 Ford Mustangs, the Steering Wheel Angle parameter indicates the change in steering wheel angle from the previously recorded sample value and does not represent the actual steering wheel position.

Airbag Module Data Sources:

- Event recorded data are collected either INTERNALLY or EXTERNALLY to the RCM.
 - INTERNAL DATA is measured, calculated, and stored internally, sensors external to the RCM include the following:
 - > The Driver and Passenger Belt Switch Circuits are wired directly to the RCM.
 - > The Driver's Seat Track Position Switch Circuit is wired directly to the RCM.
 - > The Side Impact Sensors (if equipped) are located on the side of vehicle and are wired directly to the RCM.
 - > The Occupant Classification Sensor is located in the front passenger seat and transmits data directly to the RCM on high-speed CAN bus.
 - > Front Impact Sensors (right and left) are located at the front of vehicle and are wire directly to the RCM.
 - EXTERNAL DATA recorded by the RCM are data collected from the vehicle communication network from various sources such as Powertrain Control Module, Brake Module, etc.

02007_RCM-RC6_r002

System Status at Time of Retrieval

VIN as programmed into RCM at factory	1FDSS3EL7CD*****
Current VIN from PCM	1FDSS3EL7CD*****
Ignition cycle, download (first record)	1,638
Ignition cycle, download (second record)	1,638
Restraints Control Module Part Number	BC24-14B321-AD
Restraints Control Module Serial Number	7155200400000000
Restraints Control Module Software Part Number (Version)	BL84-14C028-AB
Left/Center Frontal Restraints Sensor Serial Number	163C1909
Left Side Restraint Sensor 1 Serial Number	00000000
Left Side Restraint Sensor 2 Serial Number	00000000
Right Frontal Restraints Sensor Serial Number	00000000
Right Side Restraint Sensor 1 Serial Number	00000000
Right Side Restraints Sensor 2 Serial Number	00000000

System Status at Event (First Record)

Recording Status	Locked Record
Complete file recorded (yes,no)	Yes
Multi-event, number of events (1,2)	1
Time from event 1 to 2 (msec)	N/A
Lifetime Operating Timer at event time zero (seconds)	2,743,715
Key-on Timer at event time zero (seconds)	2,340
Vehicle voltage at time zero (Volts)	13.446
Energy Reserve Mode entered during event (Y/N)	No

Faults Present at Start of Event (First Record)

No Faults Recorded

Deployment Data (First Record)

Frontal airbag deployment, time to first stage deployment, driver (msec)	853.0
Pretensioner (buckle) deployment, time to fire, driver (msec)	853.0
Frontal airbag deployment, time to first stage deployment, front passenger (msec)	853.0
Pretensioner (buckle) deployment, time to fire, right front passenger (msec)	853.0
Maximum delta-V, longitudinal (MPH [km/h])	-6.57 [-10.57]
Time, maximum delta-V longitudinal (msec)	297
Maximum delta-V, lateral (MPH [km/h])	-5.04 [-8.11]
Time, maximum delta-V lateral (msec)	219
Left or center front, satellite Sensor discriminating deployment	Yes
Left or center, front satellite Sensor safing	Yes
RCM, front sensor discriminating deployment	Yes
RCM, front sensor safing	Yes
RCM, rollover sensor discriminating deployment	Yes
RCM, vertical sensor safing	Yes
Longitudinal Delta-V Time Zero Offset	7.5 ms
Lateral Delta-V Time Zero Offset	7.5 ms
Roll Angle Time Zero Offset	47.5 ms

Pre-Crash Data -1 sec (First Record)

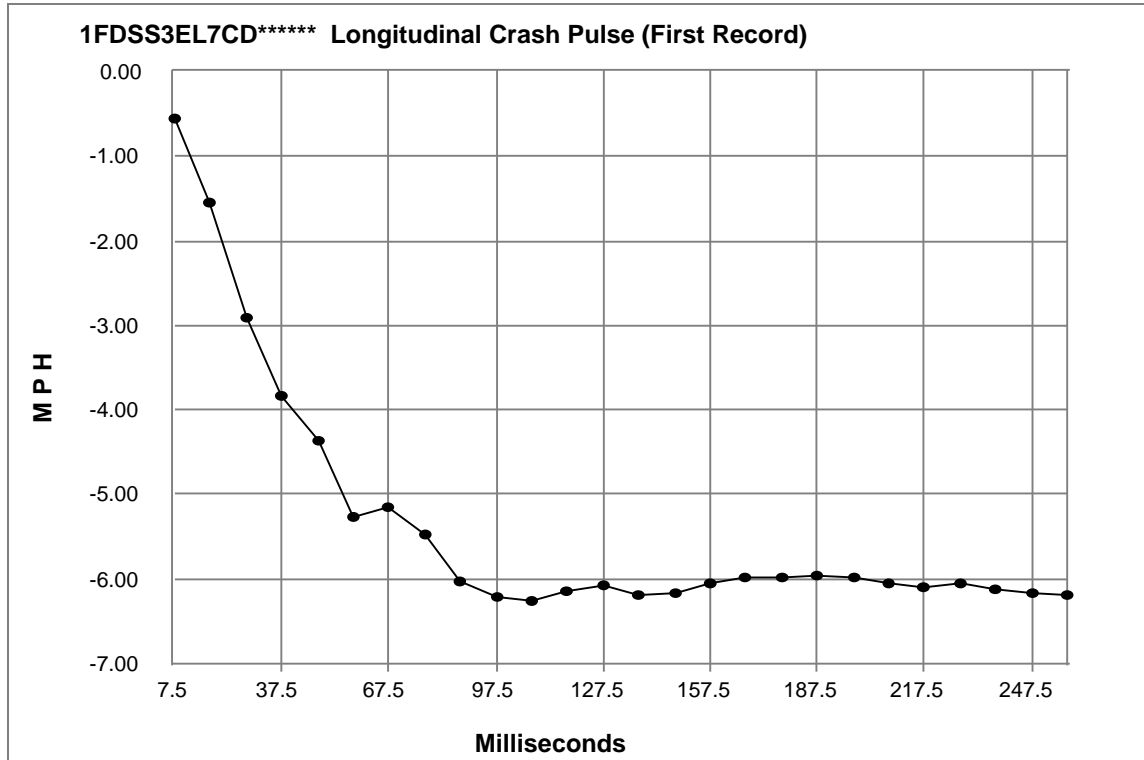
Ignition cycle, crash	1,632
Frontal air bag warning lamp, on/off	Off
Frontal air bag suppression switch status, front passenger	Not Active
Safety belt status, driver	Driver Buckled
Brake Telltale	Off
ABS Telltale	Off
Stability Control Telltale	Off
Speed Control Telltale	Off
Powertrain Wrench Telltale	Off
Powertrain Malfunction Indicator Lamp (MIL) Telltale	Off

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

Times (sec)	Speed vehicle indicated MPH [km/h]	Accelerator pedal, % full	Service brake, on/off	Engine RPM	ABS activity (engaged, non-engaged)	Stability control (engaged, non-engaged)	Traction Control via Brakes (engaged, non-engaged)	Traction Control via Engine (engaged, non-engaged)
- 5.0	67.1 [108.0]	0	On	1,900	non-engaged	non-engaged	non-engaged	non-engaged
- 4.5	66.5 [107.0]	0	On	1,900	non-engaged	non-engaged	non-engaged	non-engaged
- 4.0	65.2 [105.0]	0	On	1,900	non-engaged	non-engaged	non-engaged	non-engaged
- 3.5	64.0 [103.0]	0	On	1,900	non-engaged	non-engaged	non-engaged	non-engaged
- 3.0	63.4 [102.0]	0	On	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 2.5	62.8 [101.0]	0	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 2.0	62.8 [101.0]	15	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 1.5	62.8 [101.0]	21	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 1.0	62.8 [101.0]	35	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 0.5	63.4 [102.0]	36	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
0.0	63.4 [102.0]	5	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged

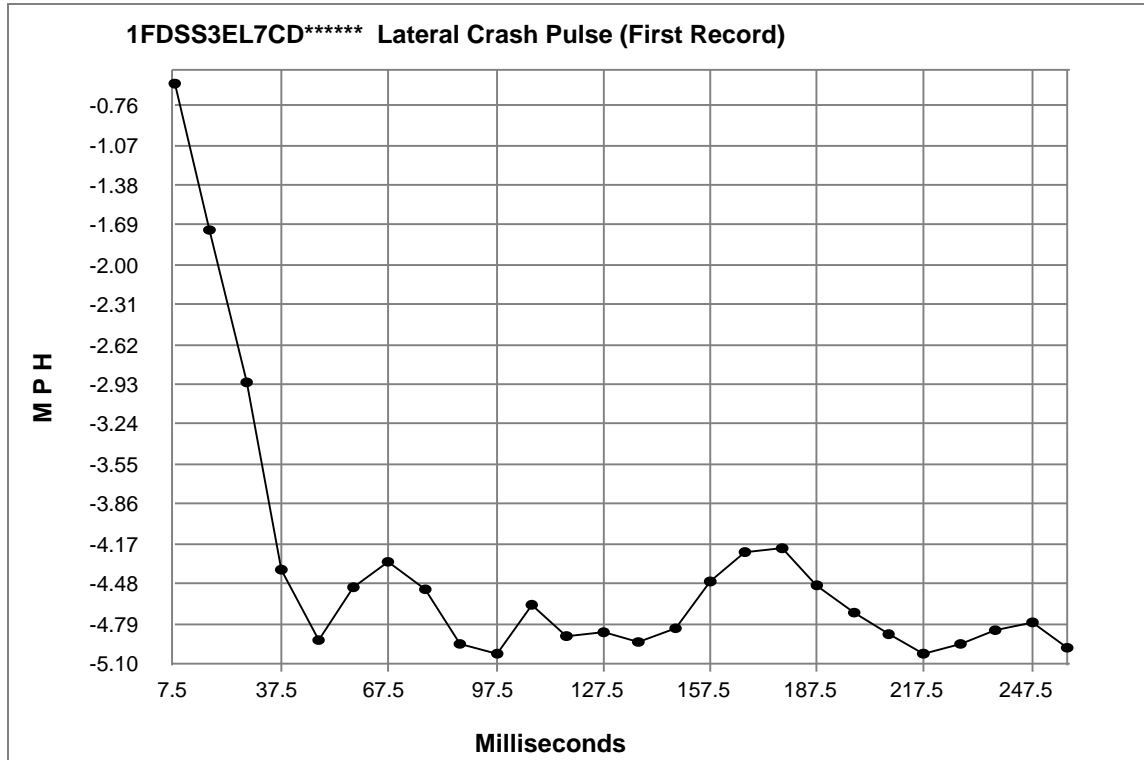
Pre-Crash Data -5 to 0 sec [10 samples/sec] (First Record)

Times (sec)	Steering Wheel Angle (degrees)	Stability Control Lateral Acceleration (g)	Stability Control Longitudinal Acceleration (g)	Stability Control Yaw Rate (deg/sec)	Stability Control Roll Rate (deg/sec)
- 5.0	Invalid	0.035	-0.107	-0.5	0.75
- 4.9	Invalid	-0.055	-0.094	0.25	1.12
- 4.8	Invalid	0.015	-0.125	-0.12	0.87
- 4.7	Invalid	0.016	-0.068	0.0	0.62
- 4.6	Invalid	0.016	-0.107	-0.12	0.37
- 4.5	Invalid	-0.017	-0.087	-0.12	0.62
- 4.4	Invalid	0.006	-0.087	-0.25	1.25
- 4.3	Invalid	-0.02	-0.121	0.12	0.5
- 4.2	Invalid	0.034	-0.102	0.37	0.37
- 4.1	Invalid	0.022	-0.109	0.87	-1.0
- 4.0	Invalid	0.019	-0.087	0.62	-0.62
- 3.9	Invalid	0.02	-0.107	0.75	-0.62
- 3.8	Invalid	0.021	-0.066	1.12	0.12
- 3.7	Invalid	0.057	-0.046	0.87	-0.12
- 3.6	Invalid	0.035	-0.043	0.75	0.37
- 3.5	Invalid	-0.005	-0.041	-0.12	0.0
- 3.4	Invalid	0.036	-0.048	-0.5	1.0
- 3.3	Invalid	0.005	-0.007	0.0	0.25
- 3.2	Invalid	-0.002	-0.03	0.25	0.25
- 3.1	Invalid	0.011	-0.048	0.5	1.12
- 3.0	Invalid	0.066	-0.01	0.62	2.0
- 2.9	Invalid	-0.006	-0.03	0.25	1.87
- 2.8	Invalid	0.056	-0.027	0.25	1.62
- 2.7	Invalid	0.056	-0.005	0.62	0.75
- 2.6	Invalid	0.051	0.0	0.75	-0.12
- 2.5	Invalid	0.091	-0.03	1.12	-0.37
- 2.4	Invalid	0.017	0.007	1.37	-1.62
- 2.3	Invalid	0.075	0.007	1.5	-1.12
- 2.2	Invalid	0.017	0.019	0.87	-0.62
- 2.1	Invalid	0.008	-0.01	0.87	0.5
- 2.0	Invalid	0.02	0.027	0.5	1.5
- 1.9	Invalid	-0.002	0.007	-0.5	2.62
- 1.8	Invalid	-0.012	0.041	-0.5	3.87
- 1.7	Invalid	-0.002	0.045	0.25	3.12
- 1.6	Invalid	-0.036	0.022	0.12	1.62
- 1.5	Invalid	0.036	0.032	0.37	0.0
- 1.4	Invalid	0.122	0.022	0.25	-1.0
- 1.3	Invalid	-0.02	0.045	-0.12	-0.75
- 1.2	Invalid	0.056	0.027	0.62	-1.12
- 1.1	Invalid	-0.082	0.045	0.75	-1.25
- 1.0	Invalid	0.101	0.063	1.5	-1.25
- 0.9	Invalid	0.033	0.007	1.37	-1.75
- 0.8	Invalid	0.132	0.063	2.12	-2.12
- 0.7	Invalid	0.163	0.027	2.12	-3.12
- 0.6	Invalid	0.251	-0.022	4.37	-1.12
- 0.5	Invalid	0.219	-0.092	6.5	-0.25
- 0.4	Invalid	0.348	-0.306	7.37	1.75
- 0.3	Invalid	0.339	-0.416	8.75	4.5
- 0.2	Invalid	0.309	-0.526	8.75	4.87
- 0.1	Invalid	0.2	-0.555	8.0	0.0
0.0	Invalid	0.226	-0.511	7.12	-1.75



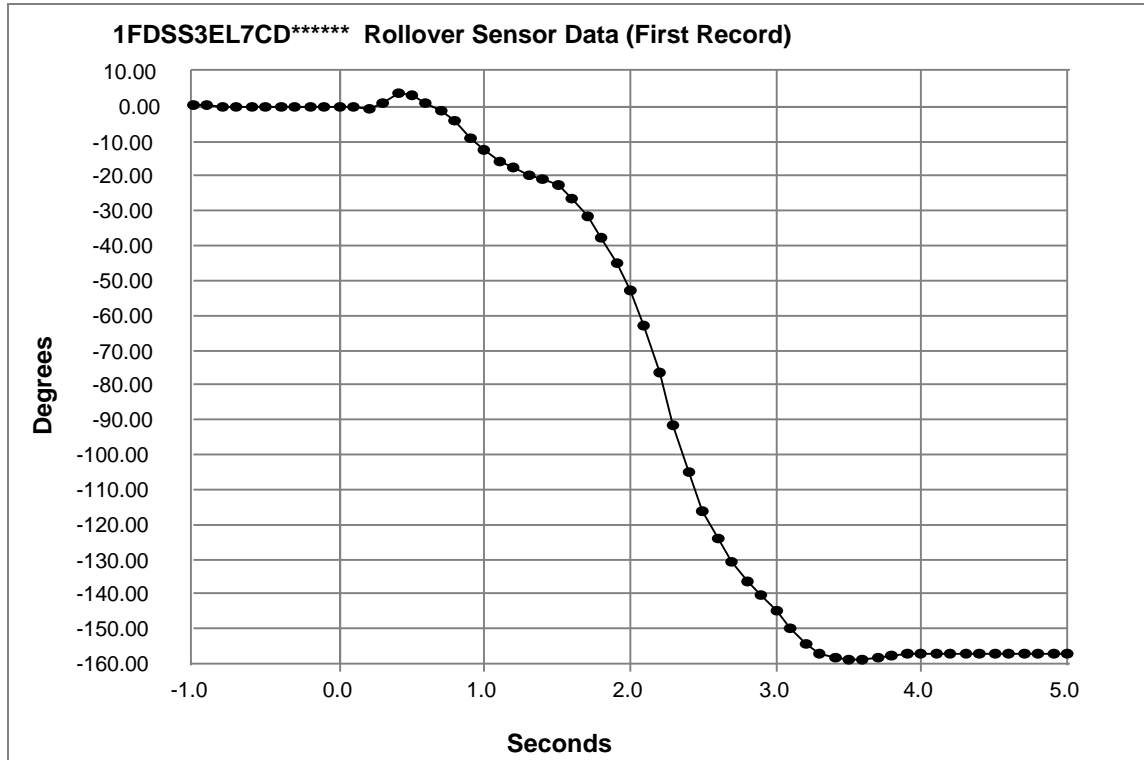
Longitudinal Crash Pulse (First Record)

Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
7.5	-0.55	-0.89
17.5	-1.54	-2.47
27.5	-2.90	-4.67
37.5	-3.84	-6.17
47.5	-4.36	-7.02
57.5	-5.27	-8.47
67.5	-5.15	-8.29
77.5	-5.48	-8.81
87.5	-6.02	-9.69
97.5	-6.21	-9.99
107.5	-6.26	-10.08
117.5	-6.15	-9.89
127.5	-6.08	-9.78
137.5	-6.19	-9.97
147.5	-6.16	-9.91
157.5	-6.05	-9.73
167.5	-5.97	-9.61
177.5	-5.98	-9.63
187.5	-5.97	-9.61
197.5	-5.99	-9.64
207.5	-6.06	-9.76
217.5	-6.09	-9.80
227.5	-6.06	-9.75
237.5	-6.12	-9.85
247.5	-6.16	-9.92
257.5	-6.19	-9.96



Lateral Crash Pulse (First Record)

Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
7.5	-0.59	-0.95
17.5	-1.73	-2.79
27.5	-2.92	-4.70
37.5	-4.36	-7.02
47.5	-4.92	-7.92
57.5	-4.51	-7.26
67.5	-4.31	-6.94
77.5	-4.52	-7.27
87.5	-4.95	-7.97
97.5	-5.02	-8.08
107.5	-4.64	-7.47
117.5	-4.88	-7.85
127.5	-4.85	-7.81
137.5	-4.93	-7.93
147.5	-4.83	-7.77
157.5	-4.46	-7.18
167.5	-4.23	-6.81
177.5	-4.21	-6.77
187.5	-4.49	-7.22
197.5	-4.70	-7.56
207.5	-4.87	-7.84
217.5	-5.03	-8.09
227.5	-4.94	-7.95
237.5	-4.84	-7.78
247.5	-4.78	-7.69
257.5	-4.97	-8.00



Rollover Sensor Data (First Record)

Time (sec)	Vehicle roll angle (degrees)
-1.0	0.32
-0.9	0.26
-0.8	0.15
-0.7	-0.11
-0.6	-0.25
-0.5	-0.26
-0.4	-0.26
-0.3	-0.19
-0.2	0.04
-0.1	0.14
0.0	0.05
0.1	-0.38
0.2	-0.58
0.3	1.14
0.4	3.7
0.5	3.1
0.6	0.76
0.7	-1.23
0.8	-4.31
0.9	-8.92
1.0	-12.68

Time (sec)	Vehicle roll angle (degrees)
1.1	-15.62
1.2	-17.43
1.3	-19.49
1.4	-20.98
1.5	-22.51
1.6	-26.3
1.7	-31.53
1.8	-37.5
1.9	-44.89
2.0	-53.0
2.1	-63.2
2.2	-76.52
2.3	-91.47
2.4	-104.95
2.5	-116.37
2.6	-124.17
2.7	-130.85
2.8	-136.24
2.9	-140.4
3.0	-144.65
3.1	-149.9

Time (sec)	Vehicle roll angle (degrees)
3.2	-154.4
3.3	-157.18
3.4	-158.52
3.5	-158.78
3.6	-158.77
3.7	-158.35
3.8	-157.77
3.9	-157.19
4.0	-157.08
4.1	-157.09
4.2	-157.22
4.3	-157.31
4.4	-157.31
4.5	-157.31
4.6	-157.31
4.7	-157.32
4.8	-157.32
4.9	-157.32
5.0	-157.32

System Status at Event (Second Record)

Recording Status	Unlocked Record
Complete file recorded (yes,no)	Yes
Multi-event, number of events (1,2)	2
Time from event 1 to 2 (msec)	2,000
Lifetime Operating Timer at event time zero (seconds)	2,743,715
Key-on Timer at event time zero (seconds)	2,340
Vehicle voltage at time zero (Volts)	11.745
Energy Reserve Mode entered during event (Y/N)	No

Faults Present at Start of Event (Second Record)

B1193-00

Deployment Data (Second Record)

Maximum delta-V, longitudinal (MPH [km/h])	6.97 [11.22]
Time, maximum delta-V longitudinal (msec)	300
Maximum delta-V, lateral (MPH [km/h])	10.99 [17.69]
Time, maximum delta-V lateral (msec)	300
RCM, rollover sensor discriminating deployment	Yes
RCM, vertical sensor safing	Yes
Longitudinal Delta-V Time Zero Offset	2.5 ms
Lateral Delta-V Time Zero Offset	2.5 ms
Roll Angle Time Zero Offset	82.5 ms

Pre-Crash Data -1 sec (Second Record)

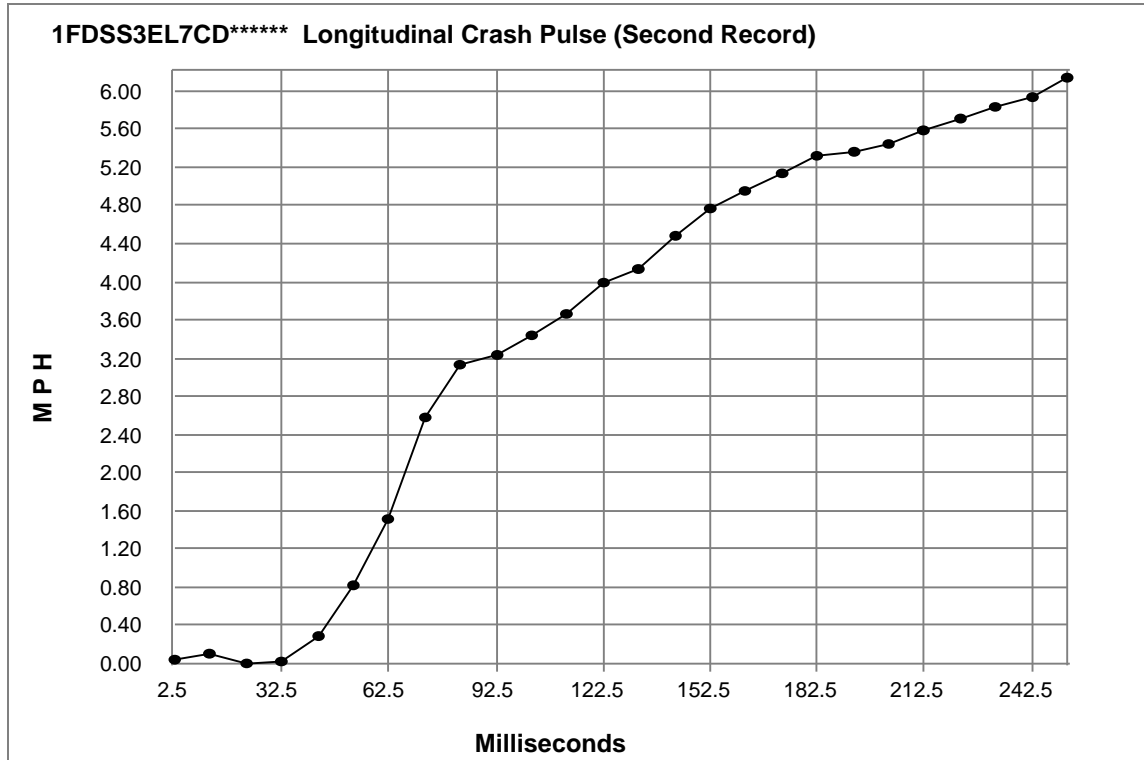
Ignition cycle, crash	1,632
Frontal air bag warning lamp, on/off	On
Frontal air bag suppression switch status, front passenger	Not Active
Safety belt status, driver	Driver Buckled
Brake Telltale	On
ABS Telltale	On
Stability Control Telltale	On
Speed Control Telltale	Off
Powertrain Wrench Telltale	Off
Powertrain Malfunction Indicator Lamp (MIL) Telltale	Off

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

Times (sec)	Speed vehicle indicated MPH [km/h]	Accelerator pedal, % full	Service brake, on/off	Engine RPM	ABS activity (engaged, non-engaged)	Stability control (engaged, non-engaged)	Traction Control via Brakes (engaged, non-engaged)	Traction Control via Engine (engaged, non-engaged)
- 5.0	62.8 [101.0]	0	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 4.5	62.8 [101.0]	15	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 4.0	62.8 [101.0]	21	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 3.5	62.8 [101.0]	35	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 3.0	63.4 [102.0]	36	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 2.5	63.4 [102.0]	5	Off	1,800	non-engaged	non-engaged	non-engaged	non-engaged
- 2.0	61.5 [99.0]	0	On	1,800	engaged	engaged	non-engaged	non-engaged
- 1.5	47.8 [77.0]	0	On	1,300	engaged	engaged	non-engaged	non-engaged
- 1.0	48.5 [78.0]	0	On	1,300	engaged	engaged	non-engaged	non-engaged
- 0.5	5.0 [8.0]	0	On	0	non-engaged	non-engaged	non-engaged	non-engaged
0.0	0.0 [0.0]	0	On	0	non-engaged	non-engaged	non-engaged	non-engaged

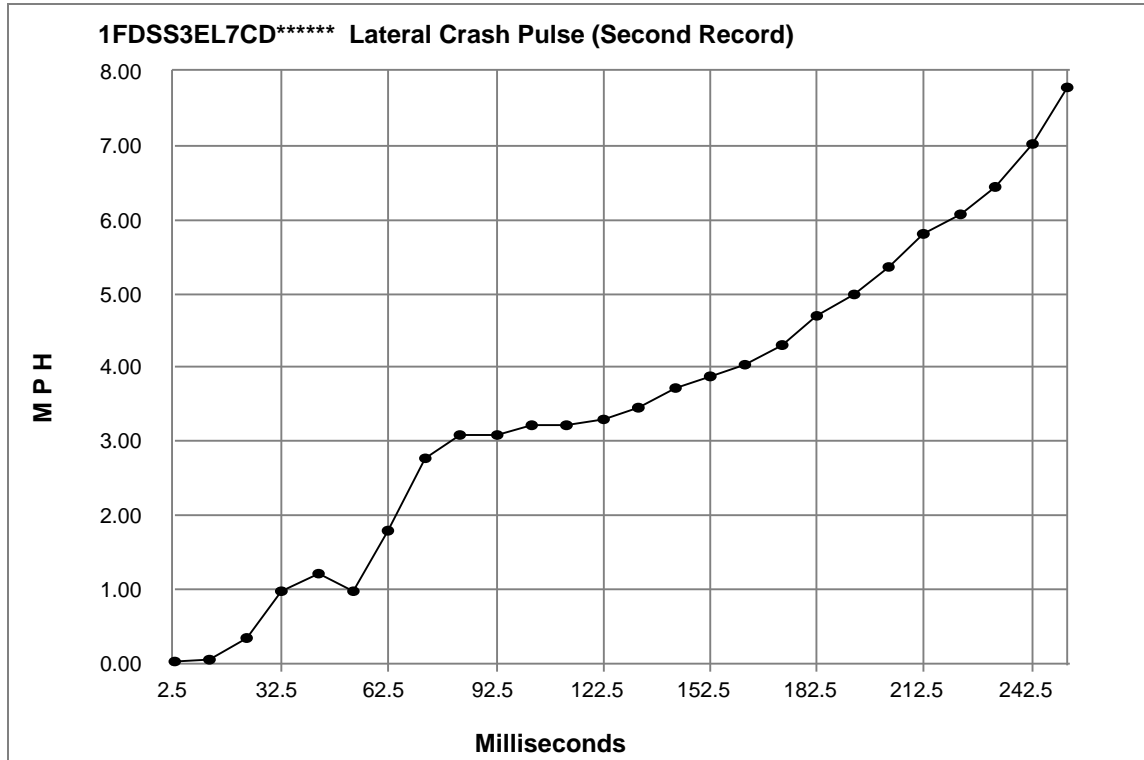
Pre-Crash Data -5 to 0 sec [10 samples/sec] (Second Record)

Times (sec)	Steering Wheel Angle (degrees)	Stability Control Lateral Acceleration (g)	Stability Control Longitudinal Acceleration (g)	Stability Control Yaw Rate (deg/sec)	Stability Control Roll Rate (deg/sec)
- 5.0	Invalid	-0.006	-0.03	0.25	1.87
- 4.9	Invalid	0.056	-0.027	0.25	1.62
- 4.8	Invalid	0.056	-0.005	0.62	0.75
- 4.7	Invalid	0.051	0.0	0.75	-0.12
- 4.6	Invalid	0.091	-0.03	1.12	-0.37
- 4.5	Invalid	0.017	0.007	1.37	-1.62
- 4.4	Invalid	0.075	0.007	1.5	-1.12
- 4.3	Invalid	0.017	0.019	0.87	-0.62
- 4.2	Invalid	0.008	-0.01	0.87	0.5
- 4.1	Invalid	0.02	0.027	0.5	1.5
- 4.0	Invalid	-0.002	0.007	-0.5	2.62
- 3.9	Invalid	-0.012	0.041	-0.5	3.87
- 3.8	Invalid	-0.002	0.045	0.25	3.12
- 3.7	Invalid	-0.036	0.022	0.12	1.62
- 3.6	Invalid	0.036	0.032	0.37	0.0
- 3.5	Invalid	0.122	0.022	0.25	-1.0
- 3.4	Invalid	-0.02	0.045	-0.12	-0.75
- 3.3	Invalid	0.056	0.027	0.62	-1.12
- 3.2	Invalid	-0.082	0.045	0.75	-1.25
- 3.1	Invalid	0.101	0.063	1.5	-1.25
- 3.0	Invalid	0.033	0.007	1.37	-1.75
- 2.9	Invalid	0.132	0.063	2.12	-2.12
- 2.8	Invalid	0.163	0.027	2.12	-3.12
- 2.7	Invalid	0.251	-0.022	4.37	-1.12
- 2.6	Invalid	0.219	-0.092	6.5	-0.25
- 2.5	Invalid	0.348	-0.306	7.37	1.75
- 2.4	Invalid	0.339	-0.416	8.75	4.5
- 2.3	Invalid	0.309	-0.526	8.75	4.87
- 2.2	Invalid	0.2	-0.555	8.0	0.0
- 2.1	Invalid	0.226	-0.511	7.12	-1.75
- 2.0	Invalid	2.0	-2.0	32.0	-17.0
- 1.9	Invalid	0.4	-0.511	39.5	6.87
- 1.8	Invalid	-0.182	-0.326	7.62	31.12
- 1.7	Invalid	0.16	-0.135	3.87	25.37
- 1.6	Invalid	0.335	-0.538	-9.0	-19.37
- 1.5	Invalid	-0.282	-0.16	-12.0	-23.62
- 1.4	Invalid	-0.061	-0.422	-15.5	-21.62
- 1.3	Invalid	-1.383	-1.685	-33.62	-44.75
- 1.2	Invalid	-0.256	-2.0	-28.62	-48.5
- 1.1	Invalid	-0.948	-2.0	3.75	-21.25
- 1.0	Invalid	0.043	-2.0	-17.12	-42.25
- 0.9	Invalid	0.52	-1.88	-18.87	-13.37
- 0.8	Invalid	-0.835	-1.526	-34.62	-21.87
- 0.7	Invalid	-1.325	-2.0	-52.75	-19.0
- 0.6	Invalid	-0.614	-1.078	-60.25	-23.5
- 0.5	Invalid	-0.436	-1.191	-61.5	-42.12
- 0.4	Invalid	-0.472	-0.299	-57.62	-54.0
- 0.3	Invalid	-0.154	-0.601	-65.5	-69.37
- 0.2	Invalid	-0.508	-0.27	-68.25	-72.0
- 0.1	Invalid	-1.592	-0.089	-66.62	-88.37
0.0	Invalid	-0.867	-0.078	-78.37	-108.25



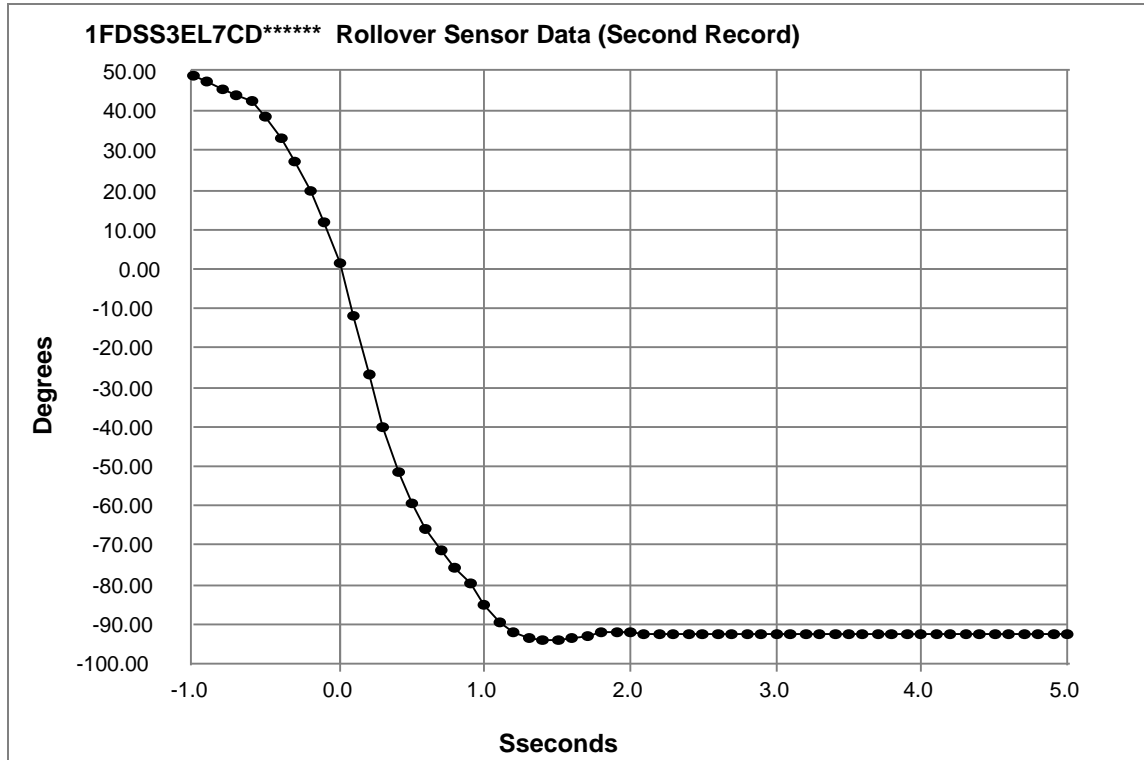
Longitudinal Crash Pulse (Second Record)

Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
2.5	0.05	0.07
12.5	0.11	0.18
22.5	0.00	0.01
32.5	0.01	0.02
42.5	0.29	0.47
52.5	0.82	1.32
62.5	1.51	2.44
72.5	2.59	4.16
82.5	3.13	5.04
92.5	3.24	5.21
102.5	3.44	5.53
112.5	3.65	5.88
122.5	4.00	6.44
132.5	4.13	6.65
142.5	4.49	7.22
152.5	4.77	7.68
162.5	4.95	7.97
172.5	5.13	8.26
182.5	5.32	8.56
192.5	5.36	8.63
202.5	5.44	8.75
212.5	5.58	8.98
222.5	5.72	9.20
232.5	5.84	9.39
242.5	5.94	9.55
252.5	6.14	9.89



Lateral Crash Pulse (Second Record)

Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
2.5	0.01	0.02
12.5	0.05	0.08
22.5	0.34	0.55
32.5	0.98	1.58
42.5	1.21	1.95
52.5	0.98	1.58
62.5	1.79	2.88
72.5	2.78	4.47
82.5	3.10	4.98
92.5	3.08	4.95
102.5	3.23	5.20
112.5	3.22	5.19
122.5	3.31	5.32
132.5	3.47	5.58
142.5	3.73	6.01
152.5	3.87	6.23
162.5	4.03	6.49
172.5	4.29	6.91
182.5	4.69	7.56
192.5	4.98	8.01
202.5	5.37	8.64
212.5	5.80	9.34
222.5	6.08	9.79
232.5	6.45	10.38
242.5	7.03	11.32
252.5	7.78	12.53



Rollover Sensor Data (Second Record)

Time (sec)	Vehicle roll angle (degrees)
-1.0	49.25
-0.9	47.44
-0.8	45.38
-0.7	43.9
-0.6	42.36
-0.5	38.57
-0.4	33.35
-0.3	27.37
-0.2	19.99
-0.1	11.87
0.0	1.68
0.1	-11.65
0.2	-26.6
0.3	-40.08
0.4	-51.49
0.5	-59.29
0.6	-65.98
0.7	-71.36
0.8	-75.52
0.9	-79.78
1.0	-85.02

Time (sec)	Vehicle roll angle (degrees)
1.1	-89.53
1.2	-92.3
1.3	-93.64
1.4	-93.9
1.5	-93.9
1.6	-93.47
1.7	-92.89
1.8	-92.31
1.9	-92.21
2.0	-92.22
2.1	-92.35
2.2	-92.44
2.3	-92.44
2.4	-92.44
2.5	-92.44
2.6	-92.44
2.7	-92.44
2.8	-92.44
2.9	-92.44
3.0	-92.44
3.1	-92.44

Time (sec)	Vehicle roll angle (degrees)
3.2	-92.44
3.3	-92.44
3.4	-92.44
3.5	-92.44
3.6	-92.44
3.7	-92.44
3.8	-92.44
3.9	-92.44
4.0	-92.44
4.1	-92.44
4.2	-92.44
4.3	-92.44
4.4	-92.44
4.5	-92.44
4.6	-92.44
4.7	-92.44
4.8	-92.44
4.9	-92.44
5.0	-92.44

Hexadecimal Data

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

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37 31 35 35 32 30 30 34 30 30 30 30 30 30 30

42 4C 38 34 2D 31 34 43 30 32 38 2D 41 42 00 00 00 00 00 00 00 00 00 00

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31 46 44 53 53 33 45 4C 37 43 44 2A 2A 2A 2A 2A 2A 00 00 00 00 00 00 00

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23	00	96	DB	23	00	31	DB	23	00	52	DC	23	00	39	DE	23	00	DE	DE	23	00	0F	DF	23	00	A7
DE	23	00	68	DE	23	00	D0	DE	23	00	B2	DE	23	00	4D	DE	23	00	0D	DE	23	00	14	DE	23	00
0A	DE	23	00	1B	DE	23	00	5B	DE	23	00	73	DE	23	00	5A	DE	23	00	8D	DE	23	00	B4	DE	23
00	CD	DE	23	00	40	36	DC	FF	47	32	DC	FF	25	2E	DC	FF	1F	29	DC	FF	2D	27	DC	FF	9D	28
DC	FF	4E	29	DC	FF	98	28	DC	FF	16	27	DC	FF	D5	26	DC	FF	28	28	DC	FF	54	27	DC	FF	6D
27	DC	FF	28	27	DC	FF	83	27	DC	FF	CB	28	DC	FF	93	29	DC	FF	AA	29	DC	FF	B0	28	DC	FF
F4	27	DC	FF	5E	27	DC	FF	D1	26	DC	FF	1E	27	DC	FF	7B	27	DC	FF	AC	27	DC	FF	03	27	DC
FF	53	52	C7	35	78	10	98	E6	DB	C0	E4	A0	0D	8B	54	78	3F	69	9B	5D	AF	51	00	43	62	36
9D	2E	DD	2A	21	2A	24	2A	56	2B	F6	2C	97	2E	E1	2E	D9	2E	7E	2E	3C	2E	3C	2E	3C	2E	3C
2E	39	2E	39	2E	39	2E	39	2E	A0	E7	78	E7	26	E7	71	E6	09	E6	06	E6	06	E6	36	E6	DC	E6
21	E7	DE	E6	B0	E5	1B	E5	EC	E9	1B	F1	6A	EF	DC	E8	49	E3	AE	DA	C5	CD	39	C3	00	BB	EC
B5	27	B0	01	AC	B3	A7	16	9D	75	8E	B8	7D	0D	69	FE	7F	FE	7F	FE	7F	FE	7F	FE	7F	FE	7F
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7F	FE	7F	FE	7F	FE	7F	FE	7F	A5	07	A7	07	A0	07	C9	07	B2	07	A0	07	C6	07	B2	07	B5	07
CB	07	D0	07	B2	07	D7	07	D7	07	E3	07	C6	07	EB	07	D7	07	F9	07	FD	07	E6	07	F0	07	E6
07	FD	07	EB	07	FD	07	0F	08	D7	07	0F	08	EB	07	BA	07	74	07	9E	06	30	06	C2	05	A5	05
D1	05	65	07	72	07	53	07	8C	07	65	07	79	07	79	07	57	07	6A	07	63	07	79	07	65	07	8E
07	A2	07	F3	07	CB	07	F4	07	D5	07	CE	07	DB	07	12	08	CA	07	08	08	08	03	08	2B	08	08
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9D 2E DD 2A 21 2A 24 2A 56 2B F6 2C 97 2E E1 2E D9 2E 7E 2E 3C 2E 3C 2E 3C 2E 3C
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07 35 08 F1 07 54 08 73 08 CB 08 AB 08 2C 09 23 09 05 09 98 08 B2 08 A0 0F 60 09
1A 07 70 08 1F 09 B6 06 93 07 69 02 D0 06 1C 04 FB 07 D8 09 8D 04 A3 02 C7 2E 4A
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Disclaimer of Liability

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ATTACHMENT B

2012 Jeep Grand Cherokee Event Data Recorder (EDR) 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	1C4RJFAG5CC*****
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CR14063_V2_ACM.CDRX
Saved on	Wednesday, October 1 2014 at 15:33:27
Collected with CDR version	Crash Data Retrieval Tool 14.0.1
Reported with CDR version	Crash Data Retrieval Tool 16.0.1
EDR Device Type	Airbag Control Module
Event(s) recovered	Most Recent Event

Comments

No comments entered.

Data Limitations

AIRBAG CONTROL MODULE (ACM) DATA LIMITATIONS:

GENERAL INFORMATION:

CAUTION: During direct-to-module imaging where the Airbag Control Module (ACM) is disconnected and removed from a vehicle, make sure the ACM is not moved, tilted or turned over while connected to and powered by the CDR Interface Module (with appropriate adaptors in place, where required). Also, after a CDR imaging process, wait 2 minutes after power is removed from the ACM before attempting to move the module. Not following these general ACM guidelines direct-to-module imaging could cause new events to be recorded in the ACM.

- For additional definitions, please refer to the CDR Help File Glossary.
- As the VIN may be used to determine the configuration of the restraint system, it is imperative that the correct VIN be entered into the CDR Tool during the imaging process.
- For Fiat vehicles, the "Read VIN from Vehicle" feature in the CDR Tool will not work. The VIN will have to be manually entered.
- Delta-V is first available starting with some 2010 MY vehicles. On vehicles not equipped with side impact sensing, Lateral Delta-V will not be available. Lateral Delta-V is also not available for the 2010 MY Dodge Journey and Fiat Freemont even when equipped with side impact sensing. Longitudinal and Lateral Delta-V are not available for the 2010-2012 MY Chrysler Town and Country/Dodge Caravan/Dodge Grand Caravan/Lancia Voyager.
- 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 Notation Indicates
Longitudinal Acceleration	Forward
Delta-V, Longitudinal	Forward
Maximum Delta-V, Longitudinal	Forward
Lateral Acceleration	Left to Right
Delta-V, Lateral	Left to Right
Maximum Delta-V, Lateral	Left to Right
Steering Input*	Steering wheel turned counter clockwise
Angular Rate	Left to Right Rotation Clockwise rotation around the longitudinal axis
Yaw Rate**	Counter clockwise rotation

* The Steering Input for the following vehicles has a positive sign notation for the steering wheel turned clockwise:

- o 2006 - 2007 Grand Cherokee
- o 2006 - 2007 Commander
- o 2005 - 2010 300, Magnum, and Charger
- o 2008 - 2010 Challenger

**The Yaw Rate for the 2011-2012 MY RAM has a positive sign notation for clockwise rotation.

CDR FILE INFORMATION:

- For ACMs that store non-deployment events, the minimum delta V required to store an event is a delta V of 5 mph (8 km/h) within a 150 ms interval.
- For non-NAFTA ACMs that control pedestrian protection devices, a non-deployment event will be stored when the pedestrian protection devices are activated.

Event(s) Recovered definitions:

- None - There are no stored events in the ACM
- Not Retrievable - Event Data may be stored in the ACM but is not retrievable by the CDR tool.
- For Continental ACMs:
 - Event Record 1 - Data from an event is stored in the ACM (not necessarily in chronological order)
 - Event Record 2 - Data from another event is stored in the ACM (not necessarily in chronological order)
 - Event Record 3 - Data from another event is stored in the ACM (not necessarily in chronological order) (for modules with 3 stored events)
- For all other ACMs:
 - Most Recent Event - Data of the most recent event is displayed in the report
 - 1st Prior Event - Two events are stored in the ACM, Data displayed is of the first prior event.
 - 2nd Prior Event - Three events are stored in the ACM, Data displayed is of the second prior event.
 - Etc., (for modules with 3 to 5 stored events)
- For TRW modules:
 - If there is a side impact, two EDR events may be stored for the one side impact event. The second event may be recorded due to the Lateral Delta V exceeding 5 mph (8 km/h) within a 150 ms interval after the side deployment occurred.
- For some Fiat vehicles:
 - Two EDR events may be stored for one impact event. The second event may be recorded due to the deployment of the frontal airbag, 3rd stage passenger.
- During an event, if power to the ACM is lost, all or part of the event data record may not be recorded. An indication may be observed in the recorded data under this condition:
 - "None" may be displayed in the "Event(s) Recovered" section of the report indicating no pre-crash vehicle data.
 - An event may be displayed in the "Event(s) Recovered" section of the report and "Interrupted" will be displayed for Vehicle Event /Pre-Crash Recorder Status.
- For 2010-2012 MY Dodge Journey and 2010-2012 MY Chrysler Town and Country, a non-deployment event will also display "Interrupted" for the Vehicle Event/Pre-Crash Recorder Status. This non-deployment event can be distinguished from a power loss by:
 - In the System Status at Event and Deployment Command Data section, Event/Deployment Recorder Status will display "Interrupted".
 - In the Deployment Command Data section, a value of "No" will be displayed for each deployment data element.

SYSTEM STATUS AT RETRIEVAL:

- Original VIN - The VIN is captured by the ACM and then recorded as the Original VIN after 10 consecutive ignition cycles of capturing the same number. Once it has been recorded, this number cannot be changed.

SYSTEM CONFIGURATION AT RETRIEVAL:

- The System Configuration data tables indicate the components that the ACM for a particular vehicle monitors and/or controls.
- Active Head Restraint (AHR) - This refers to the active head restraint systems that are electronically controlled by the ACM. AHRs may activate but not store an EDR Record if the delta V does not exceed the minimum delta V threshold. Activation of only the AHRs, if stored, will be a non-deployment event.

SYSTEM STATUS AT EVENT (if applicable):

- Event Number -
 - Indicates the event number per vehicle ignition cycle for 2010-2012 Sebring, Avenger, Caliber, Nitro, Compass, Liberty, Patriot, Wrangler, and Ram
 - Indicates the overall order of the events for all other applicable vehicles.
- Event Signal Transmission, Complete - "Yes" indicates that the ACM has sent the automatic collision notification (ACN) message.
- Odometer at Event - Vehicle odometer at the time of the event
- Operation via Energy Reserve Only - "Yes" indicates that the ACM had lost power at or before T0 and was only operating on energy reserve at T0.
- Side Fuel Cutoff, Activated - Applicable to the Fiat 500, "Yes" indicates that the ACM has sent the automatic collision notification (ACN) message.
- System Voltage at Event, ECU - Voltage at the ACM as measured by the ACM.
- System Voltage at Event, Bussed - Voltage of the vehicle system, communicated on the communication bus to other electronic modules in the vehicle.

- Temperature, Outside - Ambient Air Temperature.
- Time, Airbag Warning Lamp On - This is a cumulative time. It indicates the total amount of time that the ACM has requested the Airbag Warning Lamp be turned on.
 - This time does not include the warning lamp bulb check time, which occurs at every ignition cycle
- Time from event 1 to 2 -
 - If only one event is stored, either a value of 0 or >5 may be displayed for this data element.
 - If multiple events exist in the EDR, the time from event 1 to event 2 is defined as:
 - For Bosch and TRW modules, the time from the prior recorded event (even if it has been overwritten) to the current recorded event.
 - For Continental modules, the time from the prior existing recorded event (as long as it is still displayed in the CDR report) to the current recorded event. If the prior event in a multi-event condition is overwritten by a subsequent event, the multi-event status will no longer be displayed.
- Time, Operation System Time - This is a cumulative lifetime timer for the ACM. It indicates the total amount of time the ACM has been powered up.
- Total Number of Events -
 - Stops incrementing when each event record is recorded by the ACM for 2010 - 2012 Sebring, Avenger, Caliber, Nitro, Compass, Liberty, Patriot, Wrangler, and Ram
 - Indicates the total number of events that the ACM has recorded, including those non-deployment events that have been overwritten by a subsequent event, for all other applicable vehicles.
- VIN at Event, Last 8 Digits- Last 8 digits of the VIN of the vehicle at the time the ACM records the event.

STATUS OF THE DATA IN THE MOST RECENT EVENT (if applicable):

Definitions for Data Blocks 1 - 7 and Overall Data Record Complete:

1. Crash Record (system status and DTCs)
2. NHTSA Table #1 Vehicle System data
3. NHTSA Table #1 Longitudinal delta-V
4. NHTSA Table #2 Vehicle System Data
5. NHTSA Table #2 Lateral delta-V - will be a NO if vehicle is not equipped with side sensing
6. ACM angular rate data - will be a NO if vehicle is not equipped with roll-over sensing
7. Other Vehicle System Data - Chrysler Specific Data
8. Overall Data Record Complete - Yes, No is defined based on the specific vehicle configuration. For example, a NO may be present for a non-applicable data block but a YES may be present for overall data record complete as all of the applicable data is complete.

DEPLOYMENT COMMAND DATA (if applicable):

- A "Yes" for a particular item in the Deployment Command Data section of the report indicates that the ACM commanded the deployment /activation of the associated device.

DTCs PRESENT AT START OF EVENT (if applicable):

- If any DTCs (diagnostic trouble codes) are present in the ACM at the start of the event, these will be listed in this section. A dealership service manual can be used to decode the DTCs.

PRE-CRASH DATA:

- The recorded Event may contain Pre-Crash data. Pre-Crash data from the various electronic control modules in the vehicle is transmitted to the Airbag Control Module via the vehicle's communication bus.
- If a recorded event has Engine RPM equal to SNA and Speed, Vehicle Indicated equals SNA for each time stamp, then the data is default data and the event stored in the ACM is not valid.
- (if equip.) - If a parameter name is followed by the words (if equip.), then the parameter is only valid for vehicles equipped with the associated parameter/vehicle system.
- The MIL (Malfunction Indicator Lamp) Status for the various recorded systems indicates the requested state of the applicable malfunction indicator lamp at the time that the data was captured. Note: Some fault codes could be stored due to component/system damage from the accident. The appropriate diagnostic tool should be used to read any stored Diagnostic Trouble Codes (DTC's) in the various electronic modules (ACM, PCM, ABS, TCM, etc., where applicable) for use in interpretation of some vehicle specific recorded data.
- ABS Activity - "Yes" indicates an active ABS event in which the ABS is actively controlling the brakes.
- ABS MIL- This indicates the ABS fault indicator lamp status. It will only be "On" when there is a fault in the ABS system. The Electronic brake module DTC's should be read and recorded for final system interpretation.
- Accelerator Pedal, % Full - This indicates the actual position of the accelerator pedal.
- Brakes:
 - Brake Lamps On - "On" indicates that the brake lamps/CHMSL are illuminated.
 - Brake Switch #2 Status - "On" indicates that the brake pedal is depressed.
 - Braking System, Intervention by ESP - "Yes" indicates that the stability control system has engaged the brakes.

- Braking System, Intervention Enabled "Yes" indicates that the ESC system is functional.
- Braking System, Emergency Braking - "Yes" indicates that panic brake assist is active.
- Braking System, Maximum Braking -- "Yes" indicates that ABS is active on all 4 wheels.
- Panic Brake Assist Active - "Yes" indicates that all four of the brake circuits are undergoing ABS control.
- Service Brake - "On" indicates that the brake pedal is depressed.
- Cruise Control:
 - Cruise Control System/Status - "On" indicates that the Cruise Control system is turned on.
 - Cruise Control Engaged/Active - "Engaged"/"Yes" indicates the Cruise Control system is actively controlling vehicle speed. "Not Engaged"/"No" indicates the system is NOT controlling vehicle speed.
- Electronic Brake/Stability Control information:
 - ESC/ESP MIL - This indicates the ESC/ESP fault indication lamp status. It will only be "On" when there is a fault or thermal mode shutdown in the ESC/ESP system. The ESC/ESP module DTC's should be read and recorded for final system interpretation.
 - ESP Lamp - This is the status of the ESP symbol - "car with squiggly lines" indicator lamp. "On" indicates ESP has been turned off by the driver or has reduced performance and is not an indication of a fault in the system.
 - ESP Lamp Flashing Requested - If "Yes", then an ESP, Traction Control or Trailer Sway Control (if equipped) event was active at the time of data capture.
 - ESP Disabled - "Yes" indicates that ABS & ESP have been disabled by the driver or due to system performance.
 - ESP/ESC Functional/Active - "YES" indicates that the ESP system is functional and has no faults.
 - ESC System Status - "OK" indicates no faults in the ABS or ESC system; "ABS Fault" indicates a fault in the ABS system and "ESC Fault" indicates a fault in the ESC system.
 - Engine Torque Applied - "No" indicates no engine torque output was applied (as in Park/Neutral for Automatic transmissions or clutch depressed on manual or during an ESP/Traction Control event). If "Yes", then engine torque output was applied.
 - Stability Control - This is the status of the ESC symbol - "car with squiggly lines" indicator lamp. "On" indicates that the ESC system is functional. "Off" indicates that the ESC system was turned off either by the driver or due to a fault or thermal mode shutdown. "Engaged" indicates an active ESC/TCS event.
 - Traction Control Intervention Active - "Yes" indicates that the traction control system is actively controlling the vehicle's wheels.
- Engine RPM - On 2006-2009 Ram 2500/3500, the Engine RPM recorded is limited to a maximum of 4080 RPM. On the 2008 - 2010 Dodge Grand Caravan, 2008-2010 Chrysler Town and Country and 2009-2010 Dodge Journey, the engine RPM resolution is 256 rpm. On all other vehicles, the resolution is 32 rpm.
- Engine Throttle, % Full - This indicates the actual position of the Engine Throttle blade.
- ETC -
 - On vehicles equipped with ETC, "Accelerator Pedal, % Full" and "Engine Throttle, % Full" are relative values - relative pedal position and relative engine throttle. These parameters may record values of less than 100% when the pedal/throttle is actually at its maximum. (Max. ~ 77%)
 - ETC Lamp - Lamp "ON" indicates there is an active Electronic Throttle DTC.
 - ETC Lamp Flashing - "Yes" indicates that the ETC is in the limp-in mode.
- PCM MIL - This indicates the PCM fault indicator lamp status. It will only be "On" when there is a fault in the PCM. The Powertrain Control Module DTC's should be read and recorded for final system interpretation.
- Raw Manifold Pressure - This indicates engine load in kPa.
- Speed, Vehicle Indicated - This indicates the average of the drive wheels. The accuracy of the recorded Speed, Vehicle Indicated will be affected if the vehicle had the tire size or the final drive axle ratio changed from the factory build specifications. On the 2008 - 2009 Dodge Grand Caravan, 2008-2009 Chrysler Town and Country and 2009 Dodge Journey, the speed resolution is 2 kph. On all other vehicles, the resolution is 1 kph.
- Tire Information:
 - XX where LF = Left Front Tire, RF = Right Front Tire, LR = Left Rear Tire, and RR = Right Rear Tire.
 - Tire X Location - This indicates the location of the tire pressure sensor data being displayed for that time stamp. Default is used to indicate that the location of the tire pressure sensor is unknown or there is no tire pressure sensor in that wheel. Vehicles with Base Tire Pressure Monitoring systems will display SNA for both Tire Locations as these vehicles do not send actual pressure values across the communication bus.
 - Tire X Pressure/Tire Pressure Status, XX - This indicates the actual pressure status of the Tire Location defined in the previous column (Tire X Location) or by the values for XX. Possible values are LOW, NORMAL, HIGH, or SNA for this parameter. Vehicles with Base Tire Pressure Monitoring systems may display NORMAL even though these vehicles do not send actual pressure values across the communication bus.
 - Tire X Pressure/Tire Pressure, XX (psi) - This indicates the actual tire pressure value of the Tire Location defined in the previous column (Tire X Location) or by the values for XX. Vehicles with Base Tire Pressure Monitoring systems will display N/A for this parameter as these vehicles do not send actual pressure values across the communication bus.
 - Wheel Speed, XX - This indicates the speed value (in revolutions per minute) of a particular tire as denoted by XX.
 - For the following vehicles, if displayed, may not be accurate if the tires have been rotated:
 - 2011-2012 MY Jeep Wrangler
 - 2010-2012 MY Jeep Patriot
 - 2010-2012 MY Chrysler 200
 - 2010-2012 MY Jeep Compass
 - Tire pressure is not stored in the EDR for the following vehicles. If a value is displayed, it may not be accurate:
 - 2011-2012 MY Jeep Grand Cherokee
 - 2011-2012 MY Dodge Durango
 - 2010-2012 MY Dodge Challenger
 - 2011-2012 MY Chrysler Town and Country
 - 2011-2012 MY Dodge Grand Caravan
 - 2010-2012 MY Ram

- Tire Pressure Monitor Indicator Lamp - "On" indicates a fault in the tire pressure monitoring system. The TPM module DTC's should be read and recorded for final system interpretation.
- "T0" ("Time zero" where '0' is seen as subscript) is defined as "beginning of the crash event". T0 is the time at which the ACM algorithm is activated, a specific Delta-V is exceeded, or a non-reversible restraint device is deployed. T0 may be defined differently for front, side, rear and roll-over events.
 - If multiple algorithm decisions (i.e.: frontal, side, rear and/or rollover) are made before the first recorded event ends, all of those events are part of the same event record and "T0" is defined as the "T0" from the first recorded event.
 - In the Pre-Crash data tables, the relative time marker "-0.1s" represents the last set of data captured in the buffer prior to "T0."
- Transmission/Shifter Position -
 - Gear Status - This indicates the current transmission gear.
 - PRND/PRNDL Status - This indicates the status of the Shifter Position.
 - Reverse Gear - For manual transmission vehicles only, "Yes" indicates the transmission is in the reverse gear.
 - Shift Gear Position - This indicates the current transmission gear/Shifter Position.
- Vehicle Data Recorder Complete - Due to the interruption of data recording in one section, this data element may display "Interrupted" for all sections when some data sections are actually complete.

APPLICATION INFORMATION:

- 2005 - 2009 Durango's equipped with side airbags have EDR data that can be imaged by the CDR tool. Durango's not equipped with side airbags have EDR Data that might be imaged by the CDR tool and may be imaged by the supplier.
- For 2005 & 2006 MY, some Chrysler 300, Dodge Magnum, Dodge Charger, Jeep Grand Cherokee, and Jeep Commander models may contain EDR data that cannot be imaged by the CDR tool, but may be imaged by the supplier.
- For 2006 & 2007 MY, some PT Cruiser models may contain EDR data that cannot be imaged by the CDR tool, but may be imaged by the supplier
- EDR Data is only recorded for frontal deployments in the following vehicles:
 - 2005-2007 Durango
 - 2006-2007 Ram 1500
 - 2006-2009 Ram 2500/3500 Heavy Duty
 - 2007 Aspen, Caliber, Compass, Patriot, Nitro, Sebring, Wrangler

03001_Chrysler_r020

System Status at Retrieval

Original VIN	1C4RJFAG5CC*****
Ignition Cycle, Current	4684
Airbag Control Module Part Number	68025632AK
Airbag Control Module Serial Number	T52MD236101238a
Airbag Control Module Supplier	Bosch

System Configuration at Retrieval

Configured for Driver Frontal Airbag	Yes
Configured for Driver Knee Airbag	No
Configured for Driver Buckle Pretensioner	No
Configured for Driver Retractor Pretensioner	Yes
Configured for Driver Seatbelt Switch	Yes
Configured for Driver Seat Track Position Sensor	No
Configured for Driver Active Head Restraint	Yes
Configured for Left Curtain Airbag	Yes
Configured for Left Side Seat Airbag	Yes
Configured for Passenger Frontal Airbag	Yes
Configured for Passenger Knee Airbag	No
Configured for Front Passenger Buckle Pretensioner	No
Configured for Front Passenger Retractor Pretensioner	Yes
Configured for Front Passenger Seatbelt Switch	Yes
Configured for Front Passenger Seat Track Position Sensor	No
Configured for Front Passenger Active Head Restraint	Yes
Configured for Right Curtain Airbag	Yes
Configured for Right Side Seat Airbag	Yes
Configured for Front Passenger Occupant Classification System	No
Configured for Occupant Detection Sensor	Yes
Configured for Left Up Front Sensor	Yes
Configured for Right Up Front Sensor	Yes
Configured for Left Door Pressure Sensor	Yes
Configured for Left Side Row 1 Sensor	Yes
Configured for Left Side Row 2 Sensor	Yes
Configured for Left Side Row 3 Sensor	No
Configured for Right Door Pressure Sensor	Yes
Configured for Right Side Row 1 Sensor	Yes
Configured for Right Side Row 2 Sensor	Yes
Configured for Right Side Row 3 Sensor	No

Status of the Data in the Most Recent Event

Data Block 1 Complete (Yes, No)	Yes
Data Block 2 Complete (Yes, No)	Yes
Data Block 3 Complete (Yes, No)	Yes
Data Block 4 Complete (Yes, No)	Yes
Data Block 5 Complete (Yes, No)	Yes
Data Block 6 Complete (Yes, No)	Yes
Data Block 7 Complete (Yes, No)	Yes
Overall Data Record Complete (Yes, No)	Yes

System Status at Event (Most Recent Event)

Event Recorder Status	Complete
Event Record Status - Delta-V, Longitudinal	Complete
Event Record Status - Delta-V, Lateral	Complete
Event Record Status - Angular rate	Complete
Event Number	1
Total Number of Events Recorded	1
Time from Event 1 to 2 (sec)	> 5
Odometer Recorded at Event (miles [km])	44325 [71334]
Operation System Time at Event (min)	80606
Ignition Cycles, Crash	4674
VIN Recorded at Event (last 8 characters)	CC*****
Vehicle System Voltage Recorded at Event (V)	14.4
Operation Via Energy Reserve Only	No
Safety Belt Switch Configured, Driver (if equipped)	Yes
Safety Belt Status, Driver (if equipped)	Buckled
Safety Belt Switch Fault, Driver (if equipped)	No
Safety Belt Switch Configured, Passenger (if equipped)	Yes
Safety Belt Status, Passenger (if equipped)	Buckled
Safety Belt Switch Fault, Passenger (if equipped)	No
Seat Track Position Sensor, Driver (if equipped)	Not Configured
Seat Track Position Sensor, Passenger (if equipped)	Not Configured
Airbag Warning Lamp "On" at Event	Off
Airbag Warning Lamp "On" Time Before Event (min)	0

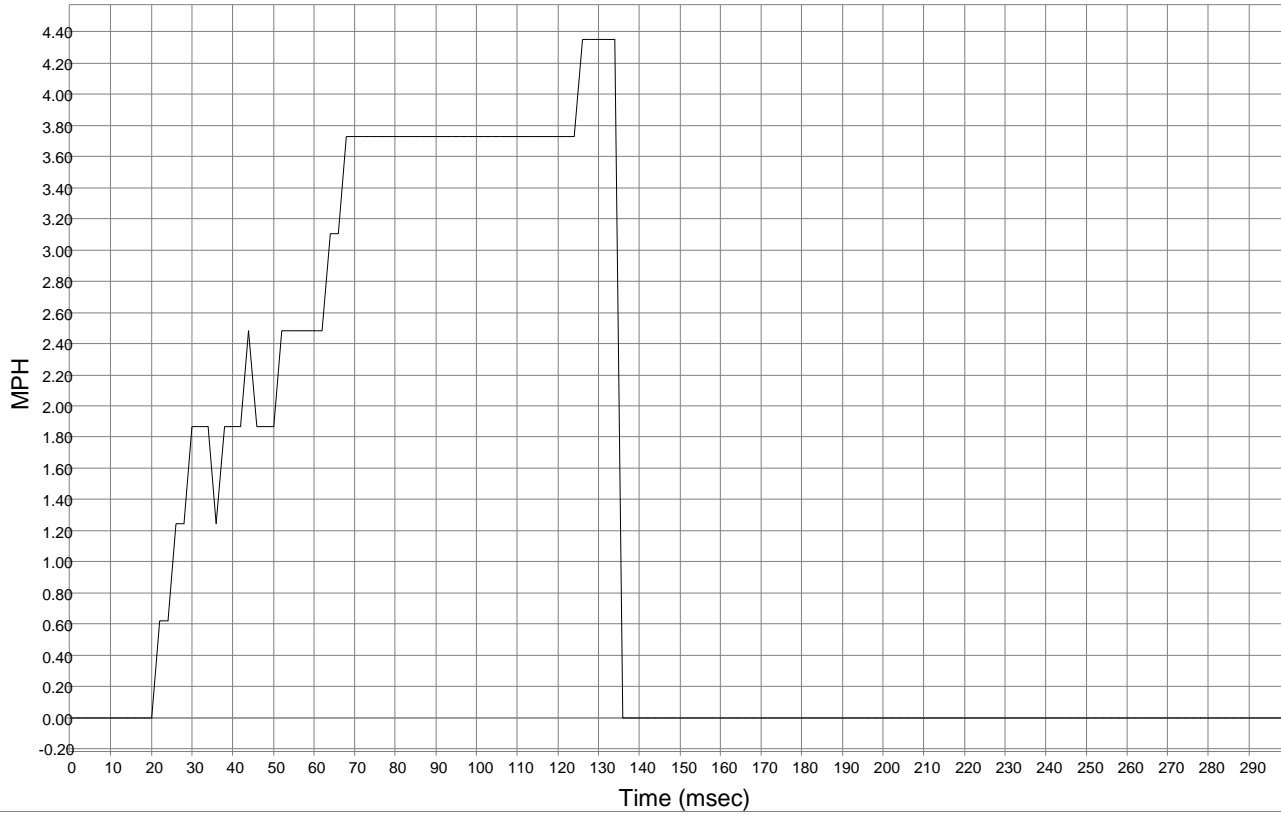
Deployment Command Data (Most Recent Event)

Event Recorder Status	Complete
Frontal Airbag Deployment, 1st Stage, Driver	No
Frontal Airbag Deployment, 2nd Stage, Driver	No
Frontal Airbag Deployment, Time Between Squib #1 and Squib #2, Driver (ms)	0
Inflatable Knee Airbag Deployment, Driver (if equipped)	No
Seatbelt Pretensioner Deployment, Driver (if equipped)	No
Side Airbag(s) Deployment, Left Side (if equipped)	No
Frontal Airbag Deployment, 1st Stage, Passenger	No
Frontal Airbag Deployment, 2nd Stage, Passenger	No
Frontal Airbag Deployment, Time Between Squib #1 and Squib #2, Passenger (ms)	0
Seatbelt Pretensioner Deployment, Front Passenger (if equipped)	No
Side Airbag(s) Deployment, Right Side (if equipped)	No
Active Head Restraint Deployment, Driver (if equipped)	Yes
Active Head Restraint Deployment, Passenger (if equipped)	Yes

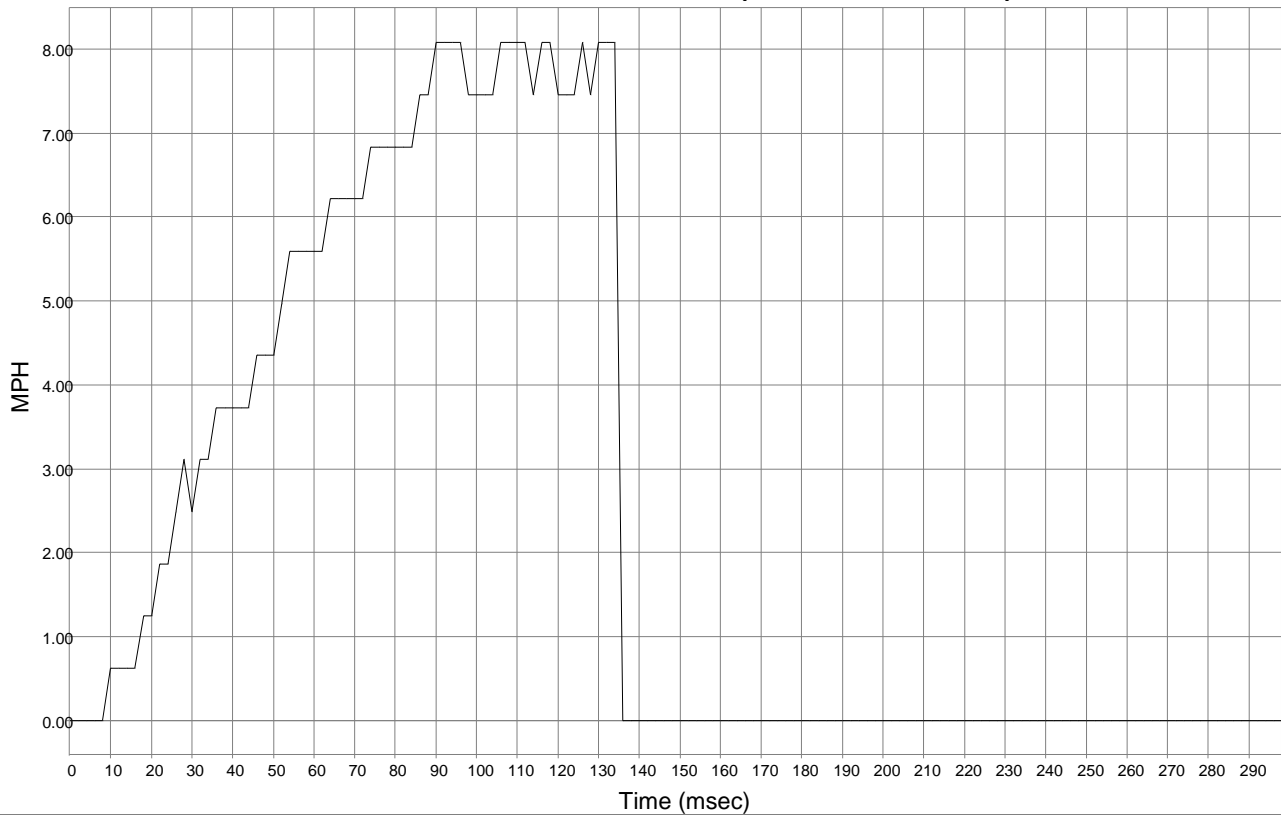
DTCs Present at Start of Event (Most Recent Event)

No DTCs Present

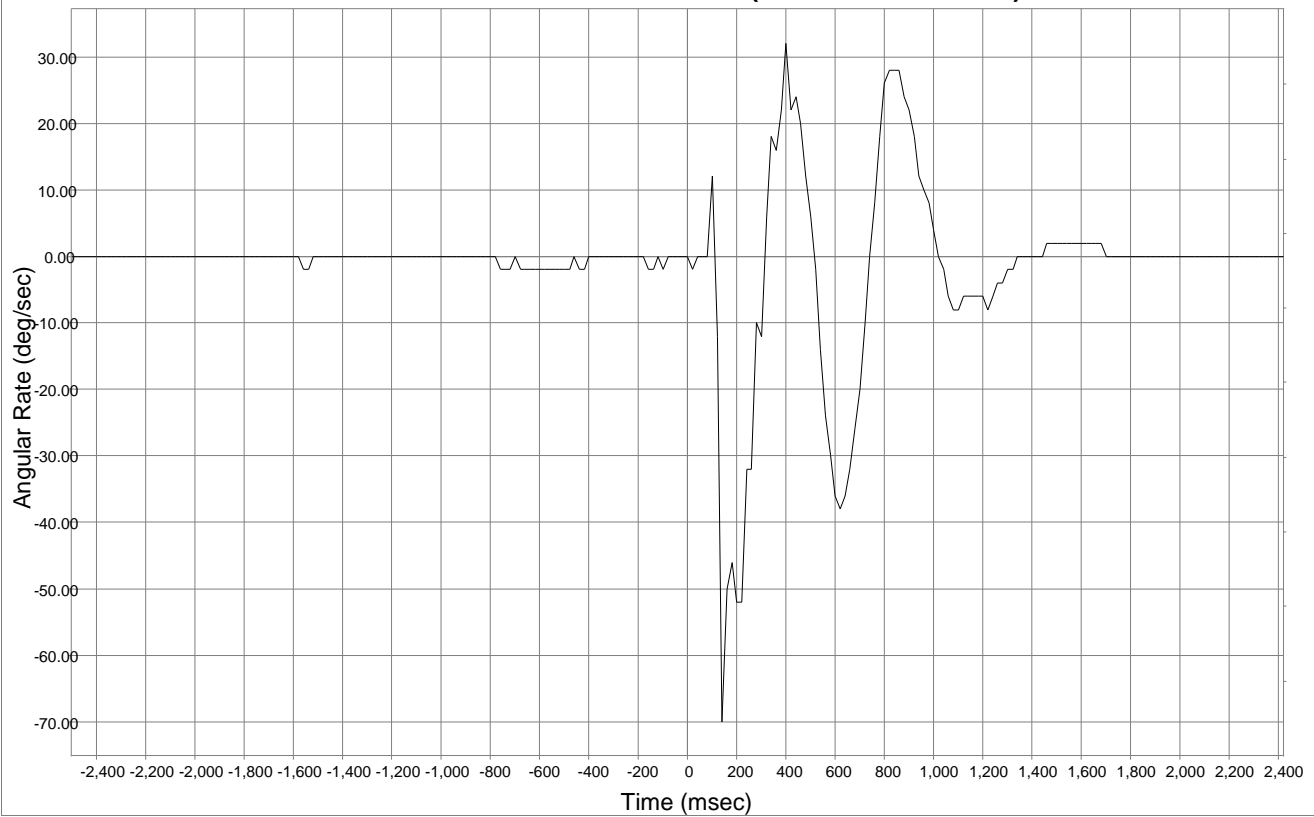
Longitudinal Crash Pulse (Most Recent Event)



Lateral Crash Pulse (Most Recent Event)



Rollover Crash Pulse (Most Recent Event)



Longitudinal Crash Pulse (Most Recent Event)

Time (msec)	Delta-V, Longitudinal (MPH [km/h])
0	0.0 [0]
2	0.0 [0]
4	0.0 [0]
6	0.0 [0]
8	0.0 [0]
10	0.0 [0]
12	0.0 [0]
14	0.0 [0]
16	0.0 [0]
18	0.0 [0]
20	0.0 [0]
22	0.6 [1]
24	0.6 [1]
26	1.2 [2]
28	1.2 [2]
30	1.9 [3]
32	1.9 [3]
34	1.9 [3]
36	1.2 [2]
38	1.9 [3]
40	1.9 [3]
42	1.9 [3]
44	2.5 [4]
46	1.9 [3]
48	1.9 [3]
50	1.9 [3]
52	2.5 [4]
54	2.5 [4]
56	2.5 [4]
58	2.5 [4]
60	2.5 [4]
62	2.5 [4]
64	3.1 [5]
66	3.1 [5]
68	3.7 [6]
70	3.7 [6]
72	3.7 [6]
74	3.7 [6]
76	3.7 [6]
78	3.7 [6]
80	3.7 [6]
82	3.7 [6]
84	3.7 [6]
86	3.7 [6]
88	3.7 [6]
90	3.7 [6]
92	3.7 [6]
94	3.7 [6]
96	3.7 [6]
98	3.7 [6]

Time (msec)	Delta-V, Longitudinal (MPH [km/h])
100	3.7 [6]
102	3.7 [6]
104	3.7 [6]
106	3.7 [6]
108	3.7 [6]
110	3.7 [6]
112	3.7 [6]
114	3.7 [6]
116	3.7 [6]
118	3.7 [6]
120	3.7 [6]
122	3.7 [6]
124	3.7 [6]
126	4.3 [7]
128	4.3 [7]
130	4.3 [7]
132	4.3 [7]
134	4.3 [7]
136	0.0 [0]
138	0.0 [0]
140	0.0 [0]
142	0.0 [0]
144	0.0 [0]
146	0.0 [0]
148	0.0 [0]
150	0.0 [0]
152	0.0 [0]
154	0.0 [0]
156	0.0 [0]
158	0.0 [0]
160	0.0 [0]
162	0.0 [0]
164	0.0 [0]
166	0.0 [0]
168	0.0 [0]
170	0.0 [0]
172	0.0 [0]
174	0.0 [0]
176	0.0 [0]
178	0.0 [0]
180	0.0 [0]
182	0.0 [0]
184	0.0 [0]
186	0.0 [0]
188	0.0 [0]
190	0.0 [0]
192	0.0 [0]
194	0.0 [0]
196	0.0 [0]
198	0.0 [0]

Time (msec)	Delta-V, Longitudinal (MPH [km/h])
200	0.0 [0]
202	0.0 [0]
204	0.0 [0]
206	0.0 [0]
208	0.0 [0]
210	0.0 [0]
212	0.0 [0]
214	0.0 [0]
216	0.0 [0]
218	0.0 [0]
220	0.0 [0]
222	0.0 [0]
224	0.0 [0]
226	0.0 [0]
228	0.0 [0]
230	0.0 [0]
232	0.0 [0]
234	0.0 [0]
236	0.0 [0]
238	0.0 [0]
240	0.0 [0]
242	0.0 [0]
244	0.0 [0]
246	0.0 [0]
248	0.0 [0]
250	0.0 [0]
252	0.0 [0]
254	0.0 [0]
256	0.0 [0]
258	0.0 [0]
260	0.0 [0]
262	0.0 [0]
264	0.0 [0]
266	0.0 [0]
268	0.0 [0]
270	0.0 [0]
272	0.0 [0]
274	0.0 [0]
276	0.0 [0]
278	0.0 [0]
280	0.0 [0]
282	0.0 [0]
284	0.0 [0]
286	0.0 [0]
288	0.0 [0]
290	0.0 [0]
292	0.0 [0]
294	0.0 [0]
296	0.0 [0]
298	0.0 [0]

Lateral Crash Pulse (Most Recent Event)

Time (msec)	Delta-V, Lateral (MPH [km/h])
0	0.0 [0]
2	0.0 [0]
4	0.0 [0]
6	0.0 [0]
8	0.0 [0]
10	0.6 [1]
12	0.6 [1]
14	0.6 [1]
16	0.6 [1]
18	1.2 [2]
20	1.2 [2]
22	1.9 [3]
24	1.9 [3]
26	2.5 [4]
28	3.1 [5]
30	2.5 [4]
32	3.1 [5]
34	3.1 [5]
36	3.7 [6]
38	3.7 [6]
40	3.7 [6]
42	3.7 [6]
44	3.7 [6]
46	4.3 [7]
48	4.3 [7]
50	4.3 [7]
52	5.0 [8]
54	5.6 [9]
56	5.6 [9]
58	5.6 [9]
60	5.6 [9]
62	5.6 [9]
64	6.2 [10]
66	6.2 [10]
68	6.2 [10]
70	6.2 [10]
72	6.2 [10]
74	6.8 [11]
76	6.8 [11]
78	6.8 [11]
80	6.8 [11]
82	6.8 [11]
84	6.8 [11]
86	7.5 [12]
88	7.5 [12]
90	8.1 [13]
92	8.1 [13]
94	8.1 [13]
96	8.1 [13]
98	7.5 [12]

Time (msec)	Delta-V, Lateral (MPH [km/h])
100	7.5 [12]
102	7.5 [12]
104	7.5 [12]
106	8.1 [13]
108	8.1 [13]
110	8.1 [13]
112	8.1 [13]
114	7.5 [12]
116	8.1 [13]
118	8.1 [13]
120	7.5 [12]
122	7.5 [12]
124	7.5 [12]
126	8.1 [13]
128	7.5 [12]
130	8.1 [13]
132	8.1 [13]
134	8.1 [13]
136	0.0 [0]
138	0.0 [0]
140	0.0 [0]
142	0.0 [0]
144	0.0 [0]
146	0.0 [0]
148	0.0 [0]
150	0.0 [0]
152	0.0 [0]
154	0.0 [0]
156	0.0 [0]
158	0.0 [0]
160	0.0 [0]
162	0.0 [0]
164	0.0 [0]
166	0.0 [0]
168	0.0 [0]
170	0.0 [0]
172	0.0 [0]
174	0.0 [0]
176	0.0 [0]
178	0.0 [0]
180	0.0 [0]
182	0.0 [0]
184	0.0 [0]
186	0.0 [0]
188	0.0 [0]
190	0.0 [0]
192	0.0 [0]
194	0.0 [0]
196	0.0 [0]
198	0.0 [0]

Time (msec)	Delta-V, Lateral (MPH [km/h])
200	0.0 [0]
202	0.0 [0]
204	0.0 [0]
206	0.0 [0]
208	0.0 [0]
210	0.0 [0]
212	0.0 [0]
214	0.0 [0]
216	0.0 [0]
218	0.0 [0]
220	0.0 [0]
222	0.0 [0]
224	0.0 [0]
226	0.0 [0]
228	0.0 [0]
230	0.0 [0]
232	0.0 [0]
234	0.0 [0]
236	0.0 [0]
238	0.0 [0]
240	0.0 [0]
242	0.0 [0]
244	0.0 [0]
246	0.0 [0]
248	0.0 [0]
250	0.0 [0]
252	0.0 [0]
254	0.0 [0]
256	0.0 [0]
258	0.0 [0]
260	0.0 [0]
262	0.0 [0]
264	0.0 [0]
266	0.0 [0]
268	0.0 [0]
270	0.0 [0]
272	0.0 [0]
274	0.0 [0]
276	0.0 [0]
278	0.0 [0]
280	0.0 [0]
282	0.0 [0]
284	0.0 [0]
286	0.0 [0]
288	0.0 [0]
290	0.0 [0]
292	0.0 [0]
294	0.0 [0]
296	0.0 [0]
298	0.0 [0]

Rollover Crash Pulse (Most Recent Event) (if equipped)

Time (msec)	Angular Rate (deg/sec)
-2500	0.00
-2480	0.00
-2460	0.00
-2440	0.00
-2420	0.00
-2400	0.00
-2380	0.00
-2360	0.00
-2340	0.00
-2320	0.00
-2300	0.00
-2280	0.00
-2260	0.00
-2240	0.00
-2220	0.00
-2200	0.00
-2180	0.00
-2160	0.00
-2140	0.00
-2120	0.00
-2100	0.00
-2080	0.00
-2060	0.00
-2040	0.00
-2020	0.00
-2000	0.00
-1980	0.00
-1960	0.00
-1940	0.00
-1920	0.00
-1900	0.00
-1880	0.00
-1860	0.00
-1840	0.00
-1820	0.00
-1800	0.00
-1780	0.00
-1760	0.00
-1740	0.00
-1720	0.00
-1700	0.00
-1680	0.00
-1660	0.00
-1640	0.00
-1620	0.00
-1600	0.00
-1580	0.00
-1560	-2.00
-1540	-2.00
-1520	0.00

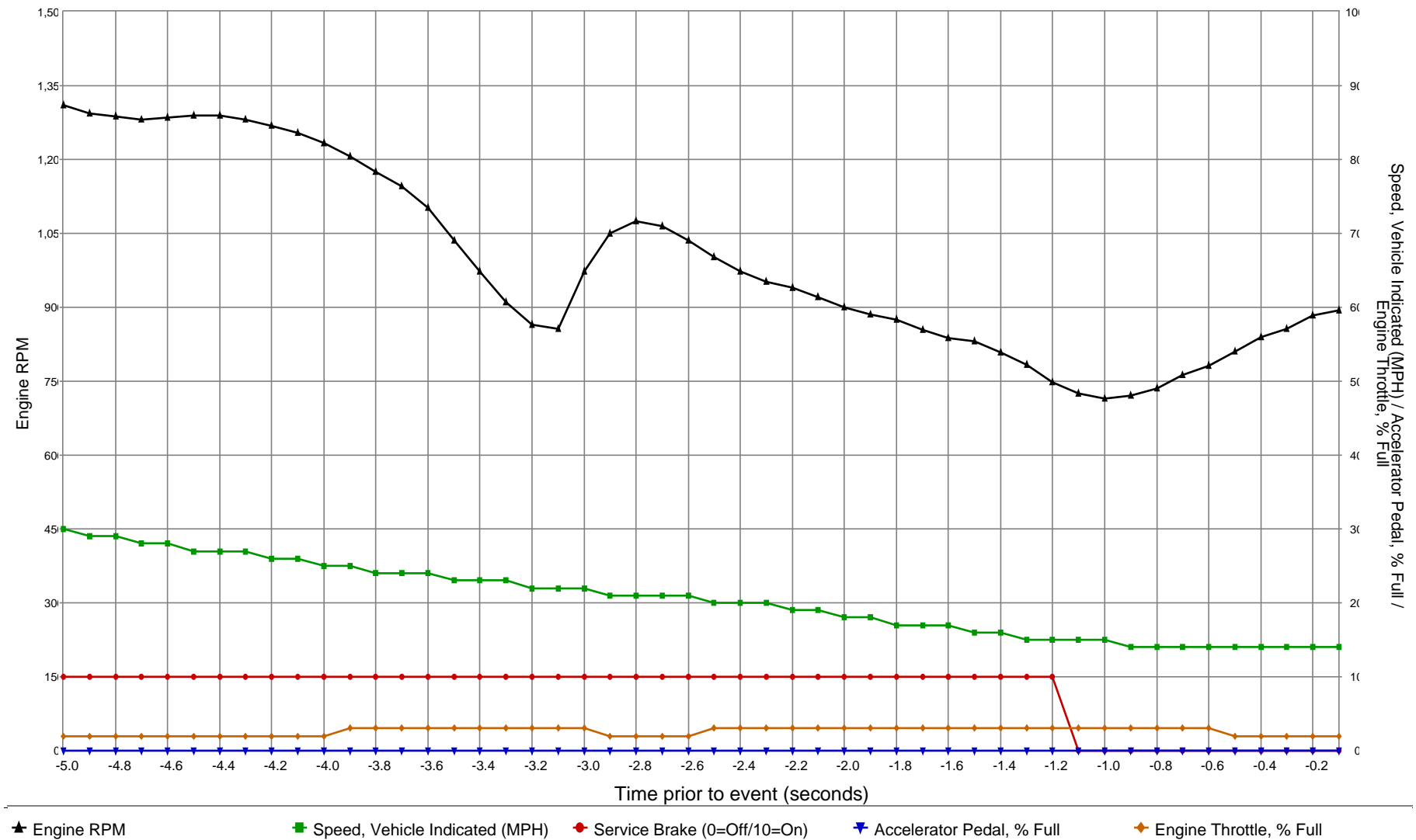
Time (msec)	Angular Rate (deg/sec)
-1500	0.00
-1480	0.00
-1460	0.00
-1440	0.00
-1420	0.00
-1400	0.00
-1380	0.00
-1360	0.00
-1340	0.00
-1320	0.00
-1300	0.00
-1280	0.00
-1260	0.00
-1240	0.00
-1220	0.00
-1200	0.00
-1180	0.00
-1160	0.00
-1140	0.00
-1120	0.00
-1100	0.00
-1080	0.00
-1060	0.00
-1040	0.00
-1020	0.00
-1000	0.00
-980	0.00
-960	0.00
-940	0.00
-920	0.00
-900	0.00
-880	0.00
-860	0.00
-840	0.00
-820	0.00
-800	0.00
-780	0.00
-760	-2.00
-740	-2.00
-720	-2.00
-700	0.00
-680	-2.00
-660	-2.00
-640	-2.00
-620	-2.00
-600	-2.00
-580	-2.00
-560	-2.00
-540	-2.00
-520	-2.00

Time (msec)	Angular Rate (deg/sec)
-500	-2.00
-480	-2.00
-460	0.00
-440	-2.00
-420	-2.00
-400	0.00
-380	0.00
-360	0.00
-340	0.00
-320	0.00
-300	0.00
-280	0.00
-260	0.00
-240	0.00
-220	0.00
-200	0.00
-180	0.00
-160	-2.00
-140	-2.00
-120	0.00
-100	-2.00
-80	0.00
-60	0.00
-40	0.00
-20	0.00
0	0.00
20	-2.00
40	0.00
60	0.00
80	0.00
100	12.00
120	-12.00
140	-70.00
160	-50.00
180	-46.00
200	-52.00
220	-52.00
240	-32.00
260	-32.00
280	-10.00
300	-12.00
320	6.00
340	18.00
360	16.00
380	22.00
400	32.00
420	22.00
440	24.00
460	20.00
480	12.00

Rollover Crash Pulse (Most Recent Event) (if equipped)

Time (msec)	Angular Rate (deg/sec)	Time (msec)	Angular Rate (deg/sec)
500	6.00	1500	2.00
520	-2.00	1520	2.00
540	-14.00	1540	2.00
560	-24.00	1560	2.00
580	-30.00	1580	2.00
600	-36.00	1600	2.00
620	-38.00	1620	2.00
640	-36.00	1640	2.00
660	-32.00	1660	2.00
680	-26.00	1680	2.00
700	-20.00	1700	0.00
720	-10.00	1720	0.00
740	0.00	1740	0.00
760	8.00	1760	0.00
780	18.00	1780	0.00
800	26.00	1800	0.00
820	28.00	1820	0.00
840	28.00	1840	0.00
860	28.00	1860	0.00
880	24.00	1880	0.00
900	22.00	1900	0.00
920	18.00	1920	0.00
940	12.00	1940	0.00
960	10.00	1960	0.00
980	8.00	1980	0.00
1000	4.00	2000	0.00
1020	0.00	2020	0.00
1040	-2.00	2040	0.00
1060	-6.00	2060	0.00
1080	-8.00	2080	0.00
1100	-8.00	2100	0.00
1120	-6.00	2120	0.00
1140	-6.00	2140	0.00
1160	-6.00	2160	0.00
1180	-6.00	2180	0.00
1200	-6.00	2200	0.00
1220	-8.00	2220	0.00
1240	-6.00	2240	0.00
1260	-4.00	2260	0.00
1280	-4.00	2280	0.00
1300	-2.00	2300	0.00
1320	-2.00	2320	0.00
1340	0.00	2340	0.00
1360	0.00	2360	0.00
1380	0.00	2380	0.00
1400	0.00	2400	0.00
1420	0.00	2420	0.00
1440	0.00		
1460	2.00		
1480	2.00		

Pre-Crash Data (Most Recent Event)



SNA values will not be plotted on the graph

Pre-Crash Data (Most Recent Event - table 1 of 4)

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

Time Stamp (sec)	Vehicle Event Recorder Status	Engine RPM	Speed, Vehicle Indicated (MPH [km/h])	Engine Throttle, % Full	Accelerator Pedal, % Full	Raw Manifold Pressure (kPa)	Service Brake	Brake Switch #2 Status	Brake Lamps On
-5.0	Complete	1,310	30 [47]	2	0.0	20	On	Closed	Yes
-4.9	Complete	1,294	29 [47]	2	0.0	20	On	Closed	Yes
-4.8	Complete	1,287	29 [46]	2	0.0	21	On	Closed	Yes
-4.7	Complete	1,282	28 [46]	2	0.0	21	On	Closed	Yes
-4.6	Complete	1,285	28 [45]	2	0.0	21	On	Closed	Yes
-4.5	Complete	1,289	27 [44]	2	0.0	21	On	Closed	Yes
-4.4	Complete	1,289	27 [44]	2	0.0	21	On	Closed	Yes
-4.3	Complete	1,281	27 [43]	2	0.0	21	On	Closed	Yes
-4.2	Complete	1,269	26 [42]	2	0.0	21	On	Closed	Yes
-4.1	Complete	1,255	26 [41]	2	0.0	21	On	Closed	Yes
-4.0	Complete	1,234	25 [41]	2	0.0	21	On	Closed	Yes
-3.9	Complete	1,206	25 [40]	3	0.0	21	On	Closed	Yes
-3.8	Complete	1,175	24 [39]	3	0.0	22	On	Closed	Yes
-3.7	Complete	1,145	24 [39]	3	0.0	22	On	Closed	Yes
-3.6	Complete	1,102	24 [38]	3	0.0	22	On	Closed	Yes
-3.5	Complete	1,036	23 [37]	3	0.0	23	On	Closed	Yes
-3.4	Complete	972	23 [37]	3	0.0	24	On	Closed	Yes
-3.3	Complete	910	23 [36]	3	0.0	25	On	Closed	Yes
-3.2	Complete	864	22 [36]	3	0.0	26	On	Closed	Yes
-3.1	Complete	857	22 [35]	3	0.0	27	On	Closed	Yes
-3.0	Complete	972	22 [35]	3	0.0	26	On	Closed	Yes
-2.9	Complete	1,050	21 [35]	2	0.0	26	On	Closed	Yes
-2.8	Complete	1,076	21 [34]	2	0.0	26	On	Closed	Yes
-2.7	Complete	1,065	21 [34]	2	0.0	25	On	Closed	Yes
-2.6	Complete	1,035	21 [33]	2	0.0	25	On	Closed	Yes
-2.5	Complete	1,002	20 [33]	3	0.0	25	On	Closed	Yes
-2.4	Complete	972	20 [32]	3	0.0	25	On	Closed	Yes
-2.3	Complete	953	20 [32]	3	0.0	25	On	Closed	Yes
-2.2	Complete	939	19 [31]	3	0.0	26	On	Closed	Yes
-2.1	Complete	921	19 [30]	3	0.0	26	On	Closed	Yes
-2.0	Complete	901	18 [30]	3	0.0	26	On	Closed	Yes
-1.9	Complete	886	18 [29]	3	0.0	26	On	Closed	Yes
-1.8	Complete	874	17 [28]	3	0.0	26	On	Closed	Yes
-1.7	Complete	855	17 [27]	3	0.0	27	On	Closed	Yes
-1.6	Complete	837	17 [27]	3	0.0	27	On	Closed	Yes
-1.5	Complete	831	16 [26]	3	0.0	27	On	Closed	Yes
-1.4	Complete	809	16 [25]	3	0.0	28	On	Closed	Yes
-1.3	Complete	783	15 [25]	3	0.0	28	On	Closed	Yes
-1.2	Complete	747	15 [24]	3	0.0	30	On	Closed	Yes
-1.1	Complete	724	15 [24]	3	0.0	31	Off	Open	Yes
-1.0	Complete	714	15 [23]	3	0.0	32	Off	Open	No
-0.9	Complete	720	14 [23]	3	0.0	33	Off	Open	No
-0.8	Complete	735	14 [23]	3	0.0	34	Off	Open	No
-0.7	Complete	763	14 [23]	3	0.0	34	Off	Open	No
-0.6	Complete	781	14 [23]	3	0.0	33	Off	Open	No
-0.5	Complete	811	14 [23]	2	0.0	32	Off	Open	No
-0.4	Complete	840	14 [23]	2	0.0	31	Off	Open	No
-0.3	Complete	857	14 [22]	2	0.0	30	Off	Open	No
-0.2	Complete	883	14 [22]	2	0.0	30	Off	Open	No
-0.1	Complete	894	14 [22]	2	0.0	29	Off	Open	No

Pre-Crash Data (Most Recent Event - table 2 of 4)

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

Time Stamp (sec)	Panic Brake Assist Active (if equip.)	PCM MIL	ABS MIL (if equip.)	ESP MIL (if equip.)	ESP Lamp (if equip.)	ESP Lamp Flashing Requested (if equip.)	ESP Disabled (if equip.)	ESP Active (if equip.)
-5.0	No	Off	Off	Off	Off	No	No	Yes
-4.9	No	Off	Off	Off	Off	No	No	Yes
-4.8	No	Off	Off	Off	Off	No	No	Yes
-4.7	No	Off	Off	Off	Off	No	No	Yes
-4.6	No	Off	Off	Off	Off	No	No	Yes
-4.5	No	Off	Off	Off	Off	No	No	Yes
-4.4	No	Off	Off	Off	Off	No	No	Yes
-4.3	No	Off	Off	Off	Off	No	No	Yes
-4.2	No	Off	Off	Off	Off	No	No	Yes
-4.1	No	Off	Off	Off	Off	No	No	Yes
-4.0	No	Off	Off	Off	Off	No	No	Yes
-3.9	No	Off	Off	Off	Off	No	No	Yes
-3.8	No	Off	Off	Off	Off	No	No	Yes
-3.7	No	Off	Off	Off	Off	No	No	Yes
-3.6	No	Off	Off	Off	Off	No	No	Yes
-3.5	No	Off	Off	Off	Off	No	No	Yes
-3.4	No	Off	Off	Off	Off	No	No	Yes
-3.3	No	Off	Off	Off	Off	No	No	Yes
-3.2	No	Off	Off	Off	Off	No	No	Yes
-3.1	No	Off	Off	Off	Off	No	No	Yes
-3.0	No	Off	Off	Off	Off	No	No	Yes
-2.9	No	Off	Off	Off	Off	No	No	Yes
-2.8	No	Off	Off	Off	Off	No	No	Yes
-2.7	No	Off	Off	Off	Off	No	No	Yes
-2.6	No	Off	Off	Off	Off	No	No	Yes
-2.5	No	Off	Off	Off	Off	No	No	Yes
-2.4	No	Off	Off	Off	Off	No	No	Yes
-2.3	No	Off	Off	Off	Off	No	No	Yes
-2.2	No	Off	Off	Off	Off	No	No	Yes
-2.1	No	Off	Off	Off	Off	No	No	Yes
-2.0	No	Off	Off	Off	Off	No	No	Yes
-1.9	No	Off	Off	Off	Off	No	No	Yes
-1.8	No	Off	Off	Off	Off	No	No	Yes
-1.7	No	Off	Off	Off	Off	No	No	Yes
-1.6	No	Off	Off	Off	Off	No	No	Yes
-1.5	No	Off	Off	Off	Off	No	No	Yes
-1.4	No	Off	Off	Off	Off	No	No	Yes
-1.3	No	Off	Off	Off	Off	No	No	Yes
-1.2	No	Off	Off	Off	Off	No	No	Yes
-1.1	No	Off	Off	Off	Off	No	No	Yes
-1.0	No	Off	Off	Off	Off	No	No	Yes
-0.9	No	Off	Off	Off	Off	No	No	Yes
-0.8	No	Off	Off	Off	Off	No	No	Yes
-0.7	No	Off	Off	Off	Off	No	No	Yes
-0.6	No	Off	Off	Off	Off	No	No	Yes
-0.5	No	Off	Off	Off	Off	No	No	Yes
-0.4	No	Off	Off	Off	Off	No	No	Yes
-0.3	No	Off	Off	Off	Off	No	No	Yes
-0.2	No	Off	Off	Off	Off	No	No	Yes
-0.1	No	Off	Off	Off	Off	No	No	Yes

Pre-Crash Data (Most Recent Event - table 3 of 4)

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

Time Stamp (sec)	Steering Input (deg) (if equip.)	Yaw Rate (deg/sec) (if equip.)	Wheel Speed LF (RPM) (if equip.)	Wheel Speed RF (RPM) (if equip.)	Wheel Speed LR (RPM) (if equip.)	Wheel Speed RR (RPM) (if equip.)
-5.0	1	0	331	330	332	332
-4.9	1	0	327	328	326	328
-4.8	0	0	322	324	322	324
-4.7	0	0	318	319	317	319
-4.6	0	0	313	316	313	315
-4.5	0	0	308	307	308	308
-4.4	0	0	303	303	303	303
-4.3	0	0	299	298	299	299
-4.2	0	0	294	296	293	295
-4.1	0	0	289	289	289	289
-4.0	0	0	284	282	283	284
-3.9	-1	0	279	278	277	280
-3.8	-1	0	276	276	273	275
-3.7	-1	0	269	269	271	270
-3.6	-1	0	267	263	265	265
-3.5	-1	0	261	261	260	261
-3.4	-1	0	258	257	257	259
-3.3	0	0	254	254	255	253
-3.2	1	0	251	251	252	251
-3.1	1	0	246	249	247	248
-3.0	1	0	244	243	245	245
-2.9	2	0	241	241	240	241
-2.8	3	0	236	237	237	238
-2.7	5	0	233	235	234	235
-2.6	7	1	229	232	229	232
-2.5	8	1	227	227	227	227
-2.4	8	1	222	223	222	224
-2.3	9	1	219	219	219	220
-2.2	10	1	213	215	214	216
-2.1	12	2	210	209	210	211
-2.0	15	2	204	206	204	205
-1.9	19	2	200	201	199	202
-1.8	22	3	195	197	195	197
-1.7	25	3	189	192	190	191
-1.6	25	3	184	187	185	188
-1.5	29	3	180	182	180	182
-1.4	41	3	175	176	175	178
-1.3	60	5	169	173	168	173
-1.2	79	8	164	171	165	171
-1.1	98	10	162	170	161	169
-1.0	118	12	159	169	159	169
-0.9	136	14	158	169	157	168
-0.8	148	16	157	168	156	167
-0.7	154	17	155	168	154	166
-0.6	156	17	154	167	153	166
-0.5	157	17	154	166	153	165
-0.4	159	17	153	166	151	165
-0.3	163	18	153	165	151	164
-0.2	166	18	152	165	150	163
-0.1	167	18	151	165	150	164

Pre-Crash Data (Most Recent Event - table 4 of 4)

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

Time Stamp (sec)	ETC Lamp (if equip.)	ETC Lamp Flashing (if equip.)	Engine Torque Applied	PRND Status	Reverse Gear (Manual Only)	Cruise Control System
-5.0	Off	No	Yes	Drive	No	Off
-4.9	Off	No	Yes	Drive	No	Off
-4.8	Off	No	Yes	Drive	No	Off
-4.7	Off	No	Yes	Drive	No	Off
-4.6	Off	No	Yes	Drive	No	Off
-4.5	Off	No	Yes	Drive	No	Off
-4.4	Off	No	Yes	Drive	No	Off
-4.3	Off	No	Yes	Drive	No	Off
-4.2	Off	No	Yes	Drive	No	Off
-4.1	Off	No	Yes	Drive	No	Off
-4.0	Off	No	Yes	Drive	No	Off
-3.9	Off	No	Yes	Drive	No	Off
-3.8	Off	No	Yes	Drive	No	Off
-3.7	Off	No	Yes	Drive	No	Off
-3.6	Off	No	Yes	Drive	No	Off
-3.5	Off	No	Yes	Drive	No	Off
-3.4	Off	No	Yes	Drive	No	Off
-3.3	Off	No	Yes	Drive	No	Off
-3.2	Off	No	Yes	Drive	No	Off
-3.1	Off	No	Yes	Drive	No	Off
-3.0	Off	No	Yes	Drive	No	Off
-2.9	Off	No	Yes	Drive	No	Off
-2.8	Off	No	Yes	Drive	No	Off
-2.7	Off	No	Yes	Drive	No	Off
-2.6	Off	No	Yes	Drive	No	Off
-2.5	Off	No	Yes	Drive	No	Off
-2.4	Off	No	Yes	Drive	No	Off
-2.3	Off	No	Yes	Drive	No	Off
-2.2	Off	No	Yes	Drive	No	Off
-2.1	Off	No	Yes	Drive	No	Off
-2.0	Off	No	Yes	Drive	No	Off
-1.9	Off	No	Yes	Drive	No	Off
-1.8	Off	No	Yes	Drive	No	Off
-1.7	Off	No	Yes	Drive	No	Off
-1.6	Off	No	Yes	Drive	No	Off
-1.5	Off	No	Yes	Drive	No	Off
-1.4	Off	No	Yes	Drive	No	Off
-1.3	Off	No	Yes	Drive	No	Off
-1.2	Off	No	Yes	Drive	No	Off
-1.1	Off	No	Yes	Drive	No	Off
-1.0	Off	No	Yes	Drive	No	Off
-0.9	Off	No	Yes	Drive	No	Off
-0.8	Off	No	Yes	Drive	No	Off
-0.7	Off	No	Yes	Drive	No	Off
-0.6	Off	No	Yes	Drive	No	Off
-0.5	Off	No	Yes	Drive	No	Off
-0.4	Off	No	Yes	Drive	No	Off
-0.3	Off	No	Yes	Drive	No	Off
-0.2	Off	No	Yes	Drive	No	Off
-0.1	Off	No	Yes	Drive	No	Off

Hexadecimal Data

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

5A 87 02 03 03 05 80 00 00 32 30 00 36 38 30 32 35 36 33 32 41 4B

5A 88 31 43 34 52 4A 46 41 47 35 43 43 2A 2A 2A 2A 2A 2A

61 E1 54 35 32 4D 44 32 33 36 31 30 31 32 33 38

61 EA 05 98 02 DB C0 8C C8 13 38 00 00 00 00 00 00 00 00 00

61 02 C1 25 00 00 6A 1A 58 C1 00 50 20 01 00 00 00 00 00 00

61 31 01 CC 01 01 33 00 00 12 39 05 C3 F1 F4 00 00 FF FE 12 42 0A E2 81 5A 07 45 0D 45 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 06 00 00 00 00 00 10 32 30 00 5E 00 00 00 00
00
00
00 00 43 43 2A 2A 2A 2A 2A 2A

61 32 02 FF 00
00
00
00
00 00 00 00 2A 2A 2A 2A 2A 2A

71 02 01 00 CC 00 03 7E 00 C1 47 C1 2B 01 2E 01 49 87 65 00 00 00 00 00 00 1E E1 15 0B 24 04 00
C0 00 44 00 03 24 04 25 00 00 00 11 4E 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 30
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 01 CC 00 03 73 00 C1 46 C1 2C 01 2F 01 49 87 35 00 00 00 00 00 00 1E E1 15 0B 25 04 00
C0 00 44 00 03 24 04 25 00 00 00 11 4C 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 37
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 02 CC 00 03 59 00 C1 47 C1 2E 01 31 01 4A 87 0B 00 00 00 00 00 00 1E E1 15 0B 26 04 00
C0 00 44 00 03 24 04 25 00 00 00 11 46 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 3D
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 03 CC 00 03 48 00 C1 49 C1 2E 01 31 01 4B 86 EA 00 00 00 00 00 00 1E E1 15 0B 27 04 00
C0 00 44 00 03 24 04 25 00 00 00 11 3F 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 4B
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 04 CC 00 03 2B 00 C1 49 C1 31 01 33 01 4C 86 EA 00 00 00 00 00 00 1E E1 15 0B 28 04 00
C0 00 44 00 03 24 04 25 00 00 00 11 3A 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 56
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 05 CC 00 03 0D 00 C1 4B C1 32 01 34 01 4E 86 ED 00 00 00 00 00 00 1E E1 15 00 29 05 00
C0 00 44 00 03 24 04 25 00 00 00 11 38 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 68
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 06 CC 00 02 FB 00 C1 4C C1 34 01 36 01 4F 86 D5 00 00 00 00 00 00 1F E1 15 0B 2A 05 00
C0 00 44 00 03 24 04 25 00 00 00 11 34 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 75
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 07 CC 00 02 DF 00 C1 4E C1 37 01 39 01 4F 86 6E 00 00 00 00 00 00 1F E0 15 0B 2A 05 00

```

C0 00 44 00 01 25 02 25 00 00 00 11 28 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B 89
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 08 CC 00 02 D0 00 C1 4F C1 3A 01 3C 01 52 85 D0 00 00 00 00 00 1F E0 15 0B 29 06 00
C0 00 44 00 01 25 02 25 00 00 00 11 10 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B A2
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

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C0 00 44 00 01 25 02 25 00 00 00 10 ED 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B B6
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00 00 00 00 00 00 00 00

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C0 00 44 00 01 25 02 25 00 00 00 10 C5 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B E1
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00 00 00 00 00 00 00 00

71 02 01 0B CC 00 02 EB 00 C1 55 C1 49 01 47 01 55 83 58 00 01 00 01 00 1F E0 15 0B 25 05 00
CC 00 44 00 01 25 02 25 00 00 00 10 9E 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0B F8
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 0C CC 00 03 0F 00 C1 59 C1 50 01 51 01 5A 82 46 00 01 00 01 00 1F E0 15 0B 23 05 00
CC 00 44 00 01 25 02 25 00 00 00 10 79 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0C 4D
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 0D CC 00 03 29 00 C1 63 C1 5D 01 5D 01 60 81 8D 00 01 00 01 00 1F E1 15 0B 23 05 00
CC 00 44 00 01 25 02 25 00 00 00 10 53 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0C 9C
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

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CC 00 44 00 01 25 02 25 00 00 00 10 3A 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0D 00
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 0F CC 00 03 45 00 C1 78 C1 71 01 70 01 76 81 7E 00 01 00 01 00 1F E1 15 0B 22 05 00
CC 00 44 00 01 25 02 25 00 00 00 10 33 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0D 6A
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 10 CC 00 03 57 00 C1 7E C1 7C 01 7A 01 7F 81 6C 00 01 00 01 00 1F E1 15 0B 22 05 00
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00 00 00 00 00 00 00 00

71 02 01 11 CC 00 03 6A 00 C1 8A C1 86 01 86 01 89 81 47 00 01 00 01 00 1F E1 15 0B 21 05 00
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00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 12 CC 00 03 76 00 C1 93 C1 8D 01 90 01 91 80 FE 00 01 00 01 00 1F E1 15 0B 21 05 00
CC 00 44 00 03 24 04 25 00 00 00 10 26 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0E 61
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 13 CC 00 03 85 00 C1 9A C1 98 01 97 01 9B 80 D3 00 01 00 01 00 1F E1 15 0B 21 05 00
CC 00 44 00 03 24 04 25 00 00 00 10 1E 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0E C4
00 00 04 00 00 00 FF FF FF 00 3F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00

71 02 01 14 CC 00 03 99 00 C1 A5 C1 A3 01 A3 01 A2 80 D3 00 01 00 01 00 1F E1 15 0B 20 05 00

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CC 00 44 00 03 24 04 25 00 00 00 10 18 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0F 0A
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00 00 00 00 00 00 00 00

71 02 01 15 CC 00 03 AB 00 C1 AF C1 AC 01 AA 01 AE 80 AD 00 01 00 01 00 1F E1 15 0B 20 05 00
CC 00 44 00 03 24 04 25 00 00 00 10 15 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0F 71
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00 00 00 00 00 00 00 00

71 02 01 16 CC 00 03 B9 00 C1 B7 C1 B5 01 B5 01 B6 80 AE 00 01 00 01 00 1F E1 15 00 1F 05 00
CC 00 44 00 03 24 04 25 00 00 00 10 13 00 FF 0F 00 00 FF 1F 00 FF FF FF 00 20 00 00 00 0F C4
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71 02 01 17 CC 00 03 CC 00 C1 C0 C1 BB 01 BC 01 BE 80 BC 00 01 00 01 00 1F E1 15 0B 1F 05 00
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71 02 01 18 CC 00 03 EA 00 C1 C6 C1 C5 01 C5 01 C5 80 95 00 01 00 01 00 1F E1 15 0B 1F 05 00
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71 02 01 19 CC 00 04 0B 00 C1 D0 C1 CA 01 CA 01 CF 80 97 00 01 00 01 00 1F E1 15 0B 1F 04 00
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71 02 01 1A CC 00 04 29 00 C1 D5 C1 D4 01 D1 01 D5 80 60 00 01 00 01 00 1F E1 15 0B 1F 04 00
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71 02 01 1D CC 00 03 CC 00 C1 E9 C1 E9 01 E7 01 E6 80 37 00 01 00 01 00 1E E1 15 0B 21 05 00
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71 02 01 1E CC 00 03 59 00 C1 F0 C1 ED 01 EC 01 F1 80 44 00 01 00 01 00 1F E1 15 0B 22 05 00
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00 00 00 00 00 00 00 00

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