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Special Crash Investigations On-Site Alleged Unintended Acceleration Investigation Vehicle: 2006 Jeep Grand Cherokee Location: Massachusetts Crash Date: May 2017

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

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

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

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16. Abstract The interest in this investigation was the alleged unintended acceleration of a 2006 Jeep Grand Cherokee through a building that led to a crash involving multiple pedestrians. The Jeep then came to a stop after striking the block wall of a building. Five pedestrians were fatally injured and an additional eight pedestrians received police–reported injuries. The crash occurred during a live vehicle auction as the Jeep was driven by a 76-year-old male during the course of his employment at the auction facility. The crash was identified by National Highway Traffic Safety Administration on May 3, 2017, through a news media search for automobile crashes of interest. The notification and on-site investigation assignment was forwarded to the Special Crash Investigations (SCI) team at Crash Research & Analysis, Inc., on the same day. The SCI team contacted the police agency responsible for the local investigation and began the process of establishing cooperation, which was established on May 3, 2017, and the on-site portion of this investigation took place May 4 and 5, 2017. Technical representatives from Fiat Chrysler America also attended and participated in the vehicle inspection. It was determined over the course of the investigation that the crash occurred through the erroneous operation of the transmission selector and a misapplication of the foot controls by the driver. The vehicle was initially stopped with the transmission shifted to neutral. The driver then mistakenly shifted the transmission into drive while applying the accelerator pedal, instead of the brake.			
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LOCATION: MASSACHUSETTS
CRASH DATE: MAY 2017

BACKGROUND

The interest in this investigation was the alleged unintended acceleration of a 2006 Jeep Grand Cherokee through a building that led to a crash involving multiple pedestrians. The Jeep then came to a stop after striking the block wall of a building (**Figure 1**). Five pedestrians were fatally injured and an additional eight pedestrians received police-reported injuries. The crash occurred during a live vehicle auction as the Jeep was driven by a 76-year-old male during the course of his employment at the auction facility.

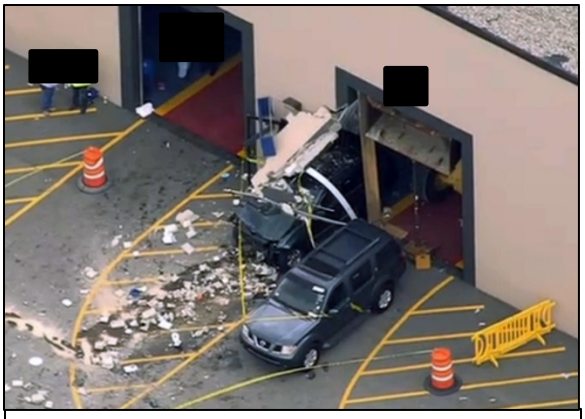


Figure 1: South-facing on-scene image showing the Jeep at its final rest position. A non-contact vehicle is located in the foreground. Image obtained from an Internet news media source**.**

The crash was identified by National Highway Traffic Safety Administration on May 3, 2017, through a news media search for automobile crashes of interest. The notification and on-site investigation assignment was forwarded to the Special Crash Investigations (SCI) team at Crash Research & Analysis, Inc., on the same day. The SCI team contacted the police agency responsible for the local investigation and began the process of establishing cooperation, which was established on May 3, 2017, and the on-site portion of this investigation took place May 4 and 5, 2017. Technical representatives from Fiat Chrysler America also attended and participated in the vehicle inspection. The on-site activities included the documentation of the building and physical plant of the crash site and an inspection of the Jeep. The Jeep inspection included the measurement of its exterior and interior damage and intrusion, identification of the points of occupant contact, assessment of the manual restraint systems, and documentation of the supplemental restraint deployment/actuation. The operation of the vehicle's transmission, accelerator pedal and throttle control was assessed. The Jeep is equipped with an air bag control module (ACM) that had event data recorder (EDR) capabilities; however, due to its date of manufacturer the EDR was not supported by the Bosch Crash Data Retrieval (CDR) tool. The EDR was removed from the vehicle by the police investigators and placed into evidence. The module was then transported to Michigan and was imaged by Bosch. The police investigator reported a verbal translation of the imaged data to SCI. A technical (text) translation of the imaged data was unavailable at the time of this report.

It was determined over the course of the investigation that the crash occurred through the erroneous operation of the transmission selector and a misapplication of the foot controls by the driver. The vehicle was initially stopped with the transmission shifted to neutral. The driver then mistakenly shifted the transmission into drive while applying the accelerator pedal, instead of the brake.

CRASH SUMMARY

Crash Site

The crash occurred during the morning hours in May 2017 at a vehicle auction facility. The crash occurred approximately 1.5 hours after the start of the auction, inside a large commercial building that accommodated numerous business offices, a show room and the section of the structure dedicated to the auction. At the time of the crash, the weather conditions reported by the National Weather Service were a temperature of 15 C° (59.0 F°), 41 percent relative humidity, 29.6 km/h (18.4 mph) west winds, 16 km (10 miles) visibility and scattered cloud cover.

The auction was a live event, scheduled weekly by the business establishment and was attended by numerous private individuals and auto dealers. **Figure 2** is an overhead view of the auction site inclusive of the main building, the parking lot and a staging lot for the auction vehicles. The overall dimensions of the concrete-block building measured approximately 128.0 m x 38.4 m (420.0 ft x 126.0 ft), length by width. The section of the building where the auction was held consisted of eight traffic lanes that were separated by open spaces for pedestrian traffic. During the auction, the for-sale vehicles moved from the staging lot and were paraded through the building via the various traffic lanes. Traffic flowed through the building from the entrance side to the exit denoted by the arrow in the Figure 2.

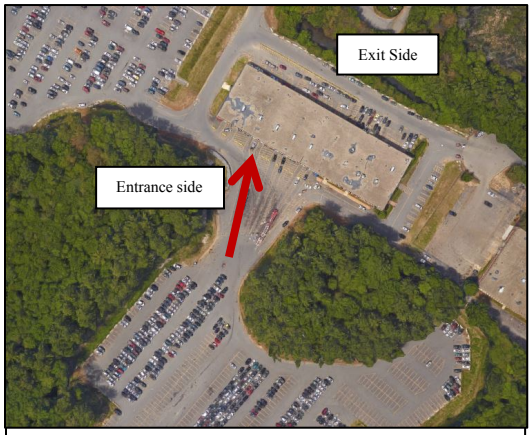


Figure 2: Overhead image showing the physical layout of the auction facility. The red arrow denotes the directional flow of traffic. Image obtained from an Internet media source.

Opposing overhead garage doors were located at the entrance/exit ends of each traffic lane. All the overhead doors were open during the auction. The concrete floor of the building was painted with red and blue lanes for different types of designated traffic. The red lanes denoted moving-vehicle traffic and the blue lanes were designated for pedestrians. The auction vehicles drove through the building at slow speed in the red lane and stopped adjacent to the auction desk as the bidding took place. A gap of several meters was maintained between the consecutive vehicles for timing, spacing and to accommodate pedestrian movement.

The crash occurred in Lane #6. The interior width of the building (from entrance to exit) measured 38.0 m (124.7 ft). **Figure 3** is a north-facing trajectory view of the Jeep approaching the building entrance. **Figure 4** is a south-facing lookback view.

Figure 3: North-facing trajectory view of the Jeep's approach to the building entrance at Lane #6.

Figure 4: South-facing lookback view from the center of the building along the Jeep's path at Lane #6.

Interior and exterior surveillance cameras recorded the activities of the auction for business and security purposes. The exterior movement of the Jeep was determined through a review of the surveillance footage along the building's exterior. Portions of the crash event were captured by several interior cameras from several different vantage points. No single camera captured the entire event from beginning to end. The time stamps associated with the various camera views were not synchronized. However, the time variance between cameras appeared to be in one second.

Pre-Crash

The Jeep was driven by a 76-year-old male who had worked at the establishment for approximately seven years. During the course of the auction, the driver started the Jeep, drove the vehicle from the staging lot toward the building and stopped approximately 20 m (65 ft) from the Lane #6 entrance. The Jeep was stationary at this location for approximately 35 seconds. A black sedan, queued in the auction sequence, was stopped forward of the Jeep at the Lane #6 entrance. There were no other vehicles directly forward of the Jeep in this lane.

After the sedan entered the auction building, the Jeep slowly proceeded forward for approximately 22 seconds and stopped. The front plane of the Jeep was located approximately at the garage door opening (**Figure 5**). The vehicle remained stationary for approximately 18 seconds and then moved forward over the next 6 seconds such that its front wheels nested into the pavement transition at the building's threshold. On the surveillance video, the Jeep can be seen rolling slightly rearward (due to transmission backlash) as it came to rest at the threshold (**Figure 6**).

Figure 5: West-looking image showing the stopped position of the Jeep with its front plane at the building entrance. Image taken from the surveillance footage at Time - 10:10:03.

Figure 6: West-looking image showing the stopped position of the Jeep with its front tires nested at the building threshold. Image taken from the surveillance footage at Time - 10:10:33**.**

The change in the pavement's elevation at the transition was an estimated 3 cm (1 in) over a 30 cm (12 in) distance. The driver reported in his interview with the police that he typically had to press on the accelerator ("give it a little gas") to get a vehicle over the transition and into the building. The Jeep was stationary at this third stop for the next 72 seconds. During this time, a potential buyer approached the Jeep from Lane #7. The buyer walked up to the Jeep and completely around the vehicle, visually inspecting the Jeep over a 30-second period. The buyer then talked to the driver and opened the left front door.

The police reported that the buyer then attached an Inova 3160D scan tool to the diagnostic link connector (DLC) in order to read any potential diagnostic trouble codes (DTCs) stored in the vehicle's electrical bus. It was reported to the police that this practice was fairly common and acceptable during the vehicle auction. Additionally, this practice had to take place outside the building, as the auction rules dictated that no one could touch the vehicle once it entered the building for auction.

The buyer passed the cable scan tool and umbilical cable through the left front window opening and the left front door closed approximately 65 seconds after the Jeep came to its third stop. Based on the time stamp associated with this camera view, the Jeep accelerated away approximately 7.1 seconds after the left front door closed. Although partially masked by the Jeep relative to the camera's perspective, an analysis of the camera footage indicated that the buyer's focus initially appeared to be directed to his left toward Lane #7 (**Figure 7**). The buyer's attention appeared to return to the scanner approximately 2 seconds prior to the Jeep acceleration. The following table summarizes the timeline of the Jeep actions and the surrounding activity:

Figure 7: West-looking view of the Jeep at the building threshold with the buyer at the left front window. Image taken from the surveillance footage at Time - 10:11:25.

Action	Time hour:min:sec	Duration Vehicle Is Stationary (sec)	Duration Vehicle in Motion (sec)
Jeep stops 20 m from Lane #6 entrance	10:08:55	35	----
Jeep begins to approach building	10:09:30		23
Jeep stops with front plane at entrance	10:09:53	18	
Jeep begins to move forward	10:10:11		6
Jeep stops with front wheels nested at the threshold transition	10:10:17	72	
Potential buyer approaches, visually inspects and talks to driver	10:10:37 to 10:11:11		----
Left front door of the Jeep is opened	10:11:16		
Scanner attached by buyer and left front door of the Jeep is closed.	10:11:22		
Buyer's focus (attention) appeared distracted	10:11:25		
Buyer's focus (attention) directed to scanner	10:11:27		
Jeep began acceleration into building	10:11:29		

The potential buyer and the driver reported to the police that the vehicle's engine started "racing" at high RPM. The driver further stated that he did not know what happened, just that the vehicle started racing and accelerated out of his control. A witness near Lane #7 stated to the police that he was initially looking to the west and then turned, when his attention was drawn to the sound of

the engine racing. He added that he thought he heard a “clunk” and the vehicle accelerated away. A second witness reported to the police that he thought he heard a “chirp of tires” as the vehicle accelerated.

Figure 8: North-facing image of the tire marks at the entrance to Lane #6. Note the angled orientation of the marks relative to the travel lane.

Figure 9: North-facing image of the fractured exit wall at the point of impact (under repair at the time of the SCI inspection).

Crash

The Jeep accelerated forward out of the driver’s control and into the building. The scan tool remained attached to the vehicle and was pulled from the buyer’s hand. Two short (acceleration) tire marks were identified at the scene during the police investigation and were also observed during the SCI scene inspection. The marks were located at the threshold to the building at the Lane #6 entrance in the pavement transition (**Figure 8**). The tread pattern and track width of the marks were consistent with the tread pattern and track width of the Jeep’s tires. The left front tire mark measured 38 cm (15.0 in) in length and the right tire mark measured 33 cm (13.0 in). Due to its initial orientation, angled slightly to the right with respect to the side plane of the building, the Jeep departed the (red) travel path of Lane #6 and entered the (blue) pedestrian zone as it accelerated forward. The vehicle traveled along a nearly straight path at a reconstructed heading angle approximately 3 degrees to the right of the lane marking. As the Jeep traversed the 38.0 m (124.7 ft) interior width of the structure, 13 pedestrians were injured either due to direct contact with the Jeep, by ground contact, or pedestrian interaction. Five people struck by the front plane of the Jeep (Events 1-5) resulted in fatalities. The front plane of the vehicle then struck and fractured the cement block-construction of the exit wall (Event 6 - **Figure 9)**. The Jeep penetrated approximately 3 m (10 ft) through the wall and came to rest. A crash diagram is included at the end of this report on Page 16.

Post-Crash

Immediately after the crash, the potential buyer ran to the Jeep, retrieved his scan tool, and faded into the crowd. In the aftermath, the police viewed the surveillance video and were able to

identify the buyer as a "person of interest." The identity of the buyer was determined; he was then located and interviewed by the police, who became suspicious that he may have altered the performance of the vehicle.

The buyer was a regular customer at the auction and his actions were determined to be routine. The police did not consider his actions or intent to be malicious. The buyer stated that he ran to the vehicle and retrieved his scan tool because he owned it and disappeared into the crowd for fear that something unintentional may have occurred. The police retained the scan tool as evidence and intended to test its operation with an exemplar Jeep Grand Cherokee at a later date. The scan tool manufacturer declined to participate in the testing. The extent of any further police follow-up is unknown.

Multiple first responders arrived at the scene. The driver suffered fractures of the right foot and the left hand. Two pedestrians were pronounced deceased at the scene. One person was pronounced dead after transport to the hospital and two people died within 11 days of the crash. Eight additional pedestrians were transported to hospitals, where they were treated and then released.

SPEED/TIME RECONSTRUCTION

The surveillance videos obtained by the police investigation were used to determine the duration of the acceleration event. Speed/time/distance formulas were then used to calculate an approximate speed of the Jeep at the time of the impact (assuming constant acceleration). As stated previously, no particular camera captured the entire event from start-to-finish and the time stamps in the cameras were not synchronized.

After a review of the various camera positions, it was determined that three cameras adequately captured the Jeep positioned at building entrance and its acceleration. Two cameras were located in the building (interior perspective) and one camera was located on the exterior entrance wall of the building. The time stamps associated to video frame showing the initial movement of the Jeep were averaged to obtain a start time. Similarly, three cameras captured the wall impact -- two interior cameras and one exterior camera -- and those associated time stamps were averaged to get obtain an end time. The approximate total acceleration time of the Jeep equated to the difference of the time stamps at the initiation of movement and impact of the vehicle.

Time at Initial Movement		Time at Impact	
Camera	**Time (min:sec)**	**Camera**	**Time (min:sec)**
A	11:29.060	D	11:33.390
B	11:29.232	E	11:33.435
C	11:29.107	F	11:33.419
average	**11:29.133**	**average**	**11:33.415**

The distance over which the vehicle accelerated was determined using the location of the front tire acceleration marks. These marks were located at the entrance wall threshold which positioned the front plane inside the building. The front plane of the Jeep was located approximately at the dimension of the front overhang from the entrance wall at the start of acceleration. Therefore, the distance the Jeep traveled to impact was approximately the interior width of the building (124.67 ft) minus the Jeep's front overhang dimension (34.3 in or 2.86 ft).

Speed Calculation

Definitions: S = distance; V = velocity; a = acceleration; t = time

Assumptions: constant acceleration; initial speed of 0.0 ft/sec

Distance/time/acceleration formula: $S = \frac{1}{2} * a * t^2$ Velocity/time formula: $V = a * t$

Combining: $V = \frac{2*S}{t}$

Accel. Time: $t = 33.415 - 29.133 = 4.282\ sec$

Distance: $S = 124.67 - 2.86 = 121.8\ ft$

Maximum impact speed: $V = \frac{2*121.8}{4.282} = 56.89\ ft/\text{sec} = 38.78\ mph$

The calculation yielded a possible (maximum) speed of approximately 38 to 39 mph. This calculation assumes that the Jeep accelerated at a constant linear rate for the entire time period (4.3 seconds) and did not take into account traction loss (wheel spin). The calculation represents a maximum speed (upper limit), given the time/distance constraints. The calculated value was determined to be within the performance limits of the Hemi-powered Jeep Grand Cherokee. Third-party test research published near the Jeep's date of manufacture reported 0-60 mph times of 7.0 seconds.

A more refined estimate of the Jeep's impact speed was determined through a frame-by-frame analysis of a surveillance video which showed the position of the Jeep in the later stages of the acceleration event, immediately prior to the impact. One camera was positioned approximately perpendicular to Lane #6 in the area of the auction booth and was used in the analysis. Using a fixed reference in the building, it was determined that the Jeep traveled approximately the length of its wheelbase (100 to 115 in) in one video frame. The change in the time stamp associated

with the two frames under analysis was 0.2 seconds. Use of the distance/velocity/time formula yielded the following speed estimate: $V = \frac{S}{t}$

S=100 in = 8.333 ft t=0.2 sec $V = \frac{8.333}{0.2} = 41.67\ fps$=28.4 mph

S=115 in = 9.583 ft t=0.2 sec $V = \frac{9.583}{0.2} = 47.92\ fps$=32.7 mph

Based on this video analysis, the estimated impact speed of the Jeep was approximately 45 to 53 km/h (28 to 33 mph).

2006 JEEP GRAND CHEROKEE

Description

The 2006 Jeep Grand Cherokee (**Figure 10**) was manufactured in August 2006 and was identified by the Vehicle Identification Number 1J4HR58236Cxxxxxx. The digital odometer reading was 245,827 km (152,754 miles). The four-wheel-drive sports utility vehicle (SUV) was built on a 278 cm (109.5 in) wheelbase and equipped with the "Limited" trim package. The Jeep had a GVWR of 2,790 kg (6,150 lb), with front axle and rear axle ratings of 1,339 kg (2,950 lb) and 1,452 kg (3,200 lb), respectively. The powertrain consisted of a 5.7-liter V8 gasoline engine that was linked to a 5-speed automatic transmission. Additional features included electronic throttle control, traction control, electronic stability control, four-wheel antilock brakes and a tire pressure monitoring system. The Jeep's brakes were a front/rear disc system with emergency braking assist. The vehicle manufacturer's recommended tire size was P245/65R17 front and rear, with cold tire pressures of 228 kPa (33 PSI). All four tires were Goodyear Fortera of the recommended size. None of the tires were damaged or restricted and all the tread depths measured 4 mm (5/32 in).

Figure 10: Left front oblique view of the Jeep.

The interior of the Jeep was equipped with front bucket seats with adjustable head restraints and a spilt-folding second row bench seat, for the seating of up to five occupants. Manual safety features included 3-point lap and shoulder seat belts for all seat positions. The front seat belts were equipped with buckle pretensioners. Supplemental restraint systems in the Jeep consisted of the Certified Advanced 208-Compliant frontal air bags.

Exterior Damage

The exterior of the Jeep (**Figure 11**) sustained damage to the front, right and top planes from the impact events with the pedestrians and the building wall. Five pedestrian impacts involved the front plane with wrapping onto the hood as the pedestrians were carried forward by the Jeep. The specific location of each pedestrian impact event was masked by the subsequent impact with the concrete block wall. Two distinct pedestrian impacts to the laminated windshield were present, located forward of the driver and front row right occupant positions. Based on the surveillance footage, the estimated Collision Deformation Classification (CDC) of the pedestrian impacts (Events 1-5) were 12FREN1, 12FREN1, 12FCAN6, 12FLAN6, 12FLEN1, respectively.

Figure 11: Overhead view of the Jeep's frontal damage**.**

The residual frontal damage that occurred from the building wall impact was distributed across the entire 152 cm (60.0 in) front end width. The direct contact damage measured 148 cm (58.2 in) and extended across the hood face and the leading edges of the front fenders. The bumper fascia and reinforcement bar deformed and separated from the vehicle. The left frame rail was not crushed while the right frame rail crushed 27 cm (10.5 in) and deformed slightly to the left. The residual crush profile was documented at the level of the hood face and was as follows: C1 = 20 cm (7.9 in), C2 = 21 cm (8.3 in), C3 = 18 cm (7.1 in), C4 = 18 cm (7.1 in), C5 = 21 cm (8.3 in), C6 = 23 cm (9.1 in). The CDC associated to the wall impact (Event 6) was 12FDEW2. A delta-V was not calculated due to the yielding properties of the impact.

The leading edges of both front fenders were displaced rearward and outward with respect to the body profile. The upper radiator support was displaced rearward. Concrete block fragments fell onto the Jeep resulting in isolated dents and scratches to the hood, fenders, upper A-pillars, and roof.

Event Data Recorder

The Jeep was equipped with an air bag control module (ACM) that had EDR capabilities. The ACM was located on the center tunnel of the Jeep, between the front seats. Data recovery was attempted with the Bosch CDR tool via a direct-to-module connection and software version 17.3; however, the imaged EDR report indicated that the data contained in the module was not retrievable by the CDR tool. The file imaged from the EDR is included at the end of this technical report as **Appendix A** for reference.

The CDR "Help" file indicated that some 2006 model year Jeep vehicles may contain EDR data that could not be read by the CDR tool. This lack of support was most likely due to the vehicle's date of manufacture. The 2006 model year was the first year of CDR support to the Jeep line of vehicles and the supplier/manufacturer coordination regarding the recording and translation of the EDR data was in a state of transition.

During the on-site activities, the investigating officer removed the module from the Jeep and cataloged it as evidence for this investigation. A representative of the vehicle's manufacturer present at the time of the joint police and SCI investigation stated that the manufacturer of the module had the capability and software interface to image and translate the module's data. The module was hand-carried to the manufacturer by the police investigator the week following the SCI inspection and the manufacturer's proprietary tool was used to image the data stored in the EDR via a direct-to-module connection. This data was reportedly collected in a hexadecimal format. Two seconds of pre-crash performance parameter were stored in the module. There was no impact-related deceleration/delta-V data.

At the time of this report, a manufacturer translation of the data was not available. The police investigator verbally reported to SCI that he was informed that the module had recorded a near-100-percent full application of the accelerator pedal and 99 percent open throttle position for the 2-second time period prior to algorithm enable (AE). The investigator further reported that he was told that the speed of the Jeep at AE was approximately 50 km/h (31 mph).

NHTSA Recalls and Investigations

There were no active recalls or open investigations for this 2006 Jeep Grand Cherokee based on a VIN query conducted during May 2017 on the NHTSA website www.safercar.gov.

Interior Damage

There was no intrusion or interior damage resulting from the exterior forces of the crash. There was no evidence of the driver contacting the interior surfaces or components of the vehicle. The only interior damage resulted from the deployment of the driver's frontal air bag and the actuation of the seat belt buckle pretensioner.

Glazing

The Jeep was configured with an AS1 laminated windshield that was bonded in the frame formed by the header, pillars and cowl. Three pedestrians struck the windshield as they wrapped onto the hood and were carried by the vehicle as it continued forward. Large fracture sites were located forward of the driver's position and the unoccupied front right occupant position. The fractures resulted in several centimeters of sagging of the windshield into the occupant compartment. The perimeter bond remained intact. Four additional fracture sites occurred from falling concrete block fragments as the Jeep struck and penetrated the wall of the building. Three

of the concrete block fractures were located at the base of the windshield while the fourth was located at the upper right A-pillar area.

The front door glazing was AS2 tempered glass. The left front glazing was partially open and the right front glazing was fully open during this crash event. Neither window was damaged. The operable rear door glazing panels, fixed quarter windows and the backlight were AS3 deep tint glazing. None of these glazing panels were damaged. The Jeep was equipped with an operable sunroof that was AS3 deep tint glass. This roof window was closed at the time of this multiple event crash. The roof glazing was scratched by concrete block fragments, but remained intact.

Foot Controls

The Jeep brake pedal was directly linked to the brake master cylinder via a mechanical linkage and an accelerator pedal linked to the throttle body by a cable routed through the front cowl (**Figure 12**). The brake pedal was trapezoidal with a top dimension of 13 cm (5.0 in), a bottom width of 10 cm (4.0 in), and a height of 7 cm (2.8 in). The accelerator pedal was rectangular (vertically oriented) with a length of 15 cm (6.0 in) and a width of 6 cm (1.5 in). The OEM rubber non-slip pads were in place over the steel pedals. The lateral offset from the center of the brake pedal to the center of the accelerator pedal was 15 cm (5.8 in).

Figure 12: View of the Jeep's foot controls.

The accelerator pedal was a suspended pedal with the pivot point located above the top of the pedal. The bottom aspect of the pedal was not supported and was 9 cm (3.5 in) above the floor pan. The static position of the accelerator pedal was 5 cm (2 in) below the height of the brake pedal. There was no interference or trapping of the accelerator pedal by the OEM carpet or floor/toe pan of the Jeep. At the time of this crash, the Jeep was not equipped with floor mats. Both pedals and their associated linkages operated smoothly without binding. The SCI investigator inspected and manually opened the engine compartment-mounted throttle body and found no evidence of binding; the mechanism operated smoothly.

Throttle Body

During the SCI inspection, the engine's air intake plenum was removed and the throttle body was inspected (**Figure 13**). At initial observation, the throttle plate was in a closed position (as expected). The throttle plate operated freely without binding. Electrical power was connected to the vehicle and upon rotation of the ignition key to the Run position the throttle body conducted a self-check of its operation. The vehicle's manufacturer reported that software programming in the powertrain control module (PCM) was designed to conduct this check. If the time duration and rotation of the throttle plate fell in designed parameters, the vehicle was then allowed to start. The vehicle's engine would not be permitted to start if the self-check fell outside of the envelope of required parameters. With the air intake removed, it was possible to observe the movement of the throttle plate during the self-check and this procedure was video-taped by SCI, the police investigators and the manufacturer. The engine was then started. The engine operated normally, despite leaking fluids due to crash-related damages.

Figure 13: Image of the Jeep's throttle body showing the closed position of the throttle plate at the time of the SCI inspection.

Manual Restraint Systems

The Jeep was configured for seating of five occupants with continuous loop three-point lap and shoulder seat belts for the five positions. Sliding latch plates were equipped at all positions. The driver's seat belt retracted onto an emergency locking retractor (ELR) while the remaining four systems used ELR/automatic locking retractors (ALR). Both front row seat belt systems were configured with buckle pretensioners. The driver utilized the seat belt system at the time of the crash, therefore the buckle pretensioner actuated. The unoccupied front right position pretensioner did not actuate as the system was not buckled. Both front row seat belt systems were equipped with adjustable D-rings and were in the full-up positions.

The driver utilized the seat belt system evidenced by the previously mentioned actuation of the buckle pretensioner. Subtle loading evidence consisted of frictional abrasions on the latch plate and minor waffling of the seat belt webbing. The front row right and second row seat belt systems were not in use and were stowed in their respective positions at the time of the crash and at the time of the SCI vehicle inspection.

Supplemental Restraint Systems

The Jeep was equipped with a 208-complaint frontal air bag system for the driver and front row right occupant positions. The systems consisted of dual-stage frontal air bags, seat track positioning sensors, seat belt buckle switches, buckle pretensioners, and a front row right occupant presence (weight) sensor. The system was controlled and monitored by a center tunnel-mounted ACM that had crash sensing and EDR capabilities.

The driver's frontal air bag deployed through the H-configuration module cover flaps. The module was mounted in the four-spokes of the steering wheel. The air bag was tethered internally and was directly vented to the occupant compartment by two ports located on the back side of the air bag. There was no damage or evidence of driver contact to the air bag.

The passenger's frontal air bag was a mid-mount design in the vertical surface of the right instrument panel. An SRS air bag designation was present at the upper right quadrant of the instrument panel denoting the presence and location of the air bag. Since the front row right seat was unoccupied, the CAC system provided automatic suppression of the air bag

Testing

During the SCI inspection, the police investigators started the Jeep's engine to check its operation. Although it was leaking fluids, the engine ran and operated smoothly. Four acceleration tests were conducted. A pair of tests were conducted with the transmission in "Drive" and with the brakes applied, the accelerator pedal was depressed to achieve high engine RPM. The Jeep did not move forward until the brakes were released. The brake horsepower was able to overcome the engine torque. The Jeep accelerated forward with wheel spin at both (front and rear) axles.

The second pair of tests was conducted with the transmission initially in neutral. The accelerator was then applied to high RPM and the transmission was shifted (dropped) into "Drive." It was noted that the initial wheel spin was primarily at the front axle as the Jeep accelerated forward (**Figure 14**). As the transmission was shifted to "Drive" an audible "clunk" was heard, in addition to the sound of the racing engine.

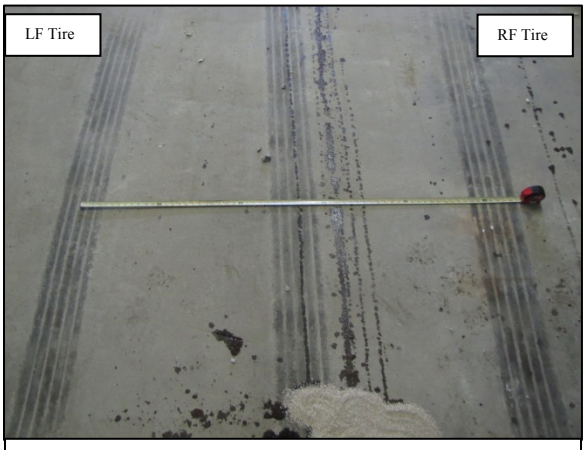


Figure 14: Image showing the front tire acceleration marks from the "Neutral-Drop Test" of the Jeep.

CONCLUSION

Everyone in attendance at the SCI inspection was in agreement that this "Neutral-Drop Test Scenario" most-likely duplicated the incident under investigation. It was theorized that the driver placed the transmission into neutral as he waited at the building entrance. The driver (potentially distracted by the buyer) then applied the accelerator to advance the Jeep into the building. When the Jeep did not respond, the driver continued to apply the accelerator further. He then realized the vehicle's transmission was in neutral and shifted the transmission into drive without first releasing the accelerator.

The driver reported in a police interview that he would typically shift a vehicle into neutral as it progressed along the auction line and let the vehicle coast at low speed. He would then shift it into drive when necessary. He was not able to recall specifically the method or manner of his operation of the Jeep in this crash.

2006 JEEP GRAND CHEROKEE OCCUPANT

Driver Demographics

Age / Sex:	76 years /male
Height:	Unknown
Weight:	Unknown
Eyewear:	None
Seat Type:	Forward-facing bucket seat
Seat Track Position:	Unknown
Manual Restraint Usage:	3-point manual lap and shoulder seat belt
Usage Source:	Vehicle inspection
Air Bags:	Front air bag available and deployed
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Exited unassisted
Transport from Scene:	Ambulance to a local hospital
Medical Treatment:	Treated and released

Driver Injuries

Injury No.	Injury	AIS 2015	Involved Physical Component	IPC Confidence
1	Right foot fracture, NFS	852004.2	Toe Pan	Probable
2	Left hand fracture, NFS	752000.2	Left instrument panel	Probable

Source: Investigating police

Driver Kinematics

The 76-year-old male belted driver of the Jeep was seated in an upright posture with the seat adjusted to a rear track position. The head restraint was adjusted 4 cm (1.5 in) above the seat back. At the on-set of the pre-crash travel into the building, the driver's left arm was resting on the top of the door with the driver's window fully open. His right foot was positioned on and depressing the accelerator pedal. Based on a review of the available surveillance videos, he did

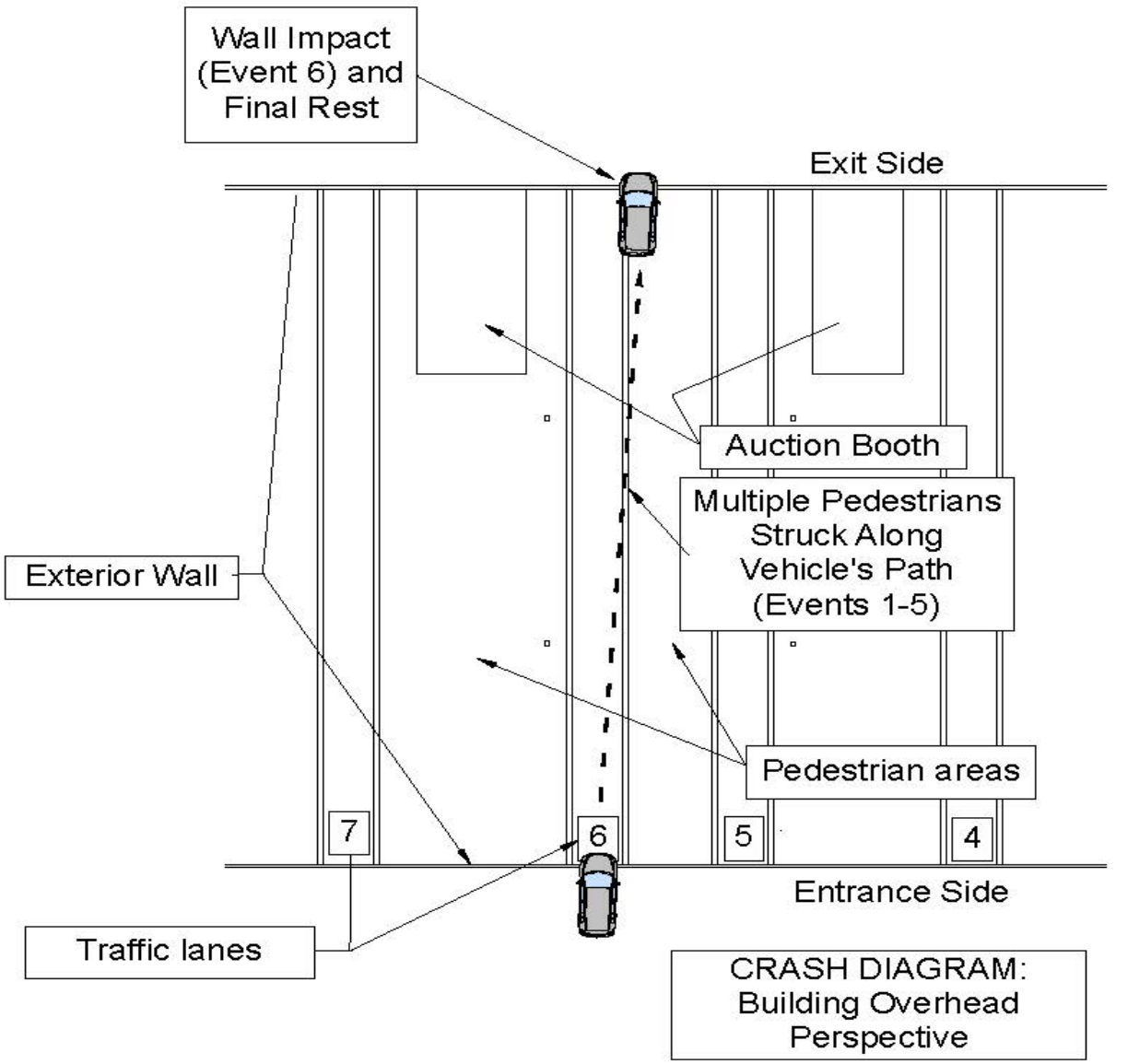
not apply the service brakes; the brake lights did not illuminate prior to impact with the building wall.

As the driver inadvertently accelerated the Jeep through the building, 13 pedestrians received injuries of varying degree. Five people were fatally injured. These impacts, although closely spaced, did not produce a sufficient deceleration of the vehicle to displace the driver from his pre-crash position in the vehicle.

The Jeep struck the building wall resulting in a crash force in the 12 o'clock direction. The acceleration from this impact actuated the driver's buckle pretensioner and deployed the driver's frontal air bag. The driver initiated a forward trajectory in response to the crash forces and loaded the seat belt system and the deployed air bag. His forward translation also loaded his lower extremities. The combination of his right foot depressing the accelerator to the floor/toe pan and the force of the impact resulted in an unspecified fracture of his right foot. His left hand was fractured as it was displaced forward and most likely impacted the instrument panel due to the impact force.

The driver then rebounded back into the driver seat coming to rest. The driver initially reported that he was not injured. In the aftermath of the crash event, he was eventually transported to a hospital where he was treated and released.

CRASH DIAGRAM



	NHTSA www.nhtsa.gov
Case Number:	CR17008

APPENDIX A:
2006 Jeep Grand Cherokee Event Data Recorder 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 User	1J4HR58236C******
Case Number EDR Data Imaging Date Crash Date	
Filename Saved on	CR17008_V1_ACM.CDRX
Imaged with CDR version Imaged with Software Licensed to (Company Name) Reported with CDR version Reported with Software Licensed to (Company Name)	Crash Data Retrieval Tool 17.3 Company Name information was removed when this file was saved without VIN sequence number Crash Data Retrieval Tool 17.6.1 NHTSA
EDR Device Type Event(s) recovered	Airbag Control Module Not retrievable by CDR tool

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 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 RotationClockwise 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:
  - 2006 - 2007 Grand Cherokee
  - 2006 - 2007 Commander
  - 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, an event will be stored when the delta V is approximately 5 mph (8 km/h) or greater 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/Dodge Grand Caravan/Lancia Voyager, 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

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 that affect the system functionality; "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, the tire location, 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_r022

System Status at Retrieval

Original VIN	1J4HR58236C******
Airbag Control Module Part Number	04896018AB
Airbag Control Module Serial Number	T52MD182539183a
Airbag Control Module Supplier	Bosch

System Configuration at Retrieval

Configured for Driver Seatbelt Switch	No
Configured for Front Center Seatbelt Switch	No
Configured for Front Passenger Seatbelt Switch	No
Configured for 2nd Row Left Seatbelt Switch	No
Configured for 2nd Row Center Seatbelt Switch	No
Configured for 2nd Row Right Seatbelt Switch	No
Configured for 3rd Row Left Seatbelt Switch	No
Configured for 3rd Row Center Seatbelt Switch	No
Configured for 3rd Row Right Seatbelt Switch	No
Configured for Driver Knee Airbag	No
Configured for Left Curtain #1	No
Configured for Right Curtain #1	No
Configured for Left Curtain #2	No
Configured for Right Curtain #2	No
Configured for Front Driver Seatbelt Pretensioner	Yes
Configured for Front Center Seatbelt Pretensioner	No
Configured for Front Passenger Seatbelt Pretensioner	Yes
Configured for 2nd Row Left Seatbelt Pretensioner	No
Configured for 2nd Row Center Seatbelt Pretensioner	No
Configured for 2nd Row Right Seatbelt Pretensioner	No
Configured for 3rd Row Left Seatbelt Pretensioner	No
Configured for 3rd Row Center Seatbelt Pretensioner	No
Configured for 3rd Row Right Seatbelt Pretensioner	No
Configured for Left Side Sensor #1	No
Configured for Left Side Sensor #2	No
Configured for Left Side Sensor #3	No
Configured for Right Side Sensor #1	No
Configured for Right Side Sensor #2	No
Configured for Right Side Sensor #3	No
Configured for Left Up Front Sensor	Yes
Configured for Right Up Front Sensor	Yes
Configured for Front Driver Digressive Load Limiter	No
Configured for Front Passenger Digressive Load Limiter	No
Configured for Driver Seat Track Position Sensor	Yes
Configured for Front Passenger Seat Track Position Sensor	Yes
Configured for Passenger Airbag Disable Switch	No
Configured for Front Passenger Occupant Classification System	Yes

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 01 52 FF 00 00 05 E3 01 30 34 38 39 36 30 31 38 41 42

5A 88 31 4A 34 48 52 35 38 32 33 36 43 2A 2A 2A 2A 2A 2A

5A 90 00 00 00 00 00 35 38 32 33 36 43 2A 2A 2A 2A 2A 2A

61 E1 54 35 32 4D 44 31 38 32 35 33 39 31 38 33

61 EA 00 80 02 C0 EC

73 E2 67 94 F6 9B 0A FF FF 9B 0E FF FF 9B A6 FF FF 92 04 FF FF 92 06 FF FF D4 15 FF FF D4 14
FF FF C0 19 FF FF

7F 31 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

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U.S. Department
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**National Highway
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