CRASH DATA RESEARCH CENTER
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CALSPAN ON-SITE ROLLOVER CRASH INVESTIGATION
SCI CASE NO: CA09084

VEHICLE: 2009 CADILLAC SRX

LOCATION: NORTH CAROLINA

CRASH DATE: OCTOBER 2009

Contract No. DTNH22-07-C-00043

Prepared for:

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National Highway Traffic Safety Administration
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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.

TECHNICAL REPORT STANDARD TITLE PAGE

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16. Abstract This on-site investigation focused on the rollover crash of a 2009 Cadillac SRX that was involved in a multiple event crash sequence. The Cadillac was equipped with four-wheel anti-lock brakes, Electronic Stability Control (ESC), a Certified Advanced 208-Compliant (CAC) frontal air bag system, front seat-mounted side impact air bags and combination side impact/rollover sensing Inflatable Curtain (IC) air bags. The manufacturer of the Cadillac has certified that the vehicle was compliant to the advanced air bag portion of Federal Motor Vehicle Safety Standard (FMVSS) 208. The CAC system included dual-stage frontal air bags for the driver and right front passenger positions, seat track positioning sensors, safety belt buckle switch sensors, buckle pretensioners, and a front right occupant presence sensor. The Cadillac was impacted on the right side in an intersection by a 2002 Saturn VUE and subsequently initiated a left side leading 2-quarter turn tripped rollover within the intersection. The inflatable curtains on both sides and the right impact side air bag deployed. The 78-year-old female driver of the Cadillac sustained minor-severity soft tissue injuries. She was transported in a bystander's vehicle to a regional trauma center where she was treated in the emergency department and released the same day.			
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BACKGROUND

This on-site investigation focused on the rollover crash of a 2009 Cadillac SRX **(Figure 1)** that was involved in a multiple event crash sequence. The Cadillac was equipped with four-wheel anti-lock brakes, Electronic Stability Control (ESC), a Certified Advanced 208-Compliant (CAC) frontal air bag system, front seat-mounted side impact air bags and combination side impact/rollover sensing Inflatable Curtain (IC) air bags. The manufacturer of the Cadillac has certified that the vehicle was compliant to the advanced air bag portion of Federal Motor Vehicle Safety Standard (FMVSS) 208. The CAC system included dual-stage frontal air bags for the driver and right front passenger positions, seat track positioning sensors, safety belt buckle switch sensors, buckle pretensioners, and a front right occupant presence sensor. The Cadillac was impacted on the right side in an intersection by a 2002 Saturn VUE and subsequently initiated a left side leading 2-quarter turn tripped rollover within the intersection. The inflatable curtains on both sides and the right impact side air bag deployed. The 78-year-old female driver of the Cadillac sustained minor-severity soft tissue injuries. She was transported in a bystander's vehicle to a regional trauma center where she was treated in the emergency department and released the same day.

Figure 1: Front right oblique view of the 2009 Cadillac SRX.

The crash was identified through a visit to a regional vehicle salvage facility on December 7, 2009. An image of the Cadillac was forwarded to the Calspan Special Crash Investigations (SCI) team for review on the same day. Based on the rollover of the vehicle and the deployment of the side impact and IC air bags, this case was assigned for an on-site investigation on December 8, 2009. The on-site investigation was initiated on December 8, 2009. The investigation involved the inspection and documentation of the Cadillac and the Saturn, a detailed interview with the driver of the Cadillac, and the documentation of the crash site. In addition, the Event Data Recorders (EDR's) in the Cadillac and the Saturn were imaged during the inspections.

SUMMARY

Crash Site

This crash occurred during daylight hours of October 2009. At the time of the crash, the environmental conditions were dry and clear. The crash occurred at the intersection of a multiple lane divided east/west asphalt road and a 3-lane north/south asphalt road. The east and westbound traffic lanes were divided by grass medians. The westbound roadway consisted of three travel lanes. The outboard and center westbound lanes were configured for right turning and west traffic. The inboard lane was configured for left turning traffic. The eastbound roadway consisted of four travel lanes. The outboard east lane was configured for right turning and east traffic, the two center lanes were configured for traffic passing straight through the intersection and the inboard lane was for left turning traffic. The intersection was bordered by a concrete curbs on all sides with the exception of the north side of the westbound travel lanes which were bordered by grass. The westbound approach to the intersection consisted of a right curve and a positive grade of 1.6 percent. The eastbound roadway approaching the intersection was straight and had a positive grade of 3.2 percent. The posted speed limit in the area of the crash was 72 km/h (45 mph). The Scene Schematic is included as **Figure 9** of this report.

Vehicle Data

2009 Cadillac SRX

The 2009 Cadillac SRX SUV was manufactured in August, 2008 and was identified by the Vehicle Identification Number (VIN): 1GYEE637490 (production sequence deleted). The vehicle was purchased new in March 2009 by the driver and had been driven approximately 9,334 km (5,800 mi) prior to the crash.

The rear-wheel drive Cadillac was powered by a 3.6-liter, V6 engine linked to a five-speed automatic transmission. The braking system consisted of power-assisted front and rear disc brakes with four-wheel anti-lock and emergency brake assist. The Cadillac was equipped with traction control, Electronic Stability Control (ESC), and a direct Tire Pressure Monitoring System (TPMS). The driver reported in the SCI interview that there were no TPMS warnings on the instrument panel prior to the crash. All windows were closed prior to the crash, evidenced by the presence of glass fragments in the upper areas of the window moldings on windows that disintegrated due to impact forces. The Cadillac was equipped with Goodyear Eagle RS-A tires on 17-inch OEM alloy wheels. The manufacturer recommended tire sizes were P235/65R17 for the front axle and P255/60R17 for the rear axle. The manufacturer recommended cold tire pressure was 221 kPa (32 PSI) for the front and rear. The tires mounted on the Cadillac matched the manufacturer recommended tire size. The specific tire data at the time of the SCI inspection was as follows:

Position	Measured Tire Pressure	Measured Tread Depth	Damage
Left Front	186 kPa (27 PSI)	8 mm (10/32 in)	None
Left Rear	117 kPa (17 PSI)	6 mm (8/32 in)	None
Right Front	186 kPa (27 PSI)	8 mm (10/32 in)	None
Right Rear	179 kPa (26 PSI)	6 mm (7/32 in)	None

The interior of the Cadillac was configured with leather-surfaced seven-passenger seating. The front bucket seats were separated by a center console and equipped with adjustable head restraints. Both restraints were in the full-down position at the time of the SCI inspection. The driver seat track was adjusted 7 cm (2.8 in) forward of the full-rear position. The driver seat back was at an angle 22 degrees aft of vertical. The front right seat track was adjusted 5 cm (2 in) forward of the full-rear position and the seat back angle was 21 degrees aft. The second row consisted of a split bench seat with folding backs, and the third row consisted of a bench seat with a folding back. The outboard rear seats were equipped with adjustable head restraints in the full down position. The third row bench was folded flat into the cargo floor at the time of the crash. This was supported by the driver interview. The accelerator and brake pedals were adjustable and were in a mid position of travel at the time of the SCI inspection, 3 cm forward of full-rear on the adjustment track.

The interior occupant safety systems consisted of 3-point lap and shoulder belts for the seven designated seating positions, front seat safety belt buckle pretensioners, dual stage CAC frontal air bags, side impact air bags in the outboard aspects of the front seats, and IC air bags that provided protection for the first and second row outboard seating positions.

2002 Saturn VUE

The 2002 Saturn VUE was manufactured in January, 2002 and was identified by the VIN: 5GZCZ63B92S (production sequence deleted). The all-wheel drive Saturn was powered by a 3.0-liter, V6 engine linked to a five-speed automatic transmission. The braking system consisted of power-assisted front disc and rear drum brakes with four-wheel antilock and electronic brakeforce distribution. The Saturn was equipped with four Bridgestone Dueler H/T tires mounted on OEM five-spoke alloy wheels. All tires were size P235/65R16, which matched the vehicle manufacturer recommended tire size. The manufacturer recommended cold tire pressure was 207 kPa (30 PSI) for the front and rear. The specific tire data at the time of the SCI inspection was as follows:

Position	Measured Tire Pressure	Measured Tread Depth	Damage
Left Front	165 kPa (24 PSI)	2 mm (2/32 in)	None
Left Rear	179 kPa (26 PSI)	3 mm (4/32 in)	None
Right Front	165 kPa (24 PSI)	2 mm (2/32 in)	None
Right Rear	159 kPa (23 PSI)	3 mm (4/32 in)	None

Crash Sequence

Pre-crash

The Cadillac was westbound driven by a restrained 78-year-old female. The vehicle was stopped in left turn lane waiting for traffic to clear the intersection in order to complete the turn and travel south. The traffic signal was on a green phase for the east/west traffic flow. **Figure 2** depicts the Cadillac's pre-crash trajectory. The imaged EDR data supported the pre-crash movements of the vehicle. The Saturn was eastbound driven by an unrestrained 42-year-old female. The female driver was approaching the intersection on the inboard center lane of the roadway.

Figure 2: Pre-crash trajectory of the Cadillac.

The Cadillac entered the intersection and the driver initiated a left turn across the eastbound travel lanes. The Cadillac driver indicated in the SCI interview that she had been waved through the intersection by the driver of a non-contact vehicle that was stopped due to backed-up traffic. She stated that she did not observe the Saturn prior to entering the intersection, and when she did detect the Saturn, she did not have time to initiate an avoidance maneuver. The Cadillac EDR data indicated the vehicle had accelerated to 14 km/h (9 mph) 0.5 sec prior to Algorithm Enable (AE). The Saturn entered the intersection at an EDR reported speed of 69 km/h 43 mph 2 seconds prior to AE. The Saturn EDR data also indicated that the driver of the Saturn initiated a braking input 2 seconds prior to AE.

Crash

The front plane of the Saturn impacted the right plane of the Cadillac within the intersection. The direction of force was within the 1 o'clock sector for the Cadillac and within the 11 o'clock sector for the Saturn. The force of the impact actuated the driver and passenger's safety belt buckle pretensioners, the right side impact air bag and the IC air bags of the Cadillac. The frontal air bags in the Saturn also deployed. The Damage Algorithm of the WinSMASH

program was used to calculate the severity of the crash (delta-V). The total delta-V for the Cadillac was 18 km/h (11.2 mph). The longitudinal and lateral delta-V components were -13.8 km/h (-8.6 mph) and -11.6 km/h (-7.2 mph), respectively. The Cadillac's EDR recorded a maximum velocity change of -6.1 km/h (-3.8 mph) longitudinally and -19.5 km/h (-12.1 mph) laterally. The calculated total delta-V for the Saturn was 21 km/h (13.1 mph) with longitudinal and lateral components of -19.7 km/h (-12.2 mph) and 7.2 km/h (4.5 mph), respectively. The Saturn's EDR recorded a maximum longitudinal velocity change of -36.4 km/h (-22.6 mph).

The momentum of the Saturn and the angle of the impact displaced the Cadillac to the left subsequent to the initial impact. The left tires of the Cadillac tripped on the asphalt of the roadway and the Cadillac initiated a left side leading rollover in the intersection. Asphalt was observed embedded within the rims of both left side wheels during the SCI inspection. The Cadillac rolled two quarter turns to the left for a distance of approximately 9 m (29.5 ft). The rollover was not interrupted. The Cadillac came to rest on its roof facing southwest in the southeast corner of the intersection. The Saturn's trajectory was redirected approximately 20 degrees to its right and the vehicle came to rest in the southeast corner of the intersection facing southeast.

Post-Crash

Police, emergency medical and tow personnel responded to the crash site. The driver of the Cadillac stated in the interview that the first person to reach her vehicle was an employee of the hospital that was located adjacent to the intersection in which the crash occurred. He opened the driver's door of the Cadillac and assisted the driver in unbuckling her safety belt and exiting the vehicle on her hands and knees. The driver sustained soft tissue injuries as a result of the crash and also during her exit of the vehicle. She was evaluated in an ambulance at the scene and the medical personnel recommended that she be transported to the nearby trauma center. The employee, who had assisted the driver of the Cadillac in exiting the vehicle, transported her to the nearby emergency department in his personal vehicle. She was treated in the emergency department and released the same day. The driver and rear left passenger of the Saturn were transported by ambulance to the nearby emergency department. Both vehicles were towed from the scene due to disabling damage. The Cadillac and the Saturn were later transferred to regional vehicle salvage facilities for auction, where they were inspected.

2009 Cadillac SRX

Exterior Damage

The right, left and top plane of the Cadillac sustained moderate-severity damage as a result of this multiple event crash sequence. The right plane of the Cadillac sustained direct contact damage across both doors as a result of the impact with the Saturn (Event 1). **Figure 3** depicts the initial impact damage. The direct contact damage began 37 cm (14.6 in) forward of the right rear axle and extended forward 172 cm (67.7 in). The maximum crush was located 71 cm (28 in) forward of the right rear axle and measured 19 cm (7.5 in). The height of the maximum crush above the ground was 55 cm (21.6 in). The Door-Sill Differential (DSD) was 5 cm (2.0 in). The combined direct and induced damage (Field L) began 16 cm (6.3 in) rear of the right rear axle and extended forward 274 cm (107.9 in). The residual crush profile resulting from the initial impact was as follows: C1 = 0 cm, C2 = 0 cm, C3 = 16 cm (6.3 in), C4 = 14 cm (5.5 in), C5 = 10 cm (3.9 in), C6 = 0 cm. The Collision Deformation Classification (CDC) assigned for the initial impact to the Cadillac was 01RPEW2.

Figure 3: Right side damage to the Cadillac.

The exterior of the Cadillac sustained severe-severity damage to the top plane as a result of the rollover (Event 2). **Figure 4** depicts the rollover damage sustained by the Cadillac. The direct contact to the top plane extended 126 cm (49.6 in) laterally from roof side rail to roof side rail and 430 cm (169.3 in) from the leading edge of the hood rearward to the backlight header. The maximum vertical crush was located on the windshield header, 17 cm (6.7 in) inboard of the left roof side rail. The maximum vertical crush measured 21 cm (8.3 in). The maximum lateral crush was located at the junction of the left A-pillar and the windshield header, and measured 6 cm (2.4 in). The windshield glazing was completely fractured, with more significant damage along the upper aspect of the windshield and near the left A-pillar. There were no laminate tears in the windshield. The front door glazing on both sides, the left rear glazing adjacent to the cargo area, the backlight glazing and the roof glazing disintegrated during the crash sequence. The right side rear glazing and

Figure 4: Rollover damage to the left and top planes of the Cadillac.

the left rear door glazing were not damaged during the crash. All four doors remained closed during the crash. The left doors and tailgate were operational post-crash. The right doors were jammed closed post-crash. The CDC assigned for the rollover event was 00TDDO4.

Event Data Recorder

The EDR of the Cadillac was imaged at the time of the inspection by applying external 12-volt power to the vehicle and imaging the data through the Diagnostic Link Connector (DLC) located under the left instrument panel via the Bosch Crash Data Retrieval tool and software version 3.3. The data was reanalyzed and reported with version 3.4. The recovered data indicated a deployment event had been stored in the module. The EDR recorded 2.5 seconds of pre-crash data that was related to the deployment event. The imaged EDR data supported the driver's statement in the SCI interview that she was at a complete stop and then accelerated into the intersection, making a left turn. The EDR reported speed of the Cadillac was 2 km/h (1 mph) 2.5 seconds prior to AE and that the vehicle accelerated to 14 km/h (9 mph) 0.5 seconds prior to AE. The side impact crash resulted in the actuation of the front safety belt pretensioners and the deployment of the right side impact air bag and both IC air bags. The rollover sensor detected a rollover event at the time of the air bag deployments. The time between the rollover event enable to the deployment was 0 milliseconds. **Attachment A** at the end of this report is the data file imaged from the EDR of the Cadillac.

Interior Damage

The Cadillac sustained moderate-severity interior damage that was attributed to passenger compartment intrusion, occupant contact and air bag deployment. There was smeared body fluid on the interior aspect of the left IC air bag adjacent to the driver's seat. There was a scuff mark located on the left side of the center instrument panel located 1-9 cm (0.4-3.5 in) behind the front corner of the center instrument panel and 30-41 cm (11.8-16.1 in) above the floor. This instrument panel contact was attributed to the driver's right knee. A scuff mark was also present on the roof above the front left seat. It was located 5-10 cm (2-3.9 in) forward of the front left corner of the sunroof opening and 1 cm (0.4 in) inboard of the front left corner of the sunroof opening extending left 9 cm (3.5 in). The intrusion to the Cadillac is listed on the following table:

Position	Component	Direction	Magnitude
Row 1 Left	Windshield header	Vertical	20 cm (7.9 in)
Row 1 Left	Roof	Vertical	20 cm (7.9 in)
Row 1 Left	Roof side rail	Lateral	10 cm (3.9 in)
Row 1 Left	A-pillar	Lateral	10 cm (3.9 in)
Row 1 Center	Windshield header	Vertical	14 cm (5.5 in)
Row 1 Center	Roof	Vertical	16 cm (6.3 in)
Row 1 Right	Roof	Vertical	8 cm (3.1 in)

Position	Component	Direction	Magnitude
Row 1 Right	Windshield Header	Vertical	5 cm (2 in)
Row 1 Right	Door, rear lower quadrant	Lateral	6 cm (2.4 in)
Row 1 Right	B-pillar	Lateral	6 cm (2.4 in)
Row 1 Right	Floor pan	Vertical	7 cm (2.8 in)
Row 2 Right	Door, forward lower quadrant	Lateral	6 cm (2.4 in)
Row 2 Right	Floor pan	Vertical	10 cm (3.9 in)

Manual Restraint Systems

The Cadillac was equipped with 3-point manual lap and shoulder belts for the seven designated seating positions. All belt systems utilized continuous loop webbing. The front row and center second row safety belts were integrated into the seat backs. The driver's belt system utilized a sliding latch plate and a buckle mounted pretensioner. The pretensioner actuated during the crash and lowered the buckle height by 3 cm (1.2 in). The driver's belt retracted onto an Emergency Locking Retractor (ELR). The driver used the safety belt at the time of the crash, which was supported by loading evidence on the belt webbing. A 3 cm (1.2 in) frictional abrasion attributed to the latch plate was located 60-63 cm (23.6-24.8 in) above the lower seat anchor. The belt traveled smoothly into and out of the retractor at the time of the SCI inspection.

The front right, second and third row safety belt systems utilized a switchable ELR/Automatic Locking Retractor (ALR) with sliding latch plates. In addition, the front right belt system utilized a buckle pretensioner which actuated during the crash, lowering the buckle height by 3 cm (1.2 in).

Frontal Air Bag System

The Cadillac was equipped with a CAC frontal air bag system. The manufacturer of the Cadillac has certified that the vehicle is compliant to the advanced air bag portion of Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The CAC system includes dual-stage frontal air bags for the driver and front right passenger positions, seat track positioning sensors, buckle pretensioners, a front right occupant presence sensor, and safety belt buckle switch sensors. The driver's air bag was concealed within the center hub of the three-spoke steering wheel. The front right passenger's air bag was concealed within the top aspect of the right instrument panel. The frontal air bags did not deploy in this crash.

Side Impact Air Bag System

The Cadillac was equipped with front seat-mounted side impact air bags and combination side impact/roll sensing, roof side rail-mounted IC air bags. The IC air bags provided protection from the roof side rail down to the belt line for the first and second row outboard seats. There was no inflatable side protection present for the third row. The left and right IC air bags and right side

impact air bag deployed in this multiple impact crash sequence. The left side impact air bag did not deploy.

The right side impact air bag deployed from a plastic panel measuring 11 x 22 cm (4.3 x 8.7 in) in the outboard aspect of the front right seat back. The air bag measured 31 cm (12.2 in) in width and 46 cm (18.1 in) in height. The side air bag contained one vent port on the outboard aspect at the 3 o'clock position and had no internal tethers. There was no damage or contact evidence on the side air bag.

The left and right IC air bags deployed from their respective roof side rails. The IC consisted of a tubular air bag contained within a sling, forming a curtain-type air bag. The tubular air bag measured 144 cm (56.7 in) in length and 14 cm (5.5 in) in diameter and was attached to the A- and C-pillars, providing longitudinal coverage across the left side glazing in the first and second rows. The sling held the air bag at the belt line in the front and second row, 40 cm (15.7 in) below the roof side rails, and allowed it to drape down to 4 cm (1.6 in) below the belt line at the B-pillar. There was a rectangular void forward of and below the IC air bags at the A-pillar that measured 15 cm (5.9 in) in height and 37 cm (14.6 in) in width.

The left IC air bag contained post-crash body fluid on the inboard side in the first row. This body fluid was located 0-22 cm (0-8.7 in) above the lower edge of the air bag and 17-43 cm (6.7-16.9 in) aft of the front edge of the air bag and was attributed to the glass cuts on the palms of the driver's hands as she crawled out of the vehicle after it came to final rest. There was an abrasion on the outboard aspect of the left curtain located 0-11 cm (0-4.3 in) above the lower edge of the air bag and 0-38 cm (0-15 in) aft of the front edge of the air bag. This abrasion was attributed to contact with the ground and the disintegrated glass fragments from the front left window as the Cadillac rolled. **Figure 5** depicts this abrasion. There was no damage or contact evidence on the right curtain air bag. **Figures 6 and 7** are overall interior views depicting the IC air bags.

Figure 5: Abrasion to the outer aspect of the left curtain.

Figure 6: Left IC air bag of the Cadillac SRX.

Figure 7: Right IC air bag.

2002 Saturn VUE

Exterior Damage

The front plane of the Saturn sustained moderate-severity damage as a result of the impact with the Cadillac **(Figure 8)**. The direct damage extended from the front left bumper corner to the front right bumper corner of the Saturn. The maximum crush was located at C3; 15 cm (5.9 in) left of the vehicle centerline and measured 15 cm (5.9 in). A crush profile was documented along the full width of the damaged front bumper. This crush profile was as follows: C1 = 10 cm (3.9 in), C2 = 13 cm (5.1 in), C3 = 15 cm (5.9 in), C4 = 14 cm (5.5 in), C5 = 14 cm (5.5 in), C6 = 12 cm (4.7 in). The CDC assigned for this impact was 11FDEW1.

Figure 8: Frontal damage to the Saturn.

Event Data Recorder

The EDR of the Saturn was imaged at the time of the inspection by applying external 12-volt power to the vehicle and imaging the data through the DLC located under the left instrument panel via the Bosch CDR tool and software version 3.3. The data was reanalyzed and reported with version 3.4. The recovered data indicated a deployment event and a non-deployment event had been stored in the module. Based on the "Off" status of the warning lamp and the pre-crash data tables, the non-deployment preceded the deployment event. The time between the events was unknown. The speed of the Saturn was 69 km/h (43 mph) 2 seconds prior to AE. The EDR data indicated that the driver of the Saturn detected the imminent crash and applied the brakes 1 second prior to AE. **Attachment B** at the end of this report is the data file imaged from the EDR of the Saturn.

2009 Cadillac SRX Driver Demographics/Data

Age/Sex:	78-year old/Female
Height:	170 cm (67 in)
Weight:	59 kg (130 lb)
Eyewear:	Prescription glasses
Seat Track Position:	Mid-track – 7 cm (2.8 in) forward of full-rear
Manual Safety Belt Use:	Lap and shoulder belt
Usage Source:	SCI interior vehicle inspection
Egress from Vehicle:	Assisted by bystander
Mode of Transport from Scene:	Personal vehicle to nearby trauma center ER
Type of Medical Treatment:	Treated in emergency department and released

Driver Injuries

Injury	Injury Severity (AIS 90/Update 98)	Injury Source
Small abrasion on left hand (1)	Minor (790202.1,2)	Disintegrated glass
20 cm contusion on outer lateral aspect of right leg - lower thigh to upper calf (2)	Minor (890402.1,1)	Center instrument panel
15 cm contusion on top of left shoulder, extending down upper arm (2)	Minor (790402.1,2)	Left door panel – rear upper quadrant

Source of injury data = Emergency Room records (1) and Driver Interview (2)

Driver Kinematics

The 78-year-old female driver of the Cadillac was seated in a mid-track position 7 cm (2.8 in) forward of full-rear. She was turning left at an intersection into which a traffic back-up had occurred. Non-contact vehicles, stopped at the intersection in the oncoming direction, had left space for turning vehicles to proceed through the intersection. One of the stopped drivers waved the driver of the Cadillac through the intersection. The driver of the Cadillac did not see the approaching Saturn and entered the intersection. She was accelerating slowly and did not initiate an avoidance maneuver prior to the initial impact.

The right side impact actuated the driver's pretensioner deployed the right side impact air bag and the IC air bags. In response to the impact force, the driver initiated a right and forward trajectory and loaded the belt system. Her right leg impacted the center instrument panel resulting in the contusion to the front and right side of her right knee area. As the Cadillac began to roll to the left, the driver continued loading the safety belt as the vehicle rolled around her. When the roof of the vehicle impacted the ground, the driver initiated a vertical and left rebound trajectory within the front left seating position. The roof over the front left seat intruded

vertically towards the driver's head, and she contacted the roof with her head evidenced by a scuff mark. This contact did not result in an injury. The driver's left shoulder loaded the left door and air bag, resulting in a contusion to her left shoulder and (driver-reported) aggravation of arthritis previously present in her left rotator cuff. Disintegrated glass from the front left window entered the passenger compartment, impacting the dorsal side of the driver's left hand and resulting in a small abrasion to the top of her left hand.

After the vehicle came to final rest on its roof, the driver was hanging inverted in the safety belt. A bystander was able to open the driver's door and assist her in unbuckling her safety belt and onto the roof of the inverted vehicle. She crawled out through the open driver's door on her hands and knees, resulting in the minor lacerations to the palms of her hands from crawling on the broken glass. The driver deposited body fluid on the left side curtain structure as she exited the vehicle. She walked to the curb and sat until emergency medical personnel arrived.

The driver of the Cadillac was checked by emergency personnel that arrived on scene and it was determined that due to her injuries, the crash dynamics and her elevated blood pressure that she should be transported to a nearby trauma center emergency department. There were other injured occupants from the Saturn that required attention from the ambulance personnel; therefore, the bystander that assisted the driver of the Cadillac from the vehicle transported her the short distance to the trauma center emergency department entrance in his personal vehicle. The driver of the Cadillac was treated in the emergency department for soft tissue injuries and released the same day.

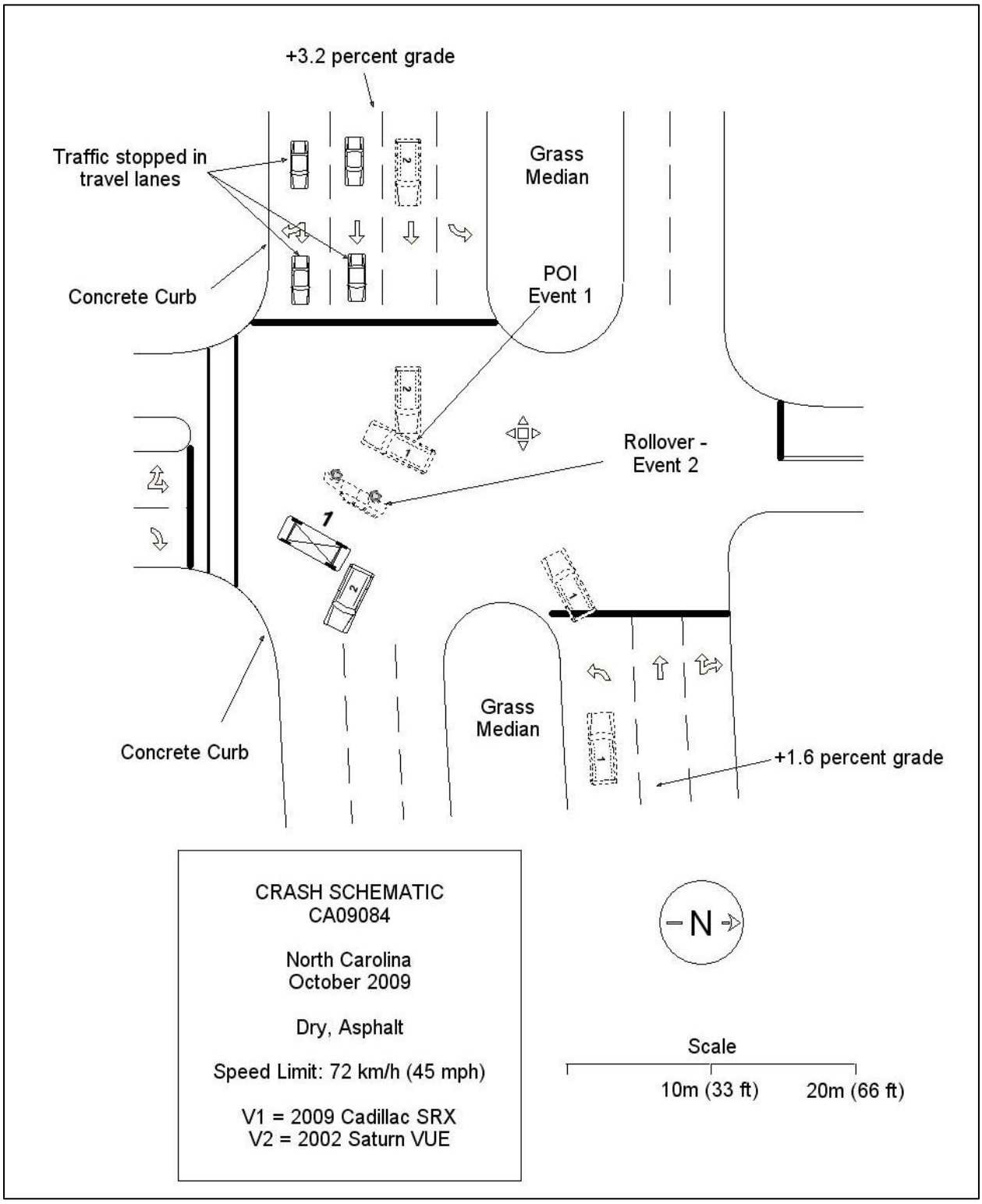


Figure 9: Crash Schematic

ATTACHMENT A:

2009 Cadillac SRX EDR Data

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	1GYEE637490******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CA09084_V1.CDR
Saved on	Tuesday, December 8 2009 at 01:46:36 PM
Collected with CDR version	Crash Data Retrieval Tool 3.3
Reported with CDR version	Crash Data Retrieval Tool 3.4
EDR Device Type	airbag control module
Event(s) recovered	Deployment

Comments

No comments entered.

Data Limitations

Recorded Crash Events:

There are two types of recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). The minimum SDM Recorded Vehicle Velocity Change, that is needed to record a Non-Deployment Event, is five MPH. A Non-Deployment Event may contain Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded vehicle velocity change. This event will be cleared by the SDM, after approximately 250 ignition cycles. This event can be overwritten by a second Deployment Event, referred to as Deployment Event #2, if the Non-Deployment Event is not locked. The data in the Non-Deployment Event file will be locked, if the Non-Deployment Event occurred within five seconds of a Deployment Event. A locked Non Deployment Event cannot be overwritten or cleared by the SDM.

The second type of SDM recorded crash event is the Deployment Event. It also may contain Pre-Crash and Crash data. The SDM can store up to two different Deployment Events. If a second Deployment Event occurs any time after the Deployment Event, the Deployment Event #2 will overwrite any non-locked Non-Deployment Event. Deployment Events cannot be overwritten or cleared by the SDM. Once the SDM has deployed an air bag, the SDM must be replaced.

Data:

-SDM Recorded Vehicle Velocity Change reflects the change in velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. For Deployment Events, the SDM will record 220 milliseconds of data after deployment criteria is met and up to 70 milliseconds before deployment criteria is met. For Non-Deployment Events, the SDM can record up to the first 300 milliseconds of data after algorithm enable. Velocity Change data is displayed in SAE sign convention.

-The CDR tool displays time from Algorithm Enable (AE) to time of deployment command in a deployment event and AE to time of maximum SDM recorded vehicle velocity change in a non-deployment event. Time from AE begins when the first air bag system enable threshold is met and ends when deployment command criteria is met or at maximum SDM recorded vehicle velocity change. Air bag systems such as frontal, side, or rollover, may be a source of an enable. The time represented in a CDR report can be that of the enable of one air bag system to the deployment time of another air bag system.

-Maximum Recorded Vehicle Velocity Change is the maximum square root value of the sum of the squares for the vehicle's combined "X" and "Y" axis change in velocity.

-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.

-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:
- -significant changes in the tire's rolling radius
- -final drive axle ratio changes
- -wheel lockup and wheel slip

-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.

-Pre-Crash data is recorded asynchronously.

-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if:
- -the SDM receives a message with an "invalid" flag from the module sending the pre-crash data
- -no data is received from the module sending the pre-crash data

-no module is present to send the pre-crash data
-Driver's and Passenger's Belt Switch Circuit Status indicates the status of the seat belt switch circuit.
-The Time Between Non-Deployment to Deployment Events is displayed in seconds. If the time between the two events is greater than five seconds, "N/A" is displayed in place of the time. If the value is negative, then the Deployment Event occurred first. If the value is positive, then the Non-Deployment Event occurred first.
-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.
-The ignition cycle counter relies upon the transitions through OFF->RUN->CRANK power-moding messages, on the GMLAN communication bus, to increment the counter. Applying and removing of battery power to the module will not increment the ignition cycle counter.
-All data should be examined in conjunction with other available physical evidence from the vehicle and scene

Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by various vehicle control modules, via the vehicle's communication network.
-The Belt Switch Circuit is wired directly to the SDM.

01005_SDMC-delphi_r001

Multiple Event Data

Associated Events Not Recorded	0
An Event(s) Preceded the Recorded Event(s)	No
An Event(s) was in Between the Recorded Event(s)	No
An Event(s) Followed the Recorded Event(s)	No
The Event(s) Not Recorded was a Deployment Event(s)	No
The Event(s) Not Recorded was a Non-Deployment Event(s)	No

System Status At AE

Low Tire Pressure Warning Lamp (If Equipped)	OFF
Vehicle Power Mode Status	Run
Remote Start Status (If Equipped)	Inactive
Run/Crank Ignition Switch Logic Level	Active

Pre-crash data

Parameter	-1.0 sec	-0.5 sec
Reduced Engine Power Mode	OFF	OFF
Cruise Control Active (If Equipped)	No	No
Cruise Control Resume Switch Active (If Equipped)	No	No
Cruise Control Set Switch Active (If Equipped)	No	No
Engine Torque (foot pounds)	94.41	94.41

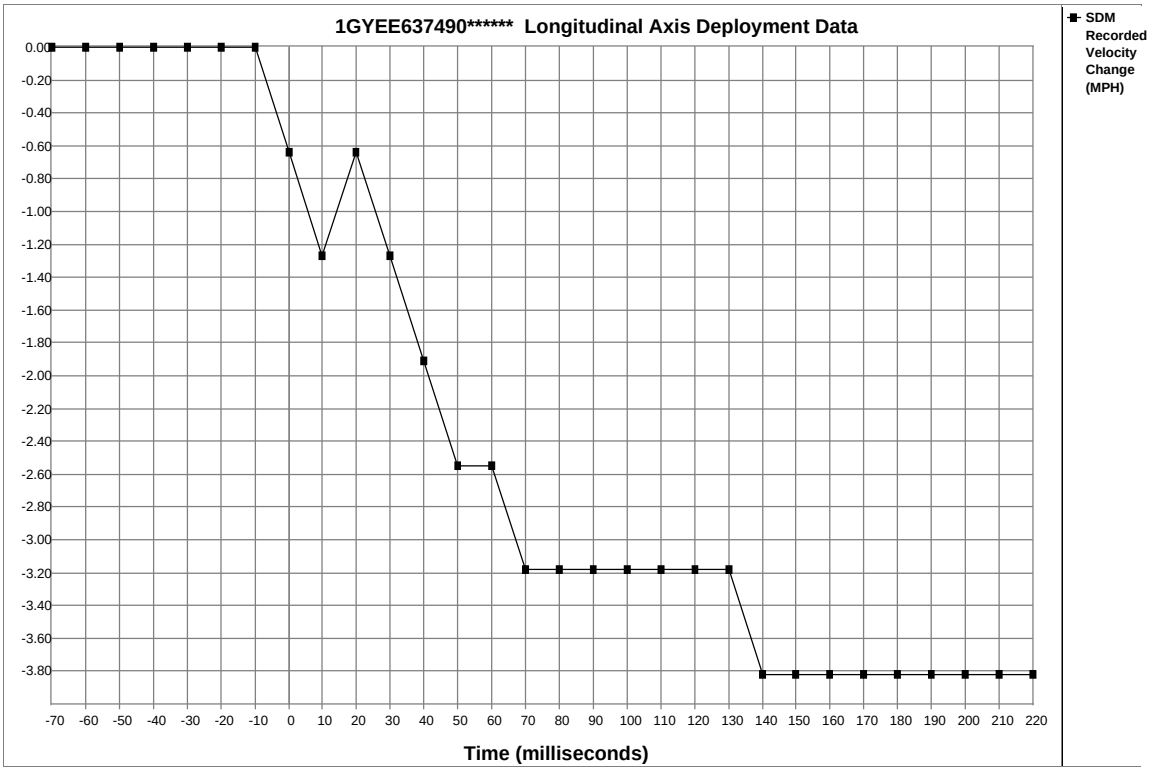
Pre-Crash Data

Parameter	-2.5 sec	-2.0 sec	-1.5 sec	-1.0 sec	-0.5 sec
Accelerator Pedal Position (percent)	11	11	11	11	11
Vehicle Speed (MPH)	1	3	6	7	9
Engine Speed (RPM)	1600	1664	1664	1728	1792
Percent Throttle	31	30	30	30	30
Brake Switch Circuit Status	OFF	OFF	OFF	OFF	OFF

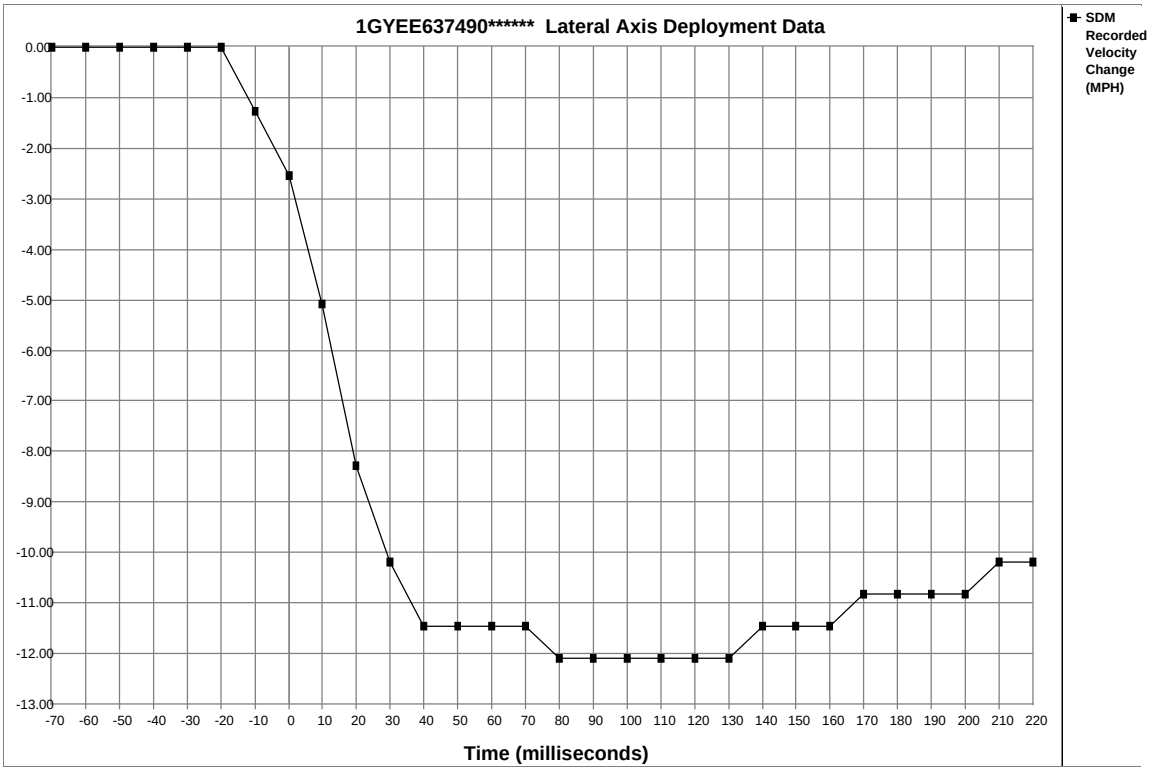
System Status At Deployment

Ignition Cycles At Investigation	1105
SIR Warning Lamp Status	OFF
SIR Warning Lamp ON/OFF Time Continuously (seconds)	655350
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	1099
Ignition Cycles At Event	1102
Ignition Cycles Since DTCs Were Last Cleared	255
Driver's Belt Switch Circuit Status	BUCKLED
Passenger's Belt Switch Circuit Status	UNBUCKLED
Passenger Seat Position Status	Rearward
Passenger Classification Status at Event Enable	Passenger Seat Empty
Current Passenger Position Status at Event Enable	Unknown
Previous Passenger Position Status at Event Enable	Unknown
Passenger Air Bag Indicator Status at Event Enable	OFF
Diagnostic Trouble Codes at Event, fault number: 1	N/A
Diagnostic Trouble Codes at Event, fault number: 2	N/A
Diagnostic Trouble Codes at Event, fault number: 3	N/A
Diagnostic Trouble Codes at Event, fault number: 4	N/A
Diagnostic Trouble Codes at Event, fault number: 5	N/A
Diagnostic Trouble Codes at Event, fault number: 6	N/A
Diagnostic Trouble Codes at Event, fault number: 7	N/A
Diagnostic Trouble Codes at Event, fault number: 8	N/A
Diagnostic Trouble Codes at Event, fault number: 9	N/A
Driver 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Driver 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Driver Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Rollover Occupant Containment Enable Status	Enabled
Side Air Bag Deployment Status	Side Air Bag(s) Were First Commanded to Deploy Due to Side Impact Event
Rollover Sensor Status	Rollover Event
Time From Rollover Event Enable to Deployment (ms)	0
Crash Record Locked	Yes
Vehicle Event Data (Pre-Crash) Associated With This Event	Yes
SDM Synchronization Counter	1102
Time Between Events (sec)	N/A
Event Recording Complete	Yes
Driver First Stage Deployment Loop Commanded	No
Passenger First Stage Deployment Loop Commanded	No
Driver Second Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded for Disposal	No
Passenger Second Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded for Disposal	No
Driver Pretensioner Deployment Loop Commanded	Yes
Passenger Pretensioner Deployment Loop Commanded	Yes
Driver Side Deployment Loop Commanded	No
Passenger Side Deployment Loop Commanded	Yes
Second Row Left Side Deployment Loop Commanded	No
Second Row Right Side Deployment Loop Commanded	No
Driver (Initiator 1) Roof Rail/Head Curtain Loop Commanded	Yes
Passenger (Initiator 1) Roof Rail/Head Curtain Loop Commanded	Yes
Driver (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Passenger (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Driver (Initiator 3) Roof Rail/Head Curtain Loop Commanded	No
Passenger (Initiator 3) Roof Rail/Head Curtain Loop Commanded	No
Driver Knee Deployment Loop Commanded	No
Passenger Knee Deployment Loop Commanded	No

Second Row Left Pretensioner Deployment Loop Commanded	No
Second Row Right Pretensioner Deployment Loop Commanded	No
Second Row Center Pretensioner Deployment Loop Commanded	No



Time (milliseconds)	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
SDM Longitudinal Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.64	-1.27	-0.64	-1.27	-1.91	-2.55	-2.55	-3.18
Time (milliseconds)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
SDM Longitudinal Axis Recorded Velocity Change (MPH)	-3.18	-3.18	-3.18	-3.18	-3.18	-3.18	-3.82	-3.82	-3.82	-3.82	-3.82	-3.82	-3.82	-3.82	-3.82



Time (milliseconds)	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
SDM Lateral Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	-1.27	-2.55	-5.09	-8.28	-10.19	-11.46	-11.46	-11.46	-11.46
Time (milliseconds)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
SDM Lateral Axis Recorded Velocity Change (MPH)	-12.10	-12.10	-12.10	-12.10	-12.10	-12.10	-11.46	-11.46	-11.46	-10.82	-10.82	-10.82	-10.82	-10.19	-10.19

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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$02  47 59 45 45 36 33 37
$03  34 39 30 31 32 38 31
$04  32 33 00 00 00 00 00
$05  36 39 00 00 00 00 00
$06  C5 00 00 00 00 00 00
$0A  00 00 00 00 00 00 00
$0B  01 00 00 00 00 00 00
$0C  00 00 00 00 00 00 00
$0D  00 00 00 00 00 00 00
$0E  01 00 00 00 00 00 00
$0F  00 00 00 00 00 00 00
$10  00 00 00 00 00 00 00
$11  03 FF FF 00 6F 00 00
$12  FF F0 FC F0 C0 00 00
$13  FF C0 F0 70 C0 00 00
$14  FF C0 F0 70 C0 00 00
$15  01 02 03 04 0B 0C 07
$16  08 05 06 00 00 00 00
$17  00 00 00 00 00 00 00
$18  01 03 04 05 00 00 00
$19  03 02 03 02 07 00 02
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$1B  00 00 00 00 00 00 00
$1C  00 00 00 00 00 00 00
$1D  00 00 00 00 00 00 00
$1E  01 00 00 00 00 00 00
$1F  00 00 00 00 00 00 00
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$21  00 00 00 00 00 00 00
$22  00 00 00 00 00 00 00
$23  00 00 00 00 00 00 00
$24  00 00 00 00 00 00 00
$25  00 00 00 00 00 00 00
$26  00 7F E7 38 68 4A 08
$27  01 63 00 00 00 00 00
$28  00 08 44 08 0B 45 04
$29  03 05 00 00 00 00 00
$2A  80 6A 00 00 00 00 00
$2B  6A 70 40 00 00 00 00
$2C  7E 7F 7E 7F 80 7F 00
$2D  FF FF FF FF FF 80 00
$2E  00 80 00 80 00 00 40
$2F  FF FF FF FF FF 80 00
$30  00 00 00 00 00 00 00
$31  FF FF FF FF FF 80 00
$32  00 00 00 00 00 00 00
$33  00 00 00 00 00 00 00
$34  00 00 00 00 00 00 00
$35  00 00 00 00 00 00 00
$36  00 00 00 00 00 00 00
$37  00 00 00 00 00 00 00
$38  00 00 00 00 00 00 00
$39  00 00 00 00 00 00 00
$3A  00 00 00 00 00 00 00
$3B  80 02 22 00 04 00 00
```

```
$3C   00 FF 04 51 00 04 51
$3D   82 C0 00 00 00 00 00
$40   1D 1D 1D 1D 1C 00 00
$41   00 00 00 00 00 00 90
$42   1C 1B 1A 1A 19 00 00
$43   07 A0 07 A0 00 00 00
$44   4D 4D 4C 4C 4E 00 00
$45   0E 0B 09 05 02 00 00
$46   00 82 C0 00 00 00 00
$50   00 00 00 00 00 00 00
$51   00 00 00 00 00 00 00
$52   00 00 00 00 00 00 00
$53   00 00 00 00 00 00 00
$54   00 00 00 00 00 00 00
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$56   00 00 00 00 00 00 00
$57   00 00 00 00 00 00 00
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$59   00 00 00 00 00 00 00
$5A   00 00 00 00 00 00 00
$5B   00 00 00 00 00 00 00
$5C   00 00 00 00 00 00 00
$5D   00 00 00 00 00 00 00
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$90   E0 A5 00 00 00 00 00
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$96   00 00 00 00 00 00 00
$97   00 00 00 00 00 00 00
$98   00 00 00 00 00 00 00
$99   00 00 00 00 00 00 00
$9A   00 00 00 00 00 00 00
$9B   00 FE 01 FC 02 F8 00
$9C   01 F3 02 F0 03 EE 00
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$01   41 48 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$02   00 00 00 F5
$03   41 4A 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$04   00 00 00 F5
$05   41 55 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$06   00 00 00 F6
$07   41 54 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$08   00 00 00 F6
$09   30 30 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$0A   00 00 00 00
$0B   30 30 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$0C   00 00 00 00
```

```
$0D  30 30 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$0E  00 00 00 00
$0F  95 81 77 43
$22  36 39
$23  FA 59 FA FA FA FA FA 30
$24  FA 47 FA FA FA FA FA 30
$25  59 FA FA FA FA FA FA 30
$26  59 FA FA FA FA FA FA 30
$40  00 00
$42  D6 50 14
$43  00 00 EC 80
$44  F6 10 00 C0 FF FC
$45  00 00 09 09 50 50 50 50
$46  04 64 04 04 64 04 64 04 04 64 00 00
$47  17 07 08
$B4  41 53 34 32 34 30 4B 4C 38 32 31 31 30 4D 55 44
$C1  01 89 91 AC
$C2  00 E9 5C C7
$CB  00 F2 86 E0
$CC  00 F2 86 E0
$DB  41 41
$DC  41 41
```

Disclaimer of Liability

The users of the CDR product and reviewers of the CDR reports and exported data shall ensure that data and information supplied is applicable to the vehicle, vehicle's system(s) and the vehicle ECU. Robert Bosch LLC and all its directors, officers, employees and members shall not be liable for damages arising out of or related to incorrect, incomplete or misinterpreted software and/or data. Robert Bosch LLC expressly excludes all liability for incidental, consequential, special or punitive damages arising from or related to the CDR data, CDR software or use thereof.

ATTACHMENT B:

2002 Saturn VUE EDR Data

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	5GZCZ63B92S******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	CA09084_V2.CDR
Saved on	Friday, December 11 2009 at 10:14:30 AM
Collected with CDR version	Crash Data Retrieval Tool 3.3
Reported with CDR version	Crash Data Retrieval Tool 3.4
EDR Device Type	airbag control module
Event(s) recovered	Deployment Non-Deployment

Comments

No comments entered.

Data Limitations

Recorded Crash Events:

There are two types of Recorded Crash Events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). It contains Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event may be overwritten by another Non-Deployment Event. This event will be cleared by the SDM, after approximately 250 ignition cycle. This event can be overwritten by a second Deployment Event, referred to as a Deployment Level Event, if the Non-Deployment Event is not locked. The data in the Non-Deployment Event file will be locked, if the Non-Deployment Event occurred within five seconds before a Deployment Event. A locked Non Deployment Event cannot be overwritten or cleared by the SDM. The second type of SDM recorded crash event is the Deployment Event. It also contains Pre-Crash and Crash data. The SDM can store up to two different Deployment Events, if they occur within five seconds of one another. If a Deployment Level Event occurs within five seconds after the Deployment Event, the Deployment Level Event will overwrite any non-locked Non-Deployment Event. Deployment Events cannot be overwritten or cleared by the SDM. Once the SDM has deployed an air bag, the SDM must be replaced.

Data:

-SDM Adjusted Algorithm Longitudinal Velocity Change:
Once the crash data is downloaded, the CDR tool mathematically adjusts the recorded algorithm longitudinal velocity data to generate an adjusted algorithm longitudinal velocity change that may more closely approximate the longitudinal velocity change the sensing system experienced during the recorded portion of the event. The adjustment takes place within the downloading tool and does not affect the crash data stored in the SDM, which is displayed in hexadecimal format. The SDM Adjusted Algorithm Longitudinal Velocity Change may not closely approximate what the sensing system experienced in all types of events. For example, if a crash is preceded by other common events, such as rough road, struck objects, or off-road travel, the SDM Adjusted Algorithm Longitudinal Velocity Change may be less than and some times significantly less than the actual longitudinal velocity change the sensing system experienced. For Deployment Events, the SDM will record 100 milliseconds of data after deployment criteria is met and up to 50 milliseconds before deployment criteria is met. Velocity Change data is displayed in SAE sign convention.
-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.
-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:
- -significant changes in the tire's rolling radius
- -final drive axle ratio changes
- -wheel lockup and wheel slip

-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.
-Some of the Pre-Crash data may be recorded after Algorithm Enable (AE). If this occurs, it may affect the reported pre-crash data values, but does not affect other data such as SDM Adjusted Algorithm Longitudinal Velocity Change.
-Pre-Crash data is recorded asynchronously.
-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if:
- -the SDM receives a message with an "invalid" flag from the module sending the pre-crash data
- -no data is received from the module sending the pre-crash data
- -no module present to send the pre-crash data

-Driver's Belt Switch Circuit Status indicates the status of the driver's seat belt switch circuit. If the vehicle's electrical system is compromised during a crash, the state of the Driver's Belt Switch Circuit may be reported other than the actual state.

-The Time Between Events is displayed in seconds. If the time between the two events is greater than five seconds, “N/A” is displayed in place of the time.
-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.
-All data should be examined in conjunction with other available physical evidence from the vehicle and scene.

Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Speed, Engine Speed, and Percent Throttle data are transmitted by the Powertrain Control Module (PCM), via the vehicle’s communication network, to the SDM.
-Brake Switch Circuit Status data is transmitted once a second by either the ABS module or the PCM, via the vehicle’s communication network, to the SDM. Depending on vehicle option content, the Brake Switch Circuit Status data may not be available.
-The SDM may obtain Belt Switch Circuit Status data a number of different ways, depending on the vehicle architecture. Some switches are wired directly to the SDM, while others may obtain the data from various vehicle control modules, via the vehicle’s communication network.

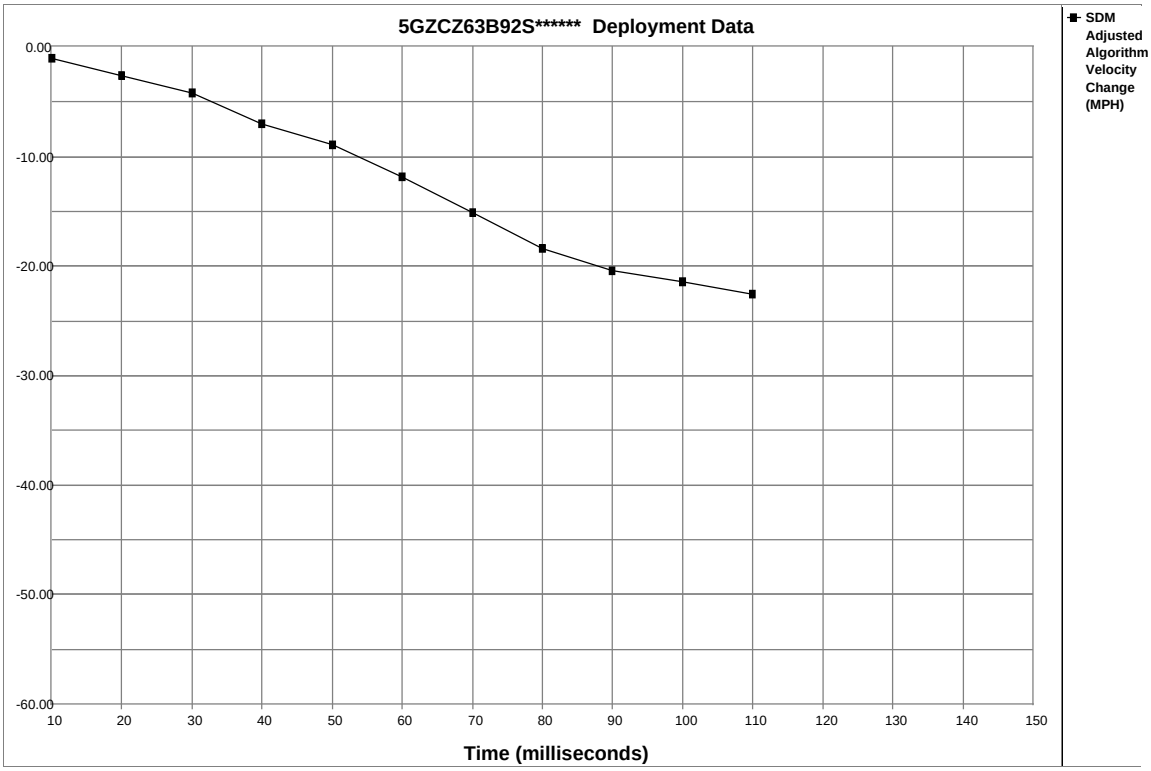
01009_SDMD_r002

System Status At Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger Belt Switch Circuit Status (If Equipped)	UNBUCKLED
Ignition Cycles At Deployment	14237
Ignition Cycles At Investigation	14243
Time Between Non-Deployment And Deployment Events (sec)	N/A
Event Recording Complete	Yes

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle
-5	41	1728	20
-4	42	1728	26
-3	42	1728	26
-2	43	1792	0
-1	14	1280	0

Seconds Before AE	Brake Switch Circuit Status
-8	OFF
-7	OFF
-6	OFF
-5	OFF
-4	OFF
-3	OFF
-2	OFF
-1	ON



Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Adjusted Algorithm Velocity Change	-1.05	-2.59	-4.13	-6.98	-8.95	-11.81	-15.10	-18.39	-20.37	-21.46	-22.56	N/A	N/A	N/A	N/A

System Status At Non-Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger Belt Switch Circuit Status (If Equipped)	UNBUCKLED
Ignition Cycles At Non-Deployment	14237
Ignition Cycles At Investigation	14243
Maximum SDM Algorithm Longitudinal Velocity Change (MPH)	-0.25

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle
-5	41	1728	26
-4	42	1728	26
-3	42	1792	0
-2	43	1280	0
-1	14	768	0

Seconds Before AE	Brake Switch Circuit Status
-8	OFF
-7	OFF
-6	OFF
-5	OFF
-4	OFF
-3	OFF
-2	OFF
-1	ON

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.

```
$01  0C 04 00 00 00 00
$02  B8 8E 00 00 00 00
$03  41 53 32 30 30 34
$04  4B 30 47 45 33 31
$05  02 41 00 00 00 00
$06  22 68 71 96 00 00
$10  F9 0B F8 00 00 00
$11  85 00 00 00 00 82
$12  00 00 00 00 00 00
$13  00 00 00 00 00 00
$14  03 04 EB 00 00 00
$18  82 81 82 45 FF 00
$1C  5A FA FA FA FA FA
$1D  FA 5A FA FA FA FA
$1E  FA FA 00 00 00 00
$1F  FF 02 00 00 00 00
$20  80 00 00 80 FE 00
$21  FF FF DF FF FF FF
$22  FF FF FF FF 00 00
$23  00 00 00 00 00 00
$24  00 00 00 00 FF FF
$25  FF FF FF 0A 00 00
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$27  00 00 00 42 42 00
$28  0C 14 1C 1B 1B 00
$29  F9 0C E0 00 00 00
$2A  00 00 00 2A 00 00
$2B  08 08 00 00 00 00
$2C  00 00 FF 00 00 12
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$2E  00 00 00 00 00 00
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$31  FF FF DF FF FF FF
$32  FF FF FF FF 00 00
$33  08 08 00 00 03 03
$34  00 00 02 05 08 0E
$35  12 18 1F 26 2A 2C
$36  2E FF FF FF FF 0B
$37  17 45 44 43 42 80
$38  00 00 42 42 33 00
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$3A  F9 0C E0 00 00 00
$3B  41 41 00 00 00 00
$3C  57 05 C9 00 00 AA
$3D  00 00 00 00 00 00
$3E  00 00 00 00 00 00
$40  FF FF FF FF FF 00
$41  FF FF FF FF FF FF
$42  FF FF FF FF 00 00
$43  FF FF FF 00 00 00
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