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# Special Crash Investigations: On-Site Air Bag Non-Deployment Crash Investigation; Vehicle: 2006 Chevrolet Cobalt; Location: Georgia; Crash Date: September 2017

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Each crash represents a unique sequence of events, and 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 submitted.


**16. Abstract**

This report documents the on-site investigation of the non-deployment of frontal air bags in a 2006 Chevrolet Cobalt involved in a rearend crash with a Toyota Tacoma making a left turn at an intersection. The Chevrolet was driven by a 16-year-old female with a front row right passenger, a16-year-old female. Both were belted at the time of the crash. The Toyota Tacoma was northbound in front of the Chevrolet, and both vehicles were approaching a four-leg intersection. The Toyota driver reported that he had missed the turn and had stopped prior to attempting to accelerate forward to execute the left turn maneuver. In dark/rainy conditions, the Chevrolet driver misjudged the Toyota's position and movement, and the front of the Chevrolet struck the back of the Toyota. The frontal damage sustained by the Chevrolet was indicative of an underride. The frontal air bags in the Chevrolet did not deploy in the crash. Both occupants in the Chevrolet were transported to a hospital with police-reported non-incapacitating (B-level) injuries, where they were treated and released. The two adult male occupants of the Toyota were not injured. The root cause of the air bag non-deployment could not be determined. However, after reconstruction and analysis of the crash, it was theorized that the (predictive) air bag sensing algorithm underestimated the severity of the crash due to the underride characteristic of the impact that elongated and "softened" the crash pulse, effectively reducing the instantaneous time rate of change in the vehicle's acceleration. The predicted crash severity likely did not meet the vehicle's air bag deployment threshold.


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## BACKGROUND

This report documents the on-site investigation of the non-deployment of frontal air bags in a 2006 Chevrolet Cobalt (**Figure 1**). The Chevrolet was involved in a front-to-rear crash with a Toyota Tacoma that was making a left turn at a four-leg intersection. The National Highway Traffic Safety Administration was notified of the crash and the non-deployment of the air bags in September 2017 by the owner of the Chevrolet. Further research of the crash was requested, and the notification was forwarded to the Special Crash Investigations team at Crash Research & Analysis, Inc., in October 2017. The SCI team contacted the owner and obtained a copy of the police crash report (PAR). The PAR was forwarded to NHTSA for evaluation, and an on-site crash investigation was assigned in October 2017. The Chevrolet, located at an insurance vehicle salvage facility, was inspected in October 2017.

**Figure 1.** Front right oblique view of the 2006 Chevrolet Cobalt.

At the time of the crash, the Chevrolet was driven by a 16-year-old female with a front row right passenger, a 16-year-old female, both belted at the time of the crash. The Toyota Tacoma was traveling northbound in front of the Chevrolet, and both vehicles were approaching a four-leg intersection. The Toyota driver reported to the police that he had missed the turn and had stopped prior to attempting to accelerate forward to execute the left turn maneuver. In dark/rainy conditions, the Chevrolet driver misjudged the Toyota's position and movement, and the front plane of the Chevrolet struck the back plane of the Toyota. The frontal damage sustained by the Chevrolet was indicative of an underride. The frontal air bags in the Chevrolet did not deploy in the crash. Both occupants in the Chevrolet had non-incapacitating (B-level) injuries and were transported to a hospital, where they were treated and released. The two adult male occupants of the Toyota were not injured.

The on-site investigation included the documentation and measurement of the Chevrolet's exterior and interior damage and intrusion, identification of occupant contact, and assessment and documentation of the manual and supplemental restraint systems. The Chevrolet was supported by the Bosch Crash Data Retrieval (CDR) tool, and data was imaged from the vehicle's Event Data Recorder (EDR) during the vehicle inspection process. The crash site was

inspected and documented by photographs and measurements. The Toyota could not be located and was not inspected.

The root cause of the air bag non-deployment could not be determined. However, after reconstruction and analysis of the crash, it was theorized that the (predictive) air bag sensing algorithm underestimated the severity of the crash due to the underride characteristic of the impact that elongated and "softened" the crash pulse, effectively reducing the instantaneous time rate of change in the vehicle's acceleration. The predicted crash severity likely did not meet the vehicle's air bag deployment threshold.

**Figure 2**. North-facing trajectory view of the Chevrolet on the approach to the intersection.

## SUMMARY

### *Crash Site*

The crash occurred on a two-lane trafficway during nighttime hours (**Figure 2**). At the time of the crash, the National Weather Service reported the conditions as rain with a temperature of 25 ºC (77.5 ºF), 91 percent humidity, and calm winds. The PAR reported environmental conditions were dark, not lighted, and with wet road surfaces. The lanes measured 3.5 m (11.5 ft) wide and were separated by solid yellow with a dashed centerline that allowed passing in the southbound direction. Both road edges were defined by painted solid white edge lines. Narrow paved shoulders of 0.6 m (2.0 ft) wide supported the travel lanes. The travel lanes and shoulders were surfaced with asphalt. In the immediate area of the crash, the roadway was straight with a positive 1% grade to the north. A four-leg, 90-degree intersection was present at the location of the crash with legs extending in the east and westbound directions. Both intersection legs consisted of two travel lanes with regulatory stop signs and painted stop lines controlling east and westbound traffic flow into and through the intersection. North/southbound traffic through the intersection was uncontrolled. The posted speed limit was 89 km/h (55 mph). Located at the northwest quadrant of the intersection was a grass roadside with a drainage ditch that transitioned to a culvert that extended under the west leg of the intersection. The ditch was 81 cm (32 in) in depth. The intersection was mapped by the SCI Investigator using a Nikon NiVo5+ total station. A crash diagram is included at the end of this report.

### *Pre-Crash*

The Toyota was traveling north approaching the intersection. The vehicle was operated by a 53-year-old belted male driver and occupied by a 39-year-old belted male in the front row right position. An unknown distance behind the Toyota, the Chevrolet was northbound driven by a belted 16-year-old female and occupied by a belted 16-year-old female in the front row right position. The EDR-recorded speed of Chevrolet was 92 km/h (57 mph) 5 seconds prior to algorithm enable (AE).

The 53-year-old male driver of the Toyota stated to the investigating police officer that his intent was to turn left at the four-leg intersection. He stated that he slowed his vehicle and activated the

left turn signal, but reported that he missed the intersection due to the dark/rainy conditions. The driver of the Chevrolet stated that she did not see the brake lights or the turn signal of the Toyota, and therefore misjudged the speed of the lead vehicle. She reported that she applied the brakes when she recognized the impending crash. The brake data recorded by the EDR was reported as invalid and could not be used to validate the driver's statement. However, speed reconstruction of the crash does indicate the Chevrolet was probably braking during the later stage of the pre-crash window and approached the stopped/slowly moving Toyota at 72 to 80 km/h (45 to 50 mph).

***Crash***

The full-front plane of the Chevrolet struck the back plane of the Toyota in a 12/6 o'clock impact configuration (Event 1). Due to the pre-crash braking of the Chevrolet, the front plane pitched downward as it engaged the back plane of the Toyota. This allowed the front bumper of the Chevrolet to underride the rear bumper of the Toyota. The physical evidence of the Chevrolet's deformation pattern indicated that the Toyota was equipped with a frame-mounted receiver hitch and a ball-mount. The center aspect of the Chevrolet's front bumper beam was deformed into a V-shape due to the interaction.

**Figure 3**. Southward lookback view from the area of the Chevrolet's final rest to the intersection.

The Toyota was displaced forward and separated to its left as it traveled through the intersection and traversed the southbound travel lane. The vehicle departed the west road edge and came to rest with its front plane in the drainage ditch and its back plane at the west road edge. At final rest the Toyota was facing west 14.3 m (47 ft) northwest of the point-of-impact (POI). The Chevrolet continued forward and came to final rest in the northbound travel lane approximately 12.2 m (40 ft) north of the impact. **Figure 3** is a lookback view from the area of the Chevrolet's final rest toward the intersection.

***Post-Crash***

The driver and front right occupant of the Chevrolet unbuckled their seat belts, opened their respective doors, and exited the vehicle unassisted. A cellular telephone call was made to the emergency response system to notify the authorities of the crash. Police, fire, and Emergency Medical Services (EMS) were dispatched to the crash site. EMS personnel evaluated the occupants of the vehicles at the scene and transported the driver and front right occupant of the Chevrolet to a local hospital where they were treated for their injuries and released. The occupants of the Toyota were not

**Figure 4**. Left side view of the Chevrolet.

injured and refused medical attention. Both vehicles sustained disabling damage and were towed from the crash site. The Chevrolet was subsequently transferred to a regional insurance vehicle salvage facility where it was inspected for this investigation.

## 2006 CHEVROLET COBALT

### *Description*

The 2006 Chevrolet Cobalt 2-door coupe (**Figure 4**) was manufactured in March 2006 and identified by Vehicle Identification Number (VIN) 1G1AK15F767xxxxxx. The unibody platform was built on a 262 cm (103.1 in) wheelbase with LS level trim. The front-wheel drive Chevrolet was powered by a transverse- mounted, 2.2 liter, I-4 gasoline engine linked to a 5-speed automatic transmission with a console-mounted shift lever. The gross vehicle weight rating (GVWR) was 1,677 kg (3,695 lb) with gross axle weight ratings (GAWR) of 867 kg (1,910 lb) front and 810 kg (1,785 lb) rear. The service brakes were power-assisted front disc/rear drum. Steering was electric speed-proportional, power-assisted rack-and-pinion. The vehicle manufacturer recommended tire size was P195/60R15 for both axles with recommended cold tire pressures of 241 kPa (35 PSI). At the time of the crash, the Chevrolet was equipped with Briway BFH53 all-season radial tires of the recommended size mounted on OEM steel wheels with plastic hubcaps. All four tires had matching Tire Identification Numbers (TINs) of BUF9 1917. The specific tire data at the time of the SCI inspection is as follows:

| Position | Tire Identification No. | Measured Tread Depth | Restricted | Damage |
|---|---|---|---|---|
| LF | BUF9 1917 | 8 mm (10/32 in) | No | None |
| LR | BUF9 1917 | 8 mm (10/32 in) | No | None |
| RR | BUF9 1917 | 8 mm (10/32 in) | No | None |
| RF | BUF9 1917 | 8 mm (10/32 in) | No | None |

The interior of the Chevrolet was configured for seating of five occupants with front row bucket seats and a second-row bench seat. The manually adjustable front row bucket seats were configured with adjustable head restraints that were in the full-down positions at the time of the crash. The second row was equipped with adjustable head restraints in the left and right positions. Safety systems consisted of manual 3-point lap and shoulder belts for the five designated seat positions with Certified Advanced 208-Compliant (CAC) supplemental frontal air bags with retractor pretensioners for the driver and front row right positions.

### *Exterior Damage*

The front plane of the Chevrolet struck the back plane of the Toyota. The direct contact damage spanned the entire 147 cm (58 in) end width of the Chevrolet. Due to the pre-crash braking of the Chevrolet and the height disparity of the vehicles, the front bumper of the Chevrolet subsequently underrode the back plane of the Toyota. Direct contact was observed across the full width of the hood that buckled and tented upward. The hood latch remained closed as both the hood and the upper radiator support were displaced rearward by the underride impact. The center aspect of the front bumper was deformed into a V-pattern as a result of its contact with the trailer hitch of the Toyota. Crush profiles were measured at the bumper elevation and across the deformed hood. The combined residual crush profile was as follows: C1 = 15 cm (6.0 in), C2 =

25 cm (9.8 in), C3= 26 cm (10.2 in), C4 = 30 cm (11.8 in), C5 = 16 cm (6.3 in), and C6 = 5 cm (2.0 in). The doors of the Chevrolet remained closed during the crash and were operational post-crash. There was no change in the wheelbase dimensions. The Collision Deformation Classification (CDC) assigned to the damage pattern was 12FDEW2. The severity of the crash in terms of delta V was calculated by the "missing vehicle" algorithm of the WinSMASH program. The calculated total delta V was 44 km/h (27 mph) with longitudinal and lateral components of -44 km/h (-27 mph) and 0, respectively. These results were considered borderline due to the use of the missing vehicle algorithm.

***Event Data Recorder***

The Chevrolet Cobalt was equipped with an air bag control module (ACM) that performed the diagnostic, sensing, and deployment command functions for the vehicle's supplemental restraint systems. This module had EDR capabilities and was fastened to the floor pan under the center console. The EDR component was imaged with the Bosch Crash Data Retrieval tool and software version 17.5 via a direct-to-module connection. Electrical power was supplied from an external 12-volt source. The imaged data was reported using version 19.4.2, and is included at the end of this report as **Appendix A**.

**Figure 5**. Overhead view depicting the front deformation of the Chevrolet.

The data limitations reported that the EDR was capable of recording two event types, namely non-deployment events and deployment events. A non-deployment event recorded data, did not deploy air bags, and required a minimum velocity change (delta V) of 8 km/h (5 mph) for qualification. Pretensioner-only actuation was considered a non-deployment event. The EDR could store one non-deployment event that could be overwritten. A non-deployment event that occurred within five seconds of a deployment event became locked and could not be overwritten. Deployment events by definition deployed air bags. The recorded data from a deployment event became locked and could not be overwritten. This EDR could store two events. A 5-second pre-crash buffer, which described various vehicle performance parameters, including vehicle speed, accelerator pedal position, brake status, and engine performance, was recorded for each event record. These performance parameters were recorded asynchronously in 1-second intervals.

The imaged data indicated that the Chevrolet's EDR had recognized and recorded one non-deployment event. Multiple event counter fields in the recording indicated that there were no other associated events. The EDR data was recorded on ignition cycle 11,904 and had been completely recorded. The data was imaged on ignition cycle 11,912. The disparity in the ignition cycle counter was likely related to the towing and movement of the vehicle during its transport to the salvage facility.

The recorded data was consistent with and attributed to the frontal impact under investigation. At the time of the recording, the air bag warning lamp was "Off," and the front seat belts were "Buckled." There were no Diagnostic Trouble Codes (DTCs). None of the air bags or seat belt

pretensioners were commanded to deploy or actuate. The maximum recorded longitudinal velocity change was -39.3 km/h (-24.4 mph) at 140 milliseconds. The maximum recorded lateral velocity change was 0.

The recorded pre-crash vehicle parameters are as follows:

| Time Seconds | Speed km/h (mph) | Accelerator Pedal Position % | Percent Throttle | Engine RPM |
|---|---|---|---|---|
| **-5** | 92 (57) | 16 | 41 | 2,048 |
| **-4** | 92 (57) | 10 | 35 | 1,984 |
| **-3** | 92 (57) | 17 | 41 | 2,176 |
| **-2** | 92 (57) | 18 | 42 | 2,240 |
| **-1** | 0 | 0 | 18 | 512 |

The brake switch circuit status was not recorded in this EDR. The antilock brake system activity was recorded as "Invalid."

Examination of the data trends revealed that the driver was applying the accelerator to maintain a constant speed from the -5 second to the -2 second time interval. The driver then lifted her foot from the accelerator denoted by the 0 percent reading at the -1 second interval. She reported to the police that she had applied the brakes when she recognized the stopped/slowly moving Toyota. The recorded vehicle speed of 0 km/h (0 mph) at the -1second interval was considered to be a consequence of ABS lock-up of the brakes. This value was not reflective of the center-of-mass speed of the vehicle. The reconstructed speed of the Chevrolet at the -1 second interval was approximately 80 to 89 km/h (50 to 55 mph).

***NHTSA Recalls and Investigations***

A VIN-based query of NHTSA's recall database (www.nhtsa.gov/recalls) for the 2006 Chevrolet Cobalt indicated that there were no open recalls pertaining to this specific vehicle as of the date of this report.

***Interior Damage***

The interior of the Chevrolet (**Figure 6**) remained intact with no reduction in size of the occupant compartment or integrity loss. The occupants used the seat belt systems that prevented them from significant contact with interior components. No occupant contact evidence was identified. There was no steering wheel rim deformation or displacement of the column's shear capsules. All glazing remained intact and undamaged. The operable door windows were closed at the time of the crash and remained operable post-crash.

**Figure 6**. Left view depicting the interior of the Chevrolet.

***Manual Restraint Systems***
The Chevrolet was equipped with 3-point continuous loop lap and shoulder seat belts for the five designated seat positions. All seat belts were configured with sliding latch plates and fixed D-rings. The driver's seat belt retracted onto an emergency locking retractor (ELR) while the remaining systems used switchable ELR/automatic locking retractors (ALR). Both front row retractors were configured with pretensioners. The pretensioners did not actuate.

The driver was restrained by the seat belt system at the time of the crash. Frictional abrasions to the polymer surface of the latch plate evidenced usage by the driver at the time of the crash. The lack of occupant contact forward of the driver's seated position supported seat belt use. The EDR also recorded the driver's seat belt status as "Buckled."

The front row right occupant was restrained by the manual seat belt system. Similar to the driver, subtle frictional abrasions to the polymer surface of the latch plate were present to support usage and occupant loading during the crash. The EDR recorded the front row right seat belt system as "Buckled."

***Supplemental Restraint Systems***
The Chevrolet was equipped with a Certified Advanced 208-Compliant (CAC) frontal air bag system for the driver and front row right occupant positions. The dual-stage air bags were mounted within the center hub of the four-spoke steering wheel and the upper right instrument panel. In addition to the air bags, the system consisted of seat track positioning sensors, seat belt buckle switches, retractor pretensioners, and a front row right occupant classification sensor. The system was monitored and controlled by a center tunnel-mounted sensing and diagnostic module that had crash sensing, fault detection, and EDR capabilities. The air bags did not deploy, and the pretensioners did not actuate in this crash.

***Air Bag Non-Deployment Discussion***
The full-frontal width of the Chevrolet struck and underrode the back plane of the Toyota. The underride characteristic of the impact likely tended to elongate and "soften" the crash pulse, effectively reducing the instantaneous time rate of change in the vehicle's acceleration.

The decision whether to actuate/deploy supplemental safety systems is achieved through the use of a predictive sensing algorithm processed during the early stages of the impact (typically 0 to 20 milliseconds). For supplemental safety device actuation/deployment to occur, the rate (and predicted rate) of the change in the acceleration imparted to the vehicle has to be in excess of the threshold unique to the design of the vehicle make/model in question. Use or nonuse of seat belts also plays a role in the magnitude of the deployment threshold.

The SCI Investigator reviewed the velocity change (delta V) data reported by the data imaged from the Chevrolet's EDR. It is important to note that delta V data is not acceleration data. However, the acceleration data can be derived from the rate of the change in velocity. That is, acceleration is equivalent to the slope of the velocity change over time. For the available delta V data, the rate of change in the early stage of the crash pulse (0 to 20 milliseconds) appeared to be fairly constant and shallow. The sensing algorithm may have predicted that the overall severity of the crash would not exceed the deployment threshold during this time, particularly with belted

occupants. The slope of the pulse became steeper approximately 30 milliseconds after AE. It has been shown that a late-deployment of the frontal air bags can cause harm to the occupant, particularly if the occupant is unrestrained or sitting close to the air bag, and it has been theorized that the frontal air bag deployment threshold has been designed such that late air bag deployment is prevented.

Due to its proprietary nature, information concerning the manufacturer's deployment algorithm is not available to the SCI Investigator; therefore, it was impossible to compare the measured crash pulse with the threshold algorithm. It was unknown if this increased rate of change occurred too late in the overall crash pulse to deploy the air bags. The air bag warning lamp was "Off" at the time of the crash, indicative that the air bag system was operating as designed. There were no recorded DTCs that may have affected the deployment/actuation of the supplemental restraint systems. The root cause of the air bag non-deployment could not be determined.

## 2006 CHEVROLET COBALT OCCUPANTS

### *Driver Demographics*

| | |
|---|---|
| Age/sex: | 16 years/female |
| Height: | 157 cm (62 in) |
| Weight: | 63 kg (138 lb) |
| Eyewear: | None |
| Seat type: | Forward-facing bucket seat with adjustable head restraint |
| Seat track position: | Unknown |
| Manual restraint usage: | 3-point lap and shoulder belt |
| Usage source: | Vehicle inspection, EDR, PAR |
| Air bags: | Front air bag available, not deployed |
| Alcohol/drug data: | None |
| Egress from vehicle: | Exited vehicle unassisted |
| Transport from scene: | Ambulance to a local hospital |
| Type of medical treatment: | Treated and released |

### *Driver Injuries*

| Injury No. | Injury | Injury Severity AIS 2015 | Involved Physical Component (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 1 | Complaint of headache and pain to the neck, chest, right hip, and back; no objective injuries noted in medical report | N/A | N/A | N/A |

*Source: emergency room records and a surrogate interview.*

### *Driver Kinematics*

The driver of the Chevrolet was seated in a forward-to-mid track seat position with the seat back slightly reclined and the head restraint adjusted to the full-down position. She was using the

manual seat belt system. Seat belt use was determined from frictional abrasions of the polymer surface of the latch plate, the lack of occupant contact evidence within the vehicle and the EDR-recorded buckled status of the seat belt.

Immediately prior to the crash, the driver attempted to avoid the crash by braking. At impact, she responded to the 12 o'clock impact force by initiating a forward trajectory. The driver loaded the seat belt system, evidenced by the frictional abrasions on the polymer surface of the latch plate. Her neck flexed forward over the seat belt, and her head probably contacted the upper aspect of the steering wheel rim. As a result of seat belt loading, the driver sustained soreness over the anterior chest, neck, and back. The contact to the steering wheel rim probably resulted in headache.

Following the crash event, the driver rebounded into the seat back where she came to rest. She unbuckled the seat belt system and opened the left door and exited the vehicle unassisted. It was noted that she was ambulatory at the arrival of the first responders. She was assessed and then transported by ambulance to the emergency room of a local hospital.

***Front Row Right Occupant Demographics***

| | |
|---|---|
| Age/sex: | 16 years/female |
| Height: | 163 cm (64 in) |
| Weight: | 54 kg (120 lb) |
| Eyewear: | None |
| Seat type: | Forward-facing bucket seat with adjustable head restraint |
| Seat track position: | Unknown |
| Manual restraint usage: | 3-point lap and shoulder belt |
| Usage source: | Vehicle inspection, EDR, PAR |
| Air bags: | Front air bag available, not deployed |
| Egress from vehicle: | Exited vehicle unassisted |
| Transport from scene: | Ambulance to a local hospital |
| Type of medical treatment: | Treated and released |

***Front Row Right Occupant Injuries***

| Injury No. | Injury | Injury Severity AIS 2015 | Involved Physical Component (IPC) | IPC Confidence Level |
|---|---|---|---|---|
| 1 | Complaint of pain to the chest, abdomen, and right lower leg; no objective injuries noted in medical report | N/A | N/A | N/A |

*Source: emergency room records and a surrogate interview.*

***Front Row Right Occupant Kinematics***

The front row right occupant of the Chevrolet was seated in an unknown track position with the seatback slightly reclined and the head restraint adjusted to the full-down position. She was using the manual seat belt system, evidenced by frictional abrasions on the latch plate, minimal interior contact, and the EDR-recorded "buckled" status of the seat belt system.

At impact with the Toyota, the front row right occupant initiated a forward trajectory in response to the 12 o'clock direction of force. She loaded the seat belt system with her torso and pelvic regions. Interview data indicated that the front row right occupant complained of pain to her chest and abdomen as result of the impact force and seat belt loading. Her right lower leg contacted the lower aspect of the right instrument panel, causing pain. There was no physical evidence within the vehicle to support this contact.

Immediately following the crash, the front row right occupant unbuckled her seat belt system, opened the right door, and exited the vehicle unassisted, where she awaited the arrival of the first responders. Local EMS personnel evaluated the occupant at the scene and transported her by ambulance to the emergency room of a local hospital, where she was treated and released.

## 2002 TOYOTA TACOMA

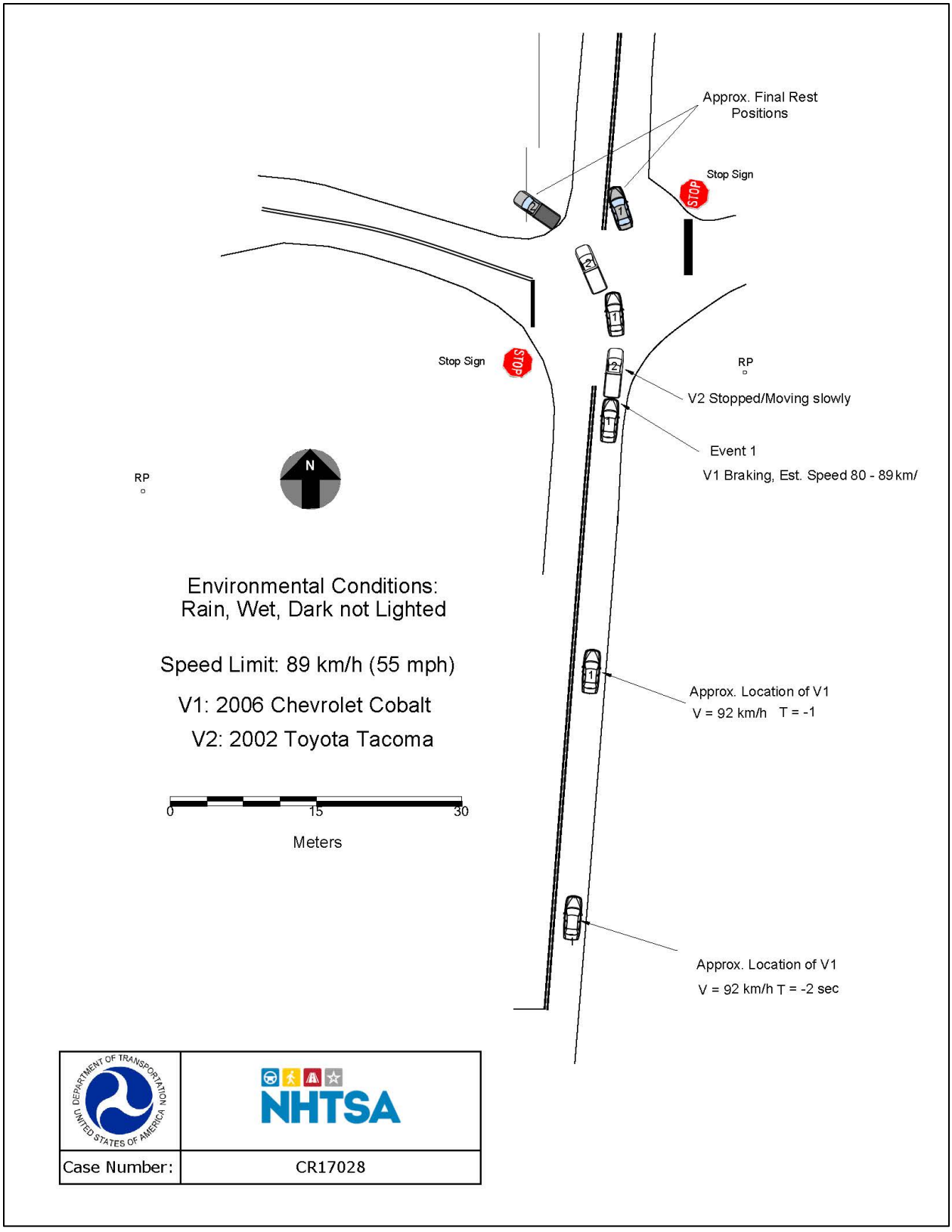
### *Description*

The 2002 Toyota Tacoma 4-door, double cab was not inspected during this on-site investigation. The vehicle was identified by the following VIN: 5TEHN72N42Zxxxxxx. The 4-wheel-drive platform was built on a 310 cm (121.9 in) wheelbase with a 3.4-liter, V-6 engine linked to a 4-speed automatic transmission. Standard features included power rack and pinion steering as well as power-assisted front disc/rear drum brakes. The Toyota sustained disabling damage that was reportedly distributed across the back plane of the vehicle.

### *Occupants*

The Toyota was occupied by a 53-year-old male driver and a 39-year-old male front row right occupant. Both occupants of the Toyota were reported by the police as restrained by the manual seat belt systems, and they were not injured.

## Crash Diagram



# APPENDIX A: 2006 Chevrolet Cobalt Event Data Recorder (EDR) Report[1]

[1] The EDR contained in this technical report was imaged using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report contained in the associated Crash Viewer application may differ relative to this report.

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

## CDR File Information

| | |
|---|---|
| User Entered VIN | 1G1AK15F767****** |
| User | |
| Case Number | |
| EDR Data Imaging Date | |
| Crash Date | |
| Filename | CR17028_V1_ACM.CDRX |
| Saved on | |
| Imaged with CDR version | Crash Data Retrieval Tool 17.5 |
| Imaged with Software Licensed to (Company Name) | Company Name information was removed when this file was saved without VIN sequence number |
| Reported with CDR version | Crash Data Retrieval Tool 19.4.2 |
| Reported with Software Licensed to (Company Name) | NHTSA |
| EDR Device Type | Airbag Control Module |
| Event(s) recovered | 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). 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 can record up to 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. If a CDR Printout user were to calculate resultant velocity change using X and Y axis time history data, the calculated value may be different than the Maximum SDM Recorded Velocity Change parameter value displayed in the CDR report. This is due to the rounding that occurs within the SDM while calculating the Maximum SDM Recorded Velocity Change value.

-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. The 1.0 second Pre-crash data value (most recent recorded data point) is the data point last sampled before AE. That is to say, the last data point may have been captured just before AE but no more than 1.0 second before AE. All subsequent Pre-crash data values are referenced from this data point.
-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
-Vehicle speed, Transmission Gear Select, and Transmission Actual Gear will be marked as invalid for manual transmission vehicles
-Pre-crash data associated with this event will always be for the first event even if it is not recorded.
-Driver's and Passenger's Belt Switch Circuit Status indicates the status of the seat belt switch circuit, except: The Passenger Belt Switch Circuit Status for 2005 vehicles is available only on the Cadillac STS. The Passenger Belt Switch Circuit Status for 2006 Chevrolet Cobalt Sport Coupe (AP) model vehicles, with the option package that includes Recaro brand seats (RPO ALV), always reports a default value of "Buckled," because there is no passenger belt switch with the Recaro seat option. The Passenger Belt Switch Circuit Status for 2010 Chevrolet Cobalt and 2010 Pontiac G5 vehicles, with RPO Z49, will report a default value of "Buckled". The Passenger Belt Switch Circuit Status for 2010 and 2011 Chevrolet HHR, with the LS or LT trim package and RPO Z49, will report a default value of "Buckled".
-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. Time Between events is measured from end of one event to the beginning of a next event. An event may occur within 5 seconds of another event, known as an extended event. This occurs when three or more sequential events are separated by more than 5 seconds but each event in the sequence is no more than 5 seconds apart from a subsequent event. Pre-crash data is locked to the first event in an extended event.
-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 counter.
-Steering Wheel Angle data is reported in 16 degree increments. 2005 through 2010 Chevrolet Cobalt, 2005 and 2006 Pontiac Pursuit, 2007 through 2010 Pontiac G5, and 2006 through 2011 Chevrolet HHR, do not record Steering Wheel Angle data and should not be relied upon.
-If more than one event is recorded, use the follow to determine which event the Multiple Event Data is associated with:
-If a Deployment event and not locked Non-Deployment event are recorded, the Multiple Event Data is associated with the Deployment event.
-If a Deployment event and a locked Non-Deployment event are recorded, then the Multiple Event Data is associated with both events.
-If a Deployment event and Deployment event #2 are recorded, then the Multiple Event Data is associated with both events.
-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.

**Data Element Sign Convention:**
The following table provides an explanation of the sign notation for data elements that may be included in this CDR report. Directional references to sign notation are all 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 Velocity Change | Forward |
| Lateral Velocity Change | Left to Right |
| Lateral Acceleration | Left to Right |
| Yaw Rate | Clockwise * |
| Steering Wheel Angle | Clockwise * |

*For Cadillac STS model vehicles with StabiliTrak 3.0 systems (RPO JL7), the positive sign notation Indicates a counterclockwise rotation.

**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 tool.

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## 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

| | |
|---|---|
| Vehicle Identification Number | **1AK15F*6******* |
| Low Tire Pressure Warning Lamp (If Equipped) | Invalid |
| Vehicle Power Mode Status | Run |
| Remote Start Status (If Equipped) | Inactive |
| Run/Crank Ignition Switch Logic Level | Active |
| Brake System Warning Lamp (If Equipped) | OFF |

## System Status At 1 second

| | |
|---|---|
| Transmission Range (If Equipped) | Fourth Gear |
| Transmission Selector Position (If Equipped) | Fourth Gear |
| Traction Control System Active (If Equipped) | Invalid |
| Service Engine Soon (Non-Emission Related) Lamp | OFF |
| Service Vehicle Soon Lamp | OFF |
| Outside Air Temperature (degrees F) (If Equipped) | 76 |
| Left Front Door Status (If Equipped) | Closed |
| Right Front Door Status (If Equipped) | Closed |
| Left Rear Door Status (If Equipped) | Unused |
| Right Rear Door Status (If Equipped) | Unused |
| Rear Door(s) Status (If Equipped) | Closed |

### Pre-crash data

| Parameter | -2 sec | -1 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 |

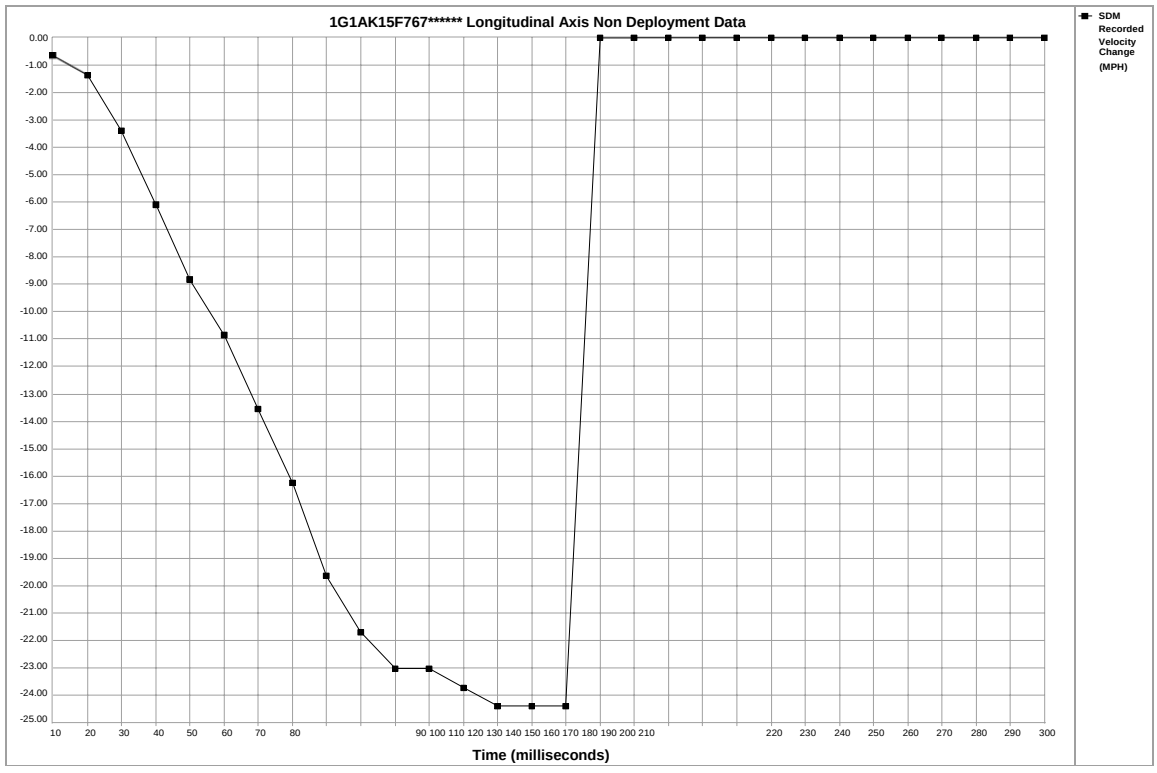
### Pre-Crash Data

| Parameter | -5 sec | -4 sec | -3 sec | -2 sec | -1 sec |
|---|---|---|---|---|---|
| Vehicle Speed (MPH) | 57 | 57 | 57 | 57 | 0 |
| Engine Speed (RPM) | 2048 | 1984 | 2176 | 2240 | 512 |
| Percent Throttle | 41 | 35 | 41 | 42 | 18 |
| Accelerator Pedal Position (percent) | 16 | 10 | 17 | 18 | 0 |
| Antilock Brake System Active (If Equipped) | Invalid | Invalid | Invalid | Invalid | Invalid |
| Lateral Acceleration (feet/s²)(If Equipped) | Invalid | Invalid | Invalid | Invalid | Invalid |
| Yaw Rate (degrees per second) (If Equipped) | Invalid | Invalid | Invalid | Invalid | Invalid |

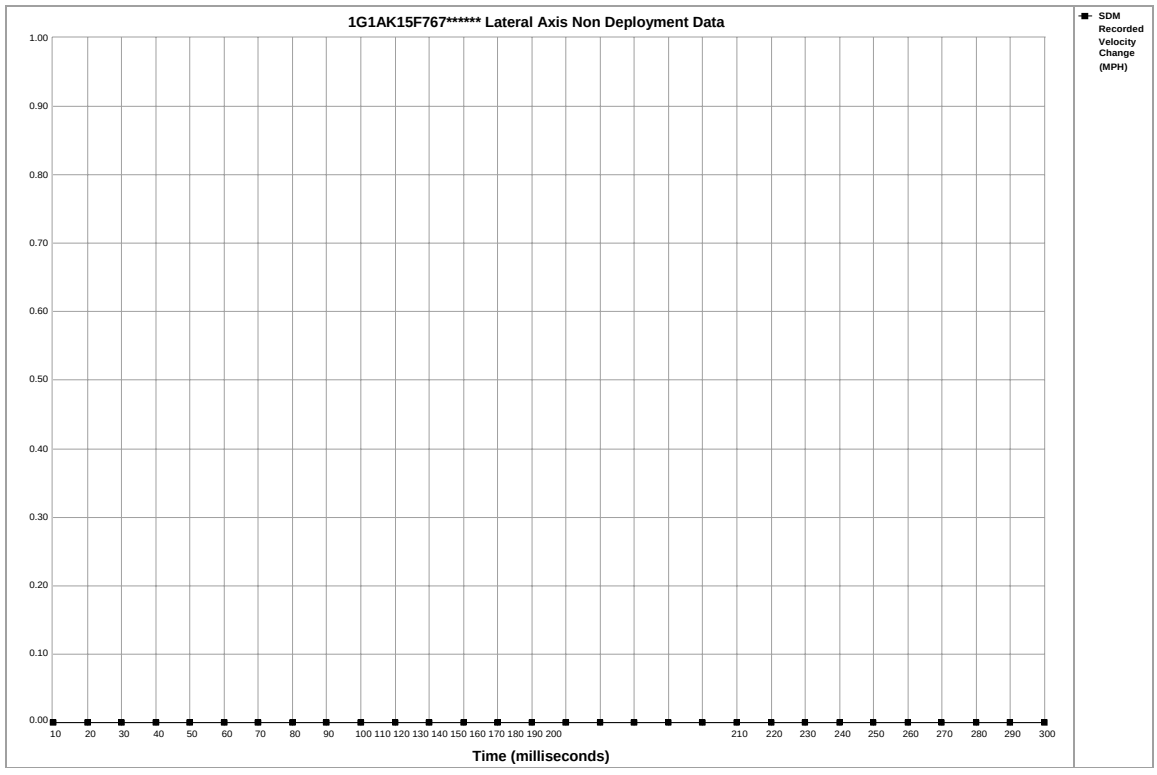
| Parameter | -5 sec | -4 sec | -3 sec | -2 sec | -1 sec |
|---|---|---|---|---|---|
| Steering Wheel Angle (degrees) (If Equipped) | 0 | 0 | 0 | 0 | 0 |
| Vehicle Dynamics Control Active (If Equipped) | Invalid | Invalid | Invalid | Invalid | Invalid |

## System Status At Non-Deployment

| | |
|---|---|
| Ignition Cycles At Investigation | 11912 |
| SIR Warning Lamp Status | OFF |
| SIR Warning Lamp ON/OFF Time (seconds) | 655200 |
| Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously | 618 |
| Ignition Cycles At Event | 11904 |
| Ignition Cycles Since DTCs Were Last Cleared | 254 |
| Driver's Belt Switch Circuit Status | BUCKLED |
| Passenger Belt Switch Circuit Status (If Equipped) | BUCKLED |
| Automatic Passenger SIR Suppression System Validity Status at AE | Valid |
| Automatic Passenger SIR Suppression System Status at AE | Air Bag Not Suppressed |
| Diagnostic Trouble Code at Event Enable, fault number: 1 | N/A |
| Diagnostic Trouble Code at Event Enable, fault number: 2 | N/A |
| Diagnostic Trouble Code at Event Enable, fault number: 3 | N/A |
| Diagnostic Trouble Code at Event Enable, fault number: 4 | N/A |
| Diagnostic Trouble Code at Event Enable, fault number: 5 | N/A |
| Diagnostic Trouble Code at Event Enable, fault number: 6 | N/A |
| Maximum Resultant SDM Recorded Vehicle Velocity Change (MPH) | 24.40 |
| Time From Algorithm Enable to Maximum Resultant SDM Recorded Vehicle Velocity Change (msec) | 140 |
| Driver First Stage Deployment Loop Commanded | No |
| Driver Second Stage Deployment Loop Commanded | No |
| Driver Side Deployment Loop Commanded | No |
| Driver Pretensioner Deployment Loop Commanded | No |
| Driver (Initiator 1) Roof Rail/Head Curtain Loop Commanded | No |
| Driver (Initiator 2) Roof Rail/Head Curtain Loop Commanded | No |
| Driver Knee Deployment Loop Commanded | No |
| Passenger First Stage Deployment Loop Commanded | No |
| Passenger Second Stage Deployment Loop Commanded | No |
| Passenger Side Deployment Loop Commanded | No |
| Passenger Pretensioner Deployment Loop Commanded | No |
| Passenger (Initiator 1) Roof Rail/Head Curtain Loop Commanded | No |
| Passenger (Initiator 2) Roof Rail/Head Curtain Loop Commanded | No |
| Passenger Knee Deployment Loop Commanded | No |
| Second Row Left Pretensioner Deployment Loop Commanded | No |
| Third Row Left Roof Rail/Head Curtain Loop Commanded | No |
| Second Row Right Pretensioner Deployment Loop Commanded | No |
| Third Row Right Roof Rail/Head Curtain Loop Commanded | No |
| Second Row Center Pretensioner Deployment Loop Commanded | No |
| Crash Record Locked | No |
| Vehicle Event Data (Pre-Crash) Associated With This Event | Yes |
| Deployment Event Recorded in the Non-Deployment Record | No |
| Event Recording Complete | Yes |




| Time (milliseconds) | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDM Longitudinal Axis Recorded Velocity Change (MPH) | -0.68 | -1.36 | -3.39 | -6.10 | -8.81 | -10.84 | -13.55 | -16.26 | -19.65 | -21.69 | -23.04 | -23.04 | -23.72 | -24.40 | -24.40 |
| Time (milliseconds) | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 |
| SDM Longitudinal Axis Recorded Velocity Change (MPH) | -24.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |




| Time (milliseconds) | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDM Lateral Axis Recorded Velocity Change (MPH) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Time (milliseconds) | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 |
| SDM Lateral Axis Recorded Velocity Change (MPH) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## Hexadecimal Data

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $01 | 08 | 00 | 00 | 00 | 00 | 00 | 00 |
| $02 | 30 | 00 | 00 | 00 | 00 | 00 | 00 |
| $03 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $04 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $05 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $06 | 00 | 0A | 00 | 03 | 0A | 00 | 00 |
| $07 | 00 | 20 | 00 | 00 | 00 | 00 | 00 |
| $08 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $09 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $0A | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $0B | 00 | 00 | 0F | 0F | 03 | 00 | 00 |
| $0C | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $0D | 00 | 00 | 40 | 00 | 00 | 00 | 00 |
| $0E | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $0F | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $10 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $11 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $12 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $13 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $14 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $15 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $16 | 03 | 06 | 0C | 16 | 34 | 00 | 00 |
| $17 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $18 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $19 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $1B | 3F | 00 | 00 | 67 | 00 | 7A | 00 |
| $1C | 3F | 00 | 00 | 02 | 00 | 1A | 00 |
| $1D | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $1E | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $1F | 28 | 00 | 00 | 00 | 00 | 00 | 00 |
| $20 | 40 | 00 | 00 | 00 | 00 | 00 | 00 |
| $21 | 00 | 00 | 00 | 00 | F0 | 00 | 00 |
| $22 | 00 | A3 | 00 | 00 | 00 | 00 | 00 |
| $24 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $25 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $26 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $27 | FF | 00 | FF | 00 | 00 | 00 | 00 |
| $2A | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $2B | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $2D | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $2E | 00 | 00 | 04 | 00 | 00 | 00 | 00 |
| $2F | 00 | FE | 2E | 88 | 08 | 00 | 00 |
| $30 | 9D | 00 | 00 | 00 | 00 | 00 | 00 |
| $31 | 00 | 2F | 2B | 1A | 29 | 00 | 00 |
| $32 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $33 | 2D | 6B | 69 | 5A | 68 | 00 | 00 |
| $34 | 08 | 23 | 22 | 1F | 20 | 00 | 00 |
| $35 | 00 | 5B | 5C | 5C | 5C | 00 | 00 |
| $36 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| $37 | 00 | 00 | 00 | 04 | 04 | 00 | E2 |
| $38 | 81 | 00 | 40 | 00 | 03 | C0 | 00 |
| $39 | 00 | 00 | 00 | 00 | 00 | 80 | 00 |
| $3A | 00 | 00 | 00 | 00 | 00 | 80 | 00 |
| $3B | 03 | 06 | 0C | 00 | 00 | 00 | 00 |
| $3C | 00 | 00 | 00 | 00 | 00 | 00 | C0 |
| $3D | 31 | 41 | 4B | 31 | 35 | 46 | 00 |
| $3E | 36 | FF | FF | FF | 00 | 00 | 00 |
| $3F | 00 | 00 | 90 | 00 | 00 | 00 | 00 |
| $40 | 20 | A5 | 00 | 00 | 00 | 00 | 00 |
| $41 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |

```
$42   00 FF F0 02 6A 00 00
$43   FE 2E 80 00 00 00 00
$44   00 00 00 00 00 00 00
$45   00 00 00 00 00 00 00
$46   00 00 00 00 00 00 00
$47   00 FF 00 FE 00 FB 00
$48   00 F7 00 F3 00 F0 00
$49   00 EC 00 E8 00 E3 00
$4A   00 E0 00 DE 00 DE 00
$4B   00 DD 00 DC 00 DC 00
$4C   00 DC 00 00 00 00 00
$4D   00 00 00 00 00 00 00
$4E   00 00 00 00 00 00 00
$4F   00 00 00 00 00 00 00
$50   00 00 00 00 00 00 00
$51   F0 00 00 00 00 00 00
$52   01 00 00 00 00 00 00
$53   0E 05 10 00 00 00 00
$54   00 00 00 00 00 00 00
$55   00 00 00 00 00 00 00
$67   00 00 00 00 00 00 00
$68   F8 F8 90 C0 00 00 00
$69   80 FF FF FF FF 00 00
$6A   FF FF FF 00 00 00 00
$6B   FF FF FF FF FF FF 00
$6C   FF FF FF FF FF FF 00
$6D   FF FF FF FF FF FF 00
$6E   FF FF FF FF FF FF 00
$6F   FF FF FF FF FF FF 00
$70   FF FF FF FF FF FF 00
$71   FF FF FF FF FF FF 00
$72   FF FF FF FF FF FF 00
$73   FF FF FF FF FF FF 00
$74   FF FF FF FF FF FF 00
$75   FF FF FF FF FF FF 00
$76   FF FF FF FF FF FF 00
$77   FF FF FF FF FF FF 00
$78   F0 00 00 F0 00 00 00
$79   81 FF FF FF 00 00 00
$7A   82 FF FF 00 00 00 00
$7B   FF FF FF FF FF FF 00

$01   41 55 01 02 03 04 52 53 41 32 03 09 01 AA AA 01
$02   01 02 03 04
$03   41 54 01 02 03 04 52 53 41 32 03 09 01 AA AA 01
$04   01 02 03 04
$05   42 55 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
$06   FF FF FF FF
$07   42 54 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
$08   FF FF FF FF
$0D   41 48 32 39 35 31 52 35 33 35 33 32 36 4C 37 5A
$0E   01 5A 4B 31
$0F   41 4A 01 02 03 04 52 45 41 32 30 32 33 30 30 30
$10   01 02 03 04
$13   42 52 30 31 33 34 56 31 06 30 36 38 4B 48 43 4A
$14   01 5A 74 02
$17   42 54 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
$18   FF FF FF FF
$21   33 19 2A B4 E6 87 91 9A
$22   90 11
$23   31 41 FA FA FA FA FA
$24   31 41 FA FA FA FA FA
$25   32 41 FA FA FA FA FA
$26   32 41 FA FA FA FA FA
$40   00 00
$41   3F 00 00 02 00 1A
```

```
$42   F0 C4
$43   00 00 8E 80
$44   C6 00 00 FC C0 C0
$45   07 01 07 01 05 01
$46   FF 1A 1A 64 64
$47   0A 64 06 04 04 05 0A 06 04 0A 00 00 FA 00 00 FF 04 64
$48   18 08 08
$B0   58
$B1   FD FE 00
$B2   FF FF FF FF FF
$B4   41 53 39 30 31 31 32 31 35 4B 45 4E 20 20 20 20
$B7   50 AA 04 0F 03
$B8   41 57 68 09 19
$C1   30 46 30 33
$CA   30 46 30 33
$CB   01 5A D1 33
$CC   01 5A D1 33
$D1   00 00
$DB   00 00
$DC   00 00
```

## Disclaimer of Liability

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**National Highway
Traffic Safety
Administration**


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