INDIANA UNIVERSITY

TRANSPORTATION RESEARCH CENTER
School of Public and Environmental Affairs
501 S. Madison Street, Suite 105
Bloomington, Indiana 47403-2452
(812) 855-3908 Fax: (812) 855-3537

ON-SITE SIDE IMPACT INFLATABLE OCCUPANT PROTECTION INVESTIGATION

CASE NUMBER - IN09034
LOCATION - TEXAS
VEHICLE - 2007 CHRYSLER SEBRING LX
CRASH DATE - September 2009

Submitted:

February 12, 2010

Contract Number: DTNH22-07-C-00044

Prepared for:

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be 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 Documentation Page

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15. *Supplementary Notes* On-site side impact inflatable occupant protection investigation involving a 2007 Chrysler Sebring LX and a 2003 Ford Mustang GT.			
16. *Abstract* This on-site investigation focused on the side impact air bag system of a 2007 Chrysler Sebring LX. Additional focus was on the crash dynamics and the sources of the driver's injuries. The Chrysler was occupied by a restrained 45-year-old female driver. She was stopped heading southwest in an alley at the intersection of a 7-lane, undivided, city street and initiated a left turn to proceed southeast on the city street. The left side plane of the Chrysler was impacted by the front plane of a northwestbound 2003 Ford Mustang GT. The direction of force on the Chrysler was within the 10 o'clock sector and the impact force was sufficient to trigger the deployment of the left side impact inflatable curtain (IC) air bag and the driver's seat-mounted side impact air bag. The vehicle's frontal air bags also deployed. The driver of the Chrysler was removed from the vehicle by rescue personnel after they mechanically forced open the left front and left rear doors and cut the safety belt. She was transported by ambulance to a hospital where she was pronounced deceased. Both vehicles were towed from the crash scene due to damage.			
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This on-site investigation focused the side impact air bag system of a 2007 Chrysler Sebring LX (**Figure 1**). Additional focus was on the crash dynamics and the sources of the driver's injuries. This crash was brought to our attention on October 2, 2009 by the National Highway Traffic Safety Administration (NHTSA) through the sampling activities of the National Automotive Sampling System-General Estimates System (NASS-GES). The investigation was assigned on October 20, 2009. The crash involved the Chrysler and a 2003 Ford Mustang GT. The crash occurred in September, 2009, at 1533 hours in Texas and was investigated by the city police department. The crash scene and both vehicles were inspected on October 25-26, 2009. An interview with the driver of the Chrysler was not possible since she sustained a fatal injury. This report is based on the police crash report, scene and vehicle inspections, police interview information, police on-scene photographs, occupant kinematic principles, exemplar Ford inspection, and evaluation of the evidence.

Figure 1: The damaged 2007 Chrysler Sebring LX

CRASH CIRCUMSTANCES

Crash Environment: The Chrysler was traveling on a 2-lane alley that formed a 3-leg intersection with a 7-lane, undivided, city street. The Ford was traveling on the city street. The alley traversed in a southwest-northeast direction and was 6.1 m (20 ft) in width. The city street traversed in a northwest-southeast direction and had three travel lanes in each directions, a bi-directional left turn lane, and was bordered by concrete curbs. Each lane was approximately 3.5 m (11.5 ft) in width. The roadway pavement markings consisted of broken white lane lines and solid yellow/broken yellow bi-directional turn lane lines. The city street was crowned in the middle and the cross grade was negative 3.3% toward each side of the street. Both the alley and the city street were level bituminous. The speed limit for the Ford was 64 km/h (40 mph). There was no posted speed limit in the alley. At the time of the crash the light condition was daylight and the weather was clear. The roadway surface was dry. The Crash Diagram is on page 13 of this report.

Figure 2: Approach of the Chrysler in the alley

Pre-Crash: The Chrysler was occupied by a restrained 45-year-old female driver. She was stopped in the alley at the intersection heading southwest (**Figure 2**) and initiated a left turn to proceed southeast on the city street. The 20-year-old male driver of the Ford was traveling northwest in the third lane from the right (**Figure**

3), and intended to continue straight ahead. The Chrysler's Event Data Recorder (EDR) pre-crash data indicated that the driver applied the brakes. The driver of the Ford applied hard braking in an attempt to avoid the crash. The crash occurred in the third lane from the right on the northwestbound roadway (**Figure 3**).

Crash: The left side plane of the Chrysler (**Figure 4**) was impacted by the front plane of the Ford (**Figure 5**). The direction of force on the Chrysler was within the 10 o'clock sector and the impact force was sufficient to trigger the deployment of the left IC air bag and the driver's seat-mounted side impact air bag. The impact also triggered the deployment of the driver's and front passenger's frontal air bags. The Chrysler was redirected to the northwest and rotated counterclockwise approximately 295 degrees as it traversed a distance of 24 m (78.7 ft) to its final rest position on the outside southeastbound lane heading west (**Figure 6**). The Ford was also redirected to the northwest. The vehicle rotated approximately 120 degrees as it traveled along a curved path and separated from the Chrysler. It continued backward in a northeast direction down the negative 3.3% cross grade of the roadway and came to final rest in the center northwest-bound lane heading southwest (**Figure 6**). The Ford traversed a distance of 35 m (114.8 ft) from the impact to the final rest position.

Figure 3: Approach of the Ford; arrow shows the approach of the Chrysler from the alley

Figure 4: Location of the impact on the Chrysler

Figure 5: Damage on the front of the Ford from the impact with the Chrysler

Figure 6: Police on-scene photo showing the final rest positions of the Chrysler and Ford

Post-Crash: The police were notified of the crash at 1533 hours and arrived at the crash scene at 1539 hours. The driver of the Chrysler was removed from the vehicle by rescue personnel after they mechanically forced open the left front and left rear doors and cut the safety belt. She was transported by ambulance to a hospital where she was pronounced deceased. The driver and front passenger of the Ford were transported by ambulance to a hospital. Both vehicles were towed from the crash scene due to damage.

CASE VEHICLE

The 2007 Chrysler Sebring LX was a front wheel drive, 4-door sedan (VIN: 1C3LC46R87N------) equipped with a 2.7-liter, V6 engine, an automatic transmission, 4-wheel anti-lock brakes with electronic brake force distribution, and a tire pressure monitoring system. The front row was equipped with bucket seats, adjustable head restraints, lap-and-shoulder safety belts, driver and front passenger frontal air bags, front seat-mounted side impact air bags, and side impact IC air bags that provided protection for the front and second row. The second row was equipped with a bench seat with folding backs, lap-and-shoulder seat safety belts, integral head restraints, and Lower Anchors and Tethers for Children (LATCH) in the outboard seating positions. The specified wheelbase was 277 cm (109.1 in).

CASE VEHICLE DAMAGE

Exterior Damage: The impact by the front of the Ford involved the left side plane of the Chrysler. The fender, A-pillar, front door, B-pillar, and rear door were directly damaged. The direct damage began 44 cm (17.3 in) forward of the left rear axle and extended 203 cm (80 in) forward along the left side. The crush measurements were taken at the mid-door level and the residual maximum crush was 59 cm (23.2 in) occurring at C_4 (**Figure 7**). Since the left side doors had been forced open by rescue personnel, it was necessary to force them back in place and tie them shut. The damaged doors could not be forced fully back into their damaged position, so an adjustment factor of 10 cm (4 in) was added to the crush measurements at C_3 and C_4 based on measurements on the doors. The vehicle's sill height was 36 cm (14.2 in) and the height of the maximum crush was 72 cm (28.3 in). The Door Sill Differential was 23 cm (9.1 in). The induced damage involved the hood, windshield, left A-pillar, left roof side rail, roof, left quarter panel, and rear bumper cover. The table below shows the vehicle's right side crush profile.

Figure 7: Top view of the crush on the left side plane of the Chrysler; each increment on the measurement rods is 5 cm (2 in)

Units	Event	Direct Damage		Field L	C_1	C_2	C_3	C_4	C_5	C_6	Direct	Field L
		Width CDC	Max Crush								±D	±D
cm	1	203	59	277	0	10	54	59	27	0	15	-21
in		79.9	23.2	109.1	0.0	3.9	21.3	23.2	10.6	0.0	5.9	-8.3

Damage Classification: The Collision Deformation Classification (CDC) was **10-LYAW-4 (300** degrees) for the left side plane impact. The Damage algorithm of the WinSMASH program calculated the total Delta V for the Chrysler as 64 km/h (39.7 mph). The longitudinal and lateral velocity changes were -32.0 km/h (-19.9 mph) and 55.4 km/h (34.4 mph), respectively. Based on the damage sustained by both vehicles, the results appeared reasonable.

The vehicle manufacturer's recommended tire size was P215/65R16. The Chrysler was equipped with the recommended size tires. The vehicle's tire data are shown in the table below.

Tire	*Measured Pressure*		*Vehicle Manufacturer's Recommended Cold Tire Pressure*		*Tread Depth*		*Damage*	*Restricted*	*Deflated*
	kPa	psi	kPa	psi	milli-meters	32nd of an inch			
LF	165	24	221	32	3	4	None	No	No
LR	165	24	221	32	6	7	None	No	No
RR	179	26	221	32	6	7	None	No	No
RF	165	24	221	32	4	5	None	No	No

Vehicle Interior: The interior inspection of the Chrysler revealed an area of scuffing on the left roof side rail (**Figure 8**), possibly related to contact by the driver's head. The left front door arm rest was scuffed and deformed (**Figure 9**). Much of the deformation on the interior door panel was also related to the impact and probably rescue activities. There were no occupant scuff marks or tissue transfer on the left IC air bag, left front seat-mounted side impact air bag, or driver's frontal air bag. However, a significant amount of blood transfer was present on the driver's frontal air bag and the outboard surface of the left front seat-mounted side impact air bag.

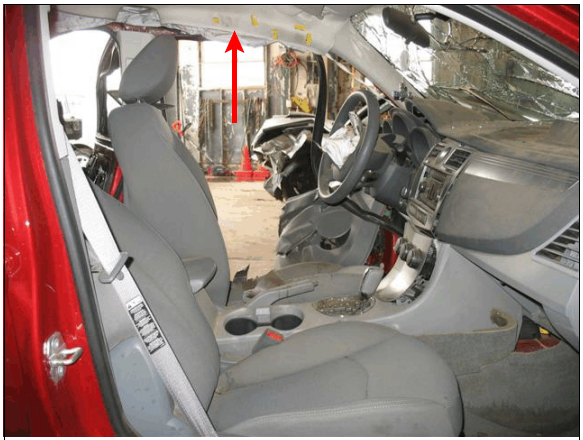


Figure 8: Front row viewed from right front door; arrow shows probable occupant contact mark on the left roof side rail

The left front and left rear doors were jammed shut, while the other doors remained closed and operational. The pre-crash status of the right front window glazing was partially open. The pre-crash status of the remaining window glazings was fixed or closed. All the left side window glazings and the backlight glazing were disintegrated by impact forces. The windshield was in place and cracked by impact forces. The remaining glazings were undamaged.

Figure 9: The left front door; arrow shows area of probable occupant contact

The vehicle sustained 14 intrusions of the passenger compartment. The most severe intrusions into the driver's space involved the forward lower quadrant of the left front door, the left B-pillar, and the rear portion of the left front window frame. These components intruded laterally 40 cm (15.7 in), 39 cm (15.4 in), and 39 cm (15.4 in), respectively. The intrusion of the left front door and left front window frame were estimated.

EVENT DATA RECORDER

The Chrysler's EDR was imaged using version 3.3 of the Bosch Crash Data Retrieval software via direct connection to the air bag control module. The EDR file was subsequently read and printed using version 3.4. The EDR recorded a deployment event. The EDR recorded 100 msec of longitudinal crash pulse data prior to air bag deployment and 149 msec of data after air bag deployment. This model EDR does not record lateral accelerations and does not display Delta V values. The longitudinal acceleration was recorded as negative 7.84 g at air bag deployment, while the maximum recorded acceleration was negative 27.45 g occurring at 8 msec after air bag deployment. The EDR recorded 5 seconds of pre-crash data at 0.1 sec intervals. The pre-crash data indicated that the Chrysler was stopped from 5 sec to 3.6 sec prior to Algorithm Enable (AE) and accelerated from 3.5 sec to 0.5 sec prior to AE. The relative throttle position was recorded as dropping from 35% to 9.1% from 0.5 to 0.4 sec prior to AE. The brake switch status was recorded as closed at 0.1 second prior to AE. The vehicle's speed was recorded at 21 km/h (13 mph) at 0.1 sec prior to AE. The EDR report is attached at the end of this report[1].

AUTOMATIC RESTRAINT SYSTEM

The Chrysler was equipped with a Certified Advanced 208-Compliant (CAC) frontal air bag system that consisted of dual stage driver and front passenger frontal air bags. The CAC system incorporated a low-risk deployment method for the front passenger frontal air bag. Based on the Holmatro Rescuer's Guide to Vehicle Safety Systems, the frontal air bag sensors were located on the left and right radiator supports. The manufacturer has certified that the vehicle is compliant

[1] Pages 12-17 of the EDR report have been deleted for confidentiality purposes.

to the Advanced Air Bag portion of the Federal Motor Vehicle Safety Standard (FMVSS) No. 208. Both frontal air bags deployed in this crash.

The Chrysler was also equipped with a side impact air bag system that consisted of roof rail-mounted IC air bags and front seat-mounted side impact air bags. Based on the Holmatro Rescuer's Guide to Vehicle Safety Systems, the side impact sensors were located within the lower B and C-pillars, and the inflators were located within the C-pillars. The left IC air bag and driver's seat-mounted side impact air bag deployed in this crash.

The driver's frontal air bag was located within the steering wheel hub and the module cover was a horizontal two-flap configuration constructed of pliable vinyl. The top cover flap was 16 cm (6.3 in) in width and 6 cm (2.4 in) in height. The bottom cover flap was 16 cm (6.3 in) in width and 9 cm in height (3.5 in). The flaps opened at the designated tear points and were undamaged. The deployed air bag (**Figure 10**) was 63 cm (24.8 in) in diameter and was designed with two 8 cm (3.1 in) wide tethers and two 3 cm (1.2 in) diameter vent ports, which were located at the 10 and 1 o'clock positions. Inspection of the air bag revealed no damage or occupant contact, but there was an extensive amount of blood transfer on the front of the air bag.

Figure 10: The driver's frontal air bag

The front passenger air bag was located within the top of the instrument panel and the module cover was a horizontal two-flap configuration constructed of firm vinyl. Both cover flaps were 21.5 cm (8.5 in) in width and 6 cm (2.4 in) in height. The flaps opened at the designated tear points and were undamaged. The deployed air bag was 42 cm (16.5 in) in width and 50 cm (19.7 in) in height. There was one tether 42 cm (16.5 in) in width located 17 cm (6.7 in) below the top of the air bag. There were two vent ports on each side of the air bag that were 5 cm and 4 cm (2 in and 1.6 in) in diameter. The vent ports were located on the side of the air bag at the 10 and 2 o'clock positions. The bottom vent ports had an elastic ring of material around the hole.

The IC air bags were located along the roof side rails inside the headliner and extended from the A-pillar to the C-pillar. There were no external vent ports. The deployed left IC air bag (**Figure 11**) was 148 cm (58.3 in) in width and 45 cm (17.7 in) in height. It was attached to the A-pillar by a 42 cm (16.5 in) nylon rope. The gap between the front of the IC air bag and the A-pillar was also 42 cm (16.5 in) at the bottom of the IC air bag. There was no gap between the back of the IC air bag and the C-pillar. The distance the IC air bag extended vertically below the beltline could not be determined since there was significant deformation of the side structure due to the impact and the left side doors would not close. The left IC air bag was not damaged and there was no discernable evidence of occupant contact.

The driver's seat-mounted side impact air bag was located in the outboard side of the seat back and deployed through a tear-seam. The deployed air bag (**Figure 12**) was 35 cm (13.8 in) in height and 32 cm (12.6 in) in width. Inspection of the air bag revealed no discernable evidence of occupant contact. There was a significant amount of blood transfer on the outboard side of the air bag. The air bag sustained damage on the outboard surface (**Figure 13**) from glass fragments from the disintegrated left front window glazing. The damage consisted of an area of small holes and abrasions located approximately 15 cm (5.9 in) below the top of the air bag and 7 cm (2.8 in) forward of the center of the air bag.

Figure 11: The deployed left IC air bag and left front seat mounted side impact air bag

Figure 12: The inboard side of the left front seat-mounted side impact air bag

Figure 13: Abrasions and small holes on the forward upper quadrant of the left seat-mounted side impact air bag due to contact by glass fragments from the disintegrated left front window glazing

MANUAL RESTRAINT SYSTEM

The Chrysler was equipped with lap-and-shoulder safety belts for all the vehicle's seating positions. The driver's safety belt consisted of continuous loop belt webbing, an Emergency Locking Retractor (ELR), sliding latch plate, and an adjustable upper anchor that was in the full-down position. The front passenger safety belt was similarly equipped, but the retractor type could not be determined since the retractor was jammed and the belt was drawn tightly into the retractor due to pretensioner actuation. The adjustable upper anchor was located in the middle position. The second row safety belts had continuous loop belt webbing, switchable ELR/Automatic Locking Retractors (ALR), sliding latch plates, and fixed upper anchors. The second row safety belts were not equipped with pretensioners.

The inspection of the driver's safety belt assembly revealed historical usage scratches on the latch plate. There were load abrasions on the latch plate belt guide. The retractor was jammed and the safety belt had been cut in two different places to allow extrication of the driver. Based on this evidence, the driver was restrained by the lap-and-shoulder safety belt at the time of the crash.

While the pretensioner probably actuated, this could not be confirmed due to the deformation of the B-pillar, which was significant and could also have jammed the retractor. The remaining seat positions were unoccupied.

CASE VEHICLE DRIVER KINEMATICS

The driver of the Chrysler [45-year-old, female; 163 cm (64 in) and 48 kg (106 lbs)] was seated in an unknown posture. At the time of the inspection, the seat track was adjusted to the middle position and the seat back was upright. The tilt steering column was adjusted to the center position.

The left side impact on the Chrysler displaced the driver to the left and slightly forward opposite the 10 o'clock direction of force and she loaded the safety belt. Scuff marks on the left roof side rail indicated that the driver's head possibly contacted the side rail, which caused a nonanatomic brain injury, basilar skull fractures, subarachnoid hemorrhage, and a pituitary gland injury. There was no discernable evidence of occupant contact on the left IC air bag or marks on the outside surface of the IC air bag to indicate that the driver's head loaded through the IC air bag and contacted the fiberglass hood of the Ford. The driver sustained a laceration of the right anterior ventricle of the heart, possibly from loading the safety belt. The driver also sustained multiple abrasions and contusions. Two areas of abrasions involved the left costal margin near the clavicle and the left superior abdomen, below the left breast, which was probably from loading the seat-mounted side impact air bag. The driver remained restrained within her seat position throughout the crash and was removed from the vehicle by emergency responders.

CASE VEHICLE DRIVER INJURIES

The driver of the Chrysler sustained a fatal injury. She was transported by ambulance to a hospital was pronounced deceased 21 minutes post crash. The table below presents the driver's injuries and injury sources.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
1	Laceration, transmural[2], 1-1.5 cm (0.4-0.6 in) right anterior ventricle of heart with 325 ml tamponade[1] (hemopericardium)	critical 441012.5,4	Torso portion of safety belt system	Possible	Autopsy

[2] The following terms are defined in DORLAND'S ILLUSTRATED MEDICAL DICTIONARY as follows:
transmural (trans-mu/ral): through the wall of an organ; extending through or affecting the entire thickness of the wall of an organ or cavity.
tamponade ((tam"pon-ad/): 1. surgical use of a tampon. 2. pathologic compression of a part.
cardiac tamponade: acute compression of the heart caused by increased intrapericardial pressure due to the collection of blood or fluid in the pericardium from rupture of the heart, penetrating trauma, or progressive effusion.
heart tamponade: *cardiac t.*
pericardial tamponade: *cardiac t.*

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
2	Nonanatomic brain injury, no spontaneous or purposeful movement nor movement to painful stimuli, PEA[3], no gag or corneal reflexes, pupils fixed and nonreacting, GCS=3	critical 160824.5,0	Roof, left front side rail	Possible	Emergency room records
3	Fractures basilar skull, bibasilar across sella turcica, radiating to occipital bone (i.e., ring fracture) and radiating to cribiform plate	severe 150206.4,8	Roof, left front side rail	Possible	Autopsy
4	Hemorrhage, subarachnoid, prominent, basal surface of cerebrum	serious 140684.3,9	Roof, left front side rail	Possible	Autopsy
5	Injury pituitary; gland encased within a fractured sella turcica with infiltrating hemorrhage	serious 140799.3,8	Roof, left front side rail	Possible	Autopsy
6	Abrasions, 5.1 x 1.3 cm (2.0 x 0.5 in) superficial, over left zygoma	minor 290202.1,2	Noncontact injury: flying glass, left front glazing	Probable	Autopsy
7	Abrasions, 1.3 cm (0.5 in), superficial, over left inferior chin	minor 290202.1,8	Noncontact injury: flying glass, left front glazing	Probable	Autopsy
8 9	Abrasions along left costal margin, including: 7.6 x 2.5 cm (3 x 1 in) near left clavicle and 5.1 x 2.5 cm (2 x 1 in) left superior abdomen, below left breast	minor 490202.1,2 590202.1,7	Air bag, driver's side impact	Possible	Autopsy
10	Lacerations (cuts, dicing type), 25.4 x 5.1 cm (10 x 2 in) along posterior surface right arm above right elbow	minor 790602.1,1	Noncontact injury: flying glass, left front glazing	Probable	Autopsy
11	Contusions along right medial thigh, 30.5 x 7.6 cm (12 x 3 in), and right medial knee, 5.1 cm (2 in)	minor 890402.1,1	Steering wheel rim	Probable	Autopsy

[3] The following term is defined in DORLAND'S ILLUSTRATED MEDICAL DICTIONARY as follows:
PEA: pulseless electrical activity
pulseless electrical activity: continued electrical rhythmicity of the heart in the absence of effective mechanical function; it may be due to uncoupling of ventricular muscle contraction from electrical activity or may be secondary to cardiac damage with respiratory failure and cessation of cardiac venous return. Called also *electromechanical dissociation*.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
12	Abrasions mid right anterior leg, 5.1 x 2.5 cm (2 x 1 in)	minor 890202.1,1	Left lower instrument panel (includes knee bolster), right of steering column	Probable	Autopsy
13	Contusions mid right anterior leg, 5.1 x 2.5 cm (2 x 1 in)	minor 890402.1,1	Left lower instrument panel (includes knee bolster), right of steering column	Probable	Autopsy
14	Abrasion, 5.1 cm (2 in), linear, right medial foot	minor 890202.1,1	Floor, foot controls	Probable	Autopsy

OTHER VEHICLE

The 2003 Ford Mustang GT was a rear wheel drive, 2-door, coupe (VIN: 1FAFP42X03F------) equipped with a 4.6-liter, V8 engine and a 5-speed manual transmission. The Ford was equipped with 4-wheel, anti-lock brakes with electronic brake force distribution, redesigned driver and front passenger frontal air bags, and traction control.

Exterior Damage: The impact with the Chrysler involved the front plane of the Ford (**Figures 14** and **15**). The front bumper, grille, hood, both fenders, and both headlamp/turn signal assemblies were directly damaged. The direct damage began at the front left bumper corner and extended across the full width of the front plane. The crush measurements were taken at the bumper level and the residual maximum crush was 74 cm (46 in) occurring at C_1 (**Figure 16**). The left side wheelbase was reduced 37 cm (14.6 in), while the right side wheelbase was extended 1 cm (0.4 in). The induced damage involved the hood and both fenders. The table below shows the front crush profile.

Figure 14: Damage on the front plane of the Ford from the impact with the Chrysler

Units	Event	Direct Damage		Field L	C_1	C_2	C_3	C_4	C_5	C_6	Direct	Field L
		Width CDC	Max Crush								±D	±D
cm	1	120	74	120	74	61	53	41	23	13	0	0
in		47.2	29.1	47.2	29.1	24.0	20.9	16.1	9.1	5.1	0.0	0.0

Figure 15: Left side view of the front plane damage on the Ford

Figure 16: Left side view of the front plane crush on the Ford

Damage Classification: The CDC for the front impact with the Chrysler was **12-FDEW-3** (**10** degrees). The Damage algorithm of the WinSMASH program calculated the Ford's total Delta-V as 65 km/h (40.4 mph). The longitudinal and lateral velocity changes were –64.0 km/h (-39.8 mph) and -11.3 km/h (7.0 mph), respectively. Based on the damage on both vehicles, the results appeared reasonable.

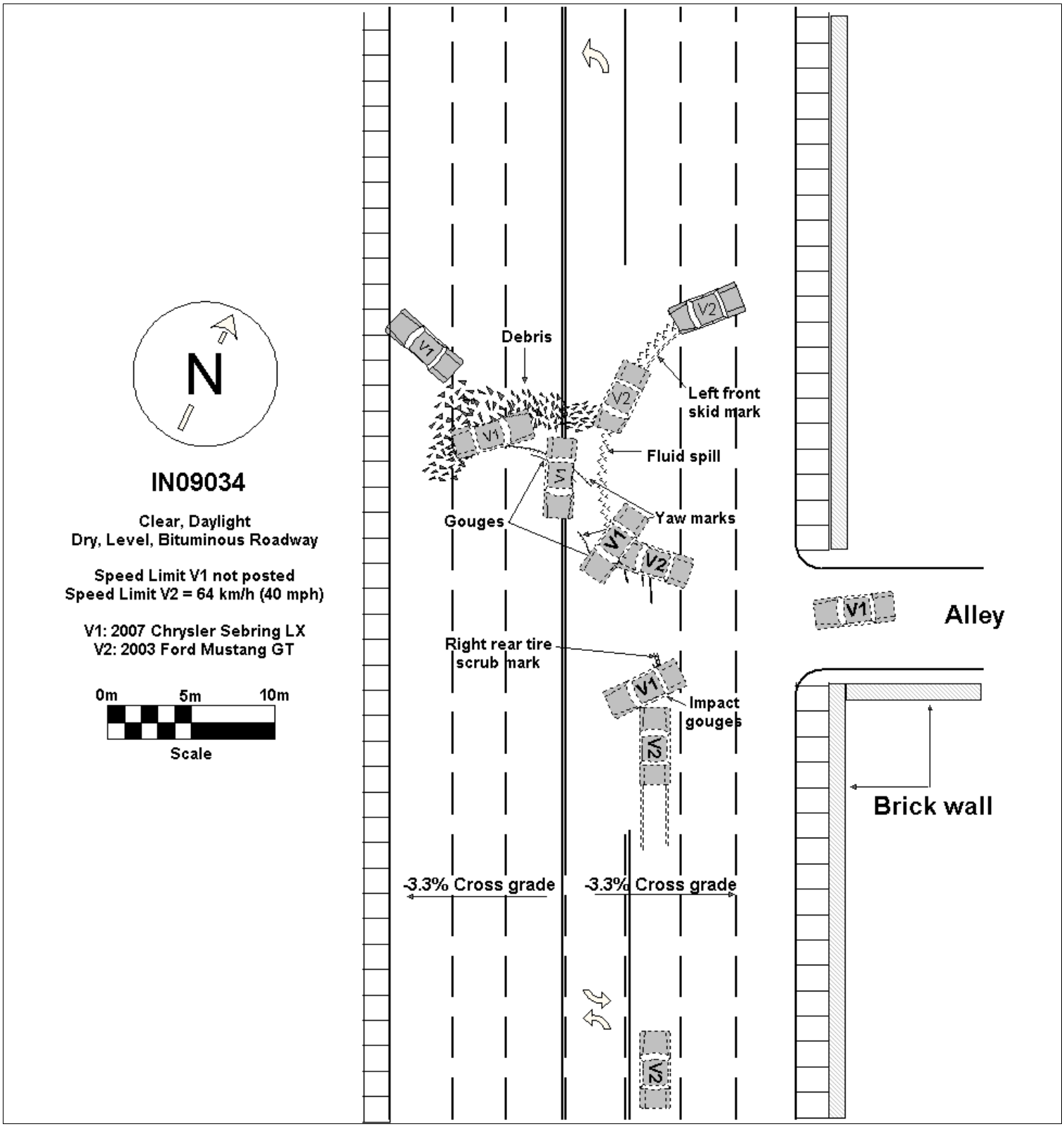
Event Data Recorder: The Ford's EDR was imaged using version 3.3 of the Bosch Crash Data Retrieval software via direct connection to the air bag control module. The EDR file was subsequently read and printed using version 3.4. The EDR recorded a deployment event. This model EDR does not record pre-crash data. The EDR recorded 116 msec of longitudinal crash pulse data. The maximum recorded velocity change was recorded as -49.15 km/h (-30.54 mph) occurring at 116 msec. The EDR report is attached at the end of this report[4].

The manufacturer's recommended tire size was P245/45R17. The Ford was equipped with a P225/50R17 size tire on the left front wheel and P245/45R17 size tires on the remaining wheels. The vehicle's tire data are shown in the table below.

[4] Pages 8 and 9 of the EDR report have been deleted for confidentiality purposes.

Tire	*Measured Pressure*		*Vehicle Manufacturer's Recommended Cold Tire Pressure*		*Tread Depth*		*Damage*	*Restricted*	*Deflated*
	kPa	psi	kPa	psi	milli-meters	32nd of an inch			
LF	Flat	Flat	207	30	6	7	None	Yes	No
LR	152	22	207	30	2	2	None	No	No
RR	193	28	207	30	4	5	None	No	No
RF	110	16	207	30	0	0	None	No	No

Other Vehicle's Occupants: The police crash report indicated that safety belt usage for the driver of the Ford (20-year-old, male), and the front passenger (19-year-old, female) was unknown. Both frontal air bags deployed as a result of the crash. The driver sustained a C (possible) injury and the front passenger sustained an A (incapacitating) injury. Both were transported by ambulance to a hospital.


N
IN09034
Clear, Daylight
Dry, Level, Bituminous Roadway
Speed Limit V1 not posted
Speed Limit V2 = 64 km/h (40 mph)
V1: 2007 Chrysler Sebring LX
V2: 2003 Ford Mustang GT
0m
5m
10m
Scale
Debris
Left front skid mark
Fluid spill
Gouges
Yaw marks
Right rear tire scrub mark
Impact gouges
-3.3% Cross grade
-3.3% Cross grade
Alley
Brick wall
V1
V2

CDR File Information

User Entered VIN	1C3LC46R87N******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	IN09034V1.CDR
Saved on	Monday, October 26 2009 at 05:04:02 PM
Collected with CDR version	Crash Data Retrieval Tool 3.3
Reported with CDR version	Crash Data Retrieval Tool 3.3
EDR Device Type	airbag control module
Event(s) recovered	Most Recent Event

IMPORTANT NOTICE: Robert Bosch LLC recommends that the latest production release of Crash Data Retrieval software be utilized when viewing, printing or exporting any retrieved data from within the CDR program. This ensures that the retrieved data has been translated using the most recent information including but not limited to that which was provided by the manufacturers of the vehicles supported in this product.

Data Limitations

AIRBAG CONTROL MODULE (ACM) DATA LIMITATIONS:

GENERAL INFORMATION:

CAUTION: During Bench top imaging, make sure the ACM is not moved, tilted or turned over while connected to and powered by the CDR Interface Module. Also, after a CDR imaging process, wait 2 minutes after power is removed from the ACM before attempting to move the module. Not following these general ACM guidelines for bench top imaging could cause new events to be recorded in the ACM.

The ACM current fault status will be altered if the ACM is powered-up without having all of the other vehicle inputs connected (ex: bench top imaging). This situation will occur when the CDR tool is connected directly to the ACM. This will not affect any of the stored fault data information. Always make a note in the CDR case comments page when an ACM bench top imaging process is performed.

The recorded Deployment Event will contain Pre-Crash data.

- T0 (where '0' is subscript) (-.01 sec.) is defined as the last sample point in the vehicle data buffer when the ACM commanded a deployment for all vehicles except the 2008 - 2009 Dodge Grand Caravan, 2008-2009 Chrysler Town and Country and 2009 Dodge Journey. In these vehicles, T0 (where '0' is subscript) is defined as the algorithm wakeup. Please note that the algorithm wakeup may be different for front, side, and roll-over events and their associated parameters.
- The VIN is captured by the ACM and then recorded as the Original VIN after 10 consecutive ignition cycles of capturing the same number. Once it has been recorded, this number can not be modified.

CDR FILE INFORMATION:

Event(s) Recovered definitions:

- None - There are no stored events in the Airbag Control Module (ACM)
- Not Retrievable - Event Data is stored in the ACM but is not retrievable by the CDR tool.
- Most Recent Event - Data of the most recent event is displayed in the report
- 1st Prior Event - Two events are stored in the ACM, Data displayed is of the first prior event.
- 2nd Prior Event - Three events are stored in the ACM, Data displayed is of the second prior event.
- Etc., (for modules with 3 to 5 stored events)

CDR RECORD INFORMATION:

- If power to the ACM is lost during a deployment event, all or part of the event data record may not be recorded. "Interrupted" will be displayed for Vehicle Event Recorder Status.
- The Airbag Control Module Configuration indicates the inputs and outputs that the ACM for a particular vehicle monitors and/or controls.
- Vehicle Data (Pre-Crash) is transmitted to the Airbag Control Module, by various vehicle control modules, via the vehicle's communication network. (For example: Vehicle Speed, Engine RPM, Percent throttle, and brake switch status are transmitted by the PCM. ESP data is from the electronic brake module.)
- On 2006-2009 Dodge Ram 2500/3500, the Engine RPM recorded is limited to a maximum of 4080 RPM.
- On the 2008 - 2009 Dodge Grand Caravan, 2008-2009 Chrysler Town and Country and 2009 Dodge Journey, the engine RPM resolution is 256 rpm. On all other vehicles, the resolution is 32 rpm.
- If a recorded event has RPM equal to 8160 or 4080 and vehicle speed equals 158 for each time stamp, then the data is default data and the event stored in the ACM is not valid.
  - The accuracy of the recorded Vehicle Speed will be affected if the vehicle had the tire size or the final drive axle ratio changed from the factory build specifications.
  - Vehicle Speed is reported as an average of the drive wheels.
- On the 2008 - 2009 Dodge Grand Caravan, 2008-2009 Chrysler Town and Country and 2009 Dodge Journey, the vehicle speed resolution is 2 mph. On all other vehicles, the resolution is 1 mph.
  - The MIL (Malfunction Indicator Lamp) Status for the various recorded systems indicates the state of the applicable malfunction indicator lamp at the time that the data was captured. Note: Some fault codes could be stored due to component/system damage from the accident.

NOTE: A StarScan Tool should be used to read any stored Diagnostic Trouble Codes (DTC's) in the various electronic modules (ACM, PCM, ABS, TCM, etc., where applicable) for use in interpretation of some vehicle specific recorded data.

VEHICLE DATA DEFINITIONS:

- N/A - Not Applicable is used to show default values. This indicates that no data exists or that the data parameter is not applicable for vehicle configuration.
- SNA - Signal Not Available indicates that a defective sensor or system fault condition exists that is not allowing the data parameter to be sent across the vehicle communication bus.
- Not Retrievable - This indicates that the CDR tool was not able to retrieve that data for that particular vehicle data parameter.

Vehicle Event Recorder Status definitions:

- Interrupted - Contains Event, but was interrupted during recording; Indicates data from the captured event was not fully recorded
- Complete - Contains Complete Data from an Event; Indicates data from the captured event has been fully recorded
- No data - Contains No Event Data
- Relative Throttle (%) - This is the percentage of throttle blade opening (0 - 100%)
- Relative Pedal (%) - This is the percentage of accelerator pedal depressed (0 - 100%)
- Brake Switch #1 Status - This is the brake switch status of Service Brake (Open/Closed); Open = Brake not depressed; Closed = Brake depressed
- Brake Switch #2 Status - This is the brake switch status for Cruise Control (Open/Closed): Open = Brake not depressed; Closed = Brake depressed
    - ABS MIL status - This indicates the ABS fault indicator lamp status. It will only be illuminated when there is a fault in the ABS system. The Electronic brake module DTC's should be read and recorded for final system interpretation.
- ESP MIL status - This indicates the ESP/BAS fault indicator lamp status. It will only be illuminated when there is a fault or thermal model shutdown in the ESP system. The ESP module DTC's should be read and recorded for final system interpretation. This is only valid for vehicles equipped with ESP.
- ESP Lamp Steady State Requested - This is the status of the ESP symbol - "car with squiggly lines" indicator lamp. "Yes" indicates ESP has been turned off by the driver or has reduced performance and is not an indication of a fault in the system. This is only valid for vehicles equipped with ESP.
- ESP Lamp Flashing Requested - If "Yes", then an ESP, Traction Control or Trailer Sway Control (if equipped) event was active at the time of data capture. This is only valid for vehicles equipped with ESP.
- ESP Disabled - "Yes" indicates that ABS & ESP have been disabled by the driver or due to system performance. This is only valid for vehicles equipped with ESP.
- Traction Control On/Off Button Status - Enabled means the system is functional and not turned off by the driver. On equipped vehicles.
- ESP Active - "YES" indicates that the ESP system is intervening with wheel specific braking/engine control. This is only valid for vehicles equipped with ESP.
- Panic Brake Assist Active - "Yes" indicates that all four of the brake circuits are under going ABS control. This is only valid for vehicles equipped with ESP.
- Steering Angle (Degrees) if equipped: Valid range is -2048 degrees to +2047 degrees;
    - Steering Angle polarity is positive for right turns on:
        - 2005 - 2007 Grand Cherokee
        - 2006 - 2007 Commander
        - 2005 - 2009 300, Magnum, and Charger
        - 2008 - 2009 Challenger
    - Steering Angle polarity is negative for right turns on:
        - 2008 - 2009 Grand Cherokee and Commander
        - All other vehicles not specified
- Yaw Rate (Degrees) if equipped: Valid range is -327.68 degrees/second to +327.67 degrees/second. All vehicles use negative yaw rate when making a right turn.
- Wheel Speed (stored for some vehicles equipped with ABS/ESP); value is revolutions per minute:
    - LF = Left Front Tire
    - RF = Right Front Tire
    - LR = Left Rear Tire
    - RR = Right Rear Tire
- ETC Lamp Status - Lamp "ON " indicates there is an active Electronic Throttle DTC. This is only valid for vehicles equipped with ETC.
- ETC Lamp Flashing - If "Yes", then the ETC is in the limp-in mode. This is only valid for vehicles equipped with ETC.
- Engine Torque Applied - If "No", then no engine torque output was applied (as in Park/Neutral for Automatic transmissions or clutch depressed on manual or during an ESP/Traction Control event), If "Yes", then engine torque output was applied.
- Tire 1 (2) Location - This indicates the location of the tire pressure sensor data. Default is used to indicate that the location of the tire pressure sensor is unknown or there is no tire pressure sensor in the wheel. Vehicles with Base Tire Pressure Monitoring systems will display SNA for both Tire Locations as these vehicles do not send actual pressure values across the communication bus.
- Tire 1 (2) Pressure Status - This indicates the actual pressure status of the Tire Location defined in the previous column. Possible values are LOW, NORMAL, HIGH, or SNA for this parameter. Vehicles with Base Tire Pressure Monitoring systems will display NORMAL even though these vehicles do not send actual pressure values across the communication bus.
- Tire 1 (2) Pressure (psi) - This indicates the actual tire pressure value of the Tire Location defined. Vehicles with Base Tire Pressure Monitoring systems will display N/A for this parameter as these vehicles do not send actual pressure values across the communication bus.
- Cruise Control System Status - "Yes" indicates that the Cruise Control system is turned on.
- Cruise Control System Active - "Yes" indicates the Cruise Control system is actively controlling vehicle speed. "No" indicates the system is NOT controlling vehicle speed.

GENERAL DEFINITIONS:

- Capture - The process of buffering data into a temporary, volatile storage medium where it is continuously updated at regular time intervals.
- Ignition Cycle - Ignition power applied to and removed from the ACM.
- Matured - Diagnostic Trouble Code has met criteria to be stored in module.
- Powered-Up - The act of applying a 10V - 16V dc power source to the appropriate pins on a specific module.
- Record - The process of saving captured data into a non-volatile device for subsequent retrieval.

ACRONYMS:

ABS	Anti-Lock Brake System
ACM	Air Bag Control Module
BAS	Brake Assist System
DTC	Diagnostic Trouble Code
EBD	Electronic Brake Distribution
ESP	Electronic Stability Program
ETC	Electronic Throttle Control
MIL	Malfunction Indicator Lamp
PCM	Power Train Control Module
PVS	Pedal Voltage Sensor
RPM	Revolution per Minute
Service Brake	Brake Pedal
TCM	Transmission Control Module
TPM	Tire Pressure Monitoring
TPS	Throttle Position Sensor
VIN	Vehicle Identification Number

APPLICATION INFORMATION:

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

Airbag Control Module Identification

Airbag Control Module Part Number	05084103AC
Airbag Control Module Serial Number	TBOME3176O0205
Airbag Control Module Supplier	TRW

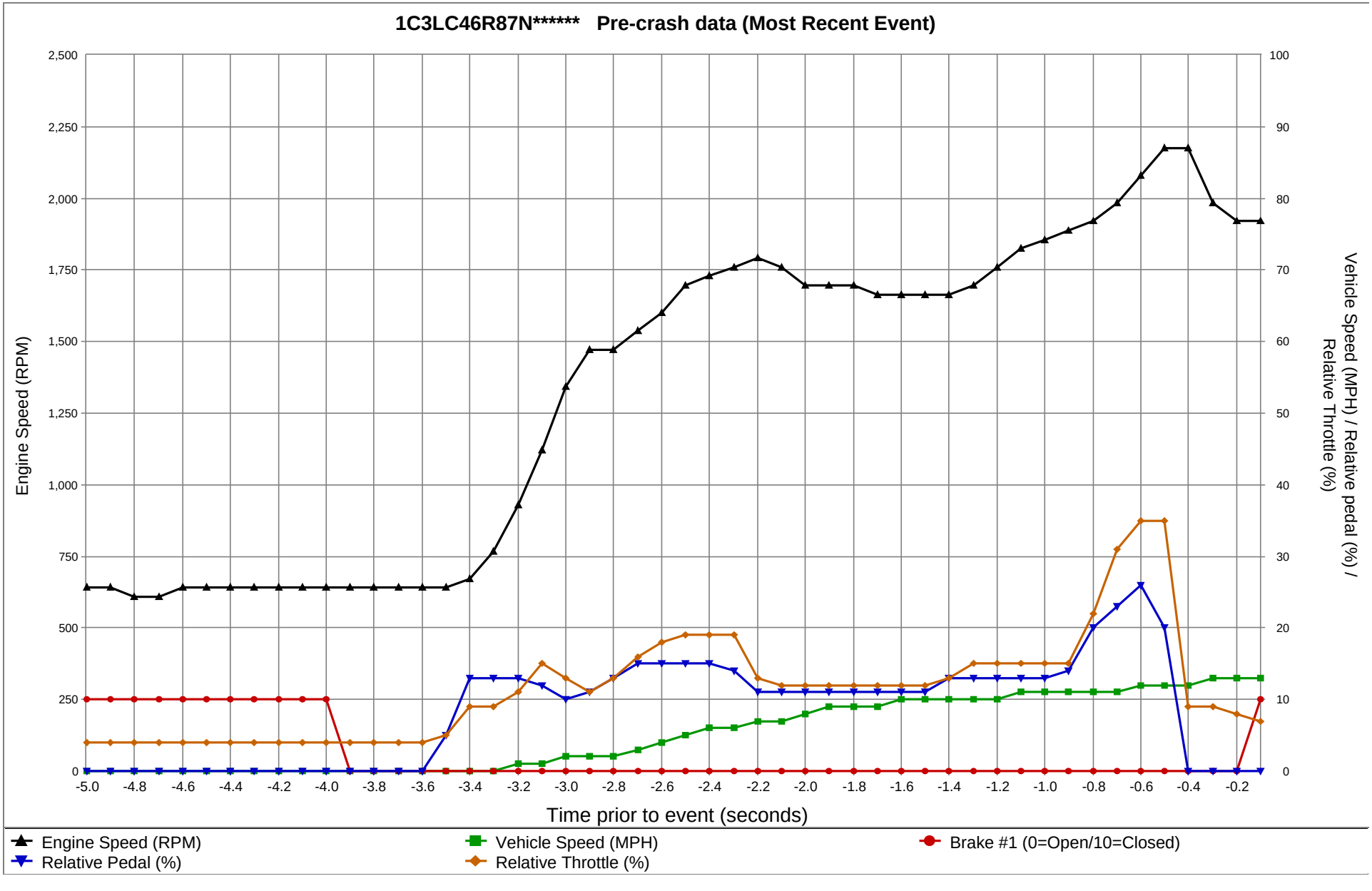
Airbag Control Module Configuration

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

System Status at Time of Retrieval

Original VIN	1C3LC46R87N******

1C3LC46R87N****** Pre-crash data (Most Recent Event)



Pre-crash data (Most Recent Event - table 1 of 3)

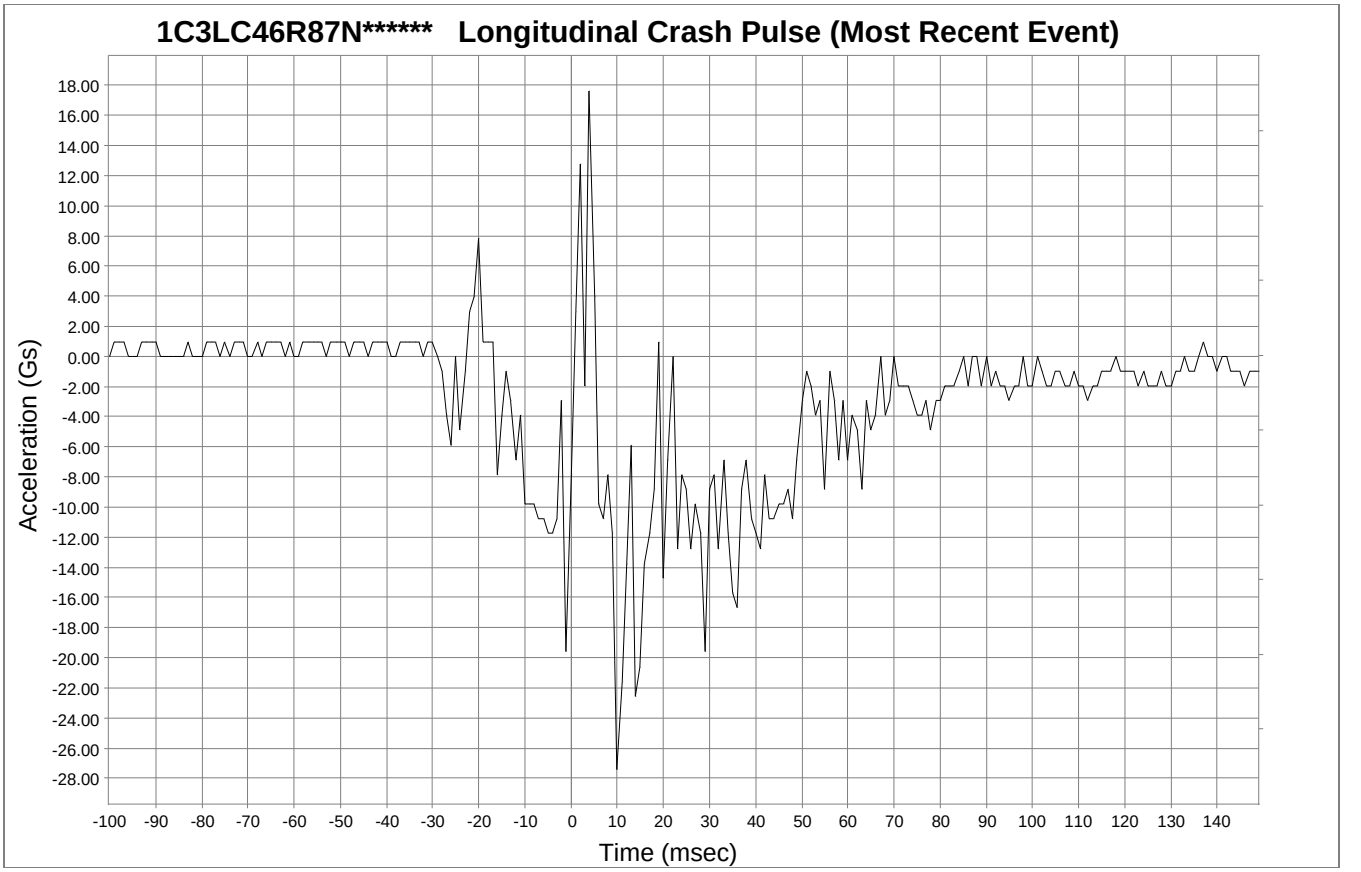
Time Stamp (sec)	Vehicle Event Recorder Status	Engine RPM	Vehicle Speed (MPH [km/h])	Relative Throttle (%)	Relative Pedal (%)	Raw Manifold Pressure (Volts)	Brake Switch #1 Status	Brake Switch #2 Status
-5.0	Complete	640	0 [0]	4.3	0.0	1.17	Closed	Closed
-4.9	Complete	640	0 [0]	4.3	0.0	1.15	Closed	Closed
-4.8	Complete	608	0 [0]	4.3	0.0	1.17	Closed	Closed
-4.7	Complete	608	0 [0]	4.3	0.0	1.17	Closed	Closed
-4.6	Complete	640	0 [0]	4.3	0.0	1.17	Closed	Closed
-4.5	Complete	640	0 [0]	4.3	0.0	1.17	Closed	Closed
-4.4	Complete	640	0 [0]	4.3	0.0	1.17	Closed	Closed
-4.3	Complete	640	0 [0]	4.3	0.0	1.15	Closed	Closed
-4.2	Complete	640	0 [0]	4.3	0.0	1.17	Closed	Closed
-4.1	Complete	640	0 [0]	4.3	0.0	1.15	Closed	Closed
-4.0	Complete	640	0 [0]	4.3	0.0	1.15	Closed	Closed
-3.9	Complete	640	0 [0]	4.3	0.0	1.17	Open	Open
-3.8	Complete	640	0 [0]	4.3	0.0	1.15	Open	Open
-3.7	Complete	640	0 [0]	4.3	0.0	1.15	Open	Open
-3.6	Complete	640	0 [0]	4.3	0.0	1.15	Open	Open
-3.5	Complete	640	0 [0]	5.1	4.7	1.15	Open	Open
-3.4	Complete	672	0 [0]	8.7	12.6	1.27	Open	Open
-3.3	Complete	768	0 [0]	9.4	13.0	1.48	Open	Open
-3.2	Complete	928	1 [1]	11.4	13.0	1.68	Open	Open
-3.1	Complete	1,120	1 [2]	14.6	12.2	1.86	Open	Open
-3.0	Complete	1,344	2 [3]	12.6	10.2	1.91	Open	Open
-2.9	Complete	1,472	2 [3]	11.4	10.6	1.78	Open	Open
-2.8	Complete	1,472	2 [4]	13.0	13.0	1.68	Open	Open
-2.7	Complete	1,536	3 [5]	15.7	14.6	1.86	Open	Open
-2.6	Complete	1,600	4 [7]	17.7	14.6	1.97	Open	Open
-2.5	Complete	1,696	5 [8]	19.3	14.6	2.05	Open	Open
-2.4	Complete	1,728	6 [9]	19.3	14.6	2.05	Open	Open
-2.3	Complete	1,760	6 [10]	18.9	14.2	2.03	Open	Open
-2.2	Complete	1,792	7 [12]	13.0	11.4	1.91	Open	Open
-2.1	Complete	1,760	7 [12]	11.8	11.4	1.66	Open	Open
-2.0	Complete	1,696	8 [13]	11.8	11.4	1.58	Open	Open
-1.9	Complete	1,696	9 [14]	11.8	11.4	1.60	Open	Open
-1.8	Complete	1,696	9 [15]	11.8	11.4	1.62	Open	Open
-1.7	Complete	1,664	9 [15]	12.2	11.0	1.64	Open	Open
-1.6	Complete	1,664	10 [16]	11.8	11.0	1.64	Open	Open
-1.5	Complete	1,664	10 [16]	11.8	11.0	1.66	Open	Open
-1.4	Complete	1,664	10 [16]	13.4	12.6	1.68	Open	Open
-1.3	Complete	1,696	10 [16]	15.0	12.6	1.84	Open	Open
-1.2	Complete	1,760	10 [16]	15.0	13.0	1.87	Open	Open
-1.1	Complete	1,824	11 [17]	15.0	13.0	1.87	Open	Open
-1.0	Complete	1,856	11 [17]	15.0	13.4	1.86	Open	Open
-0.9	Complete	1,888	11 [18]	15.0	13.8	1.86	Open	Open
-0.8	Complete	1,920	11 [18]	22.4	19.7	2.03	Open	Open
-0.7	Complete	1,984	11 [18]	30.7	23.2	2.17	Open	Open
-0.6	Complete	2,080	12 [19]	35.0	25.6	2.17	Open	Open
-0.5	Complete	2,176	12 [19]	35.0	20.5	2.17	Open	Open
-0.4	Complete	2,176	12 [20]	9.1	0.0	1.74	Open	Open
-0.3	Complete	1,984	13 [21]	8.7	0.0	1.31	Open	Open
-0.2	Complete	1,920	13 [21]	7.9	0.0	1.11	Open	Open
-0.1	Complete	1,920	13 [21]	7.1	0.0	0.98	Closed	Closed

Pre-crash data (Most Recent Event - table 2 of 3)

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

Pre-crash data (Most Recent Event - table 3 of 3)

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


1C3LC46R87N****** Longitudinal Crash Pulse (Most Recent Event)
Acceleration (Gs)
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
-12.00
-14.00
-16.00
-18.00
-20.00
-22.00
-24.00
-26.00
-28.00
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
Time (msec)

Longitudinal Crash Pulse (Most Recent Event)

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)
-100	0.00
-99	0.98
-98	0.98
-97	0.98
-96	0.00
-95	0.00
-94	0.00
-93	0.98
-92	0.98
-91	0.98
-90	0.98
-89	0.00
-88	0.00
-87	0.00
-86	0.00
-85	0.00
-84	0.00
-83	0.98
-82	0.00
-81	0.00
-80	0.00
-79	0.98
-78	0.98
-77	0.98
-76	0.00
-75	0.98
-74	0.00
-73	0.98
-72	0.98
-71	0.98
-70	0.00
-69	0.00
-68	0.98
-67	0.00
-66	0.98
-65	0.98
-64	0.98
-63	0.98
-62	0.00
-61	0.98
-60	0.00
-59	0.00
-58	0.98
-57	0.98
-56	0.98
-55	0.98
-54	0.98
-53	0.00
-52	0.98
-51	0.98

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)
-50	0.98
-49	0.98
-48	0.00
-47	0.98
-46	0.98
-45	0.98
-44	0.00
-43	0.98
-42	0.98
-41	0.98
-40	0.98
-39	0.00
-38	0.00
-37	0.98
-36	0.98
-35	0.98
-34	0.98
-33	0.98
-32	0.00
-31	0.98
-30	0.98
-29	0.00
-28	-0.98
-27	-3.92
-26	-5.88
-25	0.00
-24	-4.90
-23	-0.98
-22	2.94
-21	3.92
-20	7.84
-19	0.98
-18	0.98
-17	0.98
-16	-7.84
-15	-3.92
-14	-0.98
-13	-2.94
-12	-6.86
-11	-3.92
-10	-9.80
-9	-9.80
-8	-9.80
-7	-10.78
-6	-10.78
-5	-11.76
-4	-11.76
-3	-10.78
-2	-2.94
-1	-19.61

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)
0	-7.84
1	2.94
2	12.75
3	-1.96
4	17.65
5	3.92
6	-9.80
7	-10.78
8	-7.84
9	-11.76
10	-27.45
11	-21.57
12	-13.73
13	-5.88
14	-22.55
15	-20.59
16	-13.73
17	-11.76
18	-8.82
19	0.98
20	-14.71
21	-6.86
22	0.00
23	-12.75
24	-7.84
25	-8.82
26	-12.75
27	-9.80
28	-11.76
29	-19.61
30	-8.82
31	-7.84
32	-12.75
33	-6.86
34	-11.76
35	-15.69
36	-16.67
37	-8.82
38	-6.86
39	-10.78
40	-11.76
41	-12.75
42	-7.84
43	-10.78
44	-10.78
45	-9.80
46	-9.80
47	-8.82
48	-10.78
49	-6.86

Longitudinal Crash Pulse (Most Recent Event)

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)
50	-2.94
51	-0.98
52	-1.96
53	-3.92
54	-2.94
55	-8.82
56	-0.98
57	-2.94
58	-6.86
59	-2.94
60	-6.86
61	-3.92
62	-4.90
63	-8.82
64	-2.94
65	-4.90
66	-3.92
67	0.00
68	-3.92
69	-2.94
70	0.00
71	-1.96
72	-1.96
73	-1.96
74	-2.94
75	-3.92
76	-3.92
77	-2.94
78	-4.90
79	-2.94
80	-2.94
81	-1.96
82	-1.96
83	-1.96
84	-0.98
85	0.00
86	-1.96
87	0.00
88	0.00
89	-1.96
90	0.00
91	-1.96
92	-0.98
93	-1.96
94	-1.96
95	-2.94
96	-1.96
97	-1.96
98	0.00
99	-1.96

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)
100	-1.96
101	0.00
102	-0.98
103	-1.96
104	-1.96
105	-0.98
106	-0.98
107	-1.96
108	-1.96
109	-0.98
110	-1.96
111	-1.96
112	-2.94
113	-1.96
114	-1.96
115	-0.98
116	-0.98
117	-0.98
118	0.00
119	-0.98
120	-0.98
121	-0.98
122	-0.98
123	-1.96
124	-0.98
125	-1.96
126	-1.96
127	-1.96
128	-0.98
129	-1.96
130	-1.96
131	-0.98
132	-0.98
133	0.00
134	-0.98
135	-0.98
136	0.00
137	0.98
138	0.00
139	0.00
140	-0.98
141	0.00
142	0.00
143	-0.98
144	-0.98
145	-0.98
146	-1.96
147	-0.98
148	-0.98
149	-0.98

CDR File Information

User Entered VIN	1FAFP42X03F******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	IN09034V2.CDR
Saved on	Monday, October 26 2009 at 05:09:30 PM
Collected with CDR version	Crash Data Retrieval Tool 3.3
Reported with CDR version	Crash Data Retrieval Tool 3.3
EDR Device Type	airbag control module
Event(s) recovered	Deployment

IMPORTANT NOTICE: Robert Bosch LLC recommends that the latest production release of Crash Data Retrieval software be utilized when viewing, printing or exporting any retrieved data from within the CDR program. This ensures that the retrieved data has been translated using the most recent information including but not limited to that which was provided by the manufacturers of the vehicles supported in this product.

Module Information

The retrieval of this data has been authorized by the vehicle's owner, or other legal authority such as a subpoena or search warrant, as indicated by the CDR tool user on Monday, October 26 2009 at 05:09:30 PM .

Important Limitations on Vetronix Crash Data Retrieval (CDR) Tool Capabilities.

Disclaimer: This Restraint Control Module (RCM) records longitudinal deceleration data for the purpose of understanding the input data the Restraint Control Module used to determine whether or not to deploy restraint devices. This module does not record vehicle speed, throttle position, brake on-off, and other data, which may be recorded in some 1999 model year and later General Motors modules. The deceleration data recorded by Ford's module during a crash can subsequently be mathematically integrated into a longitudinal Delta-V. Delta-V is the change in velocity during the recording time and is NOT the speed the vehicle was traveling before the accident, and is also not the Barrier Equivalent Velocity. The Vetronix CDR Tool will read and interpret both acceleration in G's and Delta-V in mph. RCM's in Ford vehicles that can be read by the Vetronix CDR tool are listed in the Vetronix Help Files.

Important

If there is any question that the restraint system did not perform as it was designed to perform, please read the system only through the diagnostic link connector. The Vetronix CDR kit provides an RCM interface cable to plug directly into the restraint control module. The Vetronix CDR RCM Interface Cable connects only power, ground, and memory read pins to the relevant vehicle restraint control module. The other RCM pins normally connect to inputs, such as sensors, and outputs, such as airbags, are not connected when you use the RCM Interface Cable to plug directly into the module. Since the vehicle restraint control module is constantly monitoring airbag system readiness (when powered), it will detect that the sensors and airbags are not connected. The restraint control module may record a new diagnostic trouble code into memory for each device that is not connected. These new diagnostic trouble codes may record over previously written diagnostic trouble codes present prior to the accident and spoil evidence necessary to determine if the restraint system performed in the accident as it was designed to perform. Not only could this prevent Ford from being able to determine if the system performed as it was designed to perform, but, regardless of innocent inadvertence, you could raise issues of evidence spoliation in any litigation that may arise out of the accident. If you cannot read the module via the diagnostic link connector, and if you suspect improper system performance, contact Ford Motor Company and request their assistance to read the module with a proper vehicle simulator attached.

While data stored in RCM's is accurate, accident reconstructionists must be aware of the limitations of the data recorded in Ford's control modules and should compare the recorded data with the physical evidence at the accident scene using professional accident reconstruction techniques (i.e. vehicle crush characteristics, skid marks, etc) before making any assumptions about the import and validity of the data recorded in the module with respect to the crash event being analyzed. The following describes specific limitations that must be considered when analyzing recorded data. Investigators should obtain permission of the vehicle owner or have sufficient legal authority prior to reading any data.

1. There may be no deceleration data recorded in the module.
Loss of power (cut wires, damaged battery, crushed fuse box) to the module during or immediately after the crash may prevent the crash data from being recorded. A backup power supply within the module has sufficient power to

continue to analyze the deceleration data and deploy restraint devices if needed, but there is no backup power for recording.

If the deceleration input does not create a vehicle longitudinal Delta-V above 4 mph within 100 milliseconds, there may not be any data recorded.

2. In unusual circumstances, deceleration data stored in the module may be from a crash other than the one you are currently analyzing.
The module will record data from some non-deploy events. If, after the module has recorded data from a non-deploy event, and there is a subsequent event in which there is a loss of power and no new recording is made for that subsequent event, the deceleration data in the module's memory may be from the prior event. If the new, subsequent event is a deploy event and recording has occurred, the deployment times should be recorded. If there are no deployment times recorded, but airbags or other restraint devices are observed to have deployed, the recorded data that you read are most likely from a prior event.

Once an airbag or other restraint device has been commanded to deploy, the data recorded in connection with that deployment are "locked", and subsequent crashes cannot be recorded.

If a vehicle is being repaired, the RCM should be replaced after any crash in which restraint devices deploy. Early printed shop manuals refer to re-using modules by clearing the "crash data memory full" code, but this is no longer true and the latest on-line electronic shop manual directs that modules be replaced.

Crashes that involve multiple impacts will record only one of the impacts. If there is a deployment, the deployment event will be recorded and locked. If no restraint device is commanded to deploy, the recorded data are not "locked", and subsequent impacts may record over any previous recorded data. Further analysis will be required to determine which of the events was actually recorded.

3. The computed longitudinal Delta-V may understate the total Delta-V

Many real-world crashes can last longer than the memory has the capacity to record. Therefore, the actual Delta-V of the event may be higher than the Delta-V calculated and displayed by the Vetronix CDR System output. Review the end of the longitudinal acceleration/deceleration pulse - if it has not settled to zero G's by the end of the recording, the vehicle longitudinal Delta-V is most likely understated. If there is a clear decaying trend line you may choose, at your own risk, to estimate the total Delta-V by extrapolating the decay trend to zero and to calculate the additional Delta-V not captured.

Under some circumstances where power is interrupted, during the recording of data, or the module re-sets during the recording of data, a partial recording may occur. This will be shown as "no data" in the data table and will not be plotted on the graph of acceleration. When some portion of the acceleration data is not recorded, the Delta-V during that time cannot be calculated. A Delta-V will be calculated for the points that are valid, but the user must be aware that the partial Delta-V calculated will further underestimate the actual event total Delta-V.

4. This module records only longitudinal acceleration/deceleration of the vehicle. You must compute lateral or resultant total acceleration based on your estimated Principal Direction of Force (PDOF).

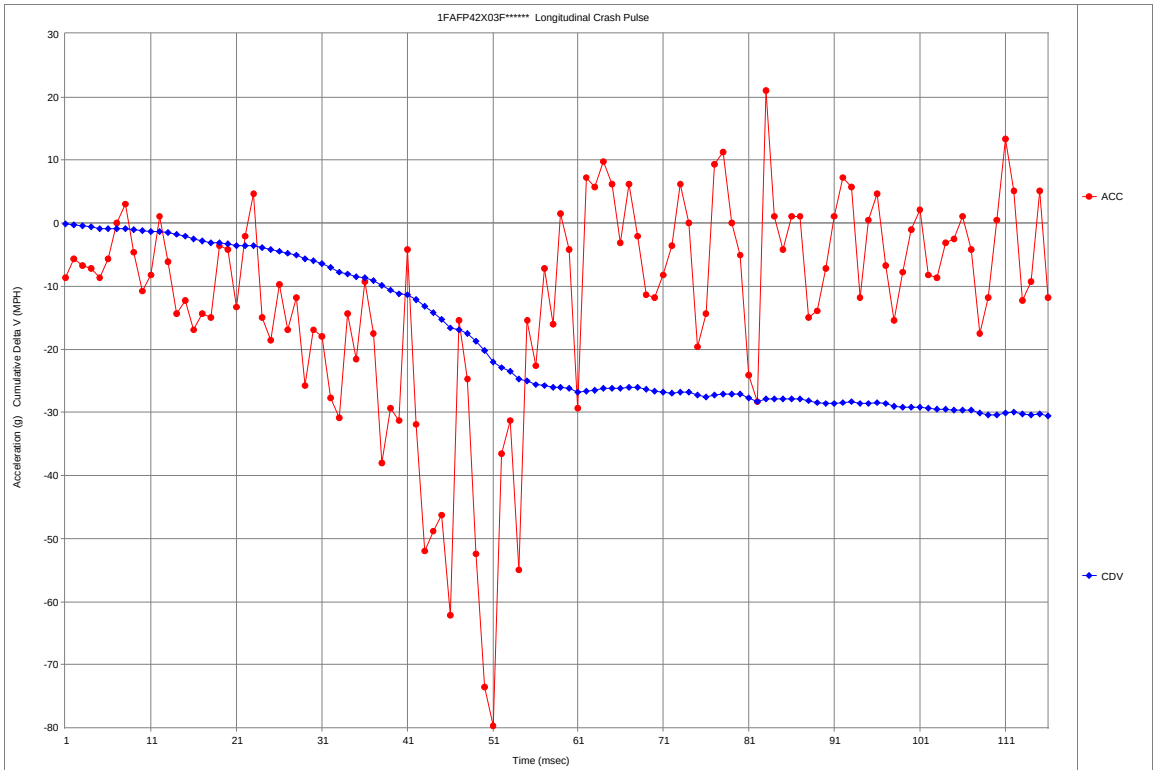
5. Vertical acceleration/decelerations are not recorded. Vehicle spin about a point not centered on the Restraints Control Module sensor may add or subtract from bulk vehicle motion.

6. This module is not intended to record acceleration/deceleration in a side-impact event. If the side impact generates a longitudinal deceleration component sufficient to wake up the frontal deployment algorithm, there may be a recording of longitudinal deceleration in a side impact event.

Any Longitudinal Delta-V determined by using data read from the air bag module should be verified with physical evidence from the crash (such as vehicle crush, skid marks) and assumed accident sequence. Multiple impacts, angular collisions, side impacts, vehicle spin, etc should be considered in addition to the data read from the air bag module.

System Status At Deployment

Diagnostic codes active when event occurred	0
Passenger Airbag Switch Position During Event	Activated
Time From Side Safing Decision to Left (Driver) Side Bag Deployment (msec)	Not Deployed
Frontal and Pretensioner Fire time (ms)	14.5


1FAFP42X03F****** Longitudinal Crash Pulse
Acceleration (g) Cumulative Delta V (MPH)
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
11
21
31
41
51
61
71
81
91
101
111
Time (msec)
ACC
CDV

Crash Pulse Data

Milliseconds	Long. Acceleration (Gs)	Long. Cumulative Delta V (MPH)
1	-8.74	-0.19
2	-5.65	-0.32
3	-6.68	-0.46
4	-7.20	-0.62
5	-8.74	-0.81
6	-5.65	-0.94
7	0.00	-0.94
8	3.08	-0.87
9	-4.63	-0.97
10	-10.79	-1.21
11	-8.22	-1.39
12	1.03	-1.37
13	-6.17	-1.50
14	-14.39	-1.82
15	-12.34	-2.09
16	-16.96	-2.46
17	-14.39	-2.78
18	-14.91	-3.10
19	-3.60	-3.18
20	-4.11	-3.27
21	-13.36	-3.57
22	-2.06	-3.61
23	4.63	-3.51
24	-14.91	-3.84
25	-18.50	-4.24
26	-9.77	-4.46
27	-16.96	-4.83
28	-11.82	-5.09
29	-25.70	-5.65
30	-16.96	-6.03
31	-17.99	-6.42
32	-27.76	-7.03
33	-30.84	-7.71
34	-14.39	-8.02
35	-21.59	-8.50
36	-9.25	-8.70
37	-17.48	-9.08
38	-38.04	-9.92
39	-29.30	-10.56
40	-31.35	-11.25
41	-4.11	-11.34
42	-31.87	-12.04
43	-51.91	-13.18
44	-48.83	-14.25
45	-46.26	-15.27
46	-62.19	-16.63
47	-15.42	-16.97
48	-24.67	-17.51
49	-52.43	-18.67
50	-73.50	-20.28

Milliseconds	Long. Acceleration (Gs)	Long. Cumulative Delta V (MPH)
51	-79.67	-22.03
52	-36.49	-22.83
53	-31.35	-23.52
54	-55.00	-24.73
55	-15.42	-25.06
56	-22.62	-25.56
57	-7.20	-25.72
58	-15.93	-26.07
59	1.54	-26.03
60	-4.11	-26.12
61	-29.30	-26.77
62	7.20	-26.61
63	5.65	-26.49
64	9.77	-26.27
65	6.17	-26.14
66	-3.08	-26.20
67	6.17	-26.07
68	-2.06	-26.11
69	-11.31	-26.36
70	-11.82	-26.62
71	-8.22	-26.80
72	-3.60	-26.88
73	6.17	-26.75
74	0.00	-26.75
75	-19.53	-27.17
76	-14.39	-27.49
77	9.25	-27.29
78	11.31	-27.04
79	0.00	-27.04
80	-5.14	-27.15
81	-24.16	-27.68
82	-28.27	-28.30
83	21.07	-27.84
84	1.03	-27.82
85	-4.11	-27.91
86	1.03	-27.88
87	1.03	-27.86
88	-14.91	-28.19
89	-13.88	-28.49
90	-7.20	-28.65
91	1.03	-28.63
92	7.20	-28.47
93	5.65	-28.35
94	-11.82	-28.61
95	0.51	-28.60
96	4.63	-28.49
97	-6.68	-28.64
98	-15.42	-28.98
99	-7.71	-29.15
100	-1.03	-29.17
101	2.06	-29.13
102	-8.22	-29.31
103	-8.74	-29.50

Milliseconds	Long. Acceleration (Gs)	Long. Cumulative Delta V (MPH)
104	-3.08	-29.57
105	-2.57	-29.62
106	1.03	-29.60
107	-4.11	-29.69
108	-17.48	-30.07
109	-11.82	-30.33
110	0.51	-30.32
111	13.36	-30.03
112	5.14	-29.92
113	-12.34	-30.19
114	-9.25	-30.39
115	5.14	-30.28
116	-11.82	-30.54