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 - IN10004
LOCATION - MISSOURI
VEHICLE - 2009 FORD FOCUS SE
CRASH DATE - January 2010

Submitted:

July 20, 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 2009 Ford Focus SE and a 1990 Dodge Omni.			
16. *Abstract* This on-site investigation focused on the side impact air bag system of a 2009 Ford Focus SE. Additional focus was on the sources of the injuries for the front row right passenger who was fatally injured. The Ford was occupied by a restrained 64-year-old male driver and a restrained 91-year-old female front right passenger. The driver of the Ford was traveling east on a state highway negotiating a right curve. A 1990 Dodge Omni was traveling north on a rural roadway and entered the intersection. The front of the Ford impacted the left side of the Dodge. The direction of force on the Ford was within the 1 o'clock sector and the impact force was sufficient to trigger a stage 2 deployment of both frontal air bags. Both side impact inflatable curtain (IC) air bags and front seat-mounted side impact air bags also deployed during the crash. The driver and front right passenger of the Ford were transported by ambulance to a hospital. The driver was treated in the emergency room for minor injuries and released. The front right passenger was admitted for treatment of serious injuries and pronounced deceased 4 hours and 52 minutes following the cash.			
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This on-site investigation focused on the side impact air bag system of a 2009 Ford Focus SE (**Figure 1**). Additional focus was on the sources of the injuries for the front right passenger who was fatally injured. This crash was brought to the attention of the National Highway Traffic Safety Administration (NHTSA) on February 2, 2009 by this contractor. The investigation was assigned on February 9, 2010. This crash involved the Ford and a 1990 Dodge Omni America. The crash occurred in January, 2010, at 1010 hours in Missouri and was investigated by the Missouri State Highway Patrol. The crash scene and both vehicles were inspected on February 10-11, 2010. The interview with the driver of the Ford was completed on February 16, 2010. This report is based on the police crash report, crash scene and vehicle inspections, exemplar Ford inspection, driver interview information, occupant medical records, occupant kinematic principles, and evaluation of the evidence.

Figure 1: The damaged 2009 Ford Focus SE

CRASH CIRCUMSTANCES

Crash Environment: The Ford was traveling on a 2-lane state highway that traversed in an east-west direction. The Ford was approaching a 4-leg intersection. The Dodge was traveling on was a 2-lane rural roadway that traversed in a north-south direction. The Dodge was approaching the same intersection. Both roadways were bituminous and had one through lane in each direction. Each lane was 3.1 m (10.2 ft) in width. The Ford's roadway had a negative 5% grade and was bordered by narrow grass shoulders. The Dodge's roadway had a positive 2.5% grade and was bordered by narrow bituminous shoulders. The approach to the intersection for the Dodge was controlled by a stop sign. The posted speed limits were 89 km/h (55 mph) for the Ford and 56 km/h (35 mph) for the Dodge. At the time of the crash the light condition was daylight and the weather was cloudy. The roadway surface was wet. The Crash Diagram is on page 15 of this report.

Figure 2: Eastbound approach of the Ford; arrow shows approach of the Dodge

Pre-Crash: The Ford was occupied by a restrained 64-year-old male driver and a restrained 91-year-old female front row passenger. The driver of the Ford was traveling east (**Figure 2**) negotiating a right curve and he intended to continue eastbound. The unrestrained 23-year-old female driver of the Dodge was traveling north approaching the intersection (**Figure 3**). She applied full braking as she approached the stop sign and skidded into the intersection where the

crash occurred. The police measured 6.4 m (21 ft) of pre-crash skid mark from the vehicle's right front tire. The driver of the Ford stated during the SCI interview that he did not see the Dodge and took no actions to avoid the crash. The Ford was equipped with an Event Data Recorder (EDR), which recorded 5 seconds of pre-crash data. The EDR recorded the Ford traveling approximately 89 km/h (55 mph) at each of the 1 second recording intervals. The "Brake Lamp Switch Depressed" variable was recorded as "No" at each of the recording intervals.

Figure 3: Northbound approach of the Dodge; arrow shows approach of the Ford

Crash: The front of the Ford (**Figure 4**) impacted the left side of the Dodge (**Figure 5**, event 1). The impact on the Ford occurred at the front right corner of the bumper fascia and involved the fender, right front wheel, and right front door. The front bumper bar was not engaged by this impact. The direction of force on the Ford was within the 1 o'clock sector and the impact force was sufficient to trigger a stage 2 deployment of both frontal air bags. Both side impact inflatable curtain (IC) air bags and front seat-mounted side impact air bags also deployed during the crash. The impact caused the Ford to rotate counterclockwise and the Dodge rotated clockwise. The left side of the Dodge impacted the right side of the Ford (**Figure 6**, event 2). The Ford rotated counterclockwise approximately 30 degrees from its initial easterly heading as it traveled 9 m (29.5 ft) and departed the north side of the roadway. It traveled an additional 14 m (45.9 ft) through a shallow ditch and up a 12% grade where the front plane (**Figure 7**) impacted and broke an 8 cm (3 in) diameter cedar tree (**Figure 8**, event 3). The vehicle traveled an additional 4.4 m (14.4 ft) as the left side plane (**Figure 9**) sideswiped a 16 cm (6.2 in) diameter oak tree (**Figure 8**, event 4) and the front plane (**Figure 7**) impacted a 19 cm (7.5 in) diameter oak tree (**Figure 8**, event 5). The Ford came to final rest (**Figure 10**) against the tree heading northeast. Following the impacts with the Ford, the unrestrained driver of the Dodge was ejected from the vehicle through the disintegrated left front window glazing. The Dodge departed the north side of the roadway and came to final rest in a ditch heading east. The driver of the Dodge came to rest on the eastbound lane of the roadway.

Figure 4: Initial impact on the Ford occurred at the front right corner and engaged the right front wheel and fender

Figure 5: Damage on the left side of the Dodge from the impact by the Ford

Figure 6: Damage on the right side of the Ford from impact with the left side of the Dodge

Figure 7: Arrow on right shows area of tree impact on the Ford for event 3; arrow on left shows damage from tree impact for event 5

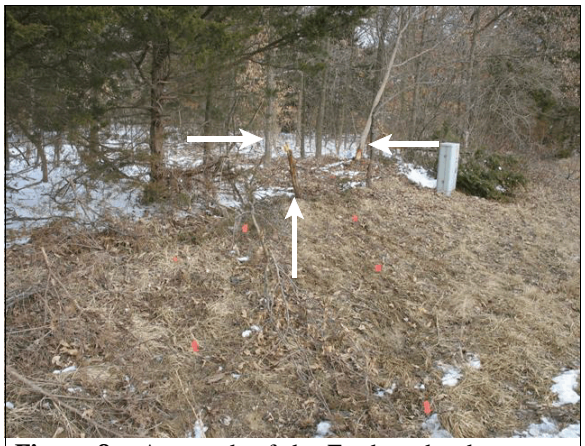


Figure 8: Approach of the Ford to the three tree impacts; arrow in center, left, and right shows trees impacted in events 3, 4 , and 5, respectively

Figure 9: Sideswipe damage on the right side of the Ford from impact with a tree (event 4)

Post-Crash: The police, emergency medical, and rescue personnel responded to the crash scene. Rescue personnel mechanically removed the Ford's right front door and removed the front passenger from the vehicle. The driver of the Ford exited the vehicle without assistance. The driver and passenger were transported by ambulance to a hospital. The driver and second row left passenger of the Dodge were also transported by ambulance to a hospital. Both vehicles were towed due to damage.

Figure 10: View back to area of initial impact in the intersection from the final rest position of the Ford

The 2009 Ford Focus SE was a front wheel drive, 5-passenger, 4-door sedan (VIN: 1FAHP35N49W------) equipped with a 2.0-liter, I-4 engine, an automatic transmission, 4-wheel anti-lock brakes, electronic stability control, 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, adjustable head restraints, and Lower Anchors and Tethers for Children (LATCH) in the outboard seating positions. The vehicle's specified wheelbase was 261 cm (102.7 in).

CASE VEHICLE DAMAGE

Exterior Damage: The Ford sustained front and right side damage during the impact with the Dodge. The front bumper fascia, fender, right front wheel, and right front door were directly damaged. The bumper bar was not engaged by this impact. The lateral distance from the side of the bumper fascia to the bumper bar was 17 cm (6.7 in). Since there was overlapping damage on the front from the impacts with the Dodge and two trees (events 1, 3, and 5), a specific crush profile for each impact could not be determined. However, the totality of the damage on the front was measured and the maximum residual crush was 36 cm (14.2 in) occurring 21 cm (8.3 in) left of the front right bumper corner (**Figure 11**). The majority of the crush on the front appeared to be related to event 5 [impact with a 19 cm (7.5 in) diameter oak tree].

Figure 11: Top view of the crush on the front of the Ford

The Ford sustained direct damage on the right rear door and quarter panel (**Figure 12**) from the impact with the left side of the Dodge (event 2). The direct damage began 69 cm (27.2 in) forward of the right rear axle and extended 152 cm (59.8 in) rearward. The crush measurements were taken at the mid-door level and the maximum residual crush was 4 cm (1.6 in) occurring at both C_3 and C_4. The table below shows the right side crush profile.

Figure 12: Damage on the right side of the Ford from the sideslap impact with the Dodge

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	2	152	4	152	0	0	4	4	1	0	-36	-36
in		59.8	1.6	59.8	0.0	0.0	1.6	1.6	0.4	0.0	-14.2	-14.2

The vehicle sustained direct damage on the left fender and both left side doors during the impact with a tree (event 4). The direct damage ended 14 cm (5.5 in) forward of the left rear axle and extended 230 cm (90.1 in) forward along the left side. The crush measurements were taken at the mid-door level and the maximum residual crush was 3 cm (1.2 in) occurring at C_3. The table below shows the left side crush profile.

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	4	230	3	230	0	2	3	0	0	0	-1	-1
in		90.6	1.2	90.6	0.0	0.8	1.2	0.0	0.0	0.0	-0.4	-0.4

Damage Classification: The Collision Deformation Classifications (CDC) for the front and right side plane impacts with the Dodge (events 1 and 2) were 01FREE7 (20 degrees) and 03RZEW1 (90 degrees), respectively. The CDCs for the front plane impacts with two trees were 12FCEN1 (0 degrees, event 3) and 12FREN2 (0 degrees, event 5). The CDC for the left side plane impact with a tree was 12LDMS1 (0 degrees, event 4).

The Missing Vehicle algorithm of the WinSMASH program calculated the total Delta V for the Ford's front impact with the Dodge as 23 km/h (14.3 mph). The longitudinal and lateral velocity changes were -21.6 km/h (-14.4 mph) and -7.9 km/h (-4.9 mph), respectively. The results should be considered borderline since there was overlapping damage on the Ford and the results are based only on the crush on the Dodge. In addition, the Ford sustained narrow end engagement during this impact. The cumulative velocity change recorded by the EDR reached -31.88 km/h (-19.81 mph) at 100 ms, which was the limit of the recording.

The Damage algorithm calculated the total Delta V for the Ford's right side plane impact with the Dodge as 6 km/h (3.7 mph). The longitudinal and lateral velocity changes were 0 km/h 0 mph) and -6 km/h (-3.7 mph), respectively. Based on the damage on both vehicles, the results were reasonable. The WinSMASH program could not be used on events 3-5 since sideswipe and yielding object impacts are out of scope for the program.

The vehicle manufacturer's recommended tire size was P195/60R15. The Ford 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	Flat	Flat	221	32	6	8	None	No	No
LR	221	32	221	32	7	9	None	No	No
RR	221	32	221	32	6	8	None	No	No
RF	Flat	Flat	221	32	6	8	None	No	No

Vehicle Interior: The interior inspection of the Ford revealed a light scuff mark on the lower left instrument panel from contact by the driver's right knee. The right instrument panel was deformed by intrusion, but it was also deformed possibly from contact by the front right passenger's right knee. The steering wheel was not deformed and there was no compression of the energy absorbing steering column.

The right front door was jammed shut and was removed by rescue personnel. The remaining doors remained closed and operational. Prior to the crash, all the window glazings were either closed for operable windows or fixed for all others. The right front, right rear, and second right rear window glazings were disintegrated from impact forces. The windshield was in place and cracked by impact forces. The remaining glazings were undamaged.

The vehicle sustained six intrusions of the passenger compartment. All the intrusions occurred in the front right passenger's seating area. The most severe intrusions involved the side panel forward of the A-pillar and the sill, which intruded laterally 28 cm (11 in) and 18 cm (7.1 in), respectively.

EVENT DATA RECORDER

The Ford's EDR was imaged using version 3.4 of the Bosch Crash Data Retrieval software via connection to the diagnostic link connector. The EDR recorded a first and second stage deployment of the frontal air bags and deployments of the front seat-mounted side impact air bags and IC air bags. The recording status was indicated as "Completed & Locked." The EDR recorded the safety belt switch circuit status for both the driver and front passenger as "Buckled,"and the safety belt pretensioners were commanded to actuate. The passenger classification status was recorded as "Occupied Enable Small," and the seat track position for the driver was recorded as "Not Forward" of the switch point. The cumulative velocity change recorded by the EDR reached -31.88 km/h (-19.81 mph) at 100 ms, which was the limit of the recording. The EDR report is attached at the end of this report[1].

[1] Pages 8-12 of the EDR report have been deleted for confidentiality purposes.

The Ford 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, driver seat position sensor, buckle-mounted pretensioners, and a front passenger weight sensor. The frontal air bag sensors were located on the left and right upper radiator supports. The manufacturer has certified that the vehicle is compliant 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 Ford 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 front doors and lower B-pillars. The inflators were located within the C-pillars between the roof side rail and the lower edge of the window glazing. Both IC air bags and front seat-mounted side impact air bags deployed in this crash.

Figure 13: The driver's frontal air bag

The driver's frontal air bag was located within the steering wheel hub and the module cover was a two-flap configuration constructed of pliable vinyl. Each cover flap was 15 cm (5.9 in) in height and 7.5 cm (3 in) in width. The flaps opened at the designated tear points and were undamaged. The deployed air bag (**Figure 13**) was 56 cm (22 in) in diameter and was designed with two 12 cm (4.7 in) wide internal tethers, which were sewn to the center of the air bag. There were two 3 cm (1.2 in) diameter vent ports located on the back of the air bag at the 11 and 1 o'clock positions. Inspection of the air bag revealed no damage and no discernable evidence of occupant contact.

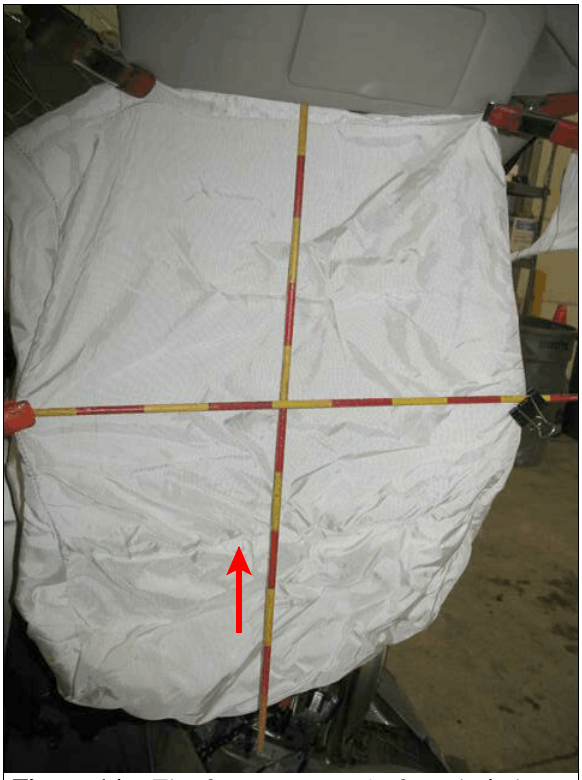


Figure 14: The front passenger's frontal air bag; arrow shows the bottom seam

The front passenger air bag was located within the top of the instrument panel and the module cover was a single horizontal flap constructed of firm vinyl with a plastic backing. The cover flap was 34 cm (13.4 in) in width and 15 cm (5.9 in) in height. It opened at the designated tear points and was undamaged. The deployed air bag (**Figure 14**) was 44 cm (17.3 in) in width and 36 cm (14.2 in) in height and had on

vent port on each side of the air bag at the 3 and 9 o'clock positions. There was no damage to the air bag and no discernable evidence of occupant contact.

Figure 15: Front portion of the right IC air bag

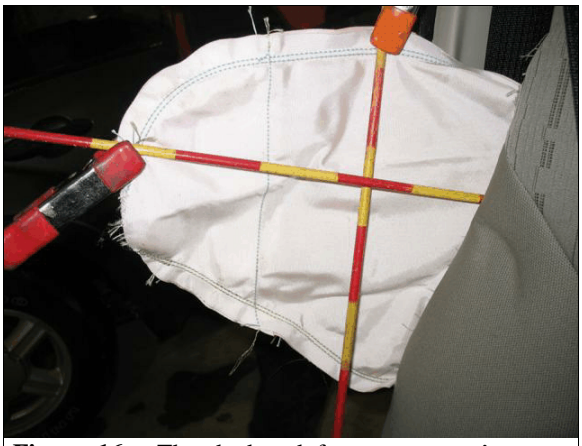


Figure 16: The deployed front passenger's seat-mounted side impact air bag

The IC air bags were located along the roof side rails inside the headliner (**Figure 15**) and extended from the A-pillar to the C-pillar. There were no external vent ports. The deployed IC air bags were 146 cm (57.4 in) in width. The height of each air bag was 34 cm (13.4 in) adjacent to the front row and 37 cm (14.6 in) adjacent to the second row. There was a non-inflatable fabric panel 15 cm in width located and the front of each IC air bag, which was attached to the A-pillar by a 19 cm (7.5 in) nylon rope. A 6 cm nylon rope attached the back of the IC air bag to the C-pillar. There was a gap above the nylon rope between the front of the fabric panel and the A-pillar that was 20 cm (7.9 in) in width at the rope and 22 cm (8.7 in) in height. There was no gap at the back of the IC air bag, which overlapped the C-pillar. The IC air bag extended vertically 1 cm (0.4 in) above the beltline adjacent to the front row and 2 cm (0.8 in) below the beltline adjacent to the second row. The inspection of the IC air bags revealed no discernable evidence of occupant contact and no damage. A dark scuff mark with vertical striations was located on the back portion of the left IC air bag and front portion of the right IC air bag, probably related to the deployment.

The front seat-mounted side impact air bags were located in the outboard side of the seat back and deployed through a tear-seam. Each deployed air bag (**Figure 16**) was 29 cm (11.4 in) in height and 23 cm (9.1 in) in width. What appeared to be a vent port 13 cm (5.1 in) in length was located on the leading edge of each air bag. There was no discernable evidence of occupant contact on either air bag and no damage.

MANUAL RESTRAINT SYSTEM

The Ford 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, buckle-mounted pretensioner, and an adjustable upper anchor that was in the full-up position. The front right passenger safety belt was similar, but was equipped with a switchable ELR/Automatic Locking Retractor (ALR). The adjustable upper anchor was also located in the full-up position. The second row safety belts were similarly

equipped as the front right passenger safety belt but had fixed upper anchors and were not equipped with pretensioners.

Figure 17: The driver's belt webbing entrapped in the D-ring

The inspection of the driver's safety belt assembly revealed that the belt webbing was bunched-up and entrapped in the D-ring (**Figure 17**). The belt webbing was stretched and the length of belt webbing extended out of the retractor was consistent with usage. The length of belt webbing as measured from the stop button to the D-ring was 150 cm (59.1 in). The pretensioner actuated and the length of the buckle stalk was reduced by 4 cm (1.6 in). This evidence was consistent with the driver's SCI interview statement that he was restrained. The EDR recorded the driver's safety belt as buckled.

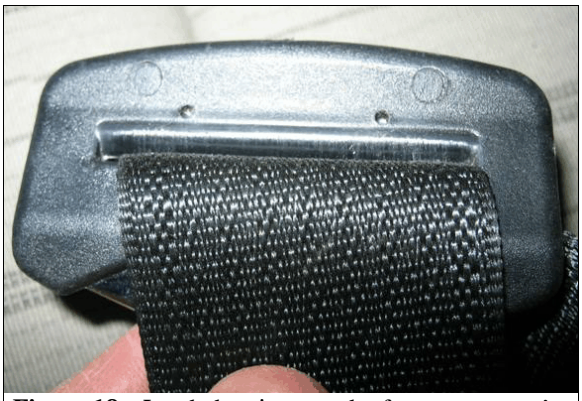


Figure 18: Load abrasions on the front passenger's latch plate belt guide

The inspection of the front right passenger's safety belt assembly revealed historical usage scratches on the latch plate and load abrasions on the latch plate belt guide (**Figure 18**). The pretensioner actuated and the length of the buckle stalk was reduced by 5 cm (2 in). The belt webbing also had a slight stretched appearance. This evidence was consistent with the driver's interview statement that the front right passenger was restrained. The EDR recorded the passenger's safety belt as buckled.

CASE VEHICLE DRIVER KINEMATICS

Based on the SCI interview, the driver of the Ford [64-year-old, male; 180 cm (71 in) and 102 kg (225 lbs)] was seated in an upright posture with his back against the seat back and both hands on the steering wheel at the 10 and 4 o'clock positions. The seat track was adjusted between the middle and rear positions and the seat back was slightly reclined. The distance from the top of the seat back to the top of the head restraint was 20 cm (7.9 in). The tilt steering column was located in the center position. The safety belt was snug across the hips and shoulder. The driver was wearing glasses at the time of the crash.

The initial impact with the left side plane of the Dodge displaced the driver forward and right opposite the 1 o'clock direction of force and he loaded the safety belt. The driver's face also loaded the deployed frontal air bag, which caused a 7.6 cm (3 in) abrasion on the left cheek. The driver sustained the following injuries from loading the safety belt: a left shoulder strain, a 7.6 cm (3 in) contusion on the left shoulder, four 5.1 cm (2 in) diameter contusions on the center chest, and a contusion across the abdomen 20.3 cm (8 in) in length. The driver also sustained a

contusion on the left hand from contacting the steering wheel and a contusion on the left knee from contacting left lower instrument panel. The right side impact with the left side of the Dodge displaced the driver to the right and his lower right left probably contacted the center console, which caused a contusion on the lower leg. The driver remained restrained within his seat position and loaded the safety belt as the vehicle sustained impacts with the three trees. Following the crash, he exited the vehicle through the driver's door without assistance.

CASE VEHICLE DRIVER INJURIES

The driver was transported by ambulance to a hospital where he was treated in the emergency room and released. He had one follow-up visit to his family physician and one visit to a chiropractor for the left shoulder strain. He did not miss any work days as a result of the 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	Abrasion left cheek, not further specified	minor 210202.1,2	Air bag, driver's	Certain	Interviewee (same person)
2	Contusions x 4, 5.1 cm (2 in), center of chest	minor 410402.1,4	Torso portion of safety belt system	Probable	Emergency room records
3	Contusion, 20.3 cm (8 in) across abdomen, not further specified	minor 510402.1,8	Lap portion of safety belt system	Probable	Interviewee (same person)
4	Sprain left shoulder, not further specified	minor 771010.1,2	Torso portion of safety belt system	Certain	Interviewee (same person)
5	Contusion, 7.6 cm (3 in), left shoulder, not further specified	minor 710402.1,2	Torso portion of safety belt system	Certain	Interviewee (same person)
6	Contusion, 5.1 cm (2 in) between right thumb and index finger	minor 710402.1,9	Steering wheel rim	Possible	Interviewee (same person)
7	Contusion medial (inside) left knee, not further specified	minor 810402.1,2	Left lower instrument panel (includes knee bolster), left of steering column	Probable	Interviewee (same person)
8	Contusion lower third of right leg, not further specified	minor 810402.1,1	Interior, center console first row	Probable	Interviewee (same person)

CASE VEHICLE FRONT ROW RIGHT PASSENGER KINEMATICS

The front row right passenger of the Ford [91-year-old, female; 160 cm (63 in) and 64 kg (140 lbs)] was seated in an upright posture with her back against the seat back. Both hands were on her lap and she was holding a purse. The seat track was adjusted to the middle position and the seat back was slightly reclined. The distance from the top of the seat back to the top of the

head restraint was 20 cm (7.9 in). The safety belt was snug across the hips and shoulder. The passenger was not wearing glasses at the time of the crash.

The initial impact with the left side plane of the Dodge displaced the front right passenger forward and right opposite the 1 o'clock direction of force and she loaded the safety belt. While there was no discernable evidence of occupant contact on the frontal air bag, the passenger's face and chest probably loaded the air bag. The passenger sustained a cerebral concussion, possibly from loading the frontal air bag. She sustained a left pneumothorax, massive hemoperitoneum, fractured ribs, fractured sternum, fractures between T_9 and T_{10} vertebral bodies, laceration of the descending aorta, contusions of the papillary muscles of the heart, and hemorrhage of the right kidney from loading the safety belt. The passenger's right leg contacted the right lower instrument panel, which caused an open, comminuted fracture of the right femoral diaphysis with posterior displacement and a fracture of the right inferior pubic ramus. The right ankle was contused from contacting the intruding right side panel forward of the A-pillar. The right side slap impact with the left side plane of the Dodge redirected the passenger to the right and her right hip and right upper arm probably contacted the right front door, which caused a contusion on the hip and arm. The passenger remained restrained in her seat position and loaded the safety belt when the vehicle departed the roadway and impacted three trees. Rescue personnel mechanically removed the right front door and removed the passenger from the vehicle.

CASE VEHICLE FRONT ROW RIGHT PASSENGER INJURIES

The front passenger was transported by ambulance to a hospital. She was pronounced deceased 4 hours and 52 minutes following the cash. The table below presents the passenger'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	Cerebral concussion with less than full orientation, sluggish responses, inconsistent sensor motor exam, GCS=12 initially	minor 161000.1,0	Air bag, front right passenger's	Possible	Hospitalization records
2	Fractured ribs: right anterior 2nd through 5th, left anterior 1st through 6th	serious 450203.3,3	Torso portion of safety belt system	Probable	Autopsy
3	Hemothorax, left, 400 ml, not further specified	serious 442200.3,2	Torso portion of safety belt system	Probable	Autopsy
4	Pneumothorax, tiny, anterior left lung, anterior to heart	moderate 442202.2,2	Torso portion of safety belt system	Probable	Hospitalization records
5	Fractured (transected) sternum between 3rd and 4th ribs	moderate 450804.2,4	Torso portion of safety belt system	Probable	Autopsy

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
6 7	Fractures between T_9 and T_{10} vertebral bodies, not further specified	moderate 650416.2,7 650416.2,7	Torso portion of safety belt system	Probable	Autopsy
8	Contusions of papillary muscles, not further specified with 20 ml of straw-colored fluid within the pericardial sac	minor 441002.1,4	Torso portion of safety belt system	Probable	Autopsy
9	Lacerations, small, descending aorta, not further specified	severe 420206.4,4	Torso portion of safety belt system	Probable	Autopsy
	Trauma blunt abdominal: significant, massive hemoperitoneum[2] with subsequent shock				Hospitalization records
10	Injury with hemorrhage of hilum right kidney	moderate 541620.2,1	Lap portion of safety belt system	Probable	Autopsy
11	Fracture, open, comminuted, distal right femoral diaphysis with posterior displacement and periprosthetic changes noted	serious 853352.3,1	Right instrument panel (Indirect injury)	Probable	Hospitalization records
12	Fracture right inferior pubic ramus with mild angulation and changes noted to right hip arthroplasty[3]	moderate 856151.2,4	Right instrument panel (Indirect injury)	Probable	Emergency room records
13	Contusion, 3 x 2 cm (1.2 x 0.8 in) mid upper chest	minor 410402.1,4	Torso portion of safety belt system	Probable	Autopsy
14	Contusion, 25 x 3 cm (9.8 x 1.2 in), right lateral lower abdomen	minor 510402.1,1	Lap portion of safety belt system	Probable	Autopsy
15	Contusion, 41 x 20 cm (16.1 x 7.9 in) left lateral lower abdomen	minor 510402.1,2	Lap portion of safety belt system	Probable	Autopsy
16	Abrasion, 1.5 cm (0.6 in), linear, right medial lower abdomen	minor 510202.1,8	Lap portion of safety belt system	Certain	Autopsy
17	Contusion (bruise) right hip, not further specified	minor 510402.1,1	Right front hardware/armrest, rear lower quadrant	Probable	Emergency room records

[2] An exploratory laparatomy was performed in the hospital because of progressively decreasing blood pressure. A significant, massive amount of blood was found in the peritoneal cavity. Hemorrhage was not able to be controlled due to dense adhesions from her prior surgeries. No specific injuries were identified during her time in the hospital. Only 200 milliliters of hemoperitoneum was found during the subsequent autopsy.

[3] The following term is defined in DORLAND'S ILLUSTRATED MEDICAL DICTIONARY as follows:
arthroplasty (ahr'thro-plas"te): plastic surgery of a joint or of joints; the formation of movable joints. Called also joint replacement.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
18	Contusions x 2, right upper anterior arm, 3 x 3 cm (1.2 x 1.2 in) and 2 x 2 cm (0.8 x 0.8 in)	minor 710402.1,1	Right front door panel, rear upper quadrant	Probable	Autopsy
19	Abrasion dorsum right hand	minor 710202.1,1	Air bag, front right passenger's	Possible	Emergency room records
20	contusion (bruise), 10 x 4 cm (3.9 x 1.6 in) dorsum right hand	minor 710402.1,1	Air bag, front right passenger's	Possible	Autopsy
21	Contusion right knee, 27 x 17 cm (10.6 x 6.7 in) and contusion, 4 x 2 cm (1.6 x 0.8 in) right shin	minor 810402.1,1	Right lower instrument panel (includes knee bolster)	Probable	Autopsy
22	Contusion, fluctuant[4], 7 x 3 cm (2.8 x 1.2 in) left medial knee and contusion, 5 x 5 cm (3.1 x 3.1 in) left medial shin	minor 810402.1,2	Right lower instrument panel (includes knee bolster)	Probable	Autopsy
23	Contusion (bruise), 6 x 4 cm (2.4 x 1.6 in) right anterior ankle	minor 810402.1,1	Right side interior surface forward of right A-pillar	Probable	Autopsy

OTHER VEHICLE

The 1990 Dodge Omni was a front wheel drive, 4-door, hatchback (VIN: 1B3XL18D6LC------) equipped with a 2.2-liter, I-4 engine, an automatic transmission, and a driver's frontal air bag.

Exterior Damage: The Dodge sustained damage on the left side during the first impact with the Ford. The front bumper and left fender were directly damaged. The direct damage ended 256 cm (100.8 in) forward of the left rear axle and extended forward along the side 73 cm (28.7 in). The crush measurements were taken at the mid-fender level and the maximum residual crush was 55 cm (21.7 in) occurring at C_5. The table below presents the left side plane crush profile.

[4] The following term is defined in DORLAND'S ILLUSTRATED MEDICAL DICTIONARY as follows:
fluctuant (fluk'choo-ent): 1. showing varying levels. 2. conveying the sensation of or exhibiting wavelike motion on palpation, owing to a liquid content.

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	73	55	107	0	10	21	42	55	47	149	139
in		28.7	21.7	42.1	0.0	3.9	8.3	16.5	21.7	18.5	58.7	54.7

The Dodge sustained direct damage on the left rear door and quarter panel during the second (sideslap) impact with the Ford. The direct damage began 47 cm (18.5 in) forward of the left rear axle and extended rearward along the side 97 cm (38.1 in). The crush measurements were taken at the upper door level the maximum residual crush was 5 cm (2 in) occurring at C_4 The table below presents the crush profile on the left rear door and quarter panel.

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	2	97	5	146	0	0	0	5	4	0	-104	-129
in		38.2	2.0	57.5	0.0	0.0	0.0	2.0	1.6	0.0	-40.9	-50.8

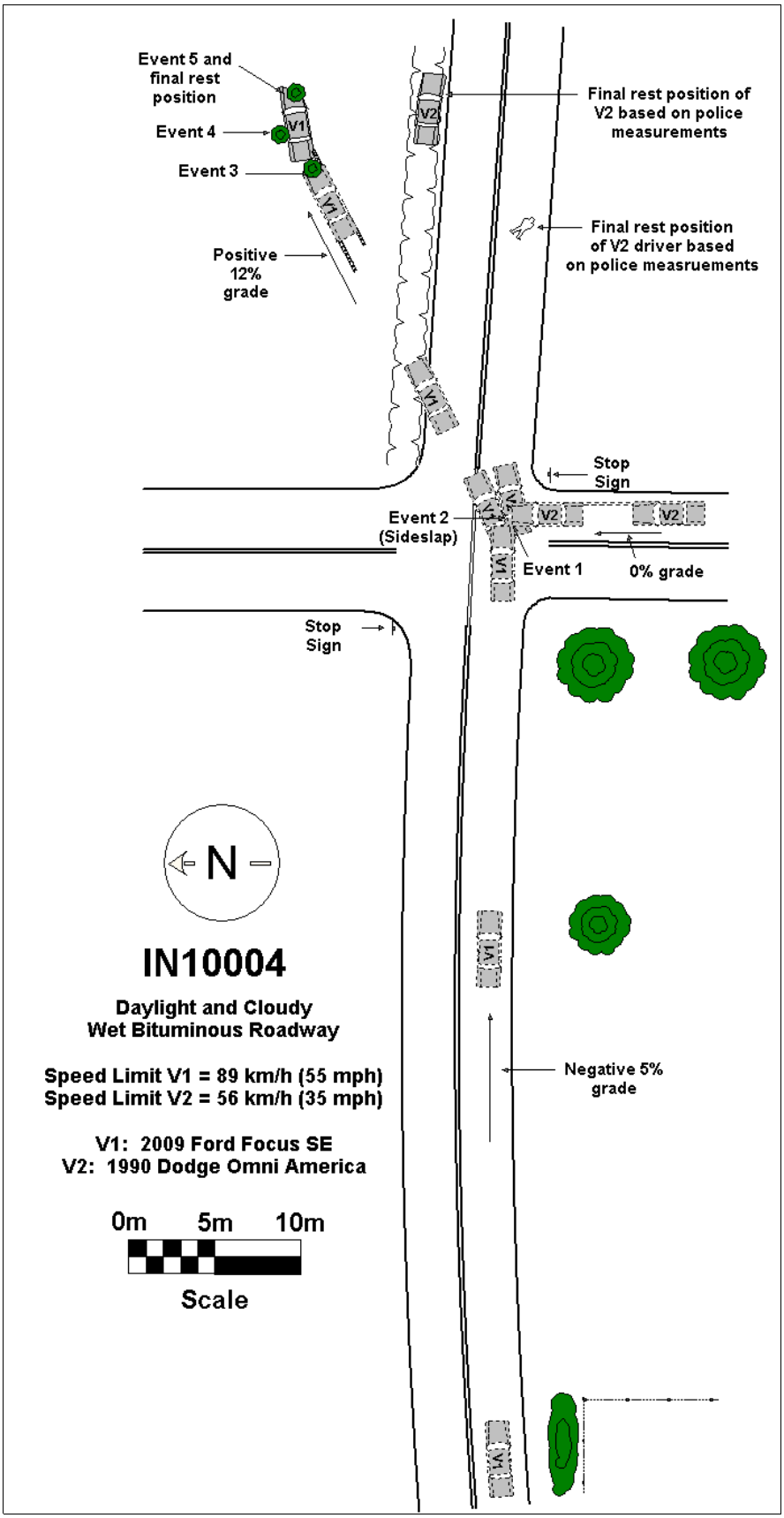
Damage Classification: The CDCs for the for the Dodge were 10LFEW4 (290 degrees) for the first impact with the Ford and 09LZAW2. The Missing Vehicle algorithm of the WinSMASH program calculated the total Delta V for the first impact with the Ford as 29 km/h (18.0 mph). The longitudinal and lateral velocity changes were -9.9 km/h (-6.2 mph) and 27.3 km/h (17.0 mph), respectively. The results should be considered borderline since they are based only on the crush on the Dodge, and the Ford sustained narrow end engagement.

The Damage algorithm calculated the total Delta V for the Dodge's left side plane impact with the Ford as 8 km/h (5.0 mph). The longitudinal and lateral velocity changes were 0 km/h 0 mph) and 8 km/h (5.0 mph), respectively. Based on the damage on both vehicles, the results were reasonable.

The manufacturer's recommended tire size was P165/80R13. The Dodge was equipped with the recommended size tires. The vehicle's tire data are presented 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	248	36	241	35	4	5	None	No	Yes
LR	179	26	241	35	6	8	None	No	No
RR	179	26	241	35	6	8	None	No	No
RF	Flat	Flat	241	35	1	1	None	No	Yes

Dodge's Occupants: The police crash report indicated that the driver of the Dodge (23-year-old female) was not restrained by the lap-and-shoulder safety belt and was ejected through the driver's window glazing. The second row left passenger (7-month-old male) was restrained in a child restraint system. The driver sustained an A (incapacitating) injury and the second row left passenger sustained a C (possible) injury. The driver and passenger were transported by ambulance to a hospital.


Event 5 and final rest position
Event 4
Event 3
Positive 12% grade
Final rest position of V2 based on police measurements
Final rest position of V2 driver based on police measruements
Stop Sign
Event 2 (Sideslap)
Event 1
0% grade
Stop Sign
N
IN10004
Daylight and Cloudy
Wet Bituminous Roadway
Speed Limit V1 = 89 km/h (55 mph)
Speed Limit V2 = 56 km/h (35 mph)
V1: 2009 Ford Focus SE
V2: 1990 Dodge Omni America
0m 5m 10m
Scale
Negative 5% grade

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	1FAHP35N49W******
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	IN10004.CDR
Saved on	Thursday, February 11 2010 at 09:33:57 AM
Collected with CDR version	Crash Data Retrieval Tool 3.4
Reported with CDR version	Crash Data Retrieval Tool 3.4
EDR Device Type	airbag control module
ACM Adapter Detected During Download	No
Event(s) Recovered	1
First Event Recorded	Deployment event status undefined

Comments

No comments entered.

Data Limitations

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 Thursday, February 11 2010 at 09:33:57 AM .

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

Airbag Module Data Limitations:

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

Airbag Module Data Sources:

- Event recorded data are collected either INTERNALLY or EXTERNALLY to the RCM.

  - INTERNAL DATA is measured, calculated, and stored internally, sensors external to the RCM include the following:
    > The Driver and Passenger Belt Switch Circuits are wired directly to the RCM.
    > The Driver's Seat Track Position Switch Circuit is wired directly to the RCM.
    > The Side Impact Sensors (if equipped) are located on the side of vehicle and are wired directly to the RCM.
    > The Occupant Classification Sensor is located in the front passenger seat and transmits data directly to the RCM on high-speed CAN bus.
    > Front Impact Sensors (right and left) are located at the front of vehicle and are wire directly to the RCM.

  - EXTERNAL DATA recorded by the RCM are data collected from the vehicle communication network from various sources such as Powertrain Control Module, Brake Module.

02006_RCM-AB9_r001

System Status at Time of Data Retrieval

VIN as programmed into RCM at factory	1FAHP35N49W******
Current Lifetime Operating Timer (sec)	1,169,447
Deployment Command Counter	1
First Record Recording Status	Completed & Locked
Second Record Recording Status	No Data
Restraints Control Module Part Number	9S43-14B321-CA
Restraints Control Module (Serial Number)	20311412
Occupant Classification System ECU (Serial Number)	5341354?14628291
Driver Front Crash Sensor (Serial Number)	047CD745
Driver 1st Row Side Crash Sensor (Serial Number)	07FC059A
Passenger 1st Row Side Crash Sensor (Serial Number)	080C4CAB
Driver 2nd Row Side Crash Sensor (Serial Number)	0459B4D1
Passenger 2nd Row Side Crash Sensor (Serial Number)	0459E03D

Deployment Data (First Record)

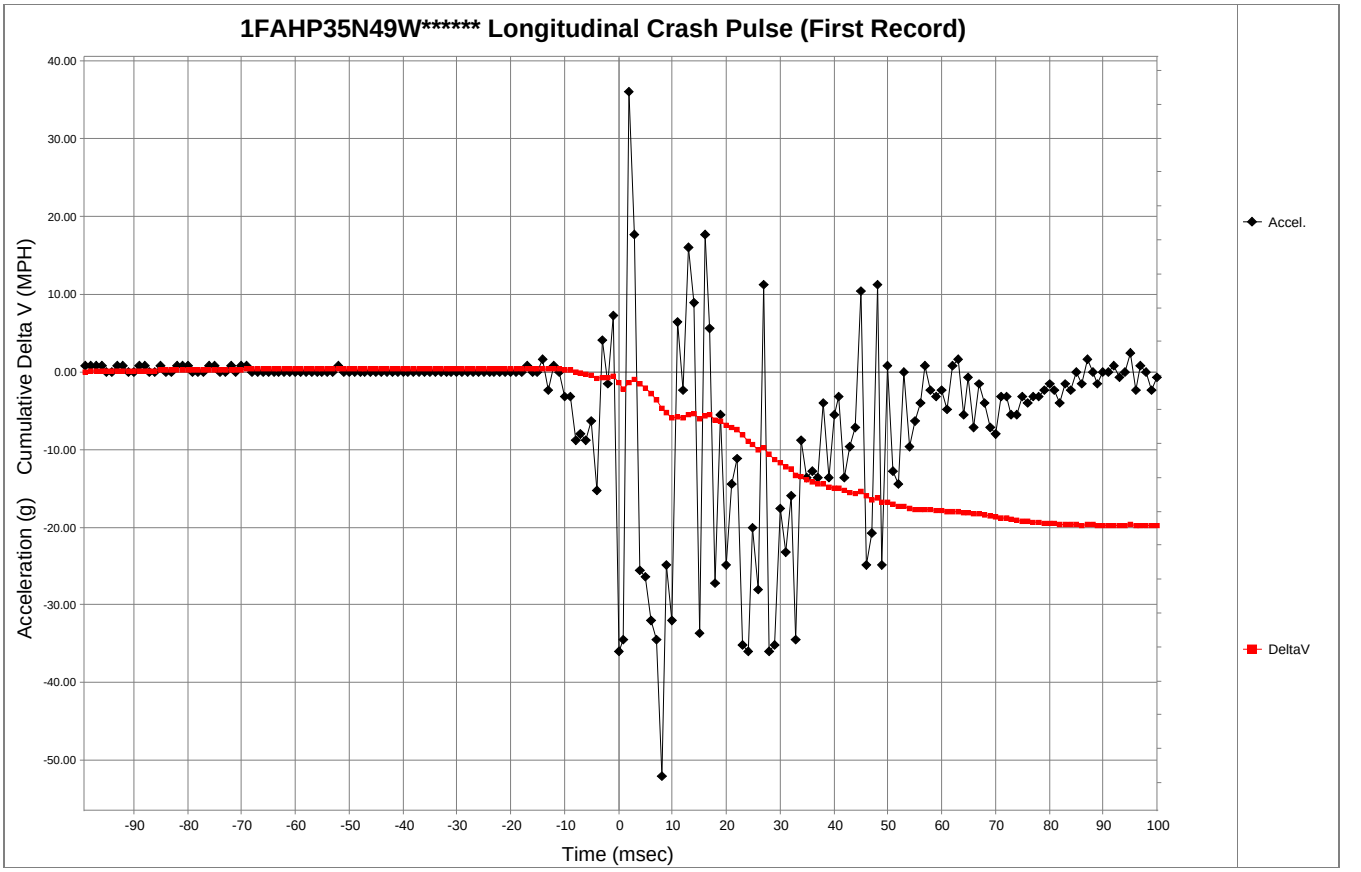
Driver First Stage Airbag Deployment Time (msec)	11.0
Driver Second Stage Airbag Deployment Time (msec)	36.5
Passenger First Stage Airbag Deployment Time (msec)	11.0
Passenger Second Stage Airbag Deployment Time (msec)	36.5
Driver Pretensioner Deployment Time (msec)	11.0
Passenger Pretensioner Deployment Time (msec)	11.0
Driver SIDE Airbag Deployment Time (msec)	62.0
Passenger SIDE Airbag Deployment Time (msec)	23.5
Driver CURTAIN Airbag Deployment Time (msec)	60.0
Passenger CURTAIN Deployment Time (msec)	21.5

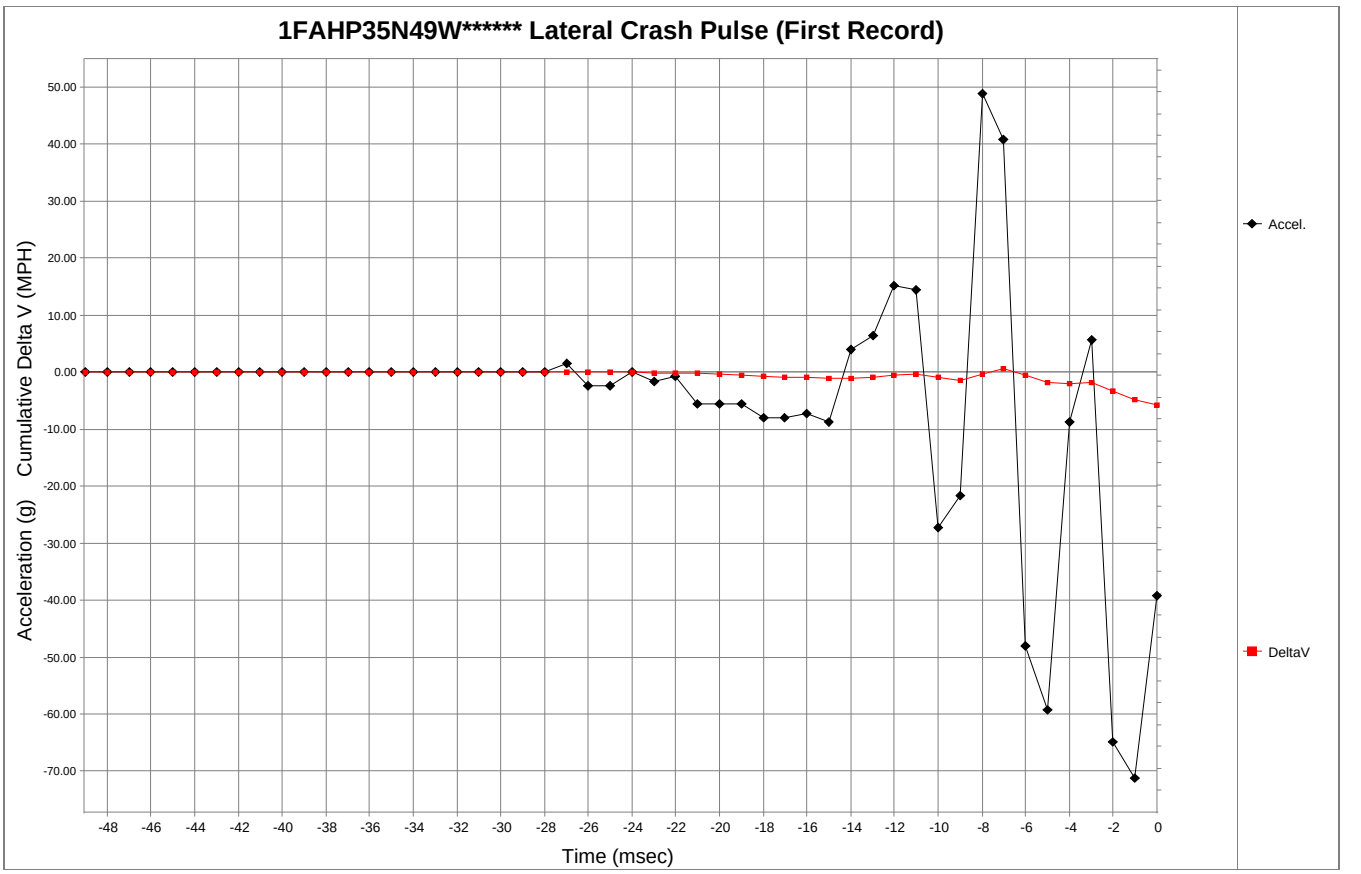
System Status at Event (First Record)

Lifetime Operating Timer at Algorithm Wake-up (sec)	1,170,342
Key On Timer at Algorithm Wake-up (sec)	1,962
Battery voltage at Algorithm Wake-up (volts)	13.82
RCM Energy Reserve voltage at Algorithm Wake-up (volts)	24.72
Driver Seat Belt Switch Circuit Status at Algorithm Wake-up	Buckled
Driver Seat Belt Switch Fault at Algorithm Wake-up	No
Driver Seat Track Forward of Switch Point at Algorithm Wake-up	Not Forward
Driver Seat Track Position Switch Fault at Algorithm Wake-up	No
Passenger Seat Belt Switch Circuit Status at Algorithm Wake-up	Buckled
Passenger Seat Belt Switch Fault at Algorithm Wake-up	No
Passenger Classification Status at Algorithm Wake-up	Occupied Enable Small
OCS Passenger State at Algorithm Wake-up	Small
Driver Front Crash Sensor Fault at Algorithm Wake-up	No
Driver SIDE Crash Sensor Row 1 Fault at Algorithm Wake-up	No
Driver SIDE Crash Sensor Row 2 Fault at Algorithm Wake-up	No
Passenger Front Crash Sensor Fault at Algorithm Wake-up	No
Passenger SIDE Crash Sensor Row 1 Fault at Algorithm Wake-up	No
Passenger SIDE Crash Sensor Row 2 Fault at Algorithm Wake-up	No

Pre-Crash Data (First Record)

Time (sec)	-4	-3	-2	-1	0
Accelerator Pedal Position (%)	0	0	0	0	0
Vehicle Speed (MPH [km/h])	54.8 [88.3]	55.6 [89.4]	55.7 [89.6]	55.5 [89.4]	55.2 [88.9]
ABS Event in Progress	No	No	No	No	No
ESP Event in Progress	No	No	No	No	No
TCS Event in Progress	No	No	No	No	No
Brake Lamp Switch Depressed (from PCM)	No	No	No	No	No
RCM Serial Number Received by OCS	Yes	Yes	Yes	Yes	Yes
OCS Sensor Status	Occupied Enable Small	Occupied Enable Small	Occupied Enable Small	Occupied Enable Small	Occupied Enable Small
OCS System Level 1 Fault	No	No	No	No	No
OCS System Level 2 Fault	No	No	No	No	No
Vehicle Calibration ID	4F	4F	4F	4F	4F
Vehicle Model Year Calibration ID	08	08	08	08	08


1FAHP35N49W****** Longitudinal Crash Pulse (First Record)
Cumulative Delta V (MPH)
Acceleration (g)
Time (msec)
Accel.
DeltaV


1FAHP35N49W****** Lateral Crash Pulse (First Record)
Cumulative Delta V (MPH)
Acceleration (g)
Time (msec)
Accel.
DeltaV

Longitudinal Crash Pulse (First Record)

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])
-99	0.80	0.02 [0.03]
-98	0.80	0.04 [0.06]
-97	0.80	0.05 [0.08]
-96	0.80	0.07 [0.11]
-95	0.00	0.07 [0.11]
-94	0.00	0.07 [0.11]
-93	0.80	0.09 [0.14]
-92	0.80	0.11 [0.18]
-91	0.00	0.11 [0.18]
-90	0.00	0.11 [0.18]
-89	0.80	0.12 [0.19]
-88	0.80	0.14 [0.23]
-87	0.00	0.14 [0.23]
-86	0.00	0.14 [0.23]
-85	0.80	0.16 [0.26]
-84	0.00	0.16 [0.26]
-83	0.00	0.16 [0.26]
-82	0.80	0.18 [0.29]
-81	0.80	0.19 [0.31]
-80	0.80	0.21 [0.34]
-79	0.00	0.21 [0.34]
-78	0.00	0.21 [0.34]
-77	0.00	0.21 [0.34]
-76	0.80	0.23 [0.37]
-75	0.80	0.25 [0.40]
-74	0.00	0.25 [0.40]
-73	0.00	0.25 [0.40]
-72	0.80	0.26 [0.42]
-71	0.00	0.26 [0.42]
-70	0.80	0.28 [0.45]
-69	0.80	0.30 [0.48]
-68	0.00	0.30 [0.48]
-67	0.00	0.30 [0.48]
-66	0.00	0.30 [0.48]
-65	0.00	0.30 [0.48]
-64	0.00	0.30 [0.48]
-63	0.00	0.30 [0.48]
-62	0.00	0.30 [0.48]
-61	0.00	0.30 [0.48]
-60	0.00	0.30 [0.48]
-59	0.00	0.30 [0.48]
-58	0.00	0.30 [0.48]
-57	0.00	0.30 [0.48]
-56	0.00	0.30 [0.48]
-55	0.00	0.30 [0.48]
-54	0.00	0.30 [0.48]
-53	0.00	0.30 [0.48]
-52	0.80	0.32 [0.51]
-51	0.00	0.32 [0.51]
-50	0.00	0.32 [0.51]

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])
-49	0.00	0.32 [0.51]
-48	0.00	0.32 [0.51]
-47	0.00	0.32 [0.51]
-46	0.00	0.32 [0.51]
-45	0.00	0.32 [0.51]
-44	0.00	0.32 [0.51]
-43	0.00	0.32 [0.51]
-42	0.00	0.32 [0.51]
-41	0.00	0.32 [0.51]
-40	0.00	0.32 [0.51]
-39	0.00	0.32 [0.51]
-38	0.00	0.32 [0.51]
-37	0.00	0.32 [0.51]
-36	0.00	0.32 [0.51]
-35	0.00	0.32 [0.51]
-34	0.00	0.32 [0.51]
-33	0.00	0.32 [0.51]
-32	0.00	0.32 [0.51]
-31	0.00	0.32 [0.51]
-30	0.00	0.32 [0.51]
-29	0.00	0.32 [0.51]
-28	0.00	0.32 [0.51]
-27	0.00	0.32 [0.51]
-26	0.00	0.32 [0.51]
-25	0.00	0.32 [0.51]
-24	0.00	0.32 [0.51]
-23	0.00	0.32 [0.51]
-22	0.00	0.32 [0.51]
-21	0.00	0.32 [0.51]
-20	0.00	0.32 [0.51]
-19	0.00	0.32 [0.51]
-18	0.00	0.32 [0.51]
-17	0.80	0.33 [0.53]
-16	0.00	0.33 [0.53]
-15	0.00	0.33 [0.53]
-14	1.60	0.37 [0.60]
-13	-2.40	0.32 [0.51]
-12	0.80	0.33 [0.53]
-11	0.00	0.33 [0.53]
-10	-3.20	0.26 [0.42]
-9	-3.20	0.19 [0.31]
-8	-8.80	0.00 [0.00]
-7	-8.00	-0.18 [-0.29]
-6	-8.80	-0.37 [-0.60]
-5	-6.40	-0.51 [-0.82]
-4	-15.20	-0.84 [-1.35]
-3	4.00	-0.76 [-1.22]
-2	-1.60	-0.79 [-1.27]
-1	7.20	-0.63 [-1.01]
0	-36.00	-1.42 [-2.29]

Longitudinal Crash Pulse (First Record) - Continued

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])
1	-34.40	-2.18 [-3.51]
2	36.00	-1.39 [-2.24]
3	17.60	-1.00 [-1.61]
4	-25.60	-1.56 [-2.51]
5	-26.40	-2.14 [-3.44]
6	-32.00	-2.85 [-4.59]
7	-34.40	-3.60 [-5.79]
8	-52.00	-4.74 [-7.63]
9	-24.80	-5.29 [-8.51]
10	-32.00	-5.99 [-9.64]
11	6.40	-5.85 [-9.41]
12	-2.40	-5.90 [-9.50]
13	16.00	-5.55 [-8.93]
14	8.80	-5.36 [-8.63]
15	-33.60	-6.09 [-9.80]
16	17.60	-5.71 [-9.19]
17	5.60	-5.59 [-9.00]
18	-27.20	-6.18 [-9.95]
19	-5.60	-6.31 [-10.15]
20	-24.80	-6.85 [-11.02]
21	-14.40	-7.17 [-11.54]
22	-11.20	-7.41 [-11.93]
23	-35.20	-8.18 [-13.16]
24	-36.00	-8.98 [-14.45]
25	-20.00	-9.41 [-15.14]
26	-28.00	-10.03 [-16.14]
27	11.20	-9.78 [-15.74]
28	-36.00	-10.57 [-17.01]
29	-35.20	-11.35 [-18.27]
30	-17.60	-11.73 [-18.88]
31	-23.20	-12.24 [-19.70]
32	-16.00	-12.59 [-20.26]
33	-34.40	-13.35 [-21.48]
34	-8.80	-13.54 [-21.79]
35	-13.60	-13.84 [-22.27]
36	-12.80	-14.12 [-22.72]
37	-13.60	-14.42 [-23.21]
38	-4.00	-14.51 [-23.35]
39	-13.60	-14.81 [-23.83]
40	-5.60	-14.93 [-24.03]
41	-3.20	-15.00 [-24.14]
42	-13.60	-15.30 [-24.62]
43	-9.60	-15.51 [-24.96]
44	-7.20	-15.67 [-25.22]
45	10.40	-15.44 [-24.85]
46	-24.80	-15.98 [-25.72]
47	-20.80	-16.44 [-26.46]
48	11.20	-16.19 [-26.06]
49	-24.80	-16.74 [-26.94]
50	0.80	-16.72 [-26.91]

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])
51	-12.80	-17.00 [-27.36]
52	-14.40	-17.32 [-27.87]
53	0.00	-17.32 [-27.87]
54	-9.60	-17.53 [-28.21]
55	-6.40	-17.67 [-28.44]
56	-4.00	-17.76 [-28.58]
57	0.80	-17.74 [-28.55]
58	-2.40	-17.79 [-28.63]
59	-3.20	-17.86 [-28.74]
60	-2.40	-17.91 [-28.82]
61	-4.80	-18.02 [-29.00]
62	0.80	-18.00 [-28.97]
63	1.60	-17.97 [-28.92]
64	-5.60	-18.09 [-29.11]
65	-0.80	-18.11 [-29.15]
66	-7.20	-18.27 [-29.40]
67	-1.60	-18.30 [-29.45]
68	-4.00	-18.39 [-29.60]
69	-7.20	-18.55 [-29.85]
70	-8.00	-18.72 [-30.13]
71	-3.20	-18.79 [-30.24]
72	-3.20	-18.86 [-30.35]
73	-5.60	-18.99 [-30.56]
74	-5.60	-19.11 [-30.75]
75	-3.20	-19.18 [-30.87]
76	-4.00	-19.27 [-31.01]
77	-3.20	-19.34 [-31.12]
78	-3.20	-19.41 [-31.24]
79	-2.40	-19.46 [-31.32]
80	-1.60	-19.50 [-31.38]
81	-2.40	-19.55 [-31.46]
82	-4.00	-19.64 [-31.61]
83	-1.60	-19.67 [-31.66]
84	-2.40	-19.72 [-31.74]
85	0.00	-19.72 [-31.74]
86	-1.60	-19.76 [-31.80]
87	1.60	-19.72 [-31.74]
88	0.00	-19.72 [-31.74]
89	-1.60	-19.76 [-31.80]
90	0.00	-19.76 [-31.80]
91	0.00	-19.76 [-31.80]
92	0.80	-19.74 [-31.77]
93	-0.80	-19.76 [-31.80]
94	0.00	-19.76 [-31.80]
95	2.40	-19.71 [-31.72]
96	-2.40	-19.76 [-31.80]
97	0.80	-19.74 [-31.77]
98	0.00	-19.74 [-31.77]
99	-2.40	-19.79 [-31.85]
100	-0.80	-19.81 [-31.88]

Lateral Crash Pulse (First Record)

Time (msec)	Recorded Vehicle Lateral Acceleration (g)	Cumulative Lateral Velocity Change (MPH [km/h])
-49	0.00	0.00 [0.00]
-48	0.00	0.00 [0.00]
-47	0.00	0.00 [0.00]
-46	0.00	0.00 [0.00]
-45	0.00	0.00 [0.00]
-44	0.00	0.00 [0.00]
-43	0.00	0.00 [0.00]
-42	0.00	0.00 [0.00]
-41	0.00	0.00 [0.00]
-40	0.00	0.00 [0.00]
-39	0.00	0.00 [0.00]
-38	0.00	0.00 [0.00]
-37	0.00	0.00 [0.00]
-36	0.00	0.00 [0.00]
-35	0.00	0.00 [0.00]
-34	0.00	0.00 [0.00]
-33	0.00	0.00 [0.00]
-32	0.00	0.00 [0.00]
-31	0.00	0.00 [0.00]
-30	0.00	0.00 [0.00]
-29	0.00	0.00 [0.00]
-28	0.00	0.00 [0.00]
-27	1.60	0.04 [0.06]
-26	-2.40	-0.02 [-0.03]
-25	-2.40	-0.07 [-0.11]
-24	0.00	-0.07 [-0.11]
-23	-1.60	-0.11 [-0.18]
-22	-0.80	-0.12 [-0.19]
-21	-5.60	-0.25 [-0.40]
-20	-5.60	-0.37 [-0.60]
-19	-5.60	-0.49 [-0.79]
-18	-8.00	-0.67 [-1.08]
-17	-8.00	-0.84 [-1.35]
-16	-7.20	-1.00 [-1.61]
-15	-8.80	-1.19 [-1.92]
-14	4.00	-1.11 [-1.79]
-13	6.40	-0.97 [-1.56]
-12	15.20	-0.63 [-1.01]
-11	14.40	-0.32 [-0.51]
-10	-27.20	-0.91 [-1.46]
-9	-21.60	-1.39 [-2.24]
-8	48.80	-0.32 [-0.51]
-7	40.80	0.58 [0.93]
-6	-48.00	-0.47 [-0.76]
-5	-59.20	-1.77 [-2.85]
-4	-8.80	-1.97 [-3.17]
-3	5.60	-1.84 [-2.96]
-2	-64.80	-3.27 [-5.26]
-1	-71.20	-4.83 [-7.77]
0	-39.20	-5.69 [-9.16]