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16. Abstract This report documents the on-site investigation of a small overlap/oblique frontal impact to a 2010 Ford Fusion. This crash occurred on a two-lane, rural roadway in a residential area. The Ford was a 4-door sedan equipped with multistage frontal air bags, front seat-mounted side impact air bags, and side impact inflatable curtain air bags. A belted 26-year-old female driver and a 13-month-old female, second-row right passenger occupied the vehicle. The second-row right passenger was seated in an unknown make/model rear-facing child restraint system. The Ford was traveling south in the southbound lane, and a 2007 Lincoln MKX was traveling north in the northbound lane. The Lincoln entered the Ford's lane, and its front plane struck the front plane of the Ford. The Ford came to final rest on the west road side in a residential yard heading north. The Lincoln came to final rest in the southbound lane heading south. The driver of the Ford sustained fatal injuries and was pronounced deceased 70 minutes following the crash. The second-row right passenger sustained police-reported "C" (possible) injuries and was transported by ambulance to a hospital (treatment unknown). A belted 73-year-old male driver occupied the Lincoln. He sustained police-reported "A" (incapacitating) injuries and was transported by ambulance to a hospital. Both vehicles were towed from the crash scene due to damage.			
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Table of Contents

BACKGROUND	1
SUMMARY	1
Crash Site	1
Pre-Crash	2
Crash.....	2
Post-Crash	3
2010 FORD FUSION	3
Description	3
Exterior Damage	4
Damage Classification.....	4
Event Data Recorder	4
Interior Damage.....	4
Manual Restriant Systems	5
Supplemental Restraint Systems	5
2010 FORD FUSION OCCUPANTS	6
Driver Demographics	6
Driver Injuries	6
Driver Kinematics	8
Second-Row Right Occupant Demographics.....	9
Second-Row Right Occupant Injuries.....	9
Second-Row Right Occupant Kinematics.....	9
2007 LINCOLN MKX	9
Description	9
Exterior Damage	9
Damage Classification.....	10
Event Data Recorder	10
Occupant Data	10
CRASH DIAGRAM.....	11
APPENDIX A: 2010 Ford Fusion Event Data Recorder Report.....	A-1
APPENDIX B: 2007 Lincoln MKX Event Data Recorder Report.....	B-1

Special Crash Investigations
On-Site Small Overlap/Oblique Impact Investigation
Case Number: IN17029
Vehicle: 2010 Ford Fusion
Location: Michigan
Crash Date: September 2017

BACKGROUND

This report documents the on-site investigation of a small overlap/oblique frontal impact to a 2010 Ford Fusion (**Figure 1**). This crash investigation was initiated by the National Highway Traffic Safety Administration in September 2017 and assigned the Special Crash Investigation team at the Indiana University Transportation Research Center. This crash involved the Ford and a 2007 Lincoln MKX. The crash occurred in Michigan in September 2017 during daytime and was investigated by a local police agency. The Ford, Lincoln, and crash scene were inspected in October 2017. An in-person interview was conducted with a relative of the driver of the Ford in October 2017.



Figure 1. The damaged 2010 Ford Fusion.

This crash occurred on a two-lane, rural roadway in a residential area. The Ford was a 4-door sedan equipped with multistage frontal air bags, front seat-mounted side impact air bags, and side impact inflatable curtain (IC) air bags. A belted 26-year-old female driver and a 13-month-old female, second-row right passenger occupied the vehicle. The second-row right passenger was seated in an unknown make/model rear-facing child restraint system (CRS).

The Ford was traveling south in the southbound lane, and the Lincoln was traveling north in the northbound lane. The Lincoln entered the Ford's lane, and its front plane struck the front plane of the Ford. The Ford came to final rest on the west road side in a residential yard heading north. The Lincoln came to final rest in the southbound lane heading south. The driver of the Ford sustained fatal injuries and was pronounced deceased 70 minutes following the crash. The second-row right passenger sustained police-reported "C" (possible) injuries and was transported by ambulance to a hospital (treatment unknown). A belted 73-year-old male driver occupied the Lincoln. He sustained police-reported "A" (incapacitating) injuries and was transported by ambulance to a hospital. His injuries and level of treatment are not known. Both vehicles were towed from the crash scene due to damage.

SUMMARY

Crash Site

This crash occurred during daytime on a two-lane, rural roadway in a residential area. The weather conditions were clear with 16 kilometers (10 miles) visibility, northeast winds at 15

km/h (9 mph), a temperature of 20.6 °C (69 °F), and a dew point of 15.6 °C (60 °F), according to local weather reports. The roadway had one lane in each direction and was bordered on each side by bituminous shoulders. The roadway surface was dry, level bituminous. The speed limit for each vehicle was 72 km/h (45 mph). The crash diagram is included at the end of this report.

Pre-Crash

The Ford was traveling south the southbound lane (**Figure 2**) at an event data recorder-reported speed of 86.0 km/h (53.4 mph) at -5.0 sec prior to algorithm enable (AE) and was gradually decelerating without brake application to 83 km/h (51.6 mph) at AE. The Lincoln was traveling north in the northbound lane at an EDR-reported speed of 64.2 km/h (39.9 mph) at -4.0 sec prior to AE was gradually accelerating to 70.9 km/h (43.9 mph) at AE. A witness who was northbound behind the Lincoln told police that the Lincoln was swerving in its lane as though the driver was falling asleep and the Lincoln entered the Ford's lane.

Crash

The front plane of the Lincoln struck the front plane of the Ford (**Figures 3 – 5**). The impact occurred 1.1 m (3.6 ft) in the Ford's travel lane. The force direction on the Ford was in the 12 o'clock sector and the impact resulted in actuation of the driver's seat belt pretensioner and a stage 2 deployment of the driver's frontal air bag. The driver's seat-mounted side impact and IC air bags also deployed. The Ford's EDR reported the maximum longitudinal and lateral velocity changes as -68.91 km/h (-42.82 mph) and 15.25 km/h (9.54 mph), respectively. The Lincoln's EDR reported its maximum longitudinal velocity change as -52.85 km/h (-32.84 mph). The Lincoln's EDR did not report the lateral velocity change. The damage

algorithm of the WinSMASH program calculated the Ford's total delta V as 45 km/h (28 mph). The longitudinal and lateral velocity changes were -44 km/h (-27 mph) and 8 km/h (5 mph), respectively. WinSMASH calculated total delta V for the Lincoln as 39 km/h (24 mph). The longitudinal and lateral velocity changes were -39 km/h (-24 mph) and 0 km/h. The WinSMASH



Figure 2. Southbound approach of the Ford.

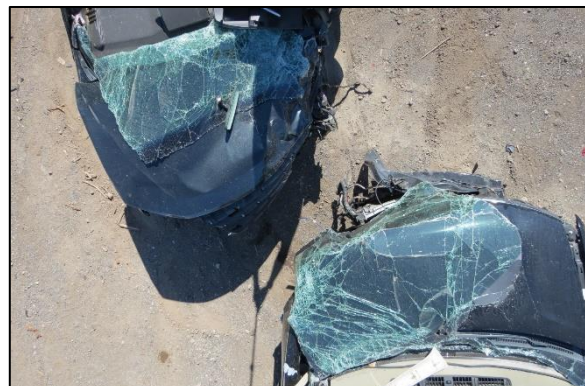


Figure 3. Approximate impact orientation of the Ford (top) and Lincoln.

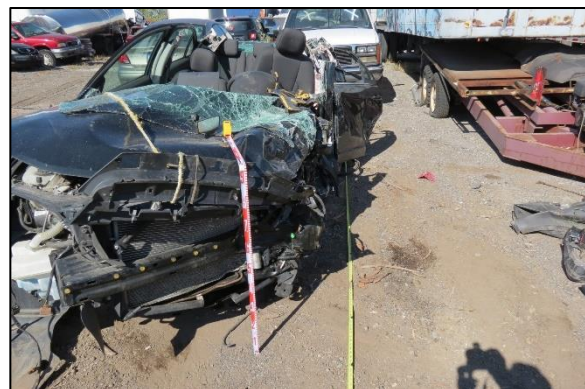


Figure 4. Damage to the front plane of the Ford.

results were considered borderline and low based on the damage to each vehicle and their respective EDR-reported velocity changes.

The impact occurred to the left corner of each vehicle's front bumper and caused the Ford to rotate counterclockwise approximately 190 degrees as it traveled 8.5 m (27.9 ft) in a southwest direction coming to final rest heading north partially in the yard and driveway of a residence. The Lincoln also rotated counterclockwise approximately 190 degrees as it traveled 13.4 m (44.0 ft) in a northeast direction coming to final rest in the northbound lane heading south.



Figure 5. Damage to the front plane of the Lincoln.

Post-Crash

The driver of each vehicle was entrapped in their vehicle. A passerby heard the second-row right passenger of the Ford crying and removed her from the vehicle. Removal status of the CRS is unknown. Emergency responders cut the pillars, left front door hinges, and striker of the Ford with a hydraulic rescue tool and removed the roof and door. They cut the driver's seat belt webbing and removed her from the vehicle. The driver was pronounced deceased approximately 70 minutes following the crash, according to the police crash report. The driver of the Lincoln was also entrapped in his vehicle, and emergency responders cut the pillars and removed the roof to extricate him. He sustained police-reported "A" (incapacitating) injuries and was transported by ambulance to a hospital. His injuries and level of treatment are not known. The police reported no suspected alcohol or drug use for either driver. Both vehicles were towed from the crash scene due to damage.

2010 FORD FUSION

Description

The Ford was a front-wheel-drive, 5-occupant, 4-door sedan with the Vehicle Identification Number (VIN) 3FAHP0HA9ARxxxxxx that was manufactured in October 2010. The vehicle was equipped with a 2.5-liter, I-4 engine, 6-speed automatic transmission, 4-wheel antilock brakes with electronic brake force distribution, traction control, and electronic stability control. The vehicle was also equipped with multistage frontal air bags, front seat-mounted side impact air bags, side impact IC air bags, and a tilt/telescoping steering column. The adjustment of the column could not be determined due to the extent of damage to the steering assembly. The specified wheelbase was 273 cm (107.5 in).

The vehicle manufacturer's recommended tire size was P225/50R17. The vehicle was equipped with Michelin Green X tires of the recommended size on the front wheels and Hercules Tour 4.0 tires of the recommended size on the rear wheels. The vehicle manufacturer's recommended cold tire pressure for the front and rear tires was 215 kPa (31 psi). The tread on the front tires was in poor condition with the tread depth measured at 3 mm (0.1 in) for both tires. The tread on the rear tires was in fair condition. The side wall of the left front tire was cut during the crash, and the tire displaced from the rim.

The front row was equipped with driver and passenger cloth-covered bucket seats with adjustable head restraints. The second row was equipped with a cloth-covered bench seat with folding backs and adjustable head restraints. The top of the driver's head restraint was located 21 cm (8.3 in) above the top of the seat back. The driver's seat track was adjusted between the forward-most and middle positions. The second-row seats had fixed tracks.

Exterior Damage

The front and left planes of the Ford sustained direct and induced damage during the impact with the front plane of the Lincoln. The direct damage to the front plane involved the left portion of the front bumper, left headlamp/turn signal, left fender, and hood. The direct damage also extended down the left plane of the vehicle involving the fender, left front wheel, left A-pillar, and left front door. The direct damage width on the front plane was 55 cm (21.7 in) beginning at the left corner of the front bumper bar. The Field L was 83 cm (32.7 in) beginning in the same location as the direct. Crush measurements were taken on the bumper bar and the maximum residual crush was 65 cm (25.6 in) occurring at 10 cm (3.9 in) right of the left corner of the bumper bar. The crush values were: $C_1 = 61$ cm (24.0 in), $C_2 = 65$ cm (25.5 in), $C_3 = 53$ cm (20.9 in), $C_4 = 25$ cm (9.8 in), $C_5 = 16$ cm (6.3 in), and $C_6 = 0$ cm.

Damage Classification

The Collision Deformation Classification (CDC) was 12FYEW3 (350 degrees). The severity of the damage was severe.

Event Data Recorder

The Ford's EDR was imaged with version 17.4.2 of the Bosch Crash Data Retrieval software and reported with version 19.3. The vehicle's air bag control module (ACM) had been removed by police and the EDR was imaged via direct connection to the ACM. The EDR report is attached to the end of this report as **Appendix A**.

The EDR recorded an unlocked event and a locked frontal and side event. The unlocked event was reported in the "First Record." The "Ignition Cycles, crash" for the unlocked event indicated that this event was unrelated to this crash.

The locked frontal and side events were reported in the "Second Record," and a "Complete" file was recorded. The driver's seat belt status was reported as "Driver Buckled," and the driver's seat track was reported as "Not Forward." The frontal air bag warning lamp was reported as "Off," and no fault codes were reported. The times to first and second stage deployments for the driver's frontal air bag were 21.0 and 26.0 msec, respectively. The "time to fire" for the driver's seat belt pretensioner was 14.5 msec. The time to deployment for the left IC air bag and driver's seat-mounted side impact air bag was 27.5 msec. The maximum longitudinal and lateral delta Vs were reported as -68.91 km/h (-42.82 mph) and 15.35 km/h (9.54 mph), respectively. The ignition cycles at the crash and when the data were imaged were reported as 14,353 and 14,355, respectively.

Interior Damage

The interior of the Ford sustained severe damage from intrusion. The most severe intrusions into the driver's seating position were 34 cm (13.4 in) of lateral intrusion of the side panel forward of

the left A-pillar and 22 cm (8.7 in) of lateral intrusion of the left sill. The driver's seat was also displaced 33 cm (13.0 in) vertically from buckling of the floor pan. Evidence of occupant contact consisted of 2 cm (0.8 in) of deformation of the lower half of the steering wheel rim and vertical displacement of the steering assembly from contact by the driver's chest when it loaded through the frontal air bag. The driver's knees contacted the lower left instrument panel displacing the instrument panel cover into the steering column and deforming the cover. The left front door was jammed shut, and emergency responders used a hydraulic rescue tool to cut and remove the door from the vehicle. The left rear door latch/striker separated and the door came open. The other doors remained closed and operational.

Manual Restraint Systems

The front and second rows were equipped with three-point lap and shoulder seat belts with sliding latch plates. The front row seat belts were equipped with adjustable upper anchors and retractor-mounted seat belt pretensioners. The driver's upper anchor was adjusted to the full-up position and the pretensioner actuated during the crash. The second-row seat belts were equipped with fixed upper anchors.

The driver was restrained by the lap and shoulder seat belt as evidenced by load marks from the belt webbing on the latch plate belt guide. There was also a load mark on the belt webbing located 95 cm (37.4 in) from the anchor, and the belt webbing was cut by emergency responders. The vehicle's EDR also reported the status of the driver's seat belt as "Driver Buckled."

The police crash report stated that the second-row right occupant was seated in a rear-facing CRS. Inspection of the second-row right seat belt assembly was unremarkable.

Supplemental Restraint Systems

The Ford was equipped with multistage frontal air bags, front seat-mounted side impact air bags, and side impact IC air bags. The driver's frontal, seat-mounted, and IC air bags deployed during the crash.

The driver's frontal air bag was located in the steering wheel hub. The air bag module had two cover flaps constructed of pliable vinyl and were separated by a horizontal tear seam. Each flap was 17 cm (6.7 in) wide at the tear seam and 10 cm (3.9 in) high. The cover flaps opened at the designated tear seams and were undamaged. The deflated air bag was 55 cm (21.6 in) in diameter. While the deformation to the steering wheel indicated that the driver's chest contacted and loaded through the frontal air bag, there was no discernable occupant contact scuff marks on the air bag. The air bag also sustained no damage.

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 deflated air bag was 21 cm (8.3 in) high and 28 cm (11.0 in) wide. There was no discernable evidence of occupant contact to the air bag and no damage.

The IC air bags were located along the roof side rail inside the headliner and extended from the A-pillar to the C-pillar. The IC air bags could not be inspected since the roof was cut and removed by emergency responders and was not present at the SCI vehicle inspection.

2010 FORD FUSION OCCUPANTS

Driver Demographics

Age/sex: 26 years/female
 Height: 160 cm (63 in)
 Weight: 109 kg (240 lbs)
 Eyewear: Unknown
 Seat type: Bucket
 Seat track position: Between forward-most and middle
 Manual restraint usage: Lap and shoulder belt
 Usage source: Vehicle inspection, EDR
 Air bags: Driver's frontal, seat-mounted side impact, and IC air bags deployed
 Alcohol/drug data: None
 Egress from vehicle: Removed by emergency responders
 Transport from scene: Ambulance
 Medical treatment: None

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Fracture, basilar hinge, through posterior cranial fossa	150206.4	Front (windshield) header, driver's, or roof	Possible Probable
2	Fracture occipital bone, not further specified	150400.2	Roof or front (windshield) header, driver's	Probable Possible
3	Fracture nasal bone, not further specified	251000.1	Steering wheel rim	Possible
4	Hemothorax, left, with 100 ml blood in pleural cavity	442200.3	Tandem IPC configuration, torso portion of seat belt system air bag, driver's frontal steering wheel hub and/or spokes and rim	Probable Possible Probable
5	Fracture left humerus, not further specified	751100.2	Left instrument panel	Probable
6	Fracture pelvis, not further specified	856100.2	Left lower instrument panel (includes knee bolster)	Probable
7 8	Fracture, displaced, right and left femurs, not further specified	853000.3 853000.3	Left lower instrument panel (includes knee bolster)	Certain
9 10	Fracture left tibia and fibula, not further specified	854000.2 854441.2	Floor, including toe pan	Probable
11	Hematoma (hemorrhage), subgaleal, 3 cm (1.2 in), right parietal scalp, not further specified	110402.1	Roof	Certain
12	Abrasions forehead, right and left both 3.8 by 2.5 cm (1.5 x 1 in)	210202.1	Air bag, driver's frontal	Certain

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
13	Abrasion, 2.5 cm (1 in), on left aspect of nose, not further specified	210202.1	Air bag, driver's frontal	Probable
14	Abrasion, 1.9 cm (0.75 in), on right cheek, not further specified	210202.1	Air bag, driver's frontal	Certain
15	Abrasions x two, 2.5 cm (1 in), on chin, not further specified	210202.1	Air bag, driver's frontal	Probable
16	Abrasion, 5.1 by 2.5 cm (2 x 1 in), on midline of chest, not further specified	410202.1	Torso portion of seat belt system	Probable
17	Contusions, multiple, 2.5 cm (1 in), on midline of abdomen, not further specified	510402.1	Steering wheel hub and/or spokes and rim	Probable
18	Contusion, 10.2 by 5.1 cm (4 x 2 in), on left lower quadrant of abdomen, not further specified	510402.1	Lap portion of seat belt system	Probable
19	Abrasion, 10.2 cm (4 in), on right upper arm, not further specified	710202.1	Steering wheel rim	Probable
20	Contusion, 7.6 by 5.1 cm (3 x 2 in), on right forearm, not further specified	710402.1	Center instrument panel	Probable
21	Abrasion, 5.1 cm (2 in), on right wrist, not further specified	710202.1	Center instrument panel	Certain
22	Contusion, 2.5 cm (1 in), on right hand, not further specified	710402.1	Center instrument panel	Certain
23	Abrasions (in a cluster), 25.4 by 15.2 cm (10 x 6 in), on left arm, not further specified	710202.1	Left instrument panel	Probable
24	Laceration, 2.5 cm (1 in) on left arm, not further specified	710602.1	Noncontact injury: flying glass, left front glazing	Probable
25	Laceration, 5.1 cm (2 in), on left elbow, not further specified	710602.1	Left instrument panel	Probable
26	Laceration, 1.9 cm (0.75 in), on left wrist, not further specified	710602.1	Left instrument panel	Probable
27	Abrasions, multiple, pinpoint, on left hand, not further specified	710202.1	Noncontact injury: flying glass, left front glazing	Possible
28 29	Abrasion, 10.2 cm (4 in), and contusion, 3.8 by 1.3 cm (1.5 x 0.5 in), on right upper leg, not further specified	810201.1 810402.1	Left lower instrument panel (includes knee bolster), right of steering column	Probable
30 31	Abrasion, 7.6 by 5.1 cm (3 x 2 in), and two lacerations, 1.9 cm and 7.6 cm (1.5 in and 3 in), on right knee, not further specified	810202.1 810602.1	Center lower instrument panel	Certain
32	Contusions (in a cluster), 20.3 by 15.2 cm (8 x 6 in), on right lower leg, not further specified	810402.1	Center lower instrument panel	Certain

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
33	Contusion, 7.6 by 7.6 cm (3 x 3 in), on right ankle, not further specified	810402.1	Left lower instrument panel (includes knee bolster), right of steering column	Probable
34 35	Contusion, 5.1 by 3.8 cm (2 x 1.5 in), and laceration, 2.5 by 0.6 cm (1 x 0.25 in), on right foot, not further specified	810402.1 810602.1	Floor, foot controls	Probable
36 37 38	Abrasion, 2.5 cm (1 in), contusions, multiple, up to 5.1 cm (2 in), and laceration, 1.3 cm (0.5 in) on left upper leg, not further specified	810202.1 810402.1 810602.1	Left lower instrument panel (includes knee bolster), left of steering column	Certain
39	Abrasions (in a cluster), 27.9 by 7.6 cm (11 x 3 in), on left lower leg, not further specified	810202.1	Left lower instrument panel (includes knee bolster), left of steering column	Certain
40	Contusion, 7.6 by 3.8 cm (3 x 1.5 in), on left foot, not further specified	810402.1	Floor, including toe pan	Probable

Source: Autopsy records.

Driver Kinematics

The driver was restrained by a lap and shoulder seat belt and the seat track was adjusted between the forward-most and middle positions. The front plane impact to the Ford resulted in actuation of the driver's seat belt pretensioner and a stage two deployment of the driver's frontal air bag. Her seat-mounted side impact and IC air bags also deployed. The impact displaced the driver forward and she loaded the seat belt and frontal air bag. Her chest loaded through the air bag and contacted the steering wheel, deforming the steering wheel. She sustained a hemothorax in her left chest, probably from loading the seat belt and contacting the steering wheel. She also sustained a fractured nasal bone, possibly from contacting the steering wheel rim. Her head probably contacted the roof and possibly the windshield header resulting in a basilar hinge fracture and fractured occipital bone. The driver's knees contacted the lower left instrument panel resulting in fractures to both femurs. Her left arm probably contacted to the left instrument panel fracturing her left humerus. Probable contact to the left lower instrument panel also resulted in a fractured pelvis. Probable contact to the intruded toe pan with possible contribution from contact with the left instrument panel resulted in fractures to her left tibia and fibula. The driver also sustained multiple lacerations, abrasions, and contusions. The driver was entrapped in the vehicle by the deformed and displaced instrument panel, steering assembly, and seat. Emergency responders used a hydraulic rescue tool to cut and remove the roof and the driver's door. They cut the driver's seat belt and removed her from the vehicle. The driver was deceased at the crash scene and officially pronounced deceased 70 minutes following the crash. The autopsy report stated that she was approximately 13 weeks pregnant and that the fetus also died.

Second-Row Right Occupant Demographics

Age/sex:	13 months/female
Height:	Unknown
Weight:	Unknown
Eyewear:	None
Seat type:	Bench with folding back
Seat track position:	Not adjustable
Manual restraint usage:	Rear-facing CRS
Usage source:	Police crash report
Air bags:	IC air bag, not deployed
Alcohol/drug data:	None
Egress from vehicle:	Removed by passerby
Transport from scene:	Ambulance
Medical treatment:	Unknown

Second-Row Right Occupant Injuries

No injury data were available for the second-row right occupant.

Second-Row Right Occupant Kinematics

The second-row right occupant was seated in an unknown make/model rear-facing CRS. The front plane impact to the Ford displaced the occupant forward into the back of the CRS. A scuff mark on the seat back of the front row right seat indicated that the CRS was displaced forward and contacted the seatback. The occupant remained in the CRS and was removed from the vehicle by a passerby, according to the police crash report. The second-row right occupant sustained police-reported “C” (possible) injuries and was transported by ambulance to a hospital. Her treatment status is unknown.

2007 LINCOLN MKX

Description

The Lincoln was a front-wheel drive, 5-occupant, 4-door station wagon vehicle with the VIN 2LMDU68C47Bxxxxxx equipped with a 3.5-liter, V-6 engine, a 6-speed automatic transmission, 4-wheel antilock brakes with electronic brake force distribution, brake assist, traction control, and electronic stability control. The vehicle was also equipped with multistage frontal air bags, front side-mounted side impact air bags, and side impact IC air bags.

Exterior Damage

The Lincoln sustained direct and induced damage to the front and left planes from the impact with the front plane of the Ford. The front bumper, hood, left head lamp/turn signal assembly, left fender, left front wheel, and left front door were directly damaged. The direct damage began at the left corner of the front bumper and extended 46 cm (18.1 in) across the front plane. The Field L was 127 cm (50.0 in). Crush measurements were taken at the bumper level and the maximum residual crush was 43 cm (16.9 in) occurring at the left corner of the front plane. The crush values were: $C_1 = 43$ cm (16.9 in), $C_2 = 41$ cm (16.1 in), $C_3 = 11$ cm (4.3 in), $C_4 = 0$ cm, $C_5 = 0$ cm, and $C_6 = 0$ cm.

Damage Classification

The CDC was 12FLEW3 (0 degrees). The severity of the damage was severe.

Event Data Recorder

The Lincoln's EDR was imaged with version 17.4.2 of the Bosch Crash Data Retrieval software and reported with version 19.3. The ACM had been removed by the police, and the data were imaged via direct connection to the ACM. The EDR report is attached to the end of this report as **Appendix B**.

The EDR reported one deployment event and the "First Record Recording Status" was reported as "Partial Record." The driver's "Seat Belt Switch Circuit Status" was reported as "Buckled." The driver's frontal, seat-mounted side impact, and both IC air bags deployed. The deployment times for the first and second stages of the driver's frontal air bag was 17.5 and 27.4 msec, respectively. The driver's seat belt pretensioner deployment time was 17.5 msec. The deployment time for the driver's seat-mounted side impact and both IC air bags was 68.0 msec. The maximum longitudinal delta V was reported as -52.85 km/h (-32.84 mph) occurring at 100 msec after AE. There was no lateral delta V data reported.

Occupant Data

The driver, a 73-year-old male, was restrained by a lap and shoulder seat belt, according to the police crash report. He sustained police-reported "A" (incapacitating) injuries and was transported by ambulance to a hospital. His injuries and level of treatment are not known.

CRASH DIAGRAM



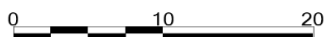
Daylight, Clear, and Dry

Dry, Level Bituminous Roadway

Speed Limit = 72 km/h (45 mph)

1 = 2010 Ford Fusion

2 = 2007 Lincoln MKX



Meters

Residential
driveway

Impact
gouges

← RP 2, Utility
Pole

← RP 1, Utility
Pole

Case Number:	IN17029

APPENDIX A: 2010 Ford Fusion Event Data Recorder Report¹

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

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

CDR File Information

User Entered VIN	3FAHP0HA9AR*****
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	IN17029_V1_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 17.4.2
Imaged with Software Licensed to (Company Name)	NHTSA
Reported with CDR version	Crash Data Retrieval Tool 19.3
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
ACM Adapter Detected During Download	Yes
Event(s) recovered	locked frontal event locked side event unlocked event

Comments

No comments entered.

The retrieval of this data has been authorized by the vehicle's owner, or other legal authority such as a court order or search warrant, as indicated by the CDR tool user on .

Data Limitations

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.
- For 2011 Ford Mustangs, the Steering Wheel Angle parameter indicates the change in steering wheel angle from the previously recorded sample value and does not represent the actual steering wheel position.

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, etc.

02007_RCM-RC6_r002

System Status at Time of Retrieval

VIN as programmed into RCM at factory	3FAHP0HA9AR*****
Current VIN from PCM	3FAHP0HA9AR*****
Ignition cycle, download (first record)	14,355
Ignition cycle, download (second record)	14,355
Restraints Control Module Part Number	9E53-14B321-BK
Restraints Control Module Serial Number	3115674200000000
Restraints Control Module Software Part Number (Version)	9E53-14C028-AB
Left/Center Frontal Restraints Sensor Serial Number	1213EBE6
Left Side Restraint Sensor 1 Serial Number	1217E63E
Left Side Restraint Sensor 2 Serial Number	1217974B
Right Frontal Restraints Sensor Serial Number	12171330
Right Side Restraint Sensor 1 Serial Number	121B5BD8
Right Side Restraints Sensor 2 Serial Number	0C5CB6BC

System Status at Event (First Record)

Recording Status	Unlocked Record
Complete file recorded (yes,no)	Yes
Multi-event, number of events (1,2)	1
Time from event 1 to 2 (msec)	N/A
Lifetime Operating Timer at event time zero (seconds)	5,642,075
Key-on Timer at event time zero (seconds)	315
Vehicle voltage at time zero (Volts)	14.175
Energy Reserve Mode entered during event (Y/N)	No

Faults Present at Start of Event (First Record)

No Faults Recorded

Deployment Data (First Record)

Maximum delta-V, longitudinal (MPH [km/h])	5.89 [9.48]
Time, maximum delta-V longitudinal (msec)	103
Maximum delta-V, lateral (MPH [km/h])	0.41 [0.66]
Time, maximum delta-V lateral (msec)	88

Pre-Crash Data -1 sec (First Record)

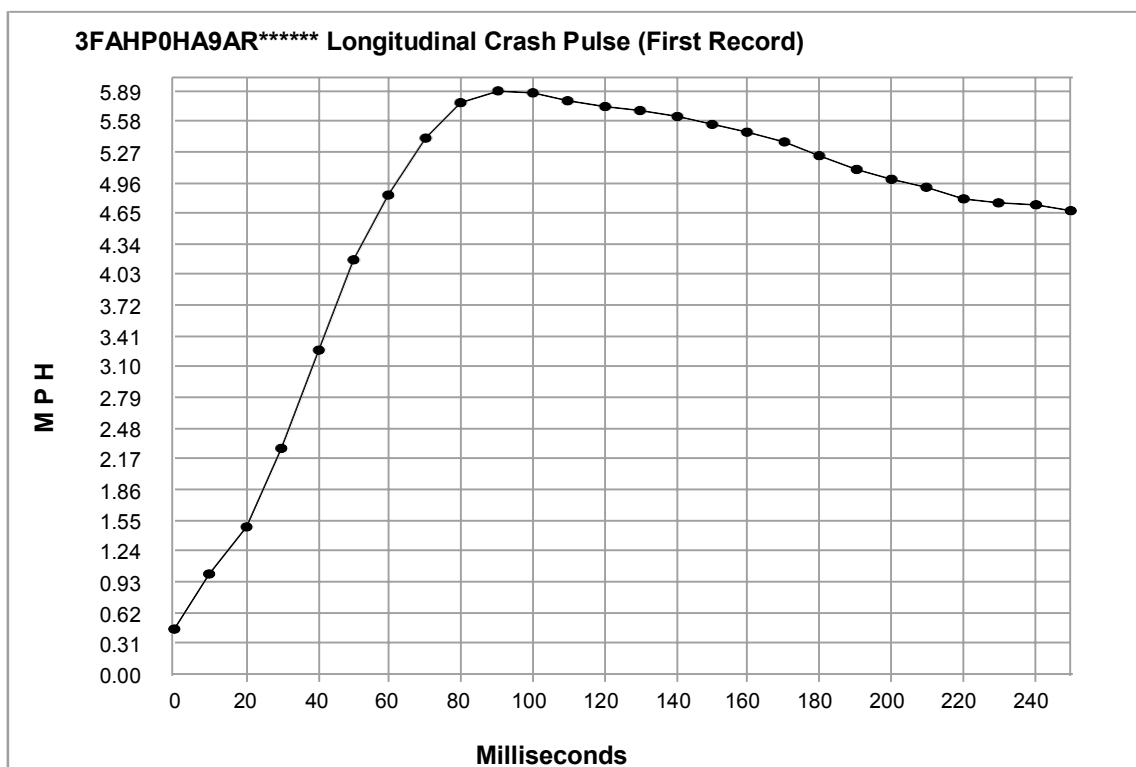
Ignition cycle, crash	6,587
Frontal air bag warning lamp, on/off	Off
Occupant size classification, front passenger (Child size Yes/No [Hex value])	No [\$01]
Safety belt status, driver	Driver Not Buckled
Seat track position switch, foremost, status, driver	Not Forward
Safety belt status, front passenger	Passenger Not Buckled
Brake Telltale	Off
ABS Telltale	Off
Stability Control Telltale	Off
Speed Control Telltale	Off
Powertrain Wrench Telltale	Off
Powertrain Malfunction Indicator Lamp (MIL) Telltale	Off

Pre-Crash Data -5 to 0 sec [2 samples/sec] (First Record)

Times (sec)	Speed vehicle indicated MPH [km/h]	Accelerator pedal, % full	Service brake, on/off	Engine rpm	ABS activity (engaged, non-engaged)	Stability control (engaged, non-engaged)	Traction Control via Brakes (engaged, non-engaged)	Traction Control via Engine (engaged, non-engaged)
- 5.0	0.6 [1.0]	2	Off	800	non-engaged	non-engaged	non-engaged	non-engaged
- 4.5	1.9 [3.0]	0	On	800	non-engaged	non-engaged	non-engaged	non-engaged
- 4.0	1.2 [2.0]	0	On	800	non-engaged	non-engaged	non-engaged	non-engaged
- 3.5	0.0 [0.0]	0	On	800	non-engaged	non-engaged	non-engaged	non-engaged
- 3.0	0.0 [0.0]	0	On	700	non-engaged	non-engaged	non-engaged	non-engaged
- 2.5	0.0 [0.0]	0	On	700	non-engaged	non-engaged	non-engaged	non-engaged
- 2.0	0.0 [0.0]	0	On	700	non-engaged	non-engaged	non-engaged	non-engaged
- 1.5	0.0 [0.0]	0	On	600	non-engaged	non-engaged	non-engaged	non-engaged
- 1.0	0.0 [0.0]	0	On	600	non-engaged	non-engaged	non-engaged	non-engaged
- 0.5	1.9 [3.0]	0	On	600	non-engaged	non-engaged	non-engaged	non-engaged
0.0	0.0 [0.0]	0	On	600	non-engaged	non-engaged	non-engaged	non-engaged

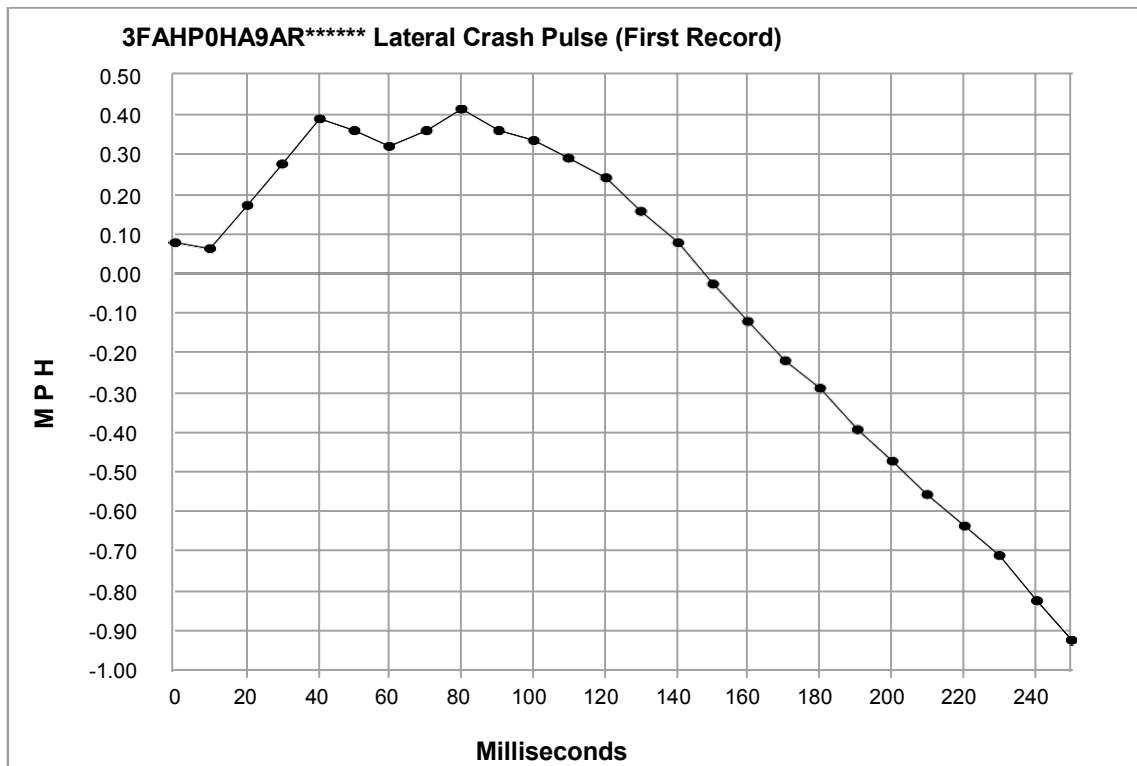
Pre-Crash Data -5 to 0 sec [10 samples/sec] (First Record)

Times (sec)	Steering Wheel Angle (degrees)	Stability Control Lateral Acceleration (g)	Stability Control Longitudinal Acceleration (g)	Stability Control Yaw Rate (deg/sec)
- 5.0	132.7	-0.011	0.031	2.5
- 4.9	151.8	-0.072	0.041	3.87
- 4.8	157.8	-0.077	-0.011	3.37
- 4.7	150.2	-0.027	-0.121	3.5
- 4.6	139.8	-0.084	-0.209	3.5
- 4.5	127.8	-0.086	-0.216	1.75
- 4.4	113.7	-0.082	-0.172	1.5
- 4.3	100.1	-0.039	-0.21	2.0
- 4.2	86.2	-0.086	-0.25	1.62
- 4.1	68.4	-0.117	-0.299	0.12
- 4.0	49.2	-0.058	-0.025	-0.12
- 3.9	34.9	-0.055	0.019	0.75
- 3.8	19.8	-0.068	-0.064	-0.37
- 3.7	-0.5	-0.055	-0.065	0.0
- 3.6	-27.4	-0.071	-0.036	0.37
- 3.5	-63.0	-0.055	-0.066	-0.12
- 3.4	-102.5	-0.063	-0.072	0.0
- 3.3	-136.2	-0.06	-0.056	0.0
- 3.2	-165.1	-0.074	-0.056	0.12
- 3.1	-188.5	-0.051	-0.05	0.12
- 3.0	-208.0	-0.068	-0.046	0.37
- 2.9	-223.4	-0.065	-0.06	0.0
- 2.8	-232.3	-0.068	-0.057	-0.12
- 2.7	-223.8	-0.074	-0.053	0.0
- 2.6	-212.3	-0.051	-0.047	0.37
- 2.5	-210.1	-0.068	-0.047	0.5
- 2.4	-214.6	-0.069	-0.042	0.37
- 2.3	-217.4	-0.06	-0.045	0.0
- 2.2	-222.1	-0.053	-0.057	0.37
- 2.1	-225.9	-0.069	-0.053	-0.12
- 2.0	-225.1	-0.06	-0.047	0.0
- 1.9	-224.9	-0.066	-0.05	0.0
- 1.8	-223.0	-0.058	-0.052	0.0
- 1.7	-219.1	-0.068	-0.049	0.0
- 1.6	-216.3	-0.068	-0.042	0.62
- 1.5	-213.1	-0.058	-0.048	0.0
- 1.4	-210.1	-0.068	-0.052	0.0
- 1.3	-207.0	0.124	1.504	-2.37
- 1.2	-207.8	-0.58	-0.336	-25.0
- 1.1	-222.3	-0.185	-0.308	-14.62
- 1.0	-192.7	-0.068	-0.442	-9.25
- 0.9	-164.4	-0.163	-0.573	-7.25
- 0.8	-161.5	-0.113	-0.445	-6.62
- 0.7	-169.9	-0.147	-0.378	-7.25
- 0.6	-165.2	-0.136	-0.347	-6.5
- 0.5	-139.9	-0.159	-0.365	-3.12
- 0.4	-84.2	-0.148	-0.161	0.87
- 0.3	0.4	-0.051	-0.033	1.0
- 0.2	73.2	-0.071	-0.033	-0.37
- 0.1	123.9	-0.049	-0.052	0.25
0.0	170.6	-0.094	-0.043	0.12



Longitudinal Crash Pulse (First Record)

Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
0	0.46	0.74
10	1.02	1.63
20	1.49	2.40
30	2.28	3.67
40	3.28	5.27
50	4.19	6.74
60	4.83	7.78
70	5.40	8.69
80	5.77	9.29
90	5.89	9.48
100	5.86	9.42
110	5.79	9.31
120	5.73	9.22
130	5.69	9.15
140	5.62	9.04
150	5.54	8.91
160	5.46	8.79
170	5.36	8.62
180	5.22	8.40
190	5.08	8.18
200	5.00	8.04
210	4.92	7.92
220	4.80	7.73
230	4.76	7.66
240	4.73	7.61
250	4.68	7.53



Lateral Crash Pulse (First Record)

Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
0	0.08	0.12
10	0.06	0.10
20	0.17	0.27
30	0.27	0.44
40	0.39	0.62
50	0.35	0.57
60	0.32	0.51
70	0.35	0.57
80	0.41	0.66
90	0.35	0.57
100	0.33	0.54
110	0.29	0.46
120	0.24	0.38
130	0.16	0.25
140	0.08	0.12
150	-0.03	-0.05
160	-0.12	-0.20
170	-0.22	-0.36
180	-0.29	-0.47
190	-0.40	-0.64
200	-0.47	-0.76
210	-0.56	-0.90
220	-0.64	-1.03
230	-0.71	-1.15
240	-0.83	-1.33
250	-0.92	-1.49

System Status at Event (Second Record)

Recording Status	Locked Record
Complete file recorded (yes,no)	Yes
Multi-event, number of events (1,2)	2
Time from event 1 to 2 (msec)	N/A
Lifetime Operating Timer at event time zero (seconds)	12,900,570
Key-on Timer at event time zero (seconds)	250
Vehicle voltage at time zero (Volts)	13.851
Energy Reserve Mode entered during event (Y/N)	Yes
Time Driver Front Satellite Sensor Lost Relative to Time Zero (msec)	15.0
Time Passenger Front Satellite Sensor Lost Relative to Time Zero (msec)	36.0
Time Driver First Row Satellite Sensor Lost Relative to Time Zero (msec)	69.5
Time Passenger Second Row Satellite Sensor Lost Relative to Time Zero (msec)	69.5

Faults Present at Start of Event (Second Record)

No Faults Recorded

Deployment Data (Second Record)

Frontal airbag deployment, time to first stage deployment, driver (msec)	21.0
Frontal airbag deployment, time to 2nd stage, driver (msec)	26.0
Side curtain airbag deployment, time to deploy, driver side (msec)	27.5
Side (thorax) air bag deployment, time to deploy, driver (msec)	27.5
Frontal pretensioner (retractor) deployment, time to fire, driver (msec)	14.5
Maximum delta-V, longitudinal (MPH [km/h])	-42.82 [-68.91]
Time, maximum delta-V longitudinal (msec)	154
Maximum delta-V, lateral (MPH [km/h])	9.54 [15.35]
Time, maximum delta-V lateral (msec)	55
Left, forward, side satellite sensor safing	Yes
Left, rear, side satellite sensor discriminating deployment	Yes
Left, rear, side satellite sensor safing	Yes
Right, forward, side satellite sensor safing	Yes
Right, rear, side satellite sensor safing	Yes
RCM, side left sensor safing	Yes
RCM, side right sensor safing	Yes
Left or center front, satellite Sensor discriminating deployment	Yes
Left or center, front satellite Sensor safing	Yes
Right, front satellite sensor safing	Yes
RCM, front sensor discriminating deployment	Yes
RCM, front sensor safing	Yes

Pre-Crash Data -1 sec (Second Record)

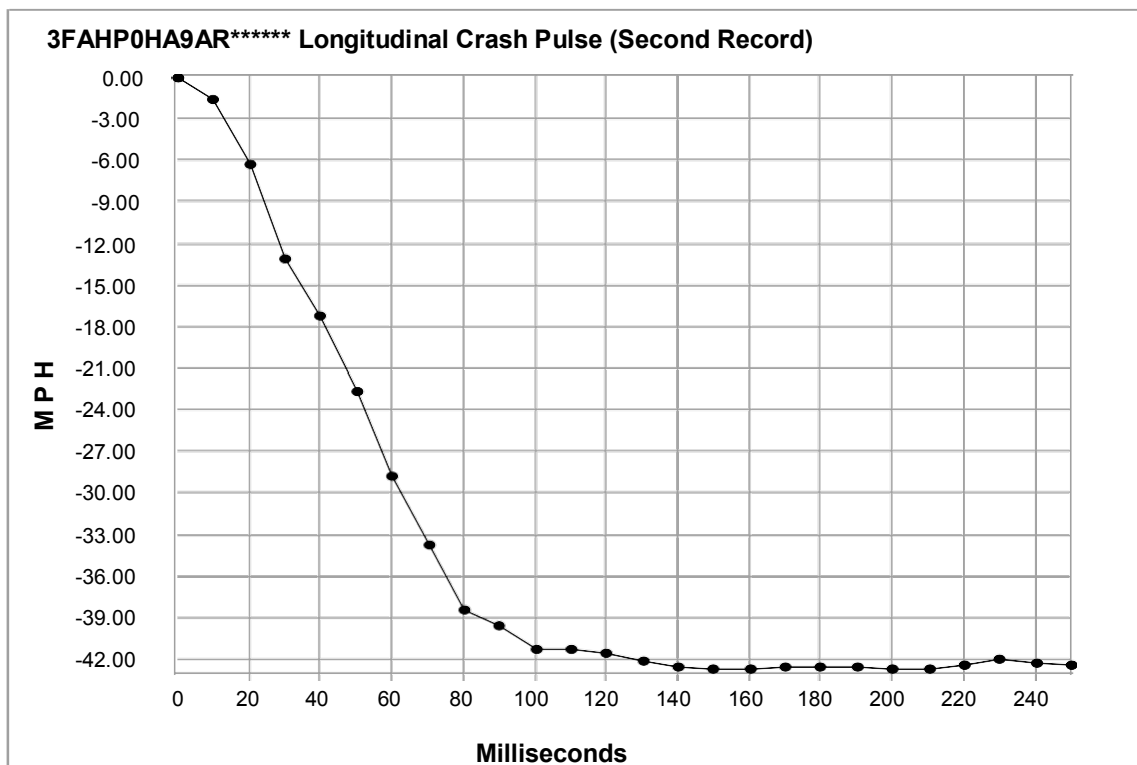
Ignition cycle, crash	14,353
Frontal air bag warning lamp, on/off	Off
Occupant size classification, front passenger (Child size Yes/No [Hex value])	Yes [\$02]
Safety belt status, driver	Driver Buckled
Seat track position switch, foremost, status, driver	Not Forward
Safety belt status, front passenger	Passenger Not Buckled
Brake Telltale	Off
ABS Telltale	Off
Stability Control Telltale	Off
Speed Control Telltale	Off
Powertrain Wrench Telltale	Off
Powertrain Malfunction Indicator Lamp (MIL) Telltale	On

Pre-Crash Data -5 to 0 sec [2 samples/sec] (Second Record)

Times (sec)	Speed vehicle indicated MPH [km/h]	Accelerator pedal, % full	Service brake, on/off	Engine rpm	ABS activity (engaged, non-engaged)	Stability control (engaged, non-engaged)	Traction Control via Brakes (engaged, non-engaged)	Traction Control via Engine (engaged, non-engaged)
- 5.0	53.4 [86.0]	15	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 4.5	53.4 [86.0]	15	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 4.0	53.4 [86.0]	11	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 3.5	52.8 [85.0]	9	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 3.0	52.8 [85.0]	7	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 2.5	52.8 [85.0]	7	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 2.0	52.8 [85.0]	7	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 1.5	52.2 [84.0]	4	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 1.0	52.2 [84.0]	0	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
- 0.5	52.2 [84.0]	0	Off	1,600	non-engaged	non-engaged	non-engaged	non-engaged
0.0	51.6 [83.0]	0	Off	1,500	non-engaged	non-engaged	non-engaged	non-engaged

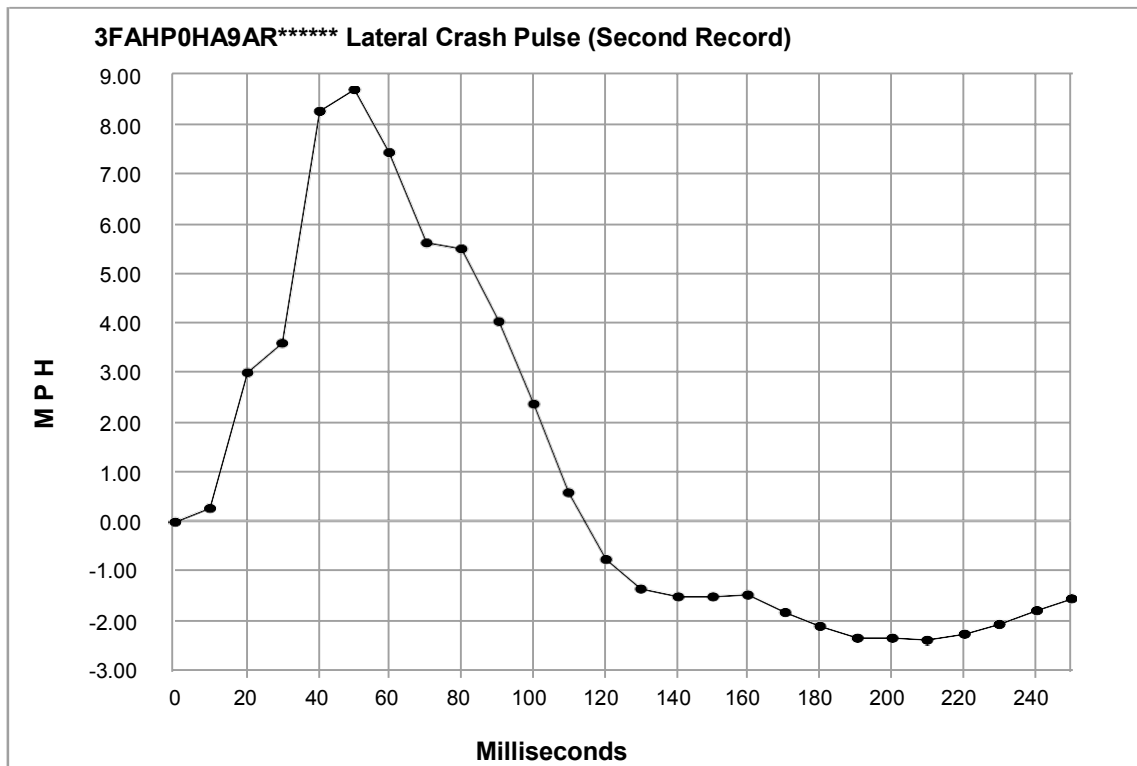
Pre-Crash Data -5 to 0 sec [10 samples/sec] (Second Record)

Times (sec)	Steering Wheel Angle (degrees)	Stability Control Lateral Acceleration (g)	Stability Control Longitudinal Acceleration (g)	Stability Control Yaw Rate (deg/sec)
- 5.0	-0.3	0.012	-0.032	0.62
- 4.9	-0.3	0.001	-0.023	0.37
- 4.8	-0.9	-0.001	-0.02	0.0
- 4.7	-1.7	0.023	-0.011	-0.12
- 4.6	-1.7	0.007	-0.013	-0.25
- 4.5	-1.3	-0.038	-0.025	0.0
- 4.4	-1.5	-0.019	-0.033	0.0
- 4.3	-1.5	0.01	-0.045	-0.25
- 4.2	-1.8	0.008	-0.056	0.12
- 4.1	-2.1	-0.001	-0.022	-0.25
- 4.0	-2.1	-0.05	-0.025	-0.62
- 3.9	-1.9	-0.008	-0.038	-0.25
- 3.8	-1.7	-0.016	-0.045	0.12
- 3.7	-1.2	0.013	-0.055	0.0
- 3.6	-0.9	0.016	-0.011	0.0
- 3.5	-0.4	-0.037	-0.063	-0.12
- 3.4	-0.4	0.017	-0.053	0.25
- 3.3	-0.5	0.07	-0.058	0.25
- 3.2	-0.8	-0.015	-0.074	0.5
- 3.1	-0.9	-0.04	-0.029	0.87
- 3.0	-1.2	-0.005	0.002	0.0
- 2.9	-1.3	-0.024	-0.101	0.12
- 2.8	-1.3	0.02	-0.084	-0.25
- 2.7	-1.5	-0.006	-0.053	0.12
- 2.6	-1.9	0.033	-0.085	-0.25
- 2.5	-2.1	-0.019	-0.054	0.0
- 2.4	-2.0	-0.078	-0.036	-0.62
- 2.3	-1.5	-0.005	-0.066	-0.25
- 2.2	-1.3	0.003	-0.045	-0.25
- 2.1	-1.0	-0.007	-0.029	-0.25
- 2.0	-1.0	-0.023	-0.044	-0.12
- 1.9	-1.0	-0.031	-0.044	0.12
- 1.8	-0.5	-0.055	-0.03	0.0
- 1.7	0.2	0.078	-0.066	0.0
- 1.6	0.3	0.016	-0.09	0.37
- 1.5	0.5	0.035	-0.064	0.12
- 1.4	0.2	-0.001	-0.027	0.12
- 1.3	0.3	0.001	-0.051	0.62
- 1.2	0.3	0.033	-0.052	0.5
- 1.1	0.3	0.059	-0.087	0.5
- 1.0	0.3	-0.032	-0.1	0.0
- 0.9	0.3	-0.015	-0.085	0.25
- 0.8	0.1	0.038	-0.062	0.5
- 0.7	0.1	-0.014	-0.07	-0.12
- 0.6	0.0	-0.002	-0.068	0.62
- 0.5	0.2	-0.004	-0.085	-0.12
- 0.4	0.9	-0.012	-0.059	0.0
- 0.3	1.5	0.0	-0.043	0.0
- 0.2	1.9	-0.061	-0.104	0.87
- 0.1	1.0	0.035	-0.015	1.25
0.0	-17.3	-0.1	-0.039	0.0



Longitudinal Crash Pulse (Second Record)

Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
0	-0.14	-0.22
10	-1.64	-2.64
20	-6.42	-10.33
30	-13.26	-21.34
40	-17.35	-27.92
50	-22.67	-36.48
60	-28.79	-46.34
70	-33.74	-54.30
80	-38.52	-61.99
90	-39.55	-63.66
100	-41.25	-66.39
110	-41.32	-66.49
120	-41.53	-66.83
130	-42.22	-67.94
140	-42.52	-68.42
150	-42.78	-68.85
160	-42.70	-68.73
170	-42.53	-68.45
180	-42.55	-68.48
190	-42.55	-68.48
200	-42.72	-68.74
210	-42.72	-68.75
220	-42.47	-68.35
230	-42.06	-67.70
240	-42.28	-68.04
250	-42.45	-68.31



Lateral Crash Pulse (Second Record)

Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
0	-0.03	-0.04
10	0.24	0.39
20	3.00	4.82
30	3.56	5.73
40	8.27	13.30
50	8.69	13.98
60	7.40	11.92
70	5.61	9.03
80	5.49	8.83
90	3.99	6.43
100	2.34	3.76
110	0.56	0.90
120	-0.80	-1.28
130	-1.39	-2.23
140	-1.55	-2.50
150	-1.52	-2.45
160	-1.49	-2.40
170	-1.83	-2.95
180	-2.13	-3.42
190	-2.36	-3.80
200	-2.36	-3.80
210	-2.39	-3.85
220	-2.29	-3.69
230	-2.10	-3.39
240	-1.80	-2.89
250	-1.56	-2.52

Hexadecimal Data

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

06 00 00 00

39 45 35 33 2D 31 34 42 33 32 31 2D 42 4B 00 00 00 00 00 00 00 00 00 00

33 31 31 35 36 37 34 32 30 30 30 30 30 30 30

39 45 35 33 2D 31 34 43 30 32 38 2D 41 42 00 00 00 00 00 00 00 00 00

12 13 EB E6 00 00 00 00 00 00 00 00 00 00 00 00

12 17 E6 3E 00 00 00 00 00 00 00 00 00 00 00 00

12 17 97 4B 00 00 00 00 00 00 00 00 00 00 00 00

12 17 13 30 00 00 00 00 00 00 00 00 00 00 00 00

12 1B 5B D8 00 00 00 00 00 00 00 00 00 00 00 00

0C 5C B6 BC 00 00 00 00 00 00 00 00 00 00 00 00

33 46 41 48 50 30 48 41 39 41 52 2A 2A 2A 2A 2A 2A

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00	00	38	11	00	00	38	13	00	27	5E	92	00	00	00	32	00	00	94	EC	00	00	21	2A	FF	FC	19	8A
00	03	CC	B0	00	00	00	00	00	03	E6	F1	00	03	EC	2A	00	03	FC	C8	00	04	14	94	00	04	22	CA
00	04	35	4E	00	04	4A	9A	00	04	5B	D0	00	04	6C	6D	00	04	70	06	00	04	75	EC	00	04	76	28
00	04	76	E3	00	04	79	47	00	04	7A	52	00	04	7B	3F	00	04	7A	FB	00	04	7A	63	00	04	7A	73
00	04	7A	71	00	04	7B	05	00	04	7B	0A	00	04	7A	2A	00	04	78	C1	00	04	79	80	00	04	7A	14
FF	FC	33	39	FF	FC	34	27	FF	FC	3D	BC	FF	FC	3F	B1	FF	FC	50	10	FF	FC	51	86	FF	FC	4D	10
FF	FC	46	D1	FF	FC	46	66	FF	FC	41	34	FF	FC	3B	6F	FF	FC	35	41	FF	FC	30	8A	FF	FC	2E	7D
FF	FC	2D	E9	FF	FC	2E	04	FF	FC	2E	21	FF	FC	2C	EF	FF	FC	2B	EA	FF	FC	2B	18	FF	FC	2B	18
FF	FC	2B	00	FF	FC	2B	58	FF	FC	2B	FF	FF	FC	2D	0F	FF	FC	2D	DF	00	00	00	00	00	00	00	00
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00	00	27	06	27	06	27	0B	27	12	27	13	27	15	27	12	27	13	27	13	27	13	27	13	27	13	27	11
27	11	27	10	27	12	27	19	27	1F	27	23	27	1A	26	63	27	0D	27	0D	27	07	26	FF	26	FF	27	03
27	01	27	01	26	FE	26	FB	26	FB	26	FD	26	FF	27	04	27	07	27	0C	27	0C	27	0B	27	08	27	07
27	04	27	03	27	03	27	01	26	FD	26	FB	26	FC	27	01	27	03	27	06	07	A4	07	A4	07	B2	07	8E
07	76	07	90	07	B5	07	9D	07	9C	07	79	07	6C	07	7B	07	92	07	8A	07	8C	07	7B	07	95	07	A5
07	68	07	C1	07	A9	07	B0	07	B9	07	BC	07	C5	07	C3	07	B7	07	AF	07	A3	07	98	07	BA	07	B7
07	AA	07	A3	07	99	07	C5	07	91	07	9B	07	96	07	86	07	B3	07	D2	07	6B	07	7C	07	9B	07	7B
07	9A	07	AC	07	8E	07	A3	07	B3	07	B9	07	B1	07	99	08	1E	07	E0	07	F3	07	CF	07	D1	07	F1
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Disclaimer of Liability

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

APPENDIX B: 2007 Lincoln MKX Event Data Recorder Report²

² The EDR report contained in this technical report was imaged using the current version of the Bosch CDR software at the time of the vehicle inspection. The CDR report contained in the associated Crash Viewer application may differ relative to this report.

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

CDR File Information

User Entered VIN	2LMDU68C47B*****
User	
Case Number	
EDR Data Imaging Date	
Crash Date	
Filename	IN17029_V2_ACM.CDRX
Saved on	
Imaged with CDR version	Crash Data Retrieval Tool 17.4.2
Imaged with Software Licensed to (Company Name)	NHTSA
Reported with CDR version	Crash Data Retrieval Tool 19.3
Reported with Software Licensed to (Company Name)	NHTSA
EDR Device Type	Airbag Control Module
ACM Adapter Detected During Download	Yes
Event(s) Recovered	1
First Event Recorded	no data

Comments

No comments entered.

The retrieval of this data has been authorized by the vehicle's owner, or other legal authority such as a court order or search warrant, as indicated by the CDR tool user on .

Data Limitations

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 wired 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.

System Status at Time of Data Retrieval

VIN as programmed into RCM at factory	2LMDU68C47B*****
Current Lifetime Operating Timer (sec)	13,388,558
Deployment Command Counter	1
First Record Recording Status	Partial record
Second Record Recording Status	No Data
Restraints Control Module Part Number	7T43-14B321-BJ
Restraints Control Module (Serial Number)	20415311
Occupant Classification System ECU (Serial Number)	22001105115
Driver Front Crash Sensor (Serial Number)	021A00F0
Passenger Front Crash Sensor (Serial Number)	021A014E
Driver 1st Row Side Crash Sensor (Serial Number)	02895BD0
Passenger 1st Row Side Crash Sensor (Serial Number)	02371AB1
Driver 2nd Row Side Crash Sensor (Serial Number)	02895ABB
Passenger 2nd Row Side Crash Sensor (Serial Number)	023716C8

Deployment Data (First Record)

Driver First Stage Airbag Deployment Time (msec)	17.5
Driver Second Stage Airbag Deployment Time (msec)	27.5
Passenger First Stage Airbag Deployment Time (msec)	N/A
Passenger Second Stage Airbag Deployment Time (msec)	N/A
Driver Pretensioner Deployment Time (msec)	17.5
Passenger Pretensioner Deployment Time (msec)	N/A
Driver SIDE Airbag Deployment Time (msec)	68.0
Passenger SIDE Airbag Deployment Time (msec)	N/A
Driver CURTAIN Airbag Deployment Time (msec)	68.0
Passenger CURTAIN Deployment Time (msec)	68.0

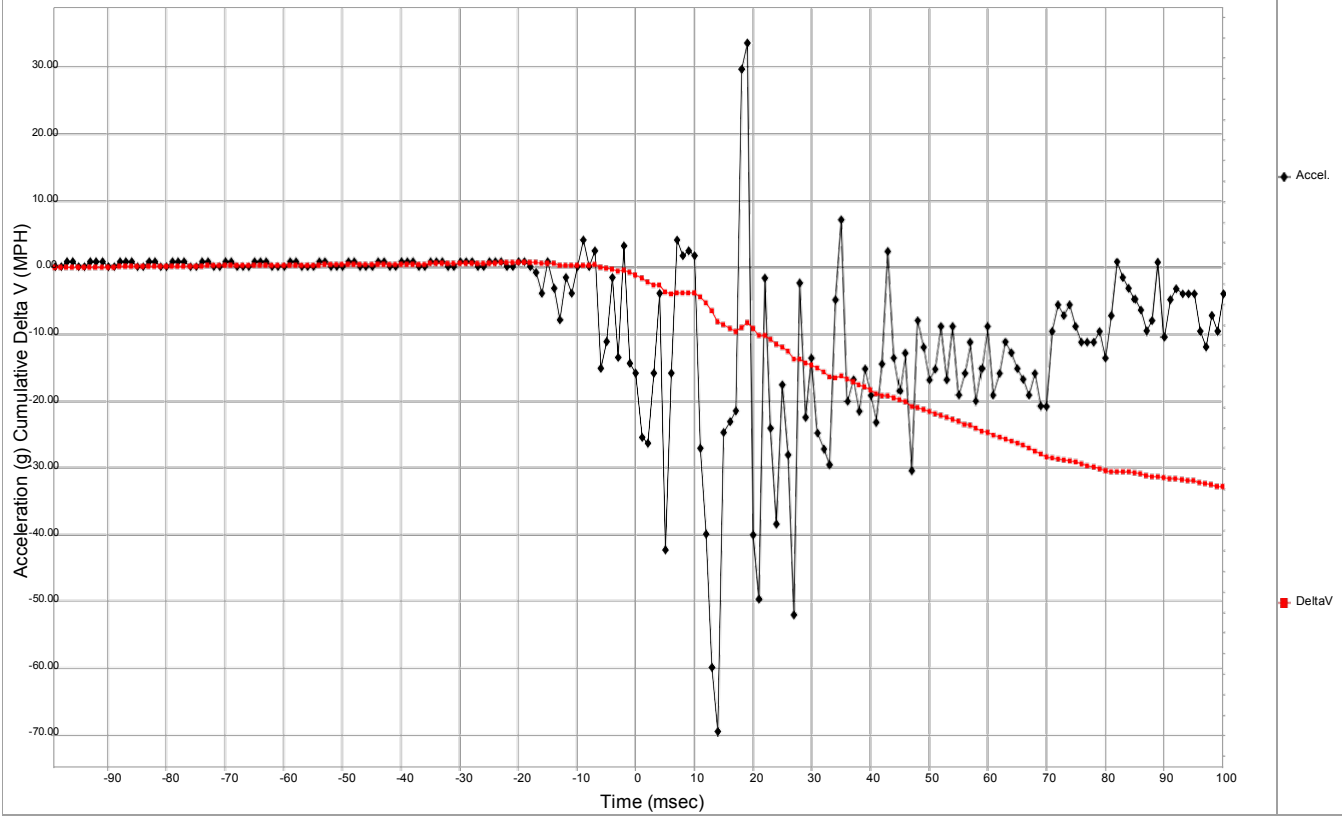
System Status at Event (First Record)

Lifetime Operating Timer at Algorithm Wake-up (sec)	13,388,499
Key On Timer at Algorithm Wake-up (sec)	615
Battery voltage at Algorithm Wake-up (volts)	14.03
RCM Energy Reserve voltage at Algorithm Wake-up (volts)	25.07
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	Unbuckled
Passenger Seat Belt Switch Fault at Algorithm Wake-up	No
Passenger Classification Status at Algorithm Wake-up	Empty
OCS Passenger State at Algorithm Wake-up	Empty
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 (%)	29	29	27	24	13
Vehicle Speed (MPH [km/h])	39.9 [64.2]	40.8 [65.7]	42.1 [67.8]	43.2 [69.5]	43.9 [70.6]
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	Empty	Empty	Empty	Empty	Empty
OCS System Level 1 Fault	No	No	No	No	No
OCS System Level 2 Fault	No	No	No	No	No
Vehicle Calibration ID	56	56	56	56	56
Vehicle Model Year Calibration ID	07	07	07	07	07

2LMDU68C47B***** Longitudinal Crash Pulse (First Record)



Longitudinal Crash Pulse (First Record)

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])	Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])
-99	0.00	0.00 [0.00]	-49	0.80	0.44 [0.71]
-98	0.00	0.00 [0.00]	-48	0.80	0.46 [0.74]
-97	0.80	0.02 [0.03]	-47	0.00	0.46 [0.74]
-96	0.80	0.04 [0.06]	-46	0.00	0.46 [0.74]
-95	0.00	0.04 [0.06]	-45	0.00	0.46 [0.74]
-94	0.00	0.04 [0.06]	-44	0.80	0.47 [0.76]
-93	0.80	0.05 [0.08]	-43	0.80	0.49 [0.79]
-92	0.80	0.07 [0.11]	-42	0.00	0.49 [0.79]
-91	0.80	0.09 [0.14]	-41	0.00	0.49 [0.79]
-90	0.00	0.09 [0.14]	-40	0.80	0.51 [0.82]
-89	0.00	0.09 [0.14]	-39	0.80	0.53 [0.85]
-88	0.80	0.11 [0.18]	-38	0.80	0.54 [0.87]
-87	0.80	0.12 [0.19]	-37	0.00	0.54 [0.87]
-86	0.80	0.14 [0.23]	-36	0.00	0.54 [0.87]
-85	0.00	0.14 [0.23]	-35	0.80	0.56 [0.90]
-84	0.00	0.14 [0.23]	-34	0.80	0.58 [0.93]
-83	0.80	0.16 [0.26]	-33	0.80	0.60 [0.97]
-82	0.80	0.18 [0.29]	-32	0.00	0.60 [0.97]
-81	0.00	0.18 [0.29]	-31	0.00	0.60 [0.97]
-80	0.00	0.18 [0.29]	-30	0.80	0.61 [0.98]
-79	0.80	0.19 [0.31]	-29	0.80	0.63 [1.01]
-78	0.80	0.21 [0.34]	-28	0.80	0.65 [1.05]
-77	0.80	0.23 [0.37]	-27	0.00	0.65 [1.05]
-76	0.00	0.23 [0.37]	-26	0.00	0.65 [1.05]
-75	0.00	0.23 [0.37]	-25	0.80	0.67 [1.08]
-74	0.80	0.25 [0.40]	-24	0.80	0.68 [1.09]
-73	0.80	0.26 [0.42]	-23	0.80	0.70 [1.13]
-72	0.00	0.26 [0.42]	-22	0.00	0.70 [1.13]
-71	0.00	0.26 [0.42]	-21	0.00	0.70 [1.13]
-70	0.80	0.28 [0.45]	-20	0.80	0.72 [1.16]
-69	0.80	0.30 [0.48]	-19	0.80	0.74 [1.19]
-68	0.00	0.30 [0.48]	-18	0.00	0.74 [1.19]
-67	0.00	0.30 [0.48]	-17	-0.80	0.72 [1.16]
-66	0.00	0.30 [0.48]	-16	-4.00	0.63 [1.01]
-65	0.80	0.32 [0.51]	-15	0.80	0.65 [1.05]
-64	0.80	0.33 [0.53]	-14	-3.20	0.58 [0.93]
-63	0.80	0.35 [0.56]	-13	-8.00	0.40 [0.64]
-62	0.00	0.35 [0.56]	-12	-1.60	0.37 [0.60]
-61	0.00	0.35 [0.56]	-11	-4.00	0.28 [0.45]
-60	0.00	0.35 [0.56]	-10	0.00	0.28 [0.45]
-59	0.80	0.37 [0.60]	-9	4.00	0.37 [0.60]
-58	0.80	0.39 [0.63]	-8	0.00	0.37 [0.60]
-57	0.00	0.39 [0.63]	-7	2.40	0.42 [0.68]
-56	0.00	0.39 [0.63]	-6	-15.20	0.09 [0.14]
-55	0.00	0.39 [0.63]	-5	-11.20	-0.16 [-0.26]
-54	0.80	0.40 [0.64]	-4	-1.60	-0.19 [-0.31]
-53	0.80	0.42 [0.68]	-3	-13.60	-0.49 [-0.79]
-52	0.00	0.42 [0.68]	-2	3.20	-0.42 [-0.68]
-51	0.00	0.42 [0.68]	-1	-14.40	-0.74 [-1.19]
-50	0.00	0.42 [0.68]	0	-16.00	-1.09 [-1.75]

Longitudinal Crash Pulse (First Record) - Continued

Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])	Time (msec)	Recorded Vehicle Longitudinal Acceleration (g)	Cumulative Longitudinal Velocity Change (MPH [km/h])
1	-25.60	-1.65 [-2.66]	51	-15.20	-21.90 [-35.24]
2	-26.40	-2.23 [-3.59]	52	-8.80	-22.10 [-35.57]
3	-16.00	-2.58 [-4.15]	53	-16.80	-22.46 [-36.15]
4	-4.00	-2.67 [-4.30]	54	-8.80	-22.66 [-36.47]
5	-42.40	-3.60 [-5.79]	55	-19.20	-23.08 [-37.14]
6	-16.00	-3.95 [-6.36]	56	-16.00	-23.43 [-37.71]
7	4.00	-3.86 [-6.21]	57	-11.20	-23.68 [-38.11]
8	1.60	-3.83 [-6.16]	58	-20.00	-24.11 [-38.80]
9	2.40	-3.78 [-6.08]	59	-15.20	-24.45 [-39.35]
10	1.60	-3.74 [-6.02]	60	-8.80	-24.64 [-39.65]
11	-27.20	-4.34 [-6.98]	61	-19.20	-25.06 [-40.33]
12	-40.00	-5.22 [-8.40]	62	-16.00	-25.41 [-40.89]
13	-60.00	-6.53 [-10.51]	63	-11.20	-25.66 [-41.30]
14	-69.60	-8.06 [-12.97]	64	-12.80	-25.94 [-41.75]
15	-24.80	-8.61 [-13.86]	65	-15.20	-26.28 [-42.29]
16	-23.20	-9.12 [-14.68]	66	-16.80	-26.64 [-42.87]
17	-21.60	-9.59 [-15.43]	67	-19.20	-27.07 [-43.56]
18	29.60	-8.94 [-14.39]	68	-16.00	-27.42 [-44.13]
19	33.60	-8.20 [-13.20]	69	-20.80	-27.87 [-44.85]
20	-40.00	-9.08 [-14.61]	70	-20.80	-28.33 [-45.59]
21	-49.60	-10.17 [-16.37]	71	-9.60	-28.54 [-45.93]
22	-1.60	-10.20 [-16.42]	72	-5.60	-28.66 [-46.12]
23	-24.00	-10.73 [-17.27]	73	-7.20	-28.82 [-46.38]
24	-38.40	-11.57 [-18.62]	74	-5.60	-28.94 [-46.57]
25	-17.60	-11.96 [-19.25]	75	-8.80	-29.14 [-46.90]
26	-28.00	-12.58 [-20.25]	76	-11.20	-29.38 [-47.28]
27	-52.00	-13.72 [-22.08]	77	-11.20	-29.63 [-47.68]
28	-2.40	-13.77 [-22.16]	78	-11.20	-29.88 [-48.09]
29	-22.40	-14.26 [-22.95]	79	-9.60	-30.09 [-48.43]
30	-13.60	-14.56 [-23.43]	80	-13.60	-30.39 [-48.91]
31	-24.80	-15.10 [-24.30]	81	-7.20	-30.54 [-49.15]
32	-27.20	-15.70 [-25.27]	82	0.80	-30.53 [-49.13]
33	-29.60	-16.35 [-26.31]	83	-1.60	-30.56 [-49.18]
34	-4.80	-16.46 [-26.49]	84	-3.20	-30.63 [-49.29]
35	7.20	-16.30 [-26.23]	85	-4.80	-30.74 [-49.47]
36	-20.00	-16.74 [-26.94]	86	-6.40	-30.88 [-49.70]
37	-16.80	-17.11 [-27.54]	87	-9.60	-31.09 [-50.03]
38	-21.60	-17.58 [-28.29]	88	-8.00	-31.26 [-50.31]
39	-15.20	-17.91 [-28.82]	89	0.80	-31.25 [-50.29]
40	-19.20	-18.34 [-29.52]	90	-10.40	-31.47 [-50.65]
41	-23.20	-18.85 [-30.34]	91	-4.80	-31.58 [-50.82]
42	-14.40	-19.16 [-30.84]	92	-3.20	-31.65 [-50.94]
43	2.40	-19.11 [-30.75]	93	-4.00	-31.74 [-51.08]
44	-13.60	-19.41 [-31.24]	94	-4.00	-31.83 [-51.23]
45	-18.40	-19.81 [-31.88]	95	-4.00	-31.91 [-51.35]
46	-12.80	-20.09 [-32.33]	96	-9.60	-32.12 [-51.69]
47	-30.40	-20.76 [-33.41]	97	-12.00	-32.39 [-52.13]
48	-8.00	-20.94 [-33.70]	98	-7.20	-32.55 [-52.38]
49	-12.00	-21.20 [-34.12]	99	-9.60	-32.76 [-52.72]
50	-16.80	-21.57 [-34.71]	100	-4.00	-32.84 [-52.85]

Lateral Crash Pulse (First Record)

Contains No Recorded Data



Page 9 of 12

Page 10 of 12

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FF FF 00 00 00 B8 92 C9 00 25|96 7E 00 CC 4B 0E
00 00 00 0A 00 00 00 0A 00 00|01 2C 00 00 01 2C
00 00 00 0E 00 00 00 0E 00 00|00 0E 00 00 00 0E
FF FF FF FF FF FF FF FF FF FF|FF FF FF FF FF
07 F8 00 00 01 60 40 22 40 22|40 21 40 21 40 21
40 21 00 00 00 00 03 06 01 04|06 19 03 CD 06 D4
0F 0F 1F 1F 0F 0F 14 04 05 1C|00 0E 02 00 00 00
00 FF FF FF 10 00 00 00 00 00|00 00 00 FF FF 00
00 00 00 00 00 0A 0A FF FF 0D|0D FF FF FF FF FF
FF FF FF B9 B9 B9 B9 B9 B9 19|19 19 19 19 19 19
19 19 0F 0F 0F 0F 0F 0F 0F 0F|0F 0F FF FF FF FF
FF FF FF FF B9 B9 B9 B9 B9 B9 19|19 19 19 19 19
19 19 19 0F 0F 0F 0F 0F 0F 0F|0F 0F 0F FF FF FF
FF FF FF FF B9 B9 B9 B9 B9 B9 19|19 19 19 19 19
19 19 19 19 0F 0F 0F 0F 0F 0F|0F 0F 0F 0F FF FF
FF FF FF FF FF FF B9 B9 B9 B9|B9 B9 19 19 19 19
19 19 19 19 19 0F 0F 0F 0F 0F|0F 0F 0F 0F 0F FF
14 0A 14 0A 1E 28 28 00 1A 8B|ED A0 0D 01 0A 16
19 27 33 4B 5F 70 89 9C B9 D4|E1 EB F4 FF FF FF
12 FF 00 01 0A 16 19 27 33 4B|5F 70 89 9C B9 D4
E1 EB F4 FF FF FF 12 FF 00 00|00 00 F3 66 FB AF
0A 3F 14 03 05 9F 9F 1F 00 85|85 2D 2D FF FF 3E
50 FF FF 50 50 FF FF 1E 1E 69|69 2D 2D FF FF FF
FF FF FF FF FF FF FF 00 CD 12|A5 2A 14 14 03 03
14 14 0D 03 7F 7F 64 64 02 02|10 10 FF FF 00 00
FF FF FF FF FF FF FF FF 00 00|00 00 00 00 16 00
FF FF FF 00 FF 00 21 7F 7F 7F|7F 7F 0A 1E FF FF
FF FF FF FF FF FF FF FF FF|FF FF FF FF 4E 4E
4E 4E 4E 4E 4E 4E 4E 4E 4E 4E|4E 48 2B 2B 2B 2B
2B 2B 2B 2B 2B 2B 2B FF FF FF|FF FF FF FF FF FF
FF FF 79 79 79 79 79 79 79 79|79 79 79 79 79 79
79 79 79 79 79 79 79 79 79 79|79 79 79 79 79 79
4E 32 FF FF 07 07 03 28 28 14|64 00 58 03 68 D4
0B 07 08 00 14 07 08 FF FF 1E|08 63 F6 96 28 2D
54 54 3F 3B D8 EE F4 10 24 7F|28 61 28 0C 0A 0C
08 59 56 50 46 38 24 14 07 FB|59 56 50 46 38 24
14 07 FB 22 1A 19 18 17 13 10|0D 0A 07 04 01 FD
FD FD FD 08 00 00 00 00 FC F7|8E F5 00 0A 0A 1E
1E 96 96 0A 0A 1E 1E 96 96 0A|0A 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00|00 00 32 44 28 0B
10 00 80 88 80 80 81 11 81 10|80 71 80 74 80 72
80 76 81 20 81 22 80 00 60 06|60 07 70 08 E0 04
60 06 60 07 E0 08 60 05 E0 0D|60 02 E0 09 70 01
E0 0A 00 00 00 00 00 00 00 00|00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00|00 00 00 00 01 60
04 00 00 00 A3 90 A8 7A 00 01|00 21 00 41 00 45
00 49 00 4D 00 51 00 5D 00 69|00 71 00 75 00 79
00 00 00 00 00 00 00 00 00 00|00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00|00 00 00 00 00 00
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02 03 07 01 02 05 01 0E 02 02|06 03 03 04 07 03
03 06 01 03 03 0E 01 0B 03 00|08 01 FF 07 06 00
04 09 07 00 04 0B 01 00 02 08|06 02 05 0A 07 02
05 0C 01 02 03 0D 01 0F 02 00|04 00 FF 00 04 01
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FF 00 08 05 FF 00 08 03 FF 00|08 04 FF 00 08 05
FF 00 08 04 FF 00 08 05 FF 00|01 09 02 00 00 03
FF 00 00 00 00 00 00 00 00 00|00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 08|08 01 01 01 01 03
03 02 01 01 00 00 00 00 00 00|00 00 00 00 00 00
00 00 00 00 00 00 00 00 FF|04 FF 05 0E 00 03
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85 00 00 00 00 00 00 00 00 00|00 00 00 00 00 00
00 0A 0C 0A 0C 00 02 0A 0D 0A|0A 0A 0A 04 09 09
0A 0A 00 00 00 00 00 00 00 00|00 15 00 00 00 16
00 00 00 29 00 00 00 2A 00 00|00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00|00 05 00 00 00 12
00 00 00 09 00 00 00 22 00 00|00 00 00 00 00 00
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Page 11 of 12

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00 00 00 00 00 00 00 00 00 00|01 03 01 60 06 00
77 F2 4E 89 00 00 32 4C 4D 44|55 36 38 43 34 37
42 4A 33 32 39 34 30 01 00 00|00 00 E3 20 BB DE
00 00 00 0A 00 01 00 10 00 03|00 1E 00 14 00 00
02 89 5A BB 02 37 1A B1 02 1A|00 F0 02 37 16 C8
02 89 5B D0 02 1A 01 4E 22 00|11 05 11 5F FF FF
32 4C 4D 44 55 36 38 43 34 37|42 4A 33 32 39 34
30 00 00 00 00 00 00 00 00 00|00 00 00 00 00 00
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00 00 00 00 00 00 00 00 00 00|00 00 00 00 00 00
00 00 07 08 00 00 00 00 00 00|00 00 00 00 00 00
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39 38 2D 42 44 00 00 00 00 00|00 00 00 00 00 00
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