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Special Crash Investigations: On-Site Child Restraint System Investigation; Vehicle: 2015 Hyundai Sonata; Location: Ohio; Crash Date: December 2016

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15. Supplementary Notes

Each crash represents a unique sequence of events, and generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems. This report and associated case data are based on information available to the Special Crash Investigation team on the date this report was submitted.

16. Abstract

This report documents the on-site investigation of the crash of a 2015 Hyundai Sonata in which a 4-year-old female in a child restraint system (CRS) in the second-row center sustained fatal injuries. This crash occurred on a curved, two-lane state highway. The Hyundai was a 4-door sedan equipped with multi-stage frontal air bags, driver's knee air bag, front seat-mounted side impact air bags, and rollover/side impact inflatable curtain (IC) air bags. A Dorel Alpha Omega Elite convertible CRS that was used in the forward-facing position was secured in the second-row center seating position. The CRS was secured by the vehicle's Lower Anchors and Tethers for Children (LATCH) system as well as a lap and shoulder seat belt. A belted 33-year-old female driver and belted 33-year-old male front row passenger also occupied the vehicle. The Hyundai was traveling in the southeast-bound lane, negotiating a left curve, and a 1997 Honda Accord was traveling in the northwest-bound lane, negotiating a right curve. The Honda entered the southeast-bound lane and its front plane struck the front plane of the Hyundai in a head-on configuration. The impact was severe and resulted in actuation of the Hyundai's driver's and front passenger's seat belt pretensioners and deployment of both frontal, driver's knee, seat-mounted side impact, and left IC air bags. The driver and front row passenger of the Hyundai each sustained police-reported "A" (incapacitating) injuries and were transported by ambulance to a hospital. The second-row center passenger sustained critical injuries and was transported by ambulance to a hospital where she was pronounced deceased. The driver of the Honda was fatally injured. Both vehicles were towed from the crash scene due to damage.

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BACKGROUND

This report documents the on-site investigation of the crash of a 2015 Hyundai Sonata (**Figure 1**) in which a 4-year-old female in a child restraint system (CRS) in the second-row center sustained fatal injuries. The crash involved the Hyundai and a 1997 Honda Accord. This investigation was initiated by the National Highway Traffic Safety Administration in March 2017 and assigned to the Special Crash Investigation Team at the Indiana University Transportation Research Center. The crash occurred in Ohio in December 2016 in the dark evening and was investigated by a local police agency. The Hyundai, crash scene, and Honda were inspected in April 2017. An in-person interview was also conducted with the driver of the Hyundai in April 2017.

Figure 1. The damaged 2015 Hyundai Sonata.

This crash occurred on a curved, two-lane State highway. The Hyundai was a 4-door sedan equipped with multi-stage frontal air bags, driver's knee air bag, front seat-mounted side impact air bags, and rollover/side impact inflatable curtain (IC) air bags. A Dorel Alpha Omega Elite convertible CRS used in the forward-facing position was secured in the second-row center seating position and was occupied by a 4-year-old female. The CRS was secured by the vehicle's Lower Anchors and Tethers for Children (LATCH) system as well as a lap and shoulder seat belt. A belted 33-year-old female driver and a belted 33-year-old male front-row passenger also occupied the vehicle. The Hyundai was traveling in the southeast-bound lane, negotiating a left curve and the Honda was traveling in the northwest-bound lane, negotiating a right curve. The Honda entered the southeast-bound lane and its front plane struck the front plane of the Hyundai head-on. The impact was severe and resulted in actuation of the Hyundai's driver's and front passenger's seat belt pretensioners and deployment of both frontal, driver's knee, seat-mounted side impact, and left IC air bags. Both vehicles came to final rest partially on the west shoulder of the roadway with the Hyundai heading south and the Honda heading northwest. The driver and front row passenger of the Hyundai each sustained police-reported "A" (incapacitating) injuries and were transported by ambulance to a hospital. The second-row center passenger sustained critical injuries and was transported by ambulance to a hospital where she was pronounced deceased. The driver of the Honda was fatally injured. Both vehicles were towed from the crash scene due to damage.

SUMMARY

Crash Site

This crash occurred during dark, early evening hours on a curved, two-lane State highway. The weather conditions were cloudy, with southwesterly winds at 6 km/h (4 mph), a temperature of 0 °C (32 °F), and a dew point of -2.8 °C (27 °F), according to local weather reports. The roadway traversed in a northwest/southeast direction and had one through lane in each direction. The southeast-bound lane was 3.5 m (11.5 ft) wide and the northwest-bound lane was 3.1 m (10.2 ft) wide. The roadway was bordered by bituminous and gravel/grass shoulders 0.9 m (3.0 ft) wide. The roadway pavement markings consisted of solid white edge lines and double yellow centerline. The speed limit for both vehicles was 89 km/h (55 mph). A crash diagram is included at the end of this report.

Figure 2. Southeast-bound approach of the Hyundai.

Figure 3. Northwest-bound approach of the Honda.

Pre-Crash

The Hyundai was traveling southeast in its lane (**Figure 2**), negotiating a left curve at a speed recorded by the event data recorder (EDR) of 89 km/h (55 mph) at -5.0 sec prior to algorithm enable (AE). The EDR reported the vehicle gradually decelerated with the service brake off to a speed of 87 km/h (54 mph) at -0.5 sec. The Honda was traveling northwest in its lane, negotiating a right curve (**Figure 3**) when it traveled into the Hyundai's lane. The EDR reported the Hyundai's speed at 0.0 sec as 83 km/h (52 mph).

Figure 4. Damage to the front plane of the Hyundai from the impact with the front plane of the Honda.

Crash

The front plane of the Hyundai (**Figure 4**) was struck head-on by the front plane of the Honda (**Figure 5**). The force direction on the Hyundai was in the 12 o'clock sector and actuated the driver's and front row passenger's seat belt pretensioners, deploying both stages of the driver's frontal air bag and all three stages of the front passenger's frontal air bag. The driver's knee, seat-mounted side impact, and left IC air bags also deployed. The vehicle's EDR reported the maximum longitudinal and lateral velocity changes as -77 km/h (-48 mph) and 14 km/h (8.7 mph), respectively. The damage algorithm of WinSMASH calculated the total delta V as 78 km/h (48 mph). The longitudinal and lateral

velocity changes were -77 km/h (-48 mph) and 14 km/h (9 mph), respectively. WinSMASH calculated the Honda's total delta V as 98 km/h (61 mph). The longitudinal and lateral velocity changes were -98 km/h (-61 mph) and 0 km/h, respectively. The results appeared reasonable.

The Hyundai rotated clockwise approximately 30 degrees following the impact and came to final rest partially on the west shoulder heading south. The Honda rotated counterclockwise approximately 15 degrees coming to final rest partially in the southeast-bound lane heading southwest with the front of the vehicle near the front of the Hyundai.

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

Post-Crash

The police were notified of the crash at 1840 hours and arrived on scene at 1902 hours. The driver of the Hyundai stated during the SCI interview that she exited the vehicle through the left front door, then fell to the ground due to her injuries. The front-row and second-row center passengers were removed from the vehicle by emergency responders. The driver and front row passenger of the Hyundai each sustained police-reported "A" (incapacitating) injuries and were transported by ambulance to a hospital. The second-row center passenger sustained critical injuries and was transported by ambulance to a hospital where she was pronounced deceased 77 minutes following the crash. Emergency responders used a hydraulic rescue tool to cut and remove the roof of the Honda to extricate the driver from the vehicle. The driver of the Honda was fatally injured. Both vehicles were towed from the crash scene due to damage.

2015 HYUNDAI SONATA

Description

The Hyundai was a front-wheel-drive, 5-occupant, 4-door sedan with the Vehicle Identification Number (VIN) 5NPE34AF9FHxxxxxx, manufactured September 3, 2014. The vehicle was equipped with a 2.4-liter, I-4 engine, 6-speed automatic transmission with sport shift feature, 4-wheel antilock brakes with brake assist, traction control, and electronic stability control (ESC). The vehicle was also equipped with multi-stage frontal air bags, driver's knee air bag, front seat-mounted side impact air bags, and rollover/side impact IC air bags that were certified by the manufacturer to be compliant to Federal Motor Vehicle Safety Standard No. 226, Ejection Mitigation. The second row was equipped with LATCH in the outboard seating positions. The driver estimated the vehicle's mileage during the interview as 25,300 miles (40,715 kilometers). The vehicle's specified wheelbase was 280 cm (110.2 in).

The vehicle manufacturer's recommended tire size was P215/55R17. The vehicle was equipped with Kumho Solus TA31 tires of the recommended size. The vehicle manufacturer's recommended cold tire pressure for the front and rear tires was 235 kPa (34 psi). The tires were all in good condition at the time of the crash.

The front row was equipped with driver and passenger leather-covered bucket seats with adjustable head restraints. The second row was equipped with a leather-covered bench seat with folding backs, adjustable head restraints in the outboard seating positions, and an integral head restraint in the center seating position. The driver's seat track was adjusted between the forward-most and middle positions and the seat back was reclined 26 degrees aft of vertical. The top of the head restraint was located 21 cm (8.3 in) above the top of the seat back. The front passenger's seat track was adjusted between the middle and rear-most positions and the seat back was reclined 10 degrees aft of vertical. The top of the head restraint was located 23 cm (9.1 in) above the top of the seat back. The second-row seat was fixed.

Exterior Damage

Exterior Damage: The Hyundai sustained direct damage to the full width of the front plane during the impact with the Honda. The direct damage began at the left corner of the front bumper and extended 160 cm (63.0 in) across the front plane. The Field L was 86 cm (33.9 in). The crush measurements were taken on the bumper bar and the maximum residual crush was 68 cm (26.8 in) occurring 25 cm (9.8 in) left of the vehicle's centerline. The crush values were C_1 = 60 cm (23.6 in), C_2 = 62 cm (24.4 in), C_3=68 cm (26.8 in), C_4 = 66 cm (26.0 in), C_5= 60 cm (23.6 in), and C_6 = 55 cm (21.7 in).

Damage Classification: The Collision Deformation Classification (CDC) was 12FDEW3 (350 degrees).

Event Data Recorder

The Hyundai was equipped with an EDR that was not supported by the Bosch Crash Data Retrieval (CDR) software. The air bag control module (ACM), which contains the EDR, was removed[1] from the vehicle and sent to NHTSA for imaging with the Hyundai CDR tool. The EDR was capable of storing the data for two events and could record a deployment and/or non-deployment event. The data for an air bag deployment event would be locked and could not be overwritten. The data for a non-deployment event, which could include actuation of a seat belt pretensioner without an air bag deployment could be overwritten by a subsequent non-deployment or deployment event. The EDR recorded one deployment event in this crash and the recording was reported as complete. The ignition cycles at the time of the crash and when the data were imaged were 2,575 and 2,578, respectively. The EDR report is attached to the end of this report as **Appendix A**.

Deployment Event Data: The seat belt status for the driver and front row passenger was reported as "On." The air bag warning lamp was reported as "Off." The times from AE to deployment of stages one and two of the driver's frontal air bag were 6 and 11 msec, respectively. The times from AE to deployment of stages one, two, and three of the front passenger's frontal air bag were 6, 11, and 44 msec, respectively. The time from AE to deployment of the driver's seat-mounted side impact air bag and the left IC air bag was 11 msec. The time from AE to deployment of the driver's and front passenger's seat belt pretensioners was 6 msec. The maximum longitudinal and lateral velocity changes were reported as -78 km/h (48.5 mph) and 14 km/h (8.7 mph).

[1] The SCI investigator obtained permission from the insurance company to remove the ACM.

Interior Damage
The interior of the Hyundai sustained minor damage when the left and right toe pans intruded longitudinally 16 and 5 cm (6.3 and 2.0 in), respectively. Evidence of occupant contact consisted of a bent steering wheel rim that resulted from the driver's chest loading through the deployed frontal air bag and contacting the steering wheel. The lower left instrument panel was deformed by contact from the driver's left knee. The center instrument panel was scuffed, possibly from contact by the driver's right hand. The outer panel of the glove box door was scuffed and the inner panel was cracked from contact by the front passenger's right knee. The center instrument panel was scuffed, possibly from contact by the front passenger's left knee. The right instrument panel was scuffed and cracked probably as a result of the passenger's chest loading through the air bag and contacting the instrument panel. All the doors remained closed an operational.

Manual Restraint Systems
The front row was equipped with lap and shoulder seat belts that were equipped with retractor-mounted pretensioners, locking latch plates, and adjustable upper anchors. The driver's upper anchor was adjusted to the full-down position and the pretensioner actuated during the crash. The front passenger's upper anchor was adjusted to the full-up position and the pretensioner also actuated during the crash. The second row was equipped with lap and shoulder seat belts with locking latch plates, fixed upper anchors, and emergency/automatic locking retractors (ELR/ALR).

The driver was restrained by the lap and shoulder seat belt as evidenced by a load mark on the belt webbing from the latch plate locking bar that was located 77 cm (30.3 in) from floor anchor. There was also a 19 cm (7.5 in) long scuff mark on the belt webbing from the D-ring that was located 153 cm (60.2 in) from the floor anchor. The vehicle's EDR also reported the status of the driver's seat belt as "On."

The front passenger was also restrained by the lap and shoulder seat belt as evidence by a load mark on the belt webbing from the latch plate locking bar that was located 77 cm (30.3 in) from floor anchor. There also was a 64 cm (25.2 in) long load mark on the belt webbing from the D-ring that began 160 cm (63.0 in) from the floor anchor. The vehicle's EDR also reported the status of the front passenger's seat belt as "On."

The second-row center passenger was seated in a forward-facing position in a convertible CRS that was secured to the vehicle by the LATCH and upper tether. The CRS was also secured by the lap and shoulder seat belt as evidenced by a slightly bent belt webbing locking clip that was found attached to the belt webbing at the SCI vehicle inspection. The CRS LATCH straps had been cut and remained attached to the vehicle's LATCH anchors. The distance between the latch anchors was 43 cm (16.9 in).

Supplemental Restraint Systems
The Hyundai was equipped with multi-stage frontal air bags, driver's knee air bag, front seat-mounted side impact air bags, and rollover/side impact IC air bags. Both frontal, driver's knee, seat-mounted side impact, and left IC air bags deployed during the front-plane impact with the Honda.

The driver's frontal air bag was located in the steering wheel hub. The module cover was a 3-flap configuration constructed of pliable vinyl. The top flap was 14 cm (5.5 in) wide and 7 cm (2.8 in) high. Each bottom flap was 6 cm (2.4 in) wide and 7 cm (2.8 in) high. The cover flaps opened at the designated tear seams and were undamaged. The deflated air bag was 55 cm (21.7 in) in diameter. The driver's chest loaded through the deployed air bag during the crash contacting and bending the top of the steering wheel rim forward 2 cm (0.8 in). There was no damage to the air bag.

The driver's knee air bag was located under the instrument panel. The module cover was not visible. The deflated air bag was 50 cm (19.9 in) wide and 47 cm (18.5 in) high. There was no discernable evidence of occupant contact to the air bag and 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 64 cm (25.2 in) high and 33 cm (13.0 in) wide and had one vent port located on the side of the air bag. There was no discernable evidence of 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 deflated left IC was 178 cm (70.1 in) long and 47 cm (18.5 in) high and extended 20 cm (7.9 in) below the beltline. There was a triangular-shaped gap between the front of the IC and the A-pillar that was 17 cm (6.7 in) high and 10 cm (4.0 in) wide at the beltline. There was no discernable evidence of occupant contact to the IC and no damage.

Figure 6. The Dorel Alpha Omega Elite convertible CRS.

Figure 7. Arrows show the location of tears in plastic on each side of the CRS.

The passenger's frontal air bag was located in the top of the instrument panel and the module cover had a single flap that was 24 cm (9.4 in) wide and 12 cm (4.7 in) high. The cover flap opened at the designated tear seams and was undamaged. The deflated air bag was 40 cm (15.7 in) wide and 53 cm (20.7 in) high. There was what appeared to be a light scuff mark located approximately 12 cm (4.7 in) below the center of the air bag that was possibly the result of contact by the driver's chest. The instrument panel was

cracked in two places behind this area suggesting that the passenger's chest loaded through the air bag and contacted the instrument panel.

Child Restraint System

The Hyundai's second-row center seating position was occupied by a 4-year-old female in a Dorel Alpha Omega Elite convertible CRS (**Figure 6**). The CRS model number was CC098-BXX and the date of manufacture was February 14, 2013. The CRS was equipped with an internal 5-point harness, harness retainer clip, upper tether, and hardware for the LATCH system. The CRS was designed to be used in the rear-facing position by children under 1-year-old, or in the forward-facing position with the internal 5-point harness, or as a belt-positing booster seat. The child was seated in the forward-facing position and was secured in the CRS by the 5-point harness. The CRS was designed for children along the following parameters when used in this manner:

CRS Parameters:

Weight: Between 10 kg and 18 kg (22 – 40 lbs)
Height: Between 86 cm and 109 cm (34 – 43 in)
Age: Over one year to be used; forward-facing

The child who occupied the CRS met the requirements.

The CRS had been removed from the vehicle and was inspected at the driver's (the child's mother) home. The CRS was secured to the vehicle by the lower anchor straps (see further information on usage, below), tether, and the lap and shoulder seat belt based on the SCI vehicle inspection and interview with the driver. The seat belt was routed through the forward-facing belt path and a belt webbing locking clip was used to secure the belt webbing. The locking clip was found attached to the belt webbing and located 2.5 cm (1.0 in) above the latch plate at the SCI vehicle inspection. The locking clip was slightly bent from loading during the crash. The seat belt retractor was not switched to the ALR setting according to the driver. The child was secured in the CRS with the 5-point harness. The driver stated during the interview that the harness clip was positioned above the child's arm pit level. The harness straps were routed through the single set of slots on the back of the CRS. The harness could be adjusted by moving the back of the CRS up or down to one of five settings via a steel adjustment bar. The adjustment bar was located in the second position from the bottom. The crotch strap was located in the forward-most of three slots.

Figure 8. Tear on the left side of the CRS.

Inspection of the CRS revealed that the harness strap adjustment bar was bent from the child loading the harness straps. The top guide on the plastic harness retaining clip was fractured for each harness strap and the harness strap was out of each guide. The plastic was stressed and torn

on each side of the CRS where the side joined with the bottom (**Figure 7**). The length of the tears was 7 cm (2.8 in) on the left (**Figure 8**) and 8 cm (3.1) on the right (**Figure 9**). The cause of these tears is not known. Their location and appearance suggested the possibility that the vehicle's seat belt may have been improperly routed through the holes in the side of the CRS at this location. However, the driver stated during the interview that the vehicle's seat belt was routed through the forward-facing belt path and load abrasions in the plastic on the edges of the belt path observed during the SCI inspection indicated the seat belt was probably routed in this manner.

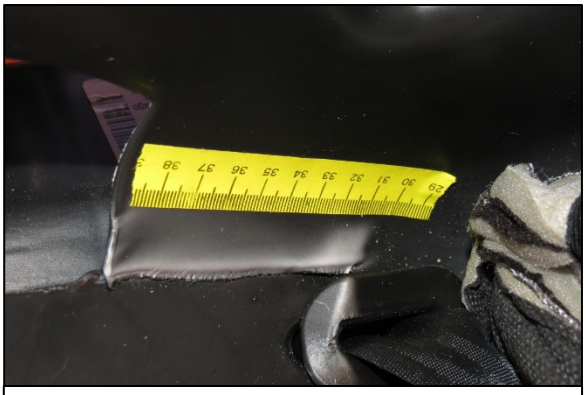


Figure 9. Tear in plastic on the right side of the CRS.

2015 HYUNDAI SONATA OCCUPANTS

Driver Demographics

Age/sex:	33 years/female
Height:	157 cm (62 in)
Weight:	64 kg (140 lb)
Eyewear:	Contact lenses
Seat type:	Bucket
Seat track position:	Between forward-most and middle
Manual restraint usage:	Lap and shoulder seat belt
Usage source:	Vehicle inspection, EDR
Air bags:	Frontal, knee, seat-mounted side impact, and left IC; deployed
Alcohol/drug data:	None
Egress from vehicle:	Exited through left front door without assistance
Transport from scene:	Ambulance
Medical treatment:	Hospitalized 10 days

Driver Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Sprain, left shoulder, not further specified	771010.1	Isolated Interior - Shoulder portion of belt restraint	Possible
2	Fractured right thumb, not further specified	752611.1	Isolated Front – Center instrument panel	Probable
3	Laceration (tear) tendon in left wrist, not further specified	740800.1	Isolated Front – Left instrument panel	Possible

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
4	Fracture, comminuted (shattered) right talus, not further specified	857200.2	Tandem IPC Initial: Floor – Foot controls including parking brake Secondary: Floor – Floor (including toe pan)	Certain Certain
5	Fracture, right big toe, not further specified	858211.1	Isolated Floor – Floor (including toe pan)	Certain
6	Abrasion, lower left lip with teeth marks present, not further specified	210202.1	Isolated Left Air Bag – Steering wheel hub	Certain
7	Contusion (bruise), 10.2 cm (4.0 in), over left upper chest, not further specified	410402.1	Isolated Interior - Shoulder portion of belt restraint	Certain
8	Abrasions, heavy, 10.2 cm (4.0 in) on right hip, not further specified	810202.1	Isolated Interior - Lap portion of belt restraint	Certain
9	Abrasions, heavy, 10.2 cm (4.0 in) on left hip, not further specified	810202.1	Isolated Interior - Lap portion of belt restraint	Certain
10	Contusion (bruising) from left knee to ankle, not further specified	810402.1	Isolated Left Air Bag – Left bottom instrument panel	Probable

Source: interviewee data–driver.

Driver Kinematics

The driver was restrained by the lap and shoulder seat belt and the seat track was adjusted between the forward-most and middle positions with the seat back reclined 26 degrees aft of vertical. The top of the head restraint was located 21 cm (8.3 in) above the top of the seat back. The frontal impact to the Hyundai resulted in actuation of the driver's seat belt pretensioner and deployment of both stages of the driver's frontal air bag. The driver's knee, seat-mounted side impact, and left IC air bags also deployed. The driver was displaced forward and loaded the seat belt resulting in a contusion to her upper left chest and an abrasion to each hip. Possible contact with the seat belt also resulted in a sprained left shoulder. Her face and chest loaded the frontal air bag, which caused an abrasion to her lower lip. The driver's chest loaded through the frontal air bag contacting and displacing the top of the steering wheel rim forward 2 cm (0.8 in); however, she reported no injury from this contact. The driver's left lower leg loaded the knee air bag resulting in a contusion that extended from the knee to the ankle. The driver's right hand probably contacted the center resulting in a fracture to her right thumb. Her left hand possibly contacted the left instrument panel causing a torn tendon in her left wrist. The driver's left foot contacted the intruded toe pan resulting in a fracture to her left great toe. Her right foot probably contacted the foot controls and intruded toe pan resulting in a comminuted fracture to her right talus. The driver then rebounded back into her seat. She stated during the interview that she exited the vehicle through the left front door unassisted, but immediately fell to the ground due to her injuries. The driver was transported by ambulance to a hospital where she was hospitalized for 10 days.

Front-Row Right Occupant Demographics

Age/sex:	33 years/male
Height:	180 cm (71 in)
Weight:	83 kg (183 lb)
Eyewear:	Glasses
Seat type:	Bucket
Seat track position:	Between middle and rear-most
Manual restraint usage:	Lap and shoulder
Usage source:	Vehicle inspection, EDR
Air bags:	Frontal: deployed; seat-mounted side impact, right IC: not deployed
Alcohol/drug data:	None
Egress from vehicle:	Removed by emergency responders
Transport from scene:	Ambulance
Medical treatment:	Hospitalized

Front-Row Right Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Injury, brain, not further specified	100099.9	Tandem IPC Initial: Right Air Bag – Right top instrument panel Secondary: Front - Right instrument panel	Possible Probable
2	Laceration (severed) artery in abdomen, not further specified	521408.4	Isolated Interior - Lap portion of belt restraint	Probable
3	Fractured right proximal femoral shaft, not further specified	853221.3	Isolated Front - Glove compartment door	Probable
4	Fracture 1st lumbar vertebrae, not further specified	650616.2	Critical IPC 2-point Critical #1: Interior – Lap portion of belt restraint Critical #2: Interior – This occupants seat cushion	Probable Possible
5	Fracture right wrist, not further specified	752400.2	Isolated Front - Right instrument panel	Probable
6	Fracture left forearm, not further specified	751900.2	Isolated Front - Center instrument panel	Probable
7	Fracture right knee (patella), not further specified	854500.2	Isolated Front - Glove compartment door	Probable
8	Fracture right talus, not further specified	857200.2	Isolated Floor – Floor (including toe pan)	Probable

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
9	Fracture right calcaneus (heel), not further specified	857300.2	Isolated Floor – Floor (including toe pan)	Probable
10	Abrasion right hip, not further specified	810202.1	Isolated Interior - Lap portion of belt restraint	Certain
11	Abrasion left hip, not further specified	810202.1	Isolated Interior - Lap portion of belt restraint	Certain

Source: interviewee data-driver.

Front-Row Right Occupant Kinematics

The front row right occupant was restrained by the lap and shoulder seat belt and the seat track was adjusted between the middle and rear-most positions with the seat back reclined 10 degrees aft of vertical. The top of the head restraint was located 23 cm (9.1in). The frontal impact resulted in actuation of the occupant's seat belt pretensioner and deployment of all three stages of the passenger's frontal air bag. The occupant was displaced forward and loaded the seat belt, which caused abrasions to both hips. He also sustained a severed artery in his abdomen, probably from loading the seat belt. He loaded through the frontal air bag and his head probably contacted the right instrument panel causing a concussion. Loading of the air bag possibly contributed to this injury. His right arm probably contacted the instrument panel resulting in a fractured wrist. The occupant's legs probably contacted the glove box door resulting in a fracture of the right knee and right femur. The occupant's feet probably contacted the intruded toe pan causing a fracture of the right calcaneus and talus. The occupant also sustained a fracture of L_1, probably from loading the seat belt with possible contribution from contact to the seat cushion during rebound. The occupant was transported by ambulance to a hospital where he was admitted for treatment of his injuries for 37 days. The occupant was subsequently readmitted due to complications from his injuries and was still hospitalized at the time of the SCI interview in April 2017.

Second-Row Center Occupant Demographics

Age/sex:	4 years/female
Height:	109 cm (43 in)
Weight:	15 kg (33 lb)
Eyewear:	None
Seat type:	Forward-facing CRS secured by LATCH and vehicle's lap and shoulder seat belt
Seat track position:	Fixed
Manual restraint usage:	CRS 5-point harness
Usage source:	CRS inspection, driver interview
Air bags:	None
Alcohol/drug data:	None
Egress from vehicle:	Removed by emergency responders

Transport from scene: Ambulance
Medical treatment: Pronounced deceased at hospital

Second-Row Center Occupant Injuries

Injury No.	Injury	Injury Severity AIS 2015	Involved Physical Components (IPC)	IPC Confidence Level
1	Dislocation atlanto-occipital joint, not further specified	650208.3	Isolated Interior - Child safety seat harness system, (i.e., straps, retainer clip, latchplate, buckle)	Probable
2	Abrasion, 1.9 x 1.3 cm (0.75 x 0.5 in) on left upper eyelid	210202.1	Isolated Interior - Other seating position seatback	Probable
3	Contusion 2.5 x 2.5 cm (1.0 x 1.0 in) on midline of forehead, not further specified	210402.1	Isolated Interior - Other seating position seatback	Probable
4	Contusion (hemorrhage in the right 4th intercostal space), right chest wall	410402.1	Isolated Interior - Child safety seat harness system, (i.e., straps, retainer clip, latchplate, buckle)	Certain
5	Abrasion, 3.8 x 1.9 cm (1.5 x 0.75 in), over right shoulder extending 4.4 cm (1.75 in) obliquely and medially	710202.1	Isolated Interior - Child safety seat harness system, (i.e., straps, retainer clip, latchplate, buckle)	Certain
6	Contusion 3.8 x 1.9 cm (1.5 x 0.75 in), over right shoulder, extending 4.4 cm (1.75 in) obliquely and medially	710402.1	Isolated Interior - Child safety seat harness system, (i.e., straps, retainer clip, latchplate, buckle)	Certain
7	Abrasion, 1.3 x 0.6 cm (0.5 x 0.25 in) on left medial thigh	810202.1	Isolated Interior - Child safety seat harness system, (i.e., straps, retainer clip, latchplate, buckle)	Certain

Sources: Autopsy records, coroner records, and interviewee data–driver. Injury Numbers 2 through 7 came only from autopsy records. Injury Number 1 came from a combination of interviewee data and autopsy records.

Second-Row Center Occupant Kinematics

The second-row center occupant was restrained by a 5-point harness in a forward-facing CRS. The frontal impact displaced the occupant forward and she loaded the 5-point harness resulting in a contusion to her chest and abrasion over her right shoulder and upper left thigh. Probable contact to the back of the right front occupant's seat caused a contusion to her left upper eyelid and forehead. The occupant then rebounded back into the CRS. The occupant also sustained an atlanto-occipital dislocation resulting from forward displacement of her head due to impact

forces. Emergency responders removed the occupant from the vehicle and transported her to a hospital where she was pronounced deceased 77 minutes following the crash. The coroner reported the cause of death as atlanto-occipital dislocation.

1997 HONDA ACCORD

Description

The Honda was a front-wheel-drive, 5-occupant, 4-door sedan with the VIN 1HGCD5656VAxxxxxx that was equipped with a 2.2-liter, I-4 engine, a 4-speed automatic transmission, and frontal air bags.

Exterior Damage

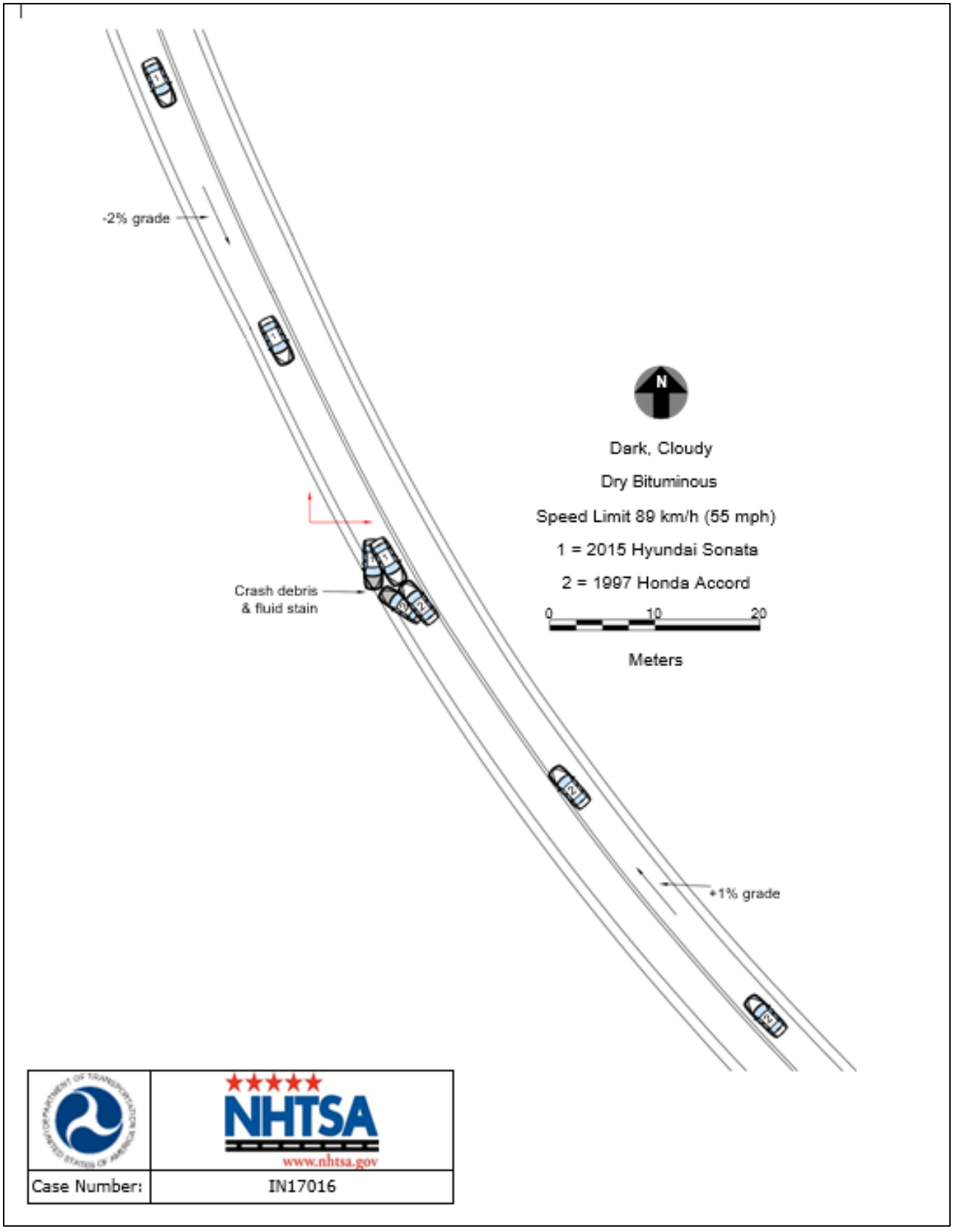
The Honda sustained direct damage to the entire front plane from the impact with the front plane of the Hyundai. The direct damage began at the right corner of the front bumper and extended 159 cm (62.6 in) across the front plane. The Field L was 127 cm (50.0 in). The crush measurements were taken on the upper radiator frame since the bumper was missing from the vehicle. The maximum residual crush was 96 cm (37.8 in) occurring 78 cm (30.7 in) right of the vehicle's centerline. The crush values were C_1 = 67 cm (26.4 in), C_2 = 77 cm (30 in), C_3 = 85 cm (33.5 in), C_4 = 93 cm (36.6) C_5 = 95 cm (37.4 in), and C_6 = 96 cm (37.8 in).

Damage Classification: The CDC was 12FDEW4 (0 degree).

Occupant Data

The 20-year-old male driver of the Honda was restrained by a lap and shoulder seat belt according to the police crash report. He sustained critical injuries and was transported by helicopter to a hospital where he died 13 days following the crash.

CRASH DIAGRAM



APPENDIX A: 2015 Hyundai Sonata Event Data Recorder (EDR) Report[2]

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

EDR

Vehicle Information

HYUNDAI I SONATA(LFA) I 2015 I AIRBAG SYSTEM	
VIN as Programmed into EMS	

Additional Information

User-entered VIN	5NPE34AF9FHXXXXXX
User Name	
Case Number	
Crash Date	IN17016_V1_ACM
Saved-on Date	2017-04-17 08:14
EDR Tool Version	E-N-H-01-00-0019
EDR Report Version	EDR001-R01
Tire Size(s)	
Memo	

Data Limitation

General Information:

Tools for downloading and interpreting the EDRs in Hyundai vehicles have been developed for vehicles produced after September 1, 2012. Currently, there is no tool for downloading and accurate interpreting data from the EDRs in Hyundai vehicles produced prior to this date.

The EDR Report requires Adobe Reader Version 9.00 or higher to open.

EDR(Event Data Recorder):

- The EDR function is part of the Airbag Control Unit(ACU).

- ACU can store up to two events.

- Event means a crash or other physical occurrence that causes the trigger threshold to be met or exceeded, or any non-reversible deployable restraint to be deployed, whichever occurs first:

    1. Deployment Event:
       1) the event which is recorded if an airbag is commanded to deploy.
       2) the event is locked and cannot be overwritten.

    2. Non-deployment Event:
       1) the event which is recorded, but in which an airbag is not commanded to deploy
       2) the event is not locked and can be overwritten by a subsequent event (Deployment or Non-deployment event), for example, Pretensioner(s) only deployment
       3) An example of a non-deployment event is a pretensioner-only deployment with no airbag deployments

- Ignition cycle count will increment by 1 in the following cases

    1. the power mode change from OFF/Accessary to IGN ON/RUN

    2. EDR data download by tools

- The ACU can record data for all or some of the following events. But, depending on the vehicle's configurations, data for side crash and/or rollover crash(event) may not be recorded.

- If power supply to the ACU is lost during an event, all or part of the data may not be recorded.

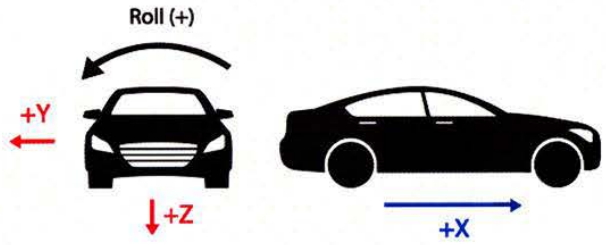
Data Limitation

Data Element Sign Convention:

The following table provides an explanation of the sign notation for data elements that may be included in the EDR report. Directional references to sign convention are from the point of view of the driver.

Data element name	Positive sign	Note
Longitudinal acceleration	Forward direction	+X at the figure 1
Delta V, longitudinal	Forward direction	+X at the figure 1
Lateral acceleration	Left to Right direction	+Y at the figure 1
Delta V, lateral	Left to Right direction	+Y at the figure 1
Normal(vertical) acceleration	Downward direction	+Z at the figure 1
Vehicle roll angle	Clockwise about the longitudinal axis	Roll(+) at the figure 1
Steering input	Counterclockwise rotation	-

Figure 1. Sign Conventions



Data Sources:

Many EDR data elements are sourced from other control modules in the vehicle.

1. Most of them can be measured and calculated by the ACU. For example, Delta-V and Rollover angle can be calculated from internal sensors in the ACU (if applicable).

2. The following pre-crash data can be transmitted to the ACU via the vehicle's communication network.
   - Vehicle Speed
   - Engine RPM
   - Engine Throttle
   - Acceleration Pedal
   - Service Brake
   - ABS Activity
   - Stability Control
   - Steering Input Angle

   *Note) Depending on the vehicle's configuration and the conditions described above, some items may not be recorded.

3. Pre-crash data is recorded in discrete intervals. Due to different refresh rates within the vehicle's electronics, the data recorded may be asynchronous to each other.

Data Limitation

Data Definitions:

- Data recorded by the ACU and imaged by the EDR tool is displayed relative to Time zero(T0). Time zero(T0) is not typically the time at which the vehicle made contact with another vehicle or object.
- Time zero (T0) means whichever of the following occurs first

  1. For systems with "wake-up" air bag control systems, the time at which the occupant restraint control algorithm is activated; or
  2. For continuously running algorithms,
     1) The first point in the interval where a longitudinal cumulative delta-V of over 0.8 km/h (0.5 mph) is reached within a 20msec time period; or
     2) For vehicles that record "delta-V, lateral," the first point in the interval where a lateral cumulative delta-V of over 0.8 km/h (0.5 mph) is reached within a 5msec time period; or
  3. Deployment of a non-reversible deployable restraint.

- Multi-event crash means the occurrence of 2 events, the first and last of which begin not more than 5 seconds apart. If an event is not part of a multi-event crash, the value of this data element will be "1".
- Service brake, on or off means the status of the device that is installed in or connected to the brake pedal system to detect whether the pedal was pressed. The device can include the brake pedal switch or other driver-operated service brake control,
- Engine RPM means

  1. For vehicles powered by internal combustion engines, the number of revolutions per minute of the main crankshaft of the vehicle's engine, and
  2. For vehicles not entirely powered by internal combustion engines, the number of revolutions per minute of the motor shaft at the point at which it enters the vehicle transmission gearbox.

- Engine Throttle is a measure of the throttle position.
- Accelerator Pedal is a measure of the accelerator pedal value.
- Seat belt status is determined by whether the buckle switch is open or closed.
- Delta-V means the cumulative change in velocity, and is calculated from internal sensors in the ACU

EDR Information

Part No. (EOL Code) as programmed into ACU	95910-C2000(C204)
ECU SW Version as programmed into ACU	LF144605
EDR Version as programmed into ACU	

< Event 1 >

Event Status at Event

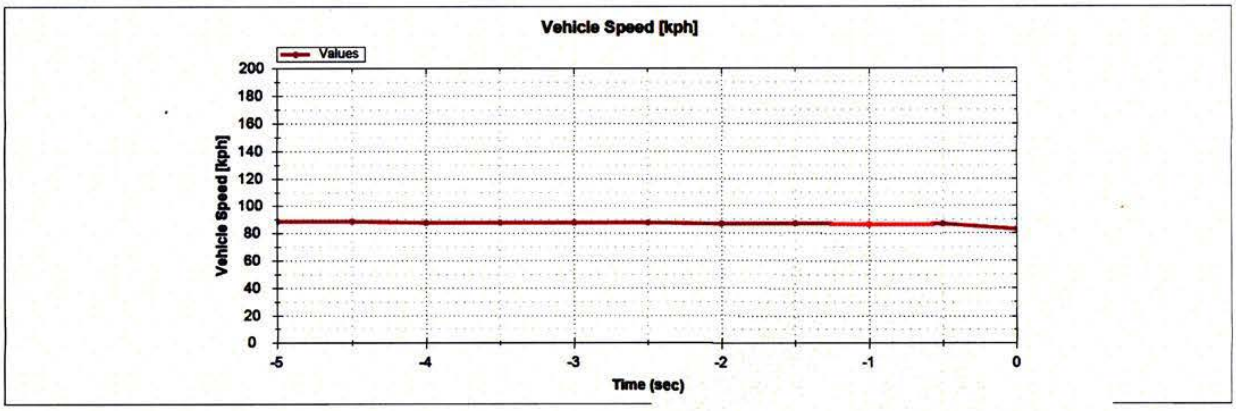
Multi-event, Number of Event (1 or 2)	1 event
Time from Event 1 to 2 [msec]	0
Completed File Recorded (Yes or No)	YES
Ignition cycle, crash [cycle]	2575
Ignition cycle, download [cycle]	2579

Pre-Crash Information (-5 ~ 0 sec)

Time (sec)	Vehicle Speed [kph]	Engine RPM [rpm]	Engine Throttle [%]	Acceleration Pedal [%]	Service Brake [on/off]	ABS Activity [on/off]	Stability Control [on/off/engaged]	Steering Input [degree]
-5.0	89	1600	0	0	OFF	OFF	on	5
-4.5	89	1600	0	0	OFF	OFF	on	10
-4.0	88	1600	0	3	OFF	OFF	on	15
-3.5	88	1600	2	4	OFF	OFF	on	15
-3.0	88	1600	1	1	OFF	OFF	on	15
-2.5	88	1600	1	3	OFF	OFF	on	15
-2.0	87	1600	3	6	OFF	OFF	on	15
-1.5	87	1600	4	7	OFF	OFF	on	10
-1.0	87	1600	0	0	OFF	OFF	on	10
-0.5	87	1600	0	0	OFF	OFF	on	5
0.0	83	1500	0	0	on	OFF	on	0

< Event 1 >

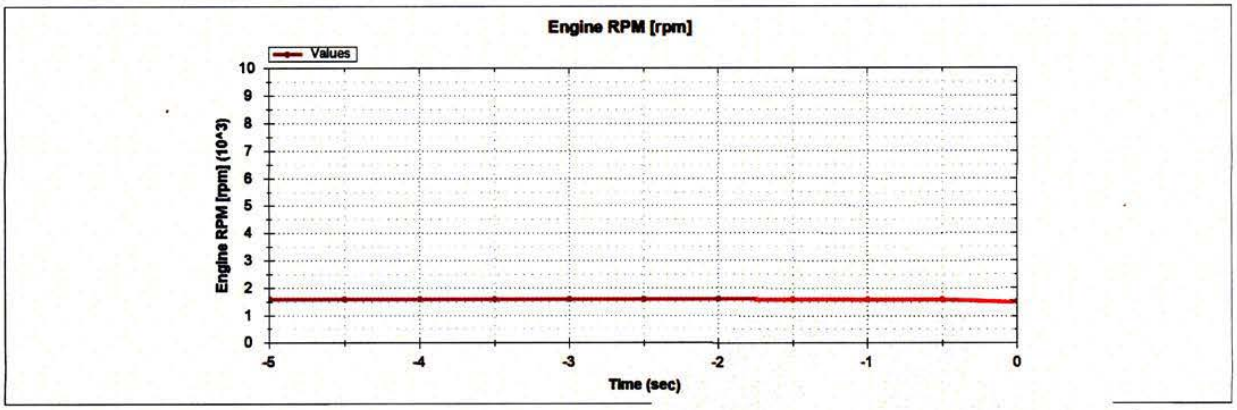
Vehicle Speed



Num	Time (sec)	Vehicle Speed [kph]
1	-5.0	89
2	-4.5	89
3	-4.0	88
4	-3.5	88
5	-3.0	88
6	-2.5	88
7	-2.0	87
8	-1.5	87
9	-1.0	87
10	-0.5	87
11	0.0	83

< Event 1 >

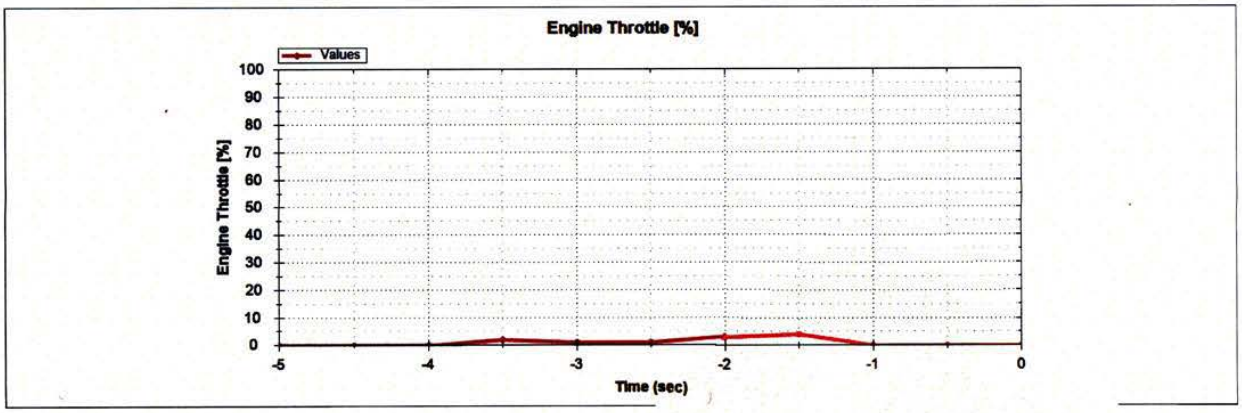
Engine RPM



Num	Time (sec)	Engine RPM [rpm]
1	-5.0	1600
2	-4.5	1600
3	-4.0	1600
4	-3.5	1600
5	-3.0	1600
6	-2.5	1600
7	-2.0	1600
8	-1.5	1600
9	-1.0	1600
10	-0.5	1600
11	0.0	1500

< Event 1 >

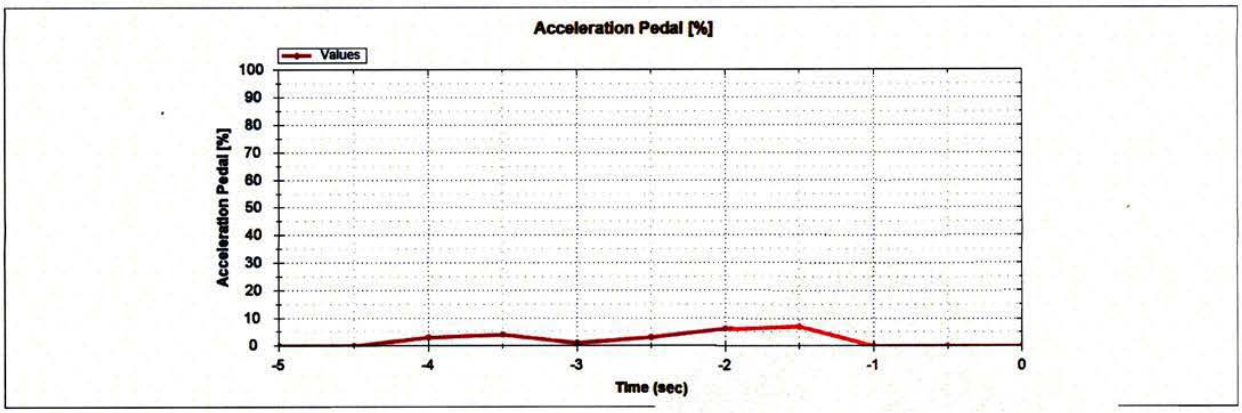
Engine Throttle



Num	Time (sec)	Engine Throttle [%]
1	-5.0	0
2	-4.5	0
3	-4.0	0
4	-3.5	2
5	-3.0	1
6	-2.5	1
7	-2.0	3
8	-1.5	4
9	-1.0	0
10	-0.5	0
11	0.0	0

< Event 1 >

Acceleration Pedal



Num	Time (sec)	Acceleration Pedal [%]
1	-5.0	0
2	-4.5	0
3	-4.0	3
4	-3.5	4
5	-3.0	1
6	-2.5	3
7	-2.0	6
8	-1.5	7
9	-1.0	0
10	-0.5	0
11	0.0	0

< Event 1 >

Service Brake

Num	Time (sec)	Service Brake [on/off]
1	-5.0	OFF
2	-4.5	OFF
3	-4.0	OFF
4	-3.5	OFF
5	-3.0	OFF
6	-2.5	OFF
7	-2.0	OFF
8	-1.5	OFF
9	-1.0	OFF
10	-0.5	OFF
11	0.0	ON

ABS Activity

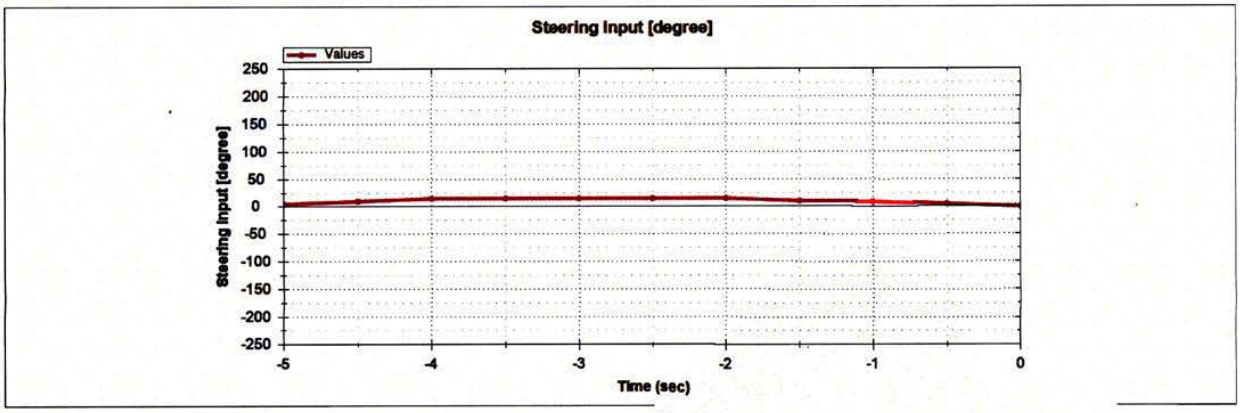
Num	Time (sec)	ABS Activity [on/off]
1	-5.0	OFF
2	-4.5	OFF
3	-4.0	OFF
4	-3.5	OFF
5	-3.0	OFF
6	-2.5	OFF
7	-2.0	OFF
8	-1.5	OFF
9	-1.0	OFF
10	-0.5	OFF
11	0.0	OFF

Stability Control

Num	Time (sec)	Stability Control [on/off/engaged]
1	-5.0	ON
2	-4.5	ON
3	-4.0	ON
4	-3.5	ON
5	-3.0	ON
6	-2.5	ON
7	-2.0	ON
8	-1.5	ON
9	-1.0	ON
10	-0.5	ON
11	0.0	ON

< Event 1 >

Steering Input



Num	Time (sec)	Steering Input [degree]
1	-5.0	5
2	-4.5	10
3	-4.0	15
4	-3.5	15
5	-3.0	15
6	-2.5	15
7	-2.0	15
8	-1.5	10
9	-1.0	10
10	-0.5	5
11	0.0	0

Note) Positive value(CCW), Negative value(CW)

< Event 1 >

System Status at Event

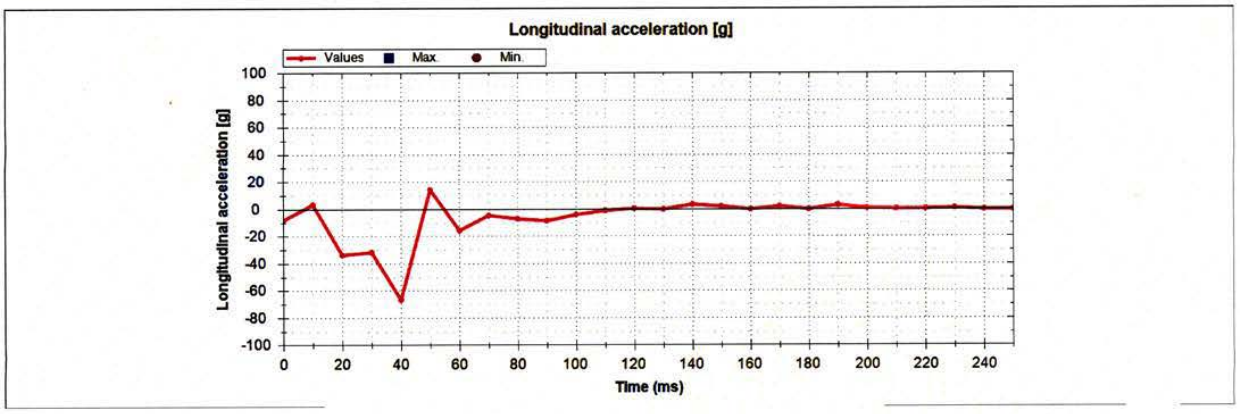
Airbag warning lamp on/off	OFF
Safety belt status, driver	ON
Safety seat belt, passenger	ON
Seat track position switch foremost status, driver	Not Supported
Seat track position switch foremost status, passenger	Not Supported
Occupant size classification, driver (5% female or larger)	Not Supported
Occupant size classification, passenger (child)	NO

Deployment Command Data at Event

Front airbag deployment time, driver (first stage) [msec]	6
Front airbag deployment time, passenger (first stage) [msec]	6
Front airbag deployment time, driver (second stage) [msec]	11
Front airbag deployment time, passenger (second stage) [msec]	11
Front airbag deployment time, driver (third stage) [msec]	Not supported
Front airbag deployment time, passenger (third stage) [msec]	44
Front airbag disposal deployment, driver (second stage) (Yes or No)	NO
Front airbag disposal deployment, passenger (second stage) (Yes or No)	NO
Front airbag disposal deployment, passenger (third stage) (Yes or No)	NO
Front side airbag deployment time, driver [msec]	11
Front side airbag deployment time, passenger [msec]	No deployment
Curtain airbag deployment time, driver [msec]	11
Curtain airbag deployment time, passenger [msec]	No deployment
Seat belt pretensioner deployment time, driver [msec]	6
Seat belt pretensioner deployment time, passengerr [msec]	6

< Event 1 >

Longitudinal crash pulse_acceleration (g, 0 ~ 250msec)

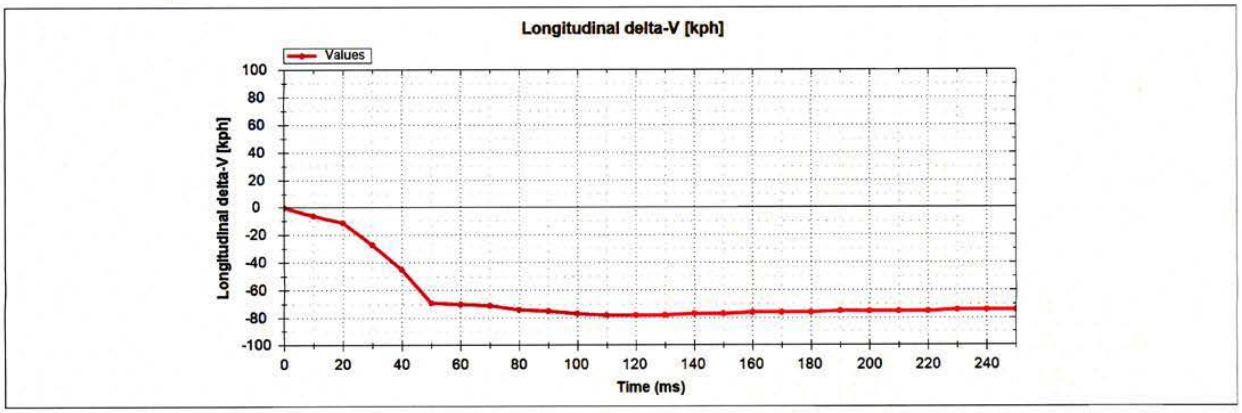


Num	Time (ms)	Longitudinal acceleration [g]
1	0.0	-8.0
2	10.0	3.5
3	20.0	-33.5
4	30.0	-31.5
5	40.0	-66.5
6	50.0	14.5
7	60.0	-15.5
8	70.0	-4.5
9	80.0	-7.0
10	90.0	-8.5
11	100.0	-4.0
12	110.0	-1.0
13	120.0	0.5
14	130.0	0.0
15	140.0	3.5
16	150.0	2.0
17	160.0	0.0
18	170.0	2.0
19	180.0	0.0
20	190.0	3.0
21	200.0	1.0
22	210.0	0.5
23	220.0	0.5
24	230.0	1.0
25	240.0	0.0
26	250.0	0.0

< Event 1 >

Longitudinal crash pulse_delta-v (kph, 0 ~ 250msec)

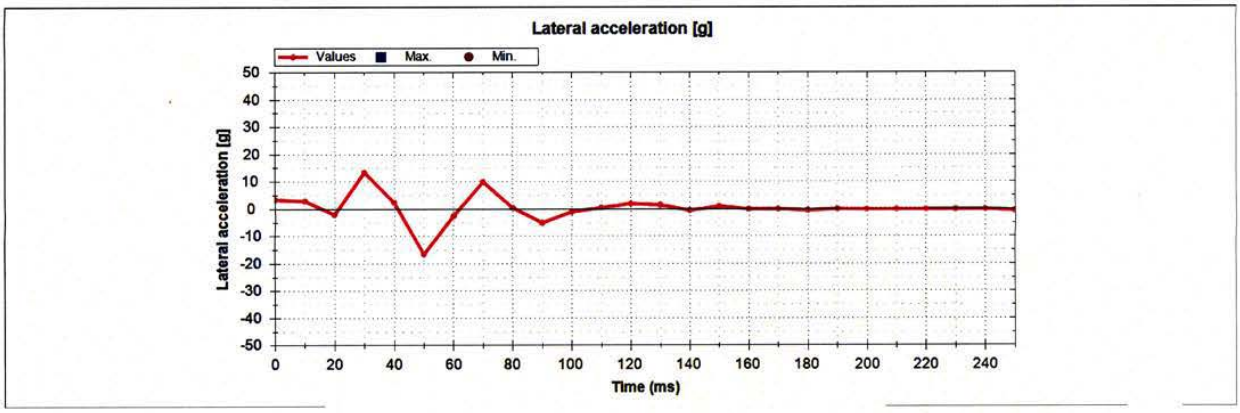
Max. delta-V [kph]	-78
Time, Max. delta-V [msec]	107.5



Num	Time (ms)	Longitudinal delta-V [kph]
1	0.0	0
2	10.0	-6
3	20.0	-11
4	30.0	-27
5	40.0	-45
6	50.0	-69
7	60.0	-70
8	70.0	-71
9	80.0	-74
10	90.0	-75
11	100.0	-77
12	110.0	-78
13	120.0	-78
14	130.0	-78
15	140.0	-77
16	150.0	-77
17	160.0	-76
18	170.0	-76
19	180.0	-76
20	190.0	-75
21	200.0	-75
22	210.0	-75
23	220.0	-75
24	230.0	-74
25	240.0	-74
26	250.0	-74

< Event 1 >

Lateral crash pulse_acceleration (g, 0 ~ 250msec)

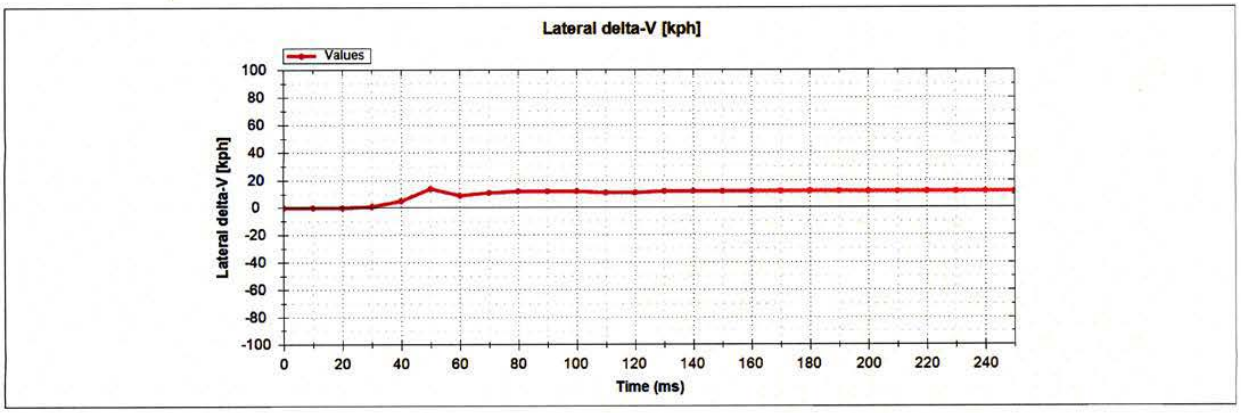


Num	Time (ms)	Lateral acceleration [g]
1	0.0	3.5
2	10.0	3.0
3	20.0	-2.0
4	30.0	13.5
5	40.0	2.5
6	50.0	-16.5
7	60.0	-2.5
8	70.0	10.0
9	80.0	0.5
10	90.0	-5.0
11	100.0	-1.0
12	110.0	0.5
13	120.0	2.0
14	130.0	1.5
15	140.0	-0.5
16	150.0	1.0
17	160.0	0.0
18	170.0	0.0
19	180.0	-0.5
20	190.0	0.0
21	200.0	0.0
22	210.0	0.0
23	220.0	0.0
24	230.0	0.0
25	240.0	0.0
26	250.0	-0.5

< Event 1 >

Lateral crash pulse_delta-v (kph, 0 ~ 250msec)

Max. delta-V [kph]	14
Time, Max. delta-V [msec]	47.5



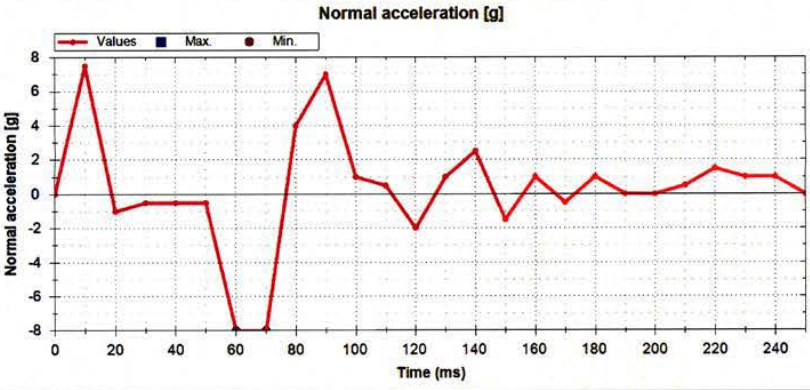
Num	Time (ms)	Lateral delta-V [kph]
1	0.0	0
2	10.0	0
3	20.0	0
4	30.0	1
5	40.0	5
6	50.0	14
7	60.0	9
8	70.0	11
9	80.0	12
10	90.0	12
11	100.0	12
12	110.0	11
13	120.0	11
14	130.0	12
15	140.0	12
16	150.0	12
17	160.0	12
18	170.0	12
19	180.0	12
20	190.0	12
21	200.0	12
22	210.0	12
23	220.0	12
24	230.0	12
25	240.0	12
26	250.0	12

< Event 1 >

Crash pulse Resultant, Time_Max. delta-V resultant (0 ~ 300 msec)

Time, Max. delta-V, resultant [msec]	120.0

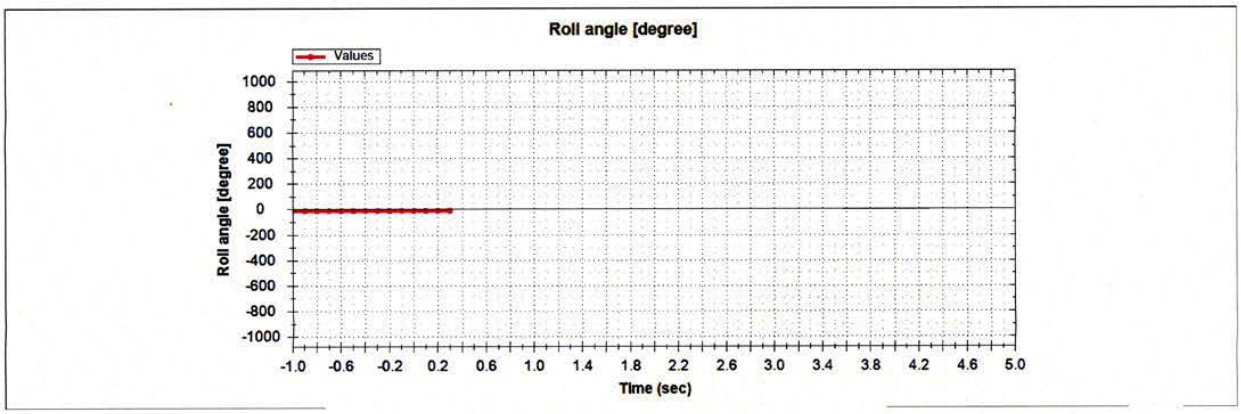
Normal acceleration (g, 0 ~ 250msec)



Num	Time (ms)	Normal acceleration [g]
1	0.0	0.0
2	10.0	7.5
3	20.0	-1.0
4	30.0	-0.5
5	40.0	-0.5
6	50.0	-0.5
7	60.0	Exceed the minimum sensor range
8	70.0	-8.0
9	80.0	4.0
10	90.0	7.0
11	100.0	1.0
12	110.0	0.5
13	120.0	-2.0
14	130.0	1.0
15	140.0	2.5
16	150.0	-1.5
17	160.0	1.0
18	170.0	-0.5
19	180.0	1.0
20	190.0	0.0
21	200.0	0.0
22	210.0	0.5
23	220.0	1.5
24	230.0	1.0
25	240.0	1.0
26	250.0	0.0

< Event 1 >

Roll angle (degree, -1 ~ 5sec)



Num	Time (sec)	Roll angle [degree]
1	-1.0	-10
2	-0.9	-10
3	-0.8	-10
4	-0.7	-10
5	-0.6	-10
6	-0.5	-10
7	-0.4	-10
8	-0.3	-10
9	-0.2	-10
10	-0.1	-10
11	0.0	-10
12	0.1	-10
13	0.2	-10
14	0.3	-10
15	0.4	Invalid data
16	0.5	Invalid data
17	0.6	Invalid data
18	0.7	Invalid data
19	0.8	Invalid data
20	0.9	Invalid data
21	1.0	Invalid data
22	1.1	Invalid data
23	1.2	Invalid data
24	1.3	Invalid data
25	1.4	Invalid data
26	1.5	Invalid data
27	1.6	Invalid data
28	1.7	Invalid data
29	1.8	Invalid data
30	1.9	Invalid data
31	2.0	Invalid data

32	2.1	Invalid data
33	2.2	Invalid data
34	2.3	Invalid data
35	2.4	Invalid data
36	2.5	Invalid data
37	2.6	Invalid data
38	2.7	Invalid data
39	2.8	Invalid data
40	2.9	Invalid data
41	3.0	Invalid data
42	3.1	Invalid data
43	3.2	Invalid data
44	3.3	Invalid data
45	3.4	Invalid data
46	3.5	Invalid data
47	3.6	Invalid data
48	3.7	Invalid data
49	3.8	Invalid data
50	3.9	Invalid data
51	4.0	Invalid data
52	4.1	Invalid data
53	4.2	Invalid data
54	4.3	Invalid data
55	4.4	Invalid data
56	4.5	Invalid data
57	4.6	Invalid data
58	4.7	Invalid data
59	4.8	Invalid data
60	4.9	Invalid data
61	5.0	Invalid data

< Event 1 >

Raw Data

FF C0 00 00 7F 79 74 64 52 3A 39 38 35 34 32 31 31 31 32 32 33 33 33 34 34 34 34 35 35 35
31 2B 7F 7F 7F 80 84 8D 88 8A 8B 8B 8B 8A 8A 8B 8B 8B 8B 8B 8B 8B 8B 8B 8B 8B 8B 8D 13
30 7E 7E 7E 7E 7E 7E 7E 7E 7E 7E 7E 7E 7E 7E FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF 00

FF FF FF FF 59 59 58 58 58 58 57 57 57 57 53 00 00 00 02 01 01 03 04 00 00 00 55 55 25 0A
0F 01 00 06 06 00 00 01 10 10 10 10 10 10 10 10 10 10 0F 00 00 00 55 55 15 80 81 82 82 82
82 82 81 81 80 7F 01 03 03 07 02 0B 0B 00 0B FF FE 00 0B FF FE 00 06 00 06 00 00 FF 2C

FC 00 00 00 7F EF 80 06 7F BC 7F C0 7F 7A 80 1C 7F E0 7F F6 7F F1 7F EE 7F F7 7F FD 80 00
7F FF 80 06 80 03 7F FF 80 03 7F FF 80 05 80 01 80 00 80 00 80 01 7F FF 7F FF 80 06 80 05
7F FB 80 1A 80 04 7F DE 7F FA 80 13 80 00 7F F5 7F FD 80 00 80 03 80 02 7F FE 80 01 7F FF
7F FF 7F FE 7F FF 7F FF 7F FF 7F FF 7F FF 7F FF 7F FF 7F FE 7F 8E 7D 7E 7E 7E 01 6F 87 8D 81 80
7B 81 84 7C 81 7E 81 7F 7F 80 82 81 81 7F 04 04 01

80 00 00 00 00 00 03 04 01 03 06 07 00 00 00

FF FF FF 00 7A 64 FA 6B 67 6C 69 6D 6D FE FE FF FF FE 6C 6C 6B 67 FF 0A 13 68 FF FF FF

< Event 2 >

There is no recorded event.

DOT HS 812 956
May 2020

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

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