On-Site Hybrid Vehicle Investigation
Dynamic Science, Inc. (DSI), Case Number DS08020
2005 Toyota Prius
Washington
June 2008

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

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16. Abstract

This on-site crash investigation focused on the dynamics of a 2005 Toyota Prius hybrid vehicle that was involved in a three-vehicle crash. This crash occurred within a 4-leg intersection in the state of Washington in May 2008. The Toyota was traveling westbound approaching the intersection. The driver had just purchased a beverage. He momentarily looked down at the beverage and when he returned his attention to the roadway he observed the traffic signal was in the red phase and he was entering the intersection. The first other vehicle, a 2007 Hyundai Accent, was traveling southbound and had entered the intersection with a green signal. The front end of the Toyota impacted the left side of the Hyundai. The impact displaced the Toyota to the left and the vehicle continued traveling in a southwest direction. The second other vehicle, a 2006 Ford E350 Super Duty van, was facing east and stopped in an eastbound lane at the intersection. The front end of the Toyota impacted the front end of the Ford. All three vehicles came to final rest near the southwest corner of the intersection.

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Dynamic Science, Inc.
Crash Investigation
Case Number: DS08020

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Background

This on-site crash investigation focused on a 2005 Toyota Prius hybrid vehicle that was involved in a three-vehicle crash (**Figure 1**). This crash occurred within a four-leg intersection in the state of Washington in May 2008.

Figure 1. Subject vehicle, 2005 Toyota Prius Hybrid

The Toyota was traveling westbound approaching the intersection. The driver had just purchased a beverage from a fast food restaurant. He momentarily looked down at the beverage and when his attention returned to the roadway he observed the traffic signal was in the red phase and he was entering the intersection. The first other vehicle, a 2007 Hyundai Accent, was traveling southbound and had entered the intersection with a green signal. The front end of the Toyota impacted the left side of the Hyundai (Event 1). The impact displaced the Toyota to the left and the vehicle continued traveling in a southwest direction. The second other vehicle, a 2006 Ford E350 Super Duty van, was facing east and stopped in an eastbound lane at the intersection. The front end of the Toyota impacted the front end of the Ford (Event 2). The Toyota and the Ford came to final rest near the southwest curb and the Hyundai came to final rest in the east leg of the intersection.

This hybrid vehicle investigation was initiated by the National Highway Traffic Safety Administration (NHTSA) during a review of General Estimates System (GES) police reports. The report indicated the Toyota was a hybrid vehicle and the Hyundai contained a deployed side air bag. DSI was sent the report on June 24, 2008 with instructions to locate the vehicles and obtain cooperation. The vehicles were located at an auto salvage facility and on July 7, 2008, DSI obtained permission to inspect the Toyota and the Hyundai. DSI was assigned the case on July 7, 2008, and the inspections were conducted on July 11, 2008. Neither inspected vehicles' Event Data Recorders (EDR) were supported by the Bosch Crash Data Retrieval (CDR) hardware and software, and permission to remove the Toyota's EDR was denied by the insurance company. The Ford van was not inspected.

Summary

Crash Site

The crash site was a four-leg intersection that comprised an east/west roadway and a north/south roadway. The east/west roadway was undivided and consisted of two lanes for each direction of travel (**Figure 2**). The roadway alignment was straight and the westbound profile maintained a positive 2.2 percent grade as it approached the intersection. The eastbound lanes approaching the intersection were level. The roadway composition was asphalt, and raised concrete curbs bordered the north and south edges. The posted speed limit was 48 km/h (30 mph), and parking was allowed along the south curb.

The north/south roadway was undivided and consisted of two lanes with one lane for each direction of travel. The roadway was straight and level, its composition was asphalt, and raised concrete curbs bordered the east and west edges. The posted speed limit was 40 kmph (25 mph), and parking was allowed along the east and west curbs. The weather was clear and the roadway was dry.

The intersection was controlled by three-phase traffic signals for all travel lanes. At the time of the crash the conditions were daylight, the roadway was dry and the weather was clear.

Figure 2. Subject vehicle's westbound approach to intersection

Pre-Crash

The Toyota was being driven by a 33-year-old male and was traveling westbound at an unknown speed. The driver had just purchased a beverage and he momentarily looked down at the beverage as he approached the intersection. When he returned his attention to the roadway the traffic signal was in the red phase and the Toyota was entering the intersection. The driver of the Toyota reportedly observed the red signal as he entered the intersection but did not have sufficient time to initiate any avoidance maneuvers.

The 2007 Hyundai Accent was being driven by a 31-year-old male and traveling southbound toward the intersection at an unknown speed. The Hyundai entered the intersection with a green signal and crossed the path of the Toyota.

The 2006 Ford E350 Super Duty van was facing east and was stopped at the intersection because the traffic signal was in the red phase for eastbound traffic.

Crash

The front end of the Toyota impacted the left side of the Hyundai (Event 1). The impact displaced the Toyota to the left, the vehicle traveled toward the southwest corner of the intersection for approximately 8 m (26 ft), and the front end of the Toyota impacted the front end of the Ford van (Event 2). The Toyota came to final rest facing southwest near the southwest curb. The impact with the Toyota displaced the Ford slightly to the right and the Ford's front left tire left a scrub mark on the pavement that measured 83 cm (33 in) in length. The Ford came to final rest facing east near the southwest curb.

Due to the overlapping damage sustained during the two impacts, a WinSMASH computation based on the Toyota's front end crush profile was not possible. For Event 1, the Missing Vehicle algorithm of WinSMASH based on the crush profile of the Hyundai computed a Total Delta-V of 7 km/h (4 mph) for the Toyota. The longitudinal and lateral components were -5 km/h (-3 mph) and -4 km/h (-2 mph), respectively. The results appear reasonable based on the damage.

After the initial impact, the Hyundai rotated clockwise approximately 50 degrees and initiated a yaw while the vehicle traveled southwest for approximately 13.5 m (44.3 ft). The vehicle's right side tires left marks on the pavement that measured 8.5 m (27.9 ft) and 4.7 m (15.4 ft), respectively. The Hyundai came to final rest facing west in the east leg of the intersection.

For the Hyundai, the algorithm computed a Total Delta-V of 9 km/h (6 mph). The longitudinal and lateral components were -6 km/h (-4 mph) and 7 km/h (4 mph), respectively. The results appear reasonable based on the vehicle's crush profile.

Post-Crash

The driver of the Toyota probably exited his vehicle without assistance through the first row left side door. He refused medical attention at the scene and reported no injuries. The Toyota was towed from the scene due to damage and was later declared a total loss by the insurance company.

After coming to final rest, the driver of the Hyundai moved the vehicle to the north curb and parked. He probably exited the vehicle without assistance through the front row left side door. He refused medical attention at the scene, reported no injuries, and then drove the vehicle to his home. The Hyundai was later declared a total loss by the insurance company.

The driver and front right passenger of the Ford reported no injuries and refused medical attention at the scene. The Ford E350 was towed due to radiator damage and the status of this vehicle was not known.

Vehicle Data - 2005 Toyota Prius

The Toyota was identified by the Vehicle Identification Number (VIN): JTDKB20U053xxxxxx. The date of manufacture was October 2005. The salvage facility reported the vehicle's milage to be 73,732 km (45,816 mi). The Toyota was a 5-door hatchback that was equipped with a 1.5-liter, 4-cylinder engine, electric motor, continuously variable transmission, sealed nickel-metal hydride traction battery, front wheel drive, and 4-wheel anti-lock braking system (ABS). The vehicle manufacturer's recommended tire size was P185/65R15 for the front and rear, and the recommended tire pressure was 241 kPa (35 psi) for the front and 228 kPa (33 psi) for the rear. The vehicle was equipped with Goodyear Integrity P185/65R15 tires. The tire manufacturer's recommended maximum tire pressure was 303 kPa (44 psi). The specific tire information was as follows:

Position	Measured Pressure	Measured Tread Depth	Restricted	Damage
LF	228 kPa (33 psi)	5 mm (6/32 in)	No	None
LR	228 kPa (33 psi)	5 mm (6/32 in)	No	None
RR	234 kPa (34 psi)	3 mm (4/32 in)	No	None
RF	241 kPa (35 psi)	4 mm (5/32 in)	No	None

The Toyota's front row seating was configured with fabric-covered bucket seats with folding backs and adjustable head restraints for the two outboard seating positions. The second row seating was configured with a fabric-covered bench seat with folding backs and adjustable head restraints for the three seating positions.

Vehicle Damage

Exterior Damage

The Toyota sustained minor front end and right side damage as a result of the frontal impacts with the Hyundai and Ford (**Figure 3**). Direct damage to the front bumper began at the front right bumper corner and extended 65 cm (25.6 in) to the left. The bumper fascia and foam backer were torn from the vehicle at the right end of the backing bar at 12 cm (4.7 in) to the left of the bumper corner. The Field L began at the front right bumper corner and extended 114 cm (44.8 in) to the left.

Figure 3. Subject vehicle showing front end crush measurement

Six crush measurements were taken at mid-bumper level as follows: C1 = 3 cm (1.2 in), C2 = 2 cm (0.8 in), C3 = 2 cm (0.8 in), C4 = 4 cm (1.6 in), C5 = 3 cm (1.2 in), C6 = 4 cm (1.6 in). Maximum crush was located at C5.

Direct damage resulted in crush to the vehicle's grille and hood. In accordance with National Automotive Sampling System (NASS) coding conventions for above-bumper crush, a second set of measurements was taken at the upper radiator support as follows: C1 = 2 cm (0.8 in), C2 = 1 cm (0.4 in), C3 = 1 cm (0.4 in), C4 = 5 cm (2.0 in), C5 = 20 cm (7.9 in), C6 = 42 cm (16.5 in). Maximum crush was located at C6. Based on the two sets crush measurements, the average crush measurements were as follows: C1 = 3 cm (1.2 in), C2 = 2 cm (0.8 in), C3 = 2 cm (0.8 in), C4 = 4 cm (1.6 in), C5 = 12 cm (4.7 in), C6 = 23 cm (9.1 in). Maximum crush was located at C6 and measured 42 cm (16.5 in) as it was not averaged. The frontal damage resulting from the two impacts could not be separated and a single Collision Deformation Classification (CDC) of 01FZEW3 was generated to describe the final appearance of the damage.

Interior Damage

The Toyota sustained no passenger compartment intrusions. The left instrument panel (IP) sustained a displaced ventilation cover that resulted from an undetermined source. A white transfer measuring 2 x 2 cm (0.8 x 0.8 in) was located on the lower left IP to the right of the steering column. This area was splattered with liquid and the transfer was determined to be a contact from the driver's beverage container.

Hybrid Electrical System

The Toyota was configured with a hybrid powertrain that consisted of a gasoline engine, generator, electric motor, and nickel metal hydride (NI-MH) propulsion battery. The gasoline engine is linked to the drive wheels and when it is running it drives the generator that keeps the traction battery charged. The generator supplies power to the electric motor and charges the battery as well.[1]

Figure 4. Battery module, located beneath second row seats

Federal Motor Vehicle Safety Standard (FMVSS) 305, Electric Powered Vehicles: Electrolyte Spillage And Electrical Shock Protection is the standard applied to vehicles that use more than 48 nominal volts of electricity as propulsion and whose speed on a level paved surface is more than 40 km/h (25 mph). FMVSS No. 305 specifies performance requirements of electrolyte spillage, retention of propulsion batteries, and electrical isolation of the chassis from the high-voltage system during a crash event.[2] The standard test requirements are summarized as follows:

Figure 5. Service plug remained in place

- Not more than 5.0 liters (1.3 gal) of electrolyte from propulsion batteries shall spill outside the passenger compartment, and none shall spill in the passenger compartment, within 30 minutes after a barrier impact test.
- No propulsion battery system component located inside the passenger compartment shall move from its installed location.
- No propulsion battery system component located outside the passenger compartment shall enter the passenger compartment.
- Electrical isolation shall exist between the propulsion battery system and the vehicle electricity-conducting structure.

The Toyota was not checked for compliance with FMVSS No. 305 but this was observed based on

[1] How Hybrid Vehicles Work, http://pressroom.toyota.com

[2] U.S. Dept. Of Transportation, 49 CFR 571.305

the following evidence:

1. There were no indications of electrolyte spillage from the propulsion battery either outside or inside the passenger compartment (**Figure 4**).

2. There was no movement of the propulsion battery or other system components including the service plug (**Figure 5**).

The electrical isolation test was not conducted. The insurance company required that there be no mechanical tear down or invasive inspection of the vehicle. There was still some degree of electrical power to the vehicle. When the doors were open or ajar, an indicator lamp was illuminated on the instrument panel. An attempt to start the vehicle was unsuccessful.

Manual Restraints

The Toyota was equipped with 3-point manual lap and shoulder belts for the five seating positions. The belts were configured with sliding latch plates that were scratched indicating historical usage. The driver's safety belt was equipped with an emergency locking retractor (ELR), and the remaining safety belts were equipped with switchable ELR/automatic locking retractors (ALR). The front row safety belts were equipped with retractor pretensioners that remained functional in ELR mode after the crash and were determined to not have actuated.

Figure 6. Driver's seat and safety belt restraint

The lap portion of the driver's safety belt webbing exhibited slight fraying along the upper edge where the belt was routed through the latch plate with the belt in the buckled position, indicating historical usage (**Figure 6**). The safety belt, latch plate and D-ring showed no evidence of occupant loading. It was determined the safety belt was used by the driver during the crash based on evidence of historical usage, the absence of occupant contacts relating to the frontal impacts, and the fact that the occupant sustained no injuries.

The Toyota was equipped with Lower Anchors and Tethers for Children Hardware (LATCH) used for securing child restraints. The second row outboard seats were equipped with lower anchors within the seat bight and all three seats were equipped with tether hardware on the seat backs.

Supplemental Restraint System

The Toyota's Supplemental Restraint System (SRS) included an air bag module, frontal air bags, side curtain air bags, seat-mounted side air bags, front and side impact sensors, and front row safety belt pretensioners.

The front row was configured with advanced dual-stage frontal air bags. The driver's frontal air bag

was housed in the steering wheel hub and the right passenger's frontal air bag was housed in the top IP. The front row was configured with seat-mounted side air bags that were housed in the outboard aspect of the seat backs. The vehicle was equipped with side curtain air bags that were designed to provide head impact protection for the front and second row outboard occupants. The seat-mounted side air bags and the side curtain air bags were controlled by side impact sensors and were designed to deploy during side impacts. The Toyota did not deploy any air bags during the crash.

Occupant Demographics - 2005 Toyota Prius

Driver

Age/Sex:	33/Male
Seated Position:	Front left
Height:	Unknown
Weight:	Unknown
Seat Type:	Bucket
Seat Track Position:	Rear-track
Manual Restraint Usage:	Lap and shoulder belt
Usage Source:	Vehicle inspection
Air bags:	Frontal air bag, seat-mounted side air bag, side curtain air bag; not deployed.
Alcohol/Drug Involvement:	None
Type of medical treatment:	None

Driver Kinematics

The 33-year-old male driver was seated in an unknown posture and was restrained by the 3-point manual lap and shoulder belt. The driver had just purchased a beverage. He momentarily looked down at the beverage and when he returned his attention to the roadway he observed the signal in the red phase, but did not have sufficient time to take avoidance actions. The scene inspection yielded no tire marks indicative of pre-crash braking and the Toyota's damage flow indicated the vehicle was tracking and traveling in a straight path.

The front end of the Toyota impacted the left side of the Hyundai. The impact forces were insufficient to command deployment of the vehicle's frontal air bags or actuate the safety belt pretensioners. At impact, the driver of the Toyota was displaced forward and right in response to the direction of force. He was held in place by the vehicle's safety belt and his beverage container struck the lower IP. The vehicle rotated counterclockwise approximately 45 degrees and was redirected to the southwest corner of the intersection. After traveling approximately 8 m (26 ft), the front end of the Toyota impacted the front end of the Ford E350 Super Duty van, which was stopped for a red signal at the intersection. The second impact displaced the Toyota driver forward again but

he remained secured in his seat by the safety belt during the crash sequence.

The Toyota came to final rest near the point of impact with the Ford. Before police arrived, the driver drove the vehicle to the north curb and parked it as a precautionary measure. It is presumed the driver exited the vehicle unassisted, as he reported no injuries and the vehicle's doors were operable. The driver refused medical attention at the scene and was not transported. Efforts to obtain additional information were unsuccessful.

Driver Injuries

The driver of the Toyota reported no injuries.

Vehicle Data - 2007 Hyundai Accent GS

The Hyundai was identified by the Vehicle Identification Number (VIN): KMHCM36C57Uxxxxxx. The milage as reported by the auto salvage facility was 29,051 km (18,052 mi). The vehicle was a 2-door hatchback that was equipped with a 1.6-liter, 4-cylinder gasoline engine, front wheel drive and power steering. The vehicle manufacturer's recommended tire size was P175/70R14 for both front and rear, and the recommended cold tire pressure was 207 kPa (30 psi) for both front and rear. The vehicle was equipped with Kumho Solus HP4 Plus P175/70R14 tires. The tire manufacturer's recommended maximum tire pressure was 303 kPa (44 psi). The specific tire information was as follows:

Position	Measured Pressure	Measured Tread Depth	Restricted	Damage
LF	179 kPa (26 psi)	6 mm (7/32 in)	No	None
LR	186 kPa (27 psi)	6 mm (8/32 in)	No	None
RR	186 kPa (27 psi)	6 mm (8/32 in)	No	None
RF	179 kPa (26 psi)	6 mm (7/32 in)	No	Sidewall abraded

The Hyundai's front row seating was configured with fabric-covered bucket seats with folding backs and adjustable head restraints for the two outboard seating positions. The second row seating was configured with a fabric-covered bench seat with adjustable head restraints for the three seating positions.

Vehicle Damage - 2007 Hyundai Accent GS

Exterior Damage

The Hyundai sustained moderate left side and front end damage as a result of the side impact with the Toyota. The direct damage to the left side began at the front left bumper corner, extended rearward 63 cm (24.8 in), and ended at the front axle. The direct damage measurement included damage to the left front rim.

The Field L began at the front left bumper corner, extended rearward 110 cm (43.3 in), and ended 47 cm rearward of the front axle at the A-pillar (**Figure 7**). The front bumper fascia was fractured and displaced from the vehicle and the front left headlamp was fractured.

Six crush measurements were taken at the mid-door level on the left side as follows: C1 = 0 cm, C2 = 0 cm, C3 = 2 cm (0.8 in), C4 = 8 cm (3.2 in), C5 = 7 cm (2.8 in), C6 = 10 cm (3.9 in). Maximum crush was located at C6 and measured 10 cm (3.9 in). The CDC for the left side impact was 10LFEW1.

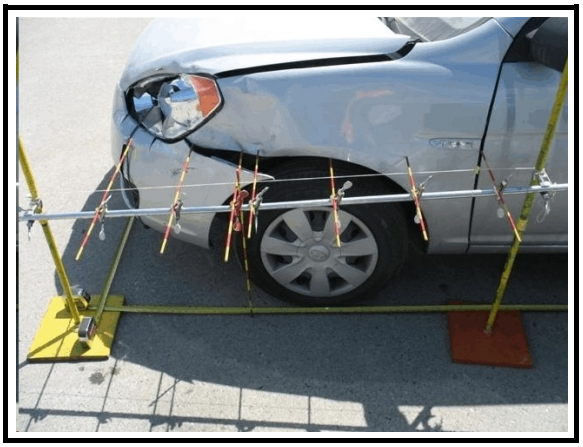

Figure 7. 2007 Hyundai Accent, showing left side crush measurement

The right front tire was abraded on the sidewall and the rim was bent and scuffed. Based on the vehicle and scene inspections, and the vehicle-to-vehicle dynamics, this damage was determined to be unrelated to the crash.

Interior Damage

The Hyundai sustained no interior damage as a result of passenger compartment intrusion during the crash. There were occupant contacts to the left seat-mounted side air bag, left door panel, and lower left instrument panel.

Manual Restraint Systems

The Hyundai was equipped with 3-point manual lap and shoulder belts for the five seating positions. The belts were configured with sliding latch plates, all of which were scratched and showed evidence of historical usage. The driver's safety belt was equipped with an ELR, and the remaining safety belts were equipped with switchable ELR/ALR. The front row safety belts were equipped with buckle pretensioners and neither actuated during the crash.

The driver's adjustable D-ring anchorage was set in the mid- to full-up position. The safety belt webbing, latch plate and D-ring showed no evidence of occupant loading. Based on evidence of historical usage, the driver's kinematics, and the limited occupant contacts it was determined this safety belt was used to restrain the driver during the crash.

The Hyundai was equipped with Lower Anchors and Tethers for Children Hardware (LATCH) used for securing child restraints. The second row outboard seats were equipped with lower anchors within the seat bight and all three seats were equipped with tether hardware on the seat backs.

Supplemental Restraint Systems

The Hyundai's Supplemental Restraint System (SRS) included an air bag control module, driver and passenger frontal air bags, seat-mounted side air bags, side curtain air bags, front and side impact sensors, and safety belt pretensioners for the front row seats.

The Hyundai was a Certified Advanced 208-Compliant (CAC) vehicle. A CAC vehicle is certified by the manufacturer to be compliant with the Advanced Air Bag portion of Federal Motor Vehicle Safety Standard (FMVSS) No. 208.

The Hyundai was equipped with advanced dual-stage frontal air bags and seat-mounted side air bags for the front row occupants. The driver's frontal air bag was housed in the steering wheel hub and the right passenger's frontal air bag was housed in the top instrument panel. The seat-mounted side air bags were housed in the outboard aspect of the seat backs. The frontal air bags did not deploy.

Figure 8. Driver's seat-mounted side air bag

During the crash the Hyundai deployed the driver's seat-mounted side air bag (**Figure 8**). The air bag was rectangular in shape, measured 45 cm (17.7 in) in height, 25 cm (9.8 in) in width. It displayed evidence of contacts on both the inboard and outboard aspects. A dark-colored L-shaped transfer was present on the bottom edge of the inboard panel measured 5 x 9 cm (2.0 x 3.5 in) and was determined to be an occupant contact. The contact was a fabric transfer and was probably deposited at impact when the driver's left hip contacted the air bag in response to the 10 o'clock direction of force.

Figure 9. Driver's side curtain air bag

The outboard panel had several patches of dark-colored transfers which were deposited during deployment when the air bag contacted the left door panel. Correlating evidence of these transfers was present on the interior door panel in the form of white residue and light abrasions.

The Hyundai was equipped with side curtain air bags which are designed to provide head protection in side impacts to the first and second row outboard occupants. The left side curtain air bag deployed during the impact with the Toyota.

The left side curtain air bag deployed from a module located in the roof side rail (**Figure 9**). The air bag measured 134 cm (52.8 in) in length, and 47 cm (18.5 in) at its forward aspect. The middle and rear aspects measured 28 cm (11.0 in) and 27 cm (10.6 in), respectively. The air bag was configured with a single tether at the forward aspect which measured 40 cm (15.8 in). The side curtain air bag was undamaged and was otherwise unremarkable.

Occupant Demographics - 2007 Hyundai Accent GS

Driver

Age/Sex:	31/Male
Seated Position:	Front left
Height:	Unknown
Weight:	Unknown
Seat Type:	Bucket with folding back
Seat Track Position:	Rear-track
Manual Restraint Usage:	Lap and shoulder belt used
Usage Source:	Vehicle inspection
Air bags:	Frontal air bag, not deployed; seat-mounted side air bag, left side curtain air bag, deployed.
Alcohol/Drug Involvement:	None
Type of medical treatment:	None

Occupant Kinematics

Driver Kinematics

The 31-year-old male driver of the Hyundai was seated in an unknown posture and restrained by the 3-point manual lap and shoulder belt. As the Hyundai passed through the intersection it was impacted on the left front by the Toyota Prius. The left seat-mounted side air bag and left side curtain air bag deployed at impact.

The driver was displaced forward and left in response to the direction of force. The driver's right knee probably contacted the lower left IP below the steering column, as a group of scuff marks were located in that area. The scuff marks were within a 10 x 10 cm (4.0 x 4.0 in) area. His left hip contacted the seat-mounted side air bags and deposited a cloth transfer to the lower inboard panel. A scuff measuring 1 cm (0.4.in) was deposited on the left arm rest, probably when the driver's left knee contacted the component. The scuff was located forward of the seat-mounted side air bag and below the side curtain air bag.

The impact displaced the Hyundai to the right and the vehicle rotated clockwise. As the vehicle rotated, the driver was displaced to the left but was held in place in his seat by the safety belt. The vehicle came to rest in the eastbound travel lanes, and then was driven to the westbound curb and parked by the driver as a safety precaution.

Occupant Injuries

The driver of the Hyundai reported no injuries on-scene and was not treated or transported. Efforts to obtain additional information were unsuccessful.

Vehicle Data - 2006 Ford E350 Super Duty

The Ford was identified by the Vehicle Identification Number (VIN): 1FBSS31L76Dxxxxxx. The vehicle's date of manufacture was not known. The vehicle was a van on a bus chassis that was equipped with a 5.4-liter, 8-cylinder gasoline engine, rear wheel drive, 4-wheel anti-lock brakes, and power steering. It was being used a commercial passenger shuttle. The vehicle was stationary at the time of the impact with the Toyota and it deployed no air bags. It was reported by police to have sustained front end damage including radiator damage and was towed from the scene.

The Ford was being driven by a 59-year-old male and the second row center seat was occupied by a 49-year-old female. Both occupants were reported by police to have used belt restraints. The occupants did not report any injuries and they did not request medical attention on-scene.

Attachment 1. Scene Diagram