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REMOTE AIR BAG DEPLOYMENT REPORT

CASE NUMBER - IN99-049

LOCATION - GEORGIA

VEHICLE - 1998 HONDA CIVIC LX

CRASH DATE - January 1998

Submitted:

August 31, 2000

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

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

Technical Report Documentation Page

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15. <i>Supplementary Notes</i> Remote redesigned air bag report involving a 1998 Honda Civic LX, equipped with manual safety belts and dual redesigned front air bags, and three fixed objects (a guardrail and two trees)					
16. <i>Abstract</i> This report covers a remote investigation of an air bag deployment crash that involved a 1998 Honda Civic LX (case vehicle) and three fixed objects (a guardrail and two trees). This crash is of special interest because the case vehicle was equipped with redesigned air bags that deployed as a result of collision events, and the restrained driver (28-year-old female) sustained fatal head injuries. The case vehicle was traveling north in the outside northbound lane of a two-lane roadway that was part of a four-lane, divided, rural interstate trafficway. It is presumed that the driver of the case vehicle intended to continue her northerly travel path. The case vehicle drifted right off the east pavement edge, partially across the improved shoulder, and impacted a guardrail end, causing the case vehicle's driver and front right passenger air bags to deploy. There were no pre-impact skidmarks or steering evidence noted and the investigating officer concluded that the driver had fallen asleep. Approximately 3.0 to 4.6 meters [10 to 15 feet] of guardrail were damaged through contact by the case vehicle. The case vehicle then descended an embankment in a clockwise yaw that reached full broadside. The case vehicle came to rest with its left side against two trees, heading east-southeast. The case vehicle driver's seat adjustments, steering wheel position, and posture are not known. She was restrained by her available, active, three-point, lap and shoulder belt and sustained, according to her certificate of death, massive head injuries. She was transported from the crash scene by ambulance to a medical facility. She was pronounced "dead on arrival" 104 minutes post-crash. The case vehicle was towed away from the scene due to disabling damage.					
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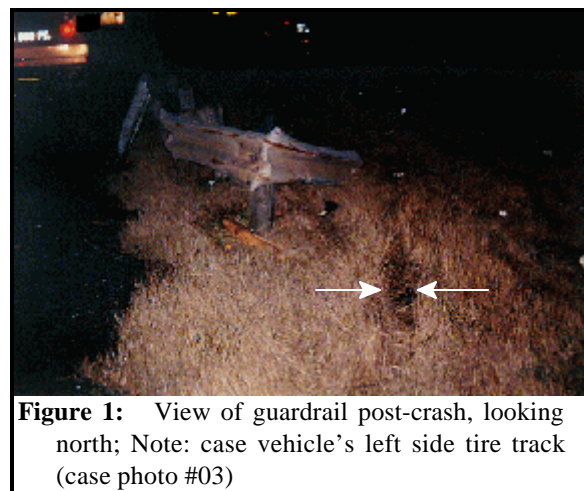
Additional photographs are available in SCI EDCS case IN99-049

This case was brought to the NHTSA's attention by a review of the 1998 Fatality Analysis Reporting System (FARS) in February 1999. The crash involved a 1998 Honda Civic LX (case vehicle) and three fixed objects (a guardrail and two trees). The crash occurred in January 1998, at 4:00 a.m., in Georgia, and was investigated by the applicable state police agency. This case is of special interest because the case vehicle was equipped with redesigned air bags that deployed as a result of collision events, and the restrained driver (28-year-old female) sustained fatal head injuries. The Police Crash Report was received in April 1999, while the police photographs and the certificate of death were received in February 2000. This report is based on the Police Crash Report, police on-scene photographs, the certificate of death, occupant kinematic principles, and this contractor's evaluation of the evidence.

CRASH CIRCUMSTANCES

The case vehicle was traveling north in the outside northbound lane of a two-lane roadway that was part of a four-lane, divided, rural interstate highway. It is presumed that the driver of the case vehicle intended to continue her northerly travel path. It was dark, not lighted, and the weather was cloudy. The roadway was bituminous, dry, straight, level, and no roadway defects were noted. The only pavement marking visible in any photograph was a single solid white edge line delineating the east pavement edge. The posted speed limit was 113 km.p.h. [70 m.p.h.]. Traffic density is not known, but was likely light given the time of day and the lack of witnesses to the crash. The crash occurred on the east shoulder of the northbound roadway.

According to the Police Crash Report, the case vehicle drifted right (northeast) off the east pavement edge, crossed the east improved shoulder, and impacted the end treatment of a W-beam steel guardrail (**Figure 1**). There were no pre-impact skidmarks or steering maneuvers noted by the investigating officer. Approximately 3.0 to 4.6 meters [10 to 15 feet] of guardrail were damaged through contact by the case vehicle. The case vehicle then descended an embankment in a clockwise yaw that reached full broadside, traveling almost 49 meters [160 feet] from the guardrail to two trees. The two trees were impacted (unknown sequence) by the left side of the case vehicle, where it came to rest facing east-southeast (approximately perpendicular to the roadway). The crash severity for the case vehicle's guardrail impact was estimated as moderate (24-40 km.p.h. [15 to 25 m.p.h.]). Because of photographic perspectives, the crash severity for the two tree impacts cannot be estimated.



The case vehicle was a front wheel drive, 1998 Honda Civic LX, five-passenger, four-door sedan (VIN: 1HGEG667XWL-----) equipped with a 1.6 liter, I-4 gasoline engine and a four-speed automatic transmission. The location of the selector lever is unknown. Four-wheel anti-lock brakes were an option for this vehicle, but it is not known if the case vehicle was so equipped. The case vehicle's wheelbase was 262 centimeters [103.2 inches]. No odometer reading was reported. The case vehicle was towed from the crash scene due to disabling damage.

The case vehicle sustained direct damage across its entire front plane from contact with the guardrail. The front bumper fascia, front bumper reinforcement bar, front grille, left and right headlamp assemblies, front sheet metal brackets, and radiator were separated from the case vehicle (**Figure 2**). The left half of the hood was displaced rearward and to the right. The left front fender was scraped rearward and to the left, exposing the left front wheel and tire (**Figure 3**). Top engine components were damaged by the bottom of the guardrail. The guardrail contacted the windshield and left upper A-pillar. The front left corner of the roof was pulled downward.

Photographic coverage of the case vehicle was not sufficient to identify or describe any possible induced damage by the guardrail. Further, the photographs do not allow descriptions of direct or induced damage to the case vehicle from contact with the two trees. Photographs of the case vehicle's interior, however, show intrusion by the left front corner of the roof, the left upper A-pillar, the steering column and the left half of the instrument panel. As well, there are indications that the left lower A-pillar and the toe pan may have intruded into the driver's seat position. It is also possible that one of the tree impacts caused the lower left B-pillar and forward part of the left rear door to intrude into the back seat.

A CDC for the case vehicle from contact with the guardrail was estimated from police photographs as: **11-FDAW-6 (320)**. The guardrail impact was outside the scope of WinSMASH (yielding object). The available photographs did not include any views of the left side of the case vehicle, such that CDCs for the tree impacts could not be estimated.



Figure 2: Case vehicle's front damage; Note: missing bumper fascia and left front fender displaced to the left (case photo #07)



Figure 3: Oblique view of case vehicle's front left damage; Note: exposed left front tire and wheel and position of left front fender (case photo #08)

Police photographs show the case vehicle driver's air bag was located in the steering wheel hub and the front right passenger's air bag module was located in the top of the instrument panel on the right. Photographs verify that both air bags deployed (**Figure 4**). Photographs also seem to indicate that the driver's module cover flaps were in the H-configuration with unknown symmetry. No clear photograph of the passenger module's cover flap is available. There are three visible blood stains on the driver's air bag fabric (**Figure 4**) but, because of the fabric's post-crash disarray, their exact location on a fully-inflated bag is unknown.

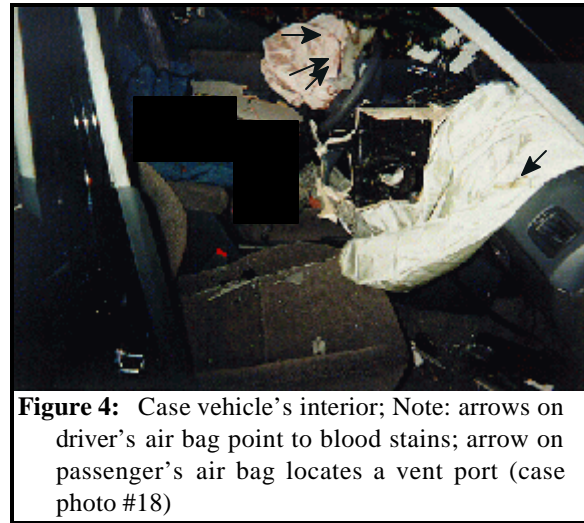


Figure 4: Case vehicle's interior; Note: arrows on driver's air bag point to blood stains; arrow on passenger's air bag locates a vent port (case photo #18)

The case vehicle's driver air bag shape is not known. No view of the driver's air bag was sufficient to estimate if it was equipped with tethers or vent ports. As with the driver's air bag, the front right passenger's air bag shape, owing to its fabric's post-crash disarray, is also unknown. No view of the passenger's air bag is sufficient to determine if it was equipped with tethers, but one vent port was visible.

CASE VEHICLE DRIVER

The case vehicle's driver (28-year-old female, White, unknown if Hispanic, height and weight unknown) was wearing her available, manual, three-point, lap-and-shoulder safety belt system. Her pre-crash seat adjustments, steering wheel position, and posture are not known. She was transported from the crash scene by ambulance to a medical facility. She was pronounced "dead on arrival," 104 minutes post-crash. No autopsy was performed. There was no other occupant in the case vehicle. The following discussion of the case vehicle's driver is based on the death certificate, on-scene photographs, and the principles of occupant kinematics.

She was probably seated in a normal driver's posture with her back against the seat back, her left foot likely on the floorboard, her right foot likely on the accelerator pedal, and at least one of her hands on the steering wheel. The investigating officer found no pre-impact evidence that the driver attempted any avoidance maneuvers prior to contacting the guardrail. That guardrail impact caused the case vehicle's driver and front right passenger air bags to deploy. At-impact, the driver moved forward and slightly to the left, toward the 11 o'clock direction of principal force. She loaded her safety belt and contacted the deploying air bag. The case vehicle slid down the embankment in a clockwise yaw and the left side

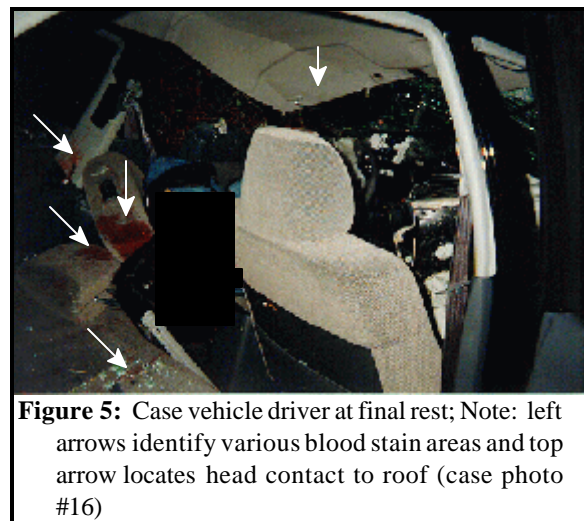


Figure 5: Case vehicle driver at final rest; Note: left arrows identify various blood stain areas and top arrow locates head contact to roof (case photo #16)

impacted the two trees. The air bag deflated and the windshield, left upper A-pillar, the front left corner of the roof, the left half of the instrument panel, and the steering wheel intruded into the driver’s seat area. Three blood stains were noted on the driver’s air bag fabric. As well, skin transfers to the right portion of the steering wheel rim were detected. Her head contacted the left sunvisor with sufficient force to dislodge it from its anchor. There were body oil transfers immediately to the right of the left sunvisor anchor on the roof. She sustained a vertical laceration to her forehead, above her left eye. As the case vehicle separated from the guardrail, began to descend down the embankment and initiated its clockwise rotation, she moved further to her left. When the case vehicle struck the two trees, she probably contacted the left side interior surface. She rebounded back into the right half of her bucket seat. The seat back was twisted to the right and rearward, and the adjustable head restraint was dislodge from its mounting, probably a result of left side intrusion and the force of her rebound. At final rest, she was slumped to her right, with her head between the two bucket seats (**Figure 5**). Blood stains can be seen on the upper B-pillar vinyl cover, the top right of the driver’s seat back, the separated driver’s head rest, and the center front portion of the rear bench seat.

CASE VEHICLE DRIVER INJURIES

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
1.	Closed head injuries, NFS	115999.7 unknown	Combination, left A-pillar and windshield header	Probable	Lay Coroner
2.	Laceration, left forehead	290600.1 minor	Combination, left A-pillar and windshield header	Probable	Police photos

OBJECTS CONTACTED

The case vehicle first impacted the end treatment of a steel W-beam guardrail supported by I-beam posts embedded in the ground, with large wooden spacers between the guardrail and the posts. Approximately 3.0 to 4.6 meters [10 to 15 feet] of guardrail were displaced through contact by the case vehicle (**Figure 1**). The Police Crash Report indicated two trees halted the case vehicle’s clockwise yaw and descent down the embankment. The diameters of those trees are not known. Possible damage to the trees is also not known.