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REMOTE ALLEGED SAFETY-RELATED DEFECT REPORT

CASE NUMBER - IN00-012
LOCATION - MISSISSIPPI
VEHICLE - 1999 HONDA CIVIC LX
CRASH DATE - February, 2000

Submitted:

November 10, 2000

Revised Submission:

November 1, 2001

Contract Number: DTNH22-94-D-17058

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U.S. Department of Transportation
National Highway Traffic Safety Administration
National Center for Statistics and Analysis
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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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Remote alleged safety-related defect investigation involving a 1999 Honda Civic LX, four-door sedan, with manual belts and dual front air bags

16. *Abstract*

This report covers a remote alleged safety-related defect investigation of an air bag non-deployment crash that involved a 1999 Honda Civic LX (case vehicle) and a fixed object (i.e., large, wooden utility pole). This crash is of special interest because the case vehicle was equipped with redesigned air bags that did not deploy and the improperly restrained (lap belt only) case vehicle's driver (75-year-old female) sustained multiple facial fractures from striking the steering wheel and windshield, resulting in her death. The case vehicle had been traveling west in the outside westbound lane of a four-lane, undivided, city street (i.e., two through lanes each direction) and was approaching a four-leg intersection, intending to turn right and travel north towards her home on the intersecting city street. The case vehicle departed the north side of the roadway prior to the intersection. The crash occurred on the north roadside, immediately east of the intersection with the connecting city street. The front left of the case vehicle impacted a large, wooden utility pole on the intersection's northeast quadrant; however, the impact did not cause the case vehicle's driver or front right passenger supplemental restraints (air bags) to deploy. The case vehicle most likely rotated counterclockwise post-impact before coming to rest near the utility pole. The case vehicle's driver was seated but the exact location of her seat track is unknown, and its unknown if the case vehicle was equipped with a tilt steering wheel. She was improperly restrained by her available, manual, three-point, lap-and-shoulder, safety belt system (i.e., the driver was wearing only her lap belt). She sustained, according to the available evidence, multiple facial fractures, most likely from contacting the steering wheel. She underwent a tracheostomy for her multiple facial fractures, but she never recovered from this surgery and was pronounced dead 27 days post-crash.

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BACKGROUND

IN00-012

This remote, alleged safety-related defect investigation was brought to the NHTSA's attention on April 1, 2000, by an engineer hired by attorneys representing the family of the case vehicle's driver. This crash involved a 1999 Honda Civic LX (case vehicle) and a fixed object (large utility pole). The crash occurred in February, 2000, at 5:22 p.m., in Mississippi, and was investigated by the applicable city police department. This crash is of special interest because the case vehicle was equipped with redesigned air bags that did not deploy and the improperly restrained (lap belt only) case vehicle's driver [75-year-old, White (unknown if Hispanic) female] sustained multiple facial fractures from striking the steering wheel and windshield, resulting in her death. This contractor contacted the investigating police agency, the investigating police officer, and the engineer hired by the family's attorney in May, 2000. This report is based on the Police Crash Report, conversations with the investigating police officer and the engineer, engineer-provided photographs, occupant kinematic principles, and this contractor's evaluation of the evidence.

CASE CIRCUMSTANCES

Figure 1: Utility pole on northeast corner of intersection impacted by case vehicle's front left half (case photo #06)

The case vehicle had been traveling west in the outside westbound lane of a four-lane, undivided, city street (i.e., two through lanes each direction) and was approaching a four-leg intersection. Presumably, the case vehicle's driver intended to make a right-hand turn and travel north towards her home on the intersecting city street. For some unknown reason, she either angled over the north curb line, inadvertently, or misjudged her location and began the right-hand turn too soon. In either case the case vehicle departed the north side of the roadway prior to the intersection. Based on the Police Crash Report, there were no pre-crash avoidance maneuvers taken by the driver. The crash occurred on the north roadside, immediately east of the intersection with the connecting city street (**Figure 1**).

The city roadway was straight and level at the area of impact. The pavement was bituminous. The shoulders were improved (i.e., concrete gutters). The roadway was bordered by what appears to be barrier curbs of indeterminate height. The one available scene photograph (**Figure 1**) indicates area barrier curbs to be no more than 7.6 to 10.2 centimeters (3 to 4 inches) in height. Pavement markings consisted of double solid yellow center lines, and both the east and westbound lanes were divided by dashed white lines. In addition, no edge lines were present. The estimated coefficient of friction is unknown. There were no reported traffic controls present. The reported speed limit was 56 km.p.h. (35 m.p.h.). The investigating police officer coded "unknown" for the case vehicle's estimated, pre-crash travel speed. At the time of the crash the light condition was daylight, the atmospheric condition was raining, and the road pavement was wet. Traffic density at the time of the crash is unknown, and the site of the crash was urban residential.

The front left of the case vehicle (**Figure 2** and **SELECTED PHOTOGRAPHS**, **Figures 7** through **12** below) impacted a large, wooden utility pole on the intersection's northeast quadrant (**Figure 1** above); however, the impact did not cause the case vehicle's driver or front right passenger supplemental restraints (air bags) to deploy. Because the pole impact was offset to the left of the case vehicle's center, the case vehicle most likely rotated counterclockwise an unknown number of degrees post-impact, before coming to rest near the utility pole.

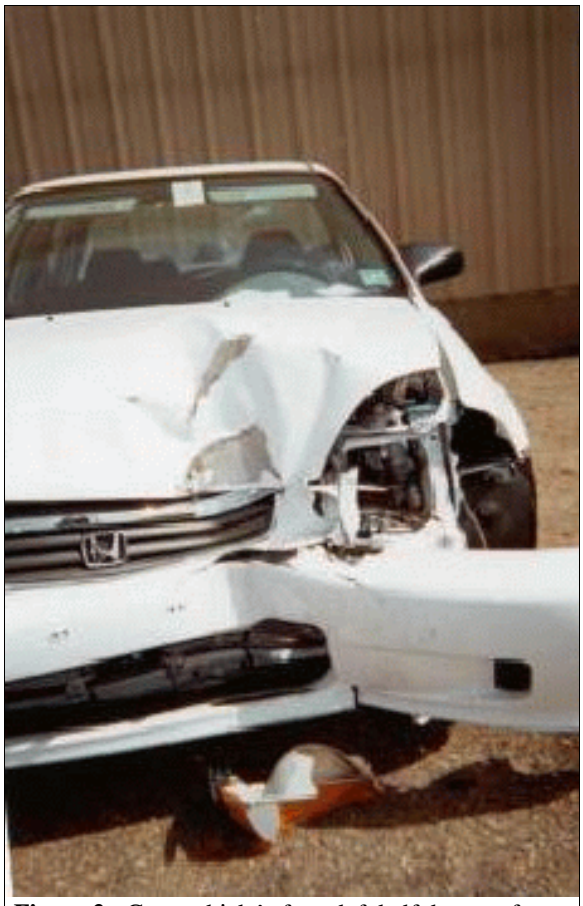

Figure 2: Case vehicle's front left half damage from utility pole impact (case photo #13)

CASE VEHICLE

The 1999 Honda Civic LX was a front wheel drive, five-passenger, four-door sedan (VIN: 1HGEJ667XXL------) equipped with a 1.6 liter, SOHC, PGMFI, I-4, gasoline engine and a four-speed automatic transmission. The selection lever was located on the steering column. 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 scene due to disabling damage.

The interior of the case vehicle had front bucket seats, most likely adjustable. Furthermore, the case vehicle was most likely equipped with a non-adjustable back bench seat; continuous loop, three-point, lap-and-shoulder, safety belt systems at the front and back outboard positions; and a two-point, lap belt system at the back center position. The case vehicle was equipped with knee bolsters for both the driver and front right passenger. Automatic restraint was provided by a Supplemental Restraint System (SRS) that consisted of a frontal air bag for the driver and front right passenger seating positions. However, neither of the front seat air bags deployed as a result of the case vehicle's frontal impact with the wooden utility pole (**Figure 3**). No additional interior components could be identified.

Figure 3: Case vehicle's front seating area showing non-deployed driver (steering wheel-mounted) and front right passenger (top instrument panel-mounted) air bags (case photo #02)

The case vehicle's contact with the utility pole involved its front left half. Direct damage began near the midpoint of the left half (**Figure 2**). The front left portion of the bumper, fascia,

and air dam were shoved rearward, with the front left bumper corner pulled forward. The left half of the grille and hood were also displaced rearward. The left headlamp assembly was missing from its original location. Induced damage was limited to the front end of the left fender. There was a spider-web type crack to the windshield glazing above the steering wheel, approximately one-third of the way down from the front roof header (**Figure 4**). This crack was most likely caused by contact from the case vehicle's driver. Below the air vent, left of the steering column, there appears to be deformation to the lower instrument panel, possibly from contact by the driver's knee. No intrusion was detected in the available photographs.

Figure 4: Close-up of crack to driver's side of case vehicle's windshield; Note: crack resulted from contact by case vehicle's driver (case photo #11)

Based on the engineer-provided photographs, the CDC for the case vehicle was estimated as: **12-FYEN-1 (10)**. The WinSMASH reconstruction program, CDC-only algorithm, provided a borderline reconstruction, but the results appear somewhat reasonable. The case vehicle's barrier equivalent Delta V was 15.4 km.p.h. (9.6 m.p.h.). With no C-measurements and no scene evidence to establish the case vehicle's approach trajectory, this contractor is uncertain as to whether the impact had sufficient Longitudinal Delta V to deploy the vehicle's air bags. The CDC-only algorithm estimated Total, Longitudinal, and Lateral Delta Vs are, respectively: 15.4 km.p.h. (9.6 m.p.h.), -15.2 km.p.h. (-9.4 m.p.h.), and -2.7 km.p.h. (-1.7 m.p.h.).

The case vehicle was equipped with a SRS that consisted of redesigned frontal air bags at the driver and front right passenger seat positions (**Figure 3** above). The driver's air bag was located in the hub of the steering wheel, and the front right passenger's air bag was located in the top of the right instrument panel. Case photographs verify that neither air bag deployed in this crash. There appears to be discoloration to the bottom center and top center of the driver's air bag module (**Figure 5**) and at the 12 o'clock, 1 o'clock, 7 o'clock' and 8 o'clock positions of the steering wheel rim. These inconclusive markings may be indications of possible driver contact to the steering wheel rim and driver's air bag module cover. There was no contact evidence readily apparent on the front right air bag module's cover.

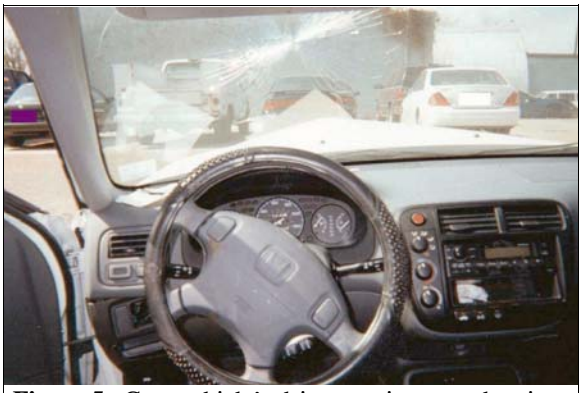

Figure 5: Case vehicle's driver seating area showing non-deployed driver air bag module and contact to windshield (case photo #14)

CASE VEHICLE DRIVER

Immediately prior to the crash, the posture of the case vehicle's driver [75-year-old, White (unknown if Hispanic) female] is unknown. According to the available information, she was most

likely seated (unknown whether upright or reclined) with her back against the seat back, her left foot on the floor, her right foot on the accelerator (i.e., there's no indication of any evasive action), and both hands on the steering wheel (i.e., she was steering to her right toward the street she lived on). Her seat track and seat back were most likely adjustable, but the exact position of either the seat track or seat back is unknown. It is most likely that the case vehicle was equipped with a tilt steering wheel, but position of the wheel is also unknown.

The case vehicle's driver (height and weight unknown) was reported, according to the investigating officer, to be improperly restrained by her available, manual, three-point, lap-and-shoulder, safety belt system (i.e., it was indicated that the driver was wearing only her lap belt). There were no other occupants in the case vehicle.

The case vehicle's driver made no known pre-crash avoidance maneuvers. As a result and independent of the improper usage of her available safety belts, her pre-impact body position did not change just prior to impact. The following discussion is based on vehicle photographs (**Figure 5** above and **Figure 6**) and occupant kinematic principles. As the westbound case vehicle approached a four-leg intersection, it is likely that all four tires mounted the north roadside's short concrete barrier curb. Thus, the probability of damage to any of the case vehicle's four tires or wheels is relatively remote. Effects of the "low" curb override on the case vehicle's driver would have been negligible. The case vehicle's impact with the large, wooden, utility pole enabled the driver to move forward and slightly to the right toward the 10 degree Direction of Principal Force, as the case vehicle decelerated. The driver's usage of only her lap belt allowed her upper torso to "jackknife" over her lap belt and into and over the steering wheel. Because the driver's air bag did not deploy, her forward movement was inhibited only by her lap belt, the case vehicle's steering wheel, and the windshield glazing. Her head struck the windshield glazing and, according to the investigating police officer, caused a scalp laceration above her hairline. Comments by the investigating officer in the narrative section of the Police Crash Report noted the driver was still in the case vehicle when he arrived on scene. She was conscious and "bleeding from the mouth area". The officer indicated, however, that she was disoriented at times, but she was of sufficient clarity of mind to authorize a "non-preferred" wrecker service.

Figure 6: Vertical view of case vehicle's driver seating area showing unidentified object on driver's seat, non-deployed driver air bag, and crack to windshield (case photo #15)

The driver was transported from the scene by ambulance to a medical facility. She sustained at least moderate injuries and was hospitalized continuously prior to being pronounced dead 27 days post-crash. According to the available evidence, she sustained multiple facial fractures, most likely from contacting the steering wheel. She underwent a tracheostomy for her multiple facial fractures, but she never recovered from this surgery. In addition, she had respiratory problems and lesions to her anterior neck, bilateral mandibular areas, upper lip, and bilateral nasal and periorbital areas.

OBJECT CONTACTED

The case vehicle impacted a large, wooden utility pole (**Figure 1** above) with a diameter of greater than 30 centimeters (11.8 inches). No contact evidence was apparent in the one scene photograph of the utility pole, nor was there evidence that the pole had fractured and/or been replaced.

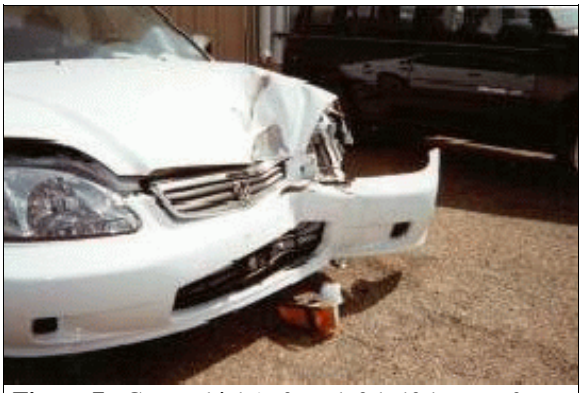

Figure 7: Case vehicle's front left half damage from utility pole impact viewed from right of front (case photo #05)

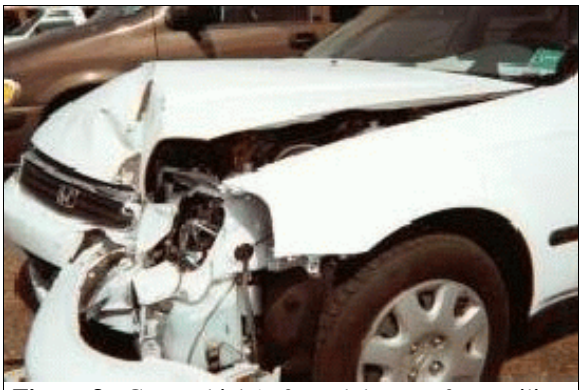

Figure 8: Case vehicle's frontal damage from utility pole impact viewed from left of front (case photo #03)

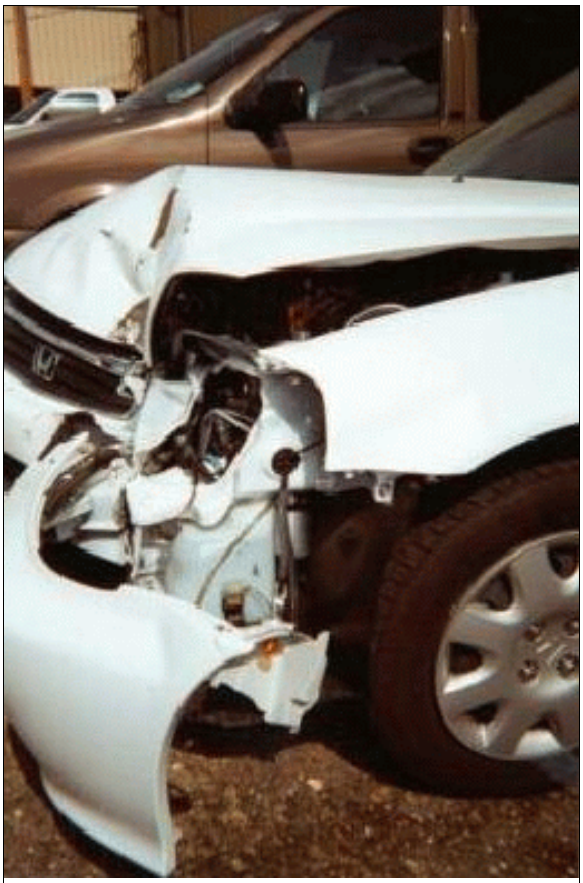

Figure 9: Closer-up vertical view of case vehicle's frontal damage from utility pole impact viewed fro left of front (case photo #04)

Figure 10: Vertical view of case vehicle's damaged front left half viewed from left of front with hood raised (case photo #10)

Figure 11: Case vehicle's damaged front left half viewed from right front with hood raised (case photo #09)

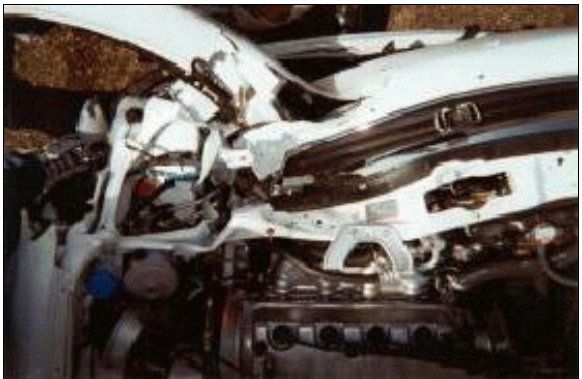

Figure 12: Overhead view of damage to case vehicle's front left half from impact with utility pole (case photo #12)