



# INDIANA UNIVERSITY

## TRANSPORTATION RESEARCH CENTER

School of Public and Environmental Affairs

222 West Second Street

Bloomington, Indiana 47403-1501

(812) 855-3908 Fax: (812) 855-3537

## SCI/NASS COMBINATION CASE REPORT

CASE NUMBER - NASS-00-74-008E

LOCATION - Nebraska

VEHICLE - 2000 HONDA ACCORD

CRASH DATE - January 2000

Submitted:

July 24, 2000

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October 3, 2000



Contract Number: DTNH22-94-D-17058

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National Highway Traffic Safety Administration  
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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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16. <i>Abstract</i> This report covers a SCI/NASS combination investigation concerning a 2000 Honda Accord (case vehicle) and a 2000 Ford F-250 4x4 crew cab pickup truck (vehicle #2). This case is of special interest because the case vehicle was equipped with seat back-mounted side air bags and the driver's side air bag deployed as a result of the collision events. The restrained case vehicle driver (31-year-old female, six months pregnant) sustained minor injuries. There was no other occupant in the case vehicle. The case vehicle was traveling north in the northbound through lane of a two-way local road, in an intersection area with turn lanes and a raised divider, intending to pass through the intersection and continue north. Vehicle #2 was stopped and headed east in the eastbound through lane of the intersecting two-way local road that had turn lanes and a raised divider in the intersection area. Vehicle #2 entered the intersection starting from a stop as the case vehicle was passing through the intersection and the front of vehicle #2 impacted the left side of the case vehicle, causing the case vehicle driver's seat back-mounted side air bag to deploy. The case vehicle was also equipped with dual front air bags and a front right side air bag, none of which deployed. The two vehicles came to rest a short distance from the point of impact and both were towed from the scene due to disabling damage. The case vehicle driver was taken to a hospital via ambulance, where she was treated for acute cervical strain and released. The driver of vehicle #2 was not injured.					
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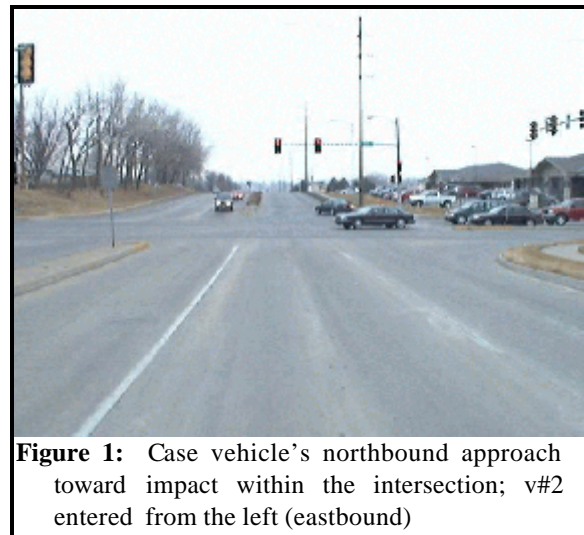
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This combination SCI/NASS crash investigation concerns a 2000 Honda Accord (case vehicle, vehicle #1) and a 2000 Ford F-250 pickup truck (vehicle #2). The crash occurred in January 2000, at 4:48 p.m., in Nebraska, and was investigated by the applicable county police department. This crash is of special interest because the case vehicle was equipped with seat back-mounted side air bags and the driver's side air bag deployed as a result of collision events. The restrained driver (31-year-old female, six months pregnant) sustained an acute cervical strain. There was no other occupant in the case vehicle. The NASS investigator inspected the scene and vehicles, and obtained a partial interview with the case vehicle driver, in February 2000. This report is based on the Police Crash Report, the NASS investigator's coded forms and photographs, the interview, the medical records, occupant kinematic principles, and this contractor's evaluation of the evidence.

### CRASH CIRCUMSTANCES

The case vehicle was traveling north in the northbound through lane of a two-way local road, in an intersection area with turn lanes and a raised divider, intending to pass through the intersection and continue north. Vehicle #2 was stopped, headed east in the eastbound lane of the intersecting two-way local road that also had turn lanes and a raised divider in the intersection area. Both roadways were concrete, with barrier curbs, painted lane lines and no defects. The north-south roadway had a negative grade for the northbound approach to the intersection and the east-west roadway had a positive grade to the east (**Figure 1**). It was daylight with no adverse weather conditions and the road surface was dry. The speed limit for both roadways was 56 km.p.h [35 m.p.h.]. The intersection was controlled by on-colors automatic signals. Vehicle #2 entered the intersection starting from a stop as the case vehicle was passing through the intersection.



**Figure 1:** Case vehicle's northbound approach toward impact within the intersection; v#2 entered from the left (eastbound)

The crash occurred within the intersection (see **SCENE DIAGRAM**, below). The front of vehicle #2 impacted the left side of the case vehicle, causing the case vehicle driver's seat back-mounted side air bag to deploy. The case vehicle was deflected a few degrees clockwise, vehicle #2 rotated a few degrees counterclockwise and both vehicles came to rest close to the point of impact, still within the intersection.

### CASE VEHICLE

The case vehicle was a front wheel drive 2000 Honda Accord EX five-passenger, four-door sedan (VIN: 1HGCG566XYA-----), equipped with a 2.3 liter I4 gasoline engine and an automatic transmission with console-mounted selector lever. Four-wheel anti-lock brakes were an option for this model, but it

is not known if the case vehicle was so equipped. The wheelbase was 272 centimeters [106.9 inches]. The odometer reading is unknown. The case vehicle was towed from the scene due to disabling damage.

### CASE VEHICLE DAMAGE

The case vehicle sustained direct contact damage in the area of the left A-pillar, wheel well and the forward edge of the driver's door, with induced damage extending forward to the left front corner and rearward to the trailing edge of the left front door. The door sill was crushed inward at the base of the A-pillar, the outside rearview mirror was damaged by direct contact, the driver's door glazing was disintegrated (kernelized) and the driver's door was jammed shut (**Figures 2 & 3**). The CDC was determined to be **10-LYEW-3** with direction of principal force 300 [-60] degrees. The winSMASH ROLDMIS algorithm was used to calculate Delta V based on the case vehicle's crush profile because vehicle #2 was partially repaired at the time of inspection. The calculated Total, Longitudinal and Lateral Delta Vs are, respectively: 25 km.p.h. [15.5 m.p.h.], -13 km.p.h. [-8.1 m.p.h.] and +22 km.p.h. [+13.7 m.p.h.]. These results appear reasonable, indicating a crash of low-to-moderate severity for the case vehicle.

The driver's seat area sustained moderate lateral intrusion by the side panel forward of the A-pillar (9 centimeters [3.5 inches]), the left of the instrument panel (10 centimeters [4 inches]) and the interior door panel (7 centimeters [2.7 inches]). The driver's seat was not damaged.

### AUTOMATIC RESTRAINT SYSTEM

The case vehicle was equipped with dual redesigned front air bags and seat back-mounted side air bags for the two front seat positions, for a total of four air bags. The driver's side air bag was the only air bag to deploy (**Figure 4**). The driver's side air bag was mounted in the outboard edge of the driver's seat back and deployed through a pre-stressed seam in the



Figure 2: Entire left side of case vehicle



Figure 3: Left side damage, looking forward



Figure 4: Front seat row, view from right, showing driver's side air bag

### *Automatic Restraint System (continued)*

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soft vinyl seat upholstery (**Figure 7**). The deployed air bag was approximately rectangular, 27 centimeters [10.6 inches] long and 24 centimeters [9.4 inches] high. There were two tethers located in the middle of the air bag (**Figures 5 & 6**). The forward edge of the air bag had two vent ports, at the top and bottom. When fully deployed, the top edge of the air bag was approximately level with the driver's door window sill.

### **CASE VEHICLE DRIVER**

The case vehicle driver (31-year-old female, six months pregnant [second trimester], white, non-Hispanic, 165 centimeters, 64 kilograms [65 inches, 141 pounds]) was restrained by her available manual, three-point, lap-and-shoulder safety belt system. There was no other occupant in the case vehicle. She was transported to a hospital via ambulance, where she was treated and released.

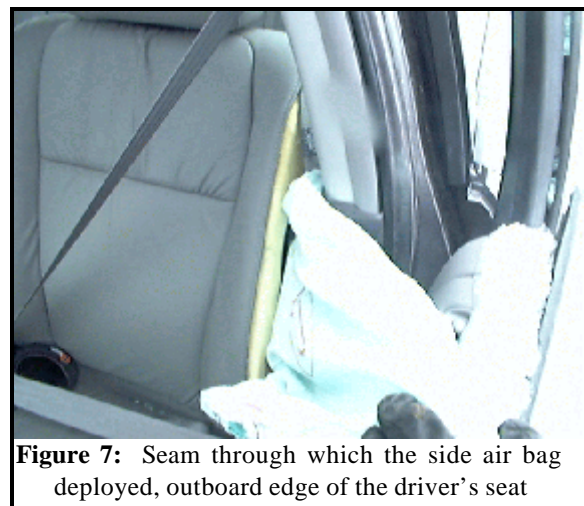
The case vehicle driver was seated in a normal driving posture with her back against the seat back, feet on the floor or foot controls and both hands on the steering wheel. Her seat back was slightly reclined and the seat track was adjusted between the middle and forward most positions. She did not attempt any avoidance maneuvers and her precrash posture did not change as she approached the collision. The impact caused the front left seat back-mounted side air bag to deploy and caused the driver to move primarily leftward and slightly forward, toward the 300 degree direction of principal force. The safety belt probably restricted her leftward and forward movement, but only slightly, and there were no loading marks on the safety belt webbing. She probably encountered the deployed side air bag with the left side of her thorax and abdomen, which served to cushion her as the interior surface of the door intruded. This intrusion was minor (7 centimeters [2.7 inches]). She rebounded rightward and rearward, back into her seat. She exited the vehicle under her own power and was taken to a hospital via ambulance, primarily as a precaution because she was pregnant. The emergency room records note that there were no signs of trauma,



**Figure 5:** Inboard side of driver's side air bag



**Figure 6:** Outboard side of driver's side air bag



**Figure 7:** Seam through which the side air bag deployed, outboard edge of the driver's seat

no indications of problems for herself or the fetus, and the only injury diagnosed was acute cervical strain, which was probably a result of contacting the shoulder portion of the safety belt system.

**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.	Acute cervical strain	640278.1 minor	Belt restraint system	Probable	Emergency Room

**VEHICLE NUMBER 2**

Vehicle #2 was a four wheel drive 2000 Ford F-250 Super Duty Crew Cab four-door pickup truck (VIN: 1FTNW21S4YE-----), equipped with a V-10 6.8 liter gasoline engine and an automatic transmission with column-mounted selector lever. Two-wheel anti-lock brakes were standard for this model, with four-wheel anti-lock brakes available as an option; it is not known how vehicle #2 was equipped. The wheelbase was 397 centimeters [156.2 inches] and the curb weight was 2,730 kilograms [6,019 pounds]. The odometer reading was 3,821 kilometers [2,374 miles]. Vehicle #2 was equipped with dual redesigned front air bags that did not deploy. Because the vehicle was under repair, the CDC is reported as unknown. The winSMASHROLDMIS algorithm was used to calculate Delta V based on the case vehicle’s crush profile. The Total, Longitudinal and Lateral Delta Vs for vehicle #2 are, respectively: 13 km.p.h. [8.1 m.p.h.], -11 km.p.h. [-6.8 m.p.h.] and -6 km.p.h. [-3.7 m.p.h.]. Vehicle #2 was towed due to disabling damage. The driver (sole occupant) was not injured.



**Figure 8:** Front of V#2, under repair



**Figure 9:** Right side of V#2, under repair



