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REMOTE REDESIGNED AIR BAG REPORT

CASE NUMBER - IN98-010
LOCATION - ALABAMA
VEHICLE - 1998 FORD EXPLORER XL
CRASH DATE - December, 1997

Submitted:

January 4, 2002

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Contract Number: DTNH22-94-D-17058

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
National Center for Statistics and Analysis
Washington, D.C. 20590-0003

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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. *Supplementary Notes*
Remote air bag deployment investigation involving a 1998 Ford Explorer XL, four-door compact utility vehicle, with manual safety belts and dual front air bags, and a curb and brick mailbox structure

16. *Abstract*

This report covers a remote investigation of an air bag deployment crash that involved a 1998 Ford Explorer XL and a curb and brick mailbox. This crash is of special interest because the case vehicle was equipped with redesigned air bags and the case vehicle's driver [32-year-old, Black (unknown if Hispanic) male] and the front right passenger (no available information) reportedly sustained no injuries from their respective, deploying, driver and front right passenger air bags. The case vehicle was traveling west-southwestward, negotiating a left-hand curve, in the west-to-southbound lane of a two-lane, undivided, city roadway and intended to continue in a south-southwesterly direction after exiting the curve. The crash most likely occurred off the roadway on the northwest roadside. The case vehicle struck a curb and then the front of the case vehicle impacted a brick mailbox structure, causing the case vehicle's driver and front right supplemental restraints (air bags) to deploy. The crash severity to the case vehicle is unknown. The case vehicle most likely came to rest at or slightly beyond the brick mailbox structure. The posture of the case vehicle's driver is unknown, but based on the available information he was most likely seated but the location of his seat track is unknown, and it is unknown if the case vehicle was equipped with the optional tilt steering wheel. The case vehicle's driver was restrained by his available, active, three-point, lap-and-shoulder, safety belt system. There were four other occupants in the case vehicle. These occupants were located in the front right, back left, back center, and back right seating positions. None of these occupants are listed on the Police Crash Report; therefore, the age and gender for all of these occupants are unknown. The pre-crash posture for all four of these occupants is unknown. The seat track location for the front right passenger is unknown. The seat track for the three back seated passengers was not adjustable. The report also indicates that the front right, back left, and back right passengers were all restrained by their available, active, three-point, lap-and-shoulder safety belt systems. The back center passenger was not using the available, active, two-point, lap belt system. According to the Police Crash Report, none of the case vehicle's five occupants were injured, and none were listed as requiring any transportation to a medical facility.

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BACKGROUND

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This remote report was brought to NHTSA's attention on January 12, 1998, by NASS GES sampling activities. This crash involved a 1998 Ford Explorer XL and a curb and brick mailbox. The crash occurred in December, 1997, at 1:40 a.m., in Alabama 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 and the case vehicle's driver [32-year-old, Black (unknown if Hispanic) male] and the front right passenger (no available information) reportedly sustained no injuries from their respective, deploying, driver and front right passenger air bags. Despite numerous attempts by this contractor to interview the driver **and** the investigating police officer, neither individual "had the time" to discuss this crash with us when contact was made, be available at agreed upon times, or return messages left for the purpose of establishing further contact. Furthermore, State Farm insurance, the case vehicle's insurer, was not able to locate any information about this crash. This report is based on the Police Crash Report, occupant kinematic principles, and this contractor's evaluation of the evidence.

CRASH CIRCUMSTANCES

The case vehicle was traveling west-southwestward, negotiating a left-hand curve, in the west-to-southbound lane of a two-lane, undivided, city roadway and intended to continue in a south-southwesterly direction after exiting the curve. Based on the Police Crash Report, the case vehicle's driver had an internal distraction and most likely made no avoidance maneuvers prior to the crash. The crash most likely occurred off the roadway on the northwest roadside; see **CRASH DIAGRAM** below.

The city roadway was curved to the left for southwest bound traffic and had an unknown grade negative to the southwest (i.e., a downgrade in the case vehicle's direction of travel), near the area of impact. The pavement was bituminous, and the width of the travel lane for the case vehicle is unknown. It is unknown if: any shoulders, pavement markings, or traffic controls were present **or** the roadway was bordered by curbs. The coefficient of friction is not estimable. The speed limit was 40 km.p.h. (25 m.p.h.), but it is unknown if any regulatory speed limit sign was posted near the crash site. At the time of the crash the light condition was dark, the atmospheric condition was clear, and the road pavement was dry. Traffic density was most likely light or there was no other traffic present and, based on the names of the neighboring streets, the site of the crash was urban residential.

According to the Police Crash Report, the case vehicle struck a curb and then the front of the case vehicle impacted a brick mailbox structure, causing the case vehicle's driver and front right supplemental restraints (air bags) to deploy. The crash severity to the case vehicle is unknown. Based on the available information and the crash configuration, this contractor believes that the case vehicle's right front tire most likely impacted the curb followed by the case vehicle's front and/or front left portions striking the brick mailbox structure. The case vehicle most likely came to rest at or slightly beyond the brick mailbox structure.

The 1998 Ford Explorer XL was a rear wheel drive, 4x2, five-passenger, four-door, multi-purpose, compact utility vehicle (VIN: 1FAFP13P9WW------) equipped with a 4.0L, V-6 engine. The case vehicle's transmission is unknown, but a five-speed, heavy duty manual transmission with overdrive was standard while four or five-speed automatic transmissions were available as options. Braking was achieved by a power-assisted, front and rear disc, four-wheel, anti-lock system. The case vehicle's wheelbase was 283 centimeters (111.6 inches), and the odometer reading is unknown because the case vehicle was not inspected.

With no available photographs, the exterior and interior damage, including evidence of occupant contacts, to the case vehicle are unknown. According to the Police Crash Report there was damage to the front surface and right and left fender areas and/or right and left front tires. With no available vehicle photographs, the CDCs for the case vehicle are not estimable. No reconstruction program was used on this crash because the NASS, CDS, WinSMASH protocol requires that actual vehicular crush measurements be obtained. The crash severity to the case vehicle is unknown. The case vehicle was towed from the scene due to damage. According to the Police Crash Report, the non-vehicular property damage was classified as "severe". Available information in the Police Crash Report indicates that the speed limit for the case vehicle was 40 km.p.h. (25 m.p.h.) and a pre-impact speed estimate of 32-48 km.p.h. (20-30 m.p.h.).

The case vehicle's driver air bag was located in the steering wheel hub. Because this case is a remote investigation, the existence, number, and size of tethers or vent ports could not be assessed nor could the shape or size of the driver's air bag be described. The investigating police officer made no mention of any evidence of contact or damage to the air bag's fabric.

The location of the front right passenger's air bag is unknown (i.e., top versus middle instrument panel mounted). Because this case is a remote investigation, the existence, number, and size of tethers or vent ports could not be assessed nor could the shape or size of the front right passenger's air bag be described. The investigating police officer made no mention of any evidence of contact or damage to the air bag's fabric.

CASE VEHICLE OCCUPANTS

Immediately prior to the crash the posture of the case vehicle's driver (of unknown height and weight) is unknown, but based on the available information he was most likely seated with his head and, to a lesser extent his upper torso, turned around toward the back seating area talking to his child (location unknown). The right side of his back was most likely against the seat back, his left foot was on the floor, his right foot was on the accelerator, and his left hand, if not both hands, on the steering wheel. The location of his seat track and seat back are unknown, and it is unknown if the case vehicle was equipped with the optional tilt steering wheel.

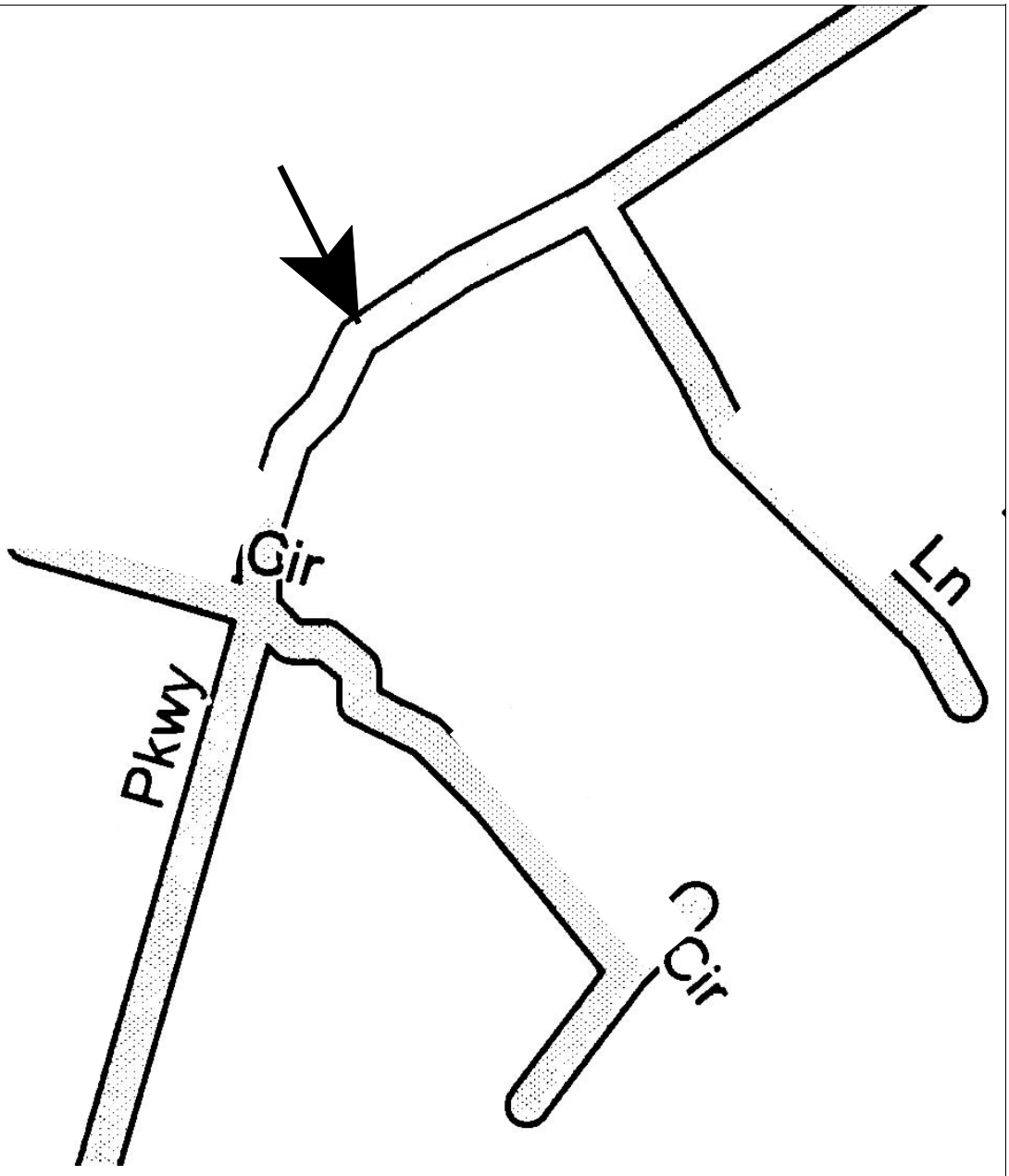
According to the Police Crash Report, the case vehicle's driver was restrained by his available, active, three-point, lap-and-shoulder, safety belt system. There is no available information to confirm or refute this assertion.

The case vehicle's driver made no known pre-crash avoidance maneuvers. As a result and independent of the assumed use of his available safety belts, his pre-impact body position did not change just prior to impact. Although it is unknown which impact caused the case vehicle's front air bags to deploy, it is most likely that the impact with the brick mailbox structure was the primary impact. The case vehicle's impact with the curb most likely had little, if any, affect upon the driver's posture. The most likely effect would have been to cause the driver to begin returning his attention to the vehicle's off road travel path. The case vehicle's primary impact enabled the case vehicle's driver to continue forward and slightly upward toward the case vehicle's unknown Direction of Principal Force (i.e., most likely between 350 degrees and 10 degrees) as the case vehicle decelerated. The driver's safety belt system most likely locked up and, in conjunction with his deploying air bag, prevented the driver from loading the steering wheel and column. As a result of his safety belt systems, the driver most likely rebounded backwards into his seat back as the vehicle came to final rest. His exact position at final rest is unknown.

The Police Crash Report indicates that there were four other occupants in the case vehicle. These occupants were located in the front right, back left, back center, and back right seating positions. None of these occupants are listed on the Police Crash Report; therefore, the age, gender, race, ethnic origin, height, and weight for all of these occupants are unknown. The pre-crash posture for all four of these occupants is unknown. The seat track location for the front right passenger is unknown. The seat track for the three back seated passengers was not adjustable. The report also indicates that the front right, back left, and back right passengers were all restrained by their available, active, three-point, lap-and-shoulder safety belt systems. The back center passenger was not using the available, active, two-point, lap belt system.

CASE VEHICLE OCCUPANT INJURIES

According to the Police Crash Report, none of the case vehicle's five occupants were injured, and none were listed as requiring any transportation to a medical facility.



This drawing was taken from MapQuest and shows (i.e., arrow) the approximate crash location on the "Parkway" that was indicated on the Police Crash Report–0.2 kilometers (0.1 miles) north-northeast of the four-leg intersection with the "Circle"