TRANSPORTATION RESEARCH CENTER

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DEPOWERED AIR BAG REPORT

CASE NUMBER - IN97-041
LOCATION - Texas
VEHICLE - 1998 CHEVROLET CAVALIER
CRASH DATE - October, 1997

Submitted:

April 29, 1998

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Prepared for:

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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 STANDARD TITLE PAGE

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15. *Supplementary Notes* On-site depowered/second generation air bag deployment investigation involving a 1998 Chevrolet Cavalier and a 1984 Oldsmobile Delta 88.			
16. *Abstract* This report covers an on-site investigation of an air bag deployment crash. This case is of special interest because the case vehicle (1998 Chevrolet Cavalier) was equipped with depowered/second generation air bags that deployed as a result of the crash events. The case vehicle was southbound in the southbound left turn lane of a divided local road, approaching an intersection and intending to turn left to travel east on the intersecting road. Vehicle #2 was northbound in the center northbound through lane of the same divided local road, intending to continue straight. The speed limit for both vehicles was 80 km.p.h. (50 m.p.h.). The case vehicle turned left as vehicle #2 was passing through the intersection. The crash occurred within the intersection when the front of the case vehicle impacted the left side of vehicle #2, causing the case vehicle's driver and front right passenger air bags to deploy. The case vehicle was traveling approximately 24 km.p.h. (15 m.p.h.) and the driver did not attempt any avoidance action. Vehicle #2 was traveling 32 - 40 km.p.h. (20 - 25 m.p.h.). Both vehicles were towed from the scene due to disabling damage. There were four occupants in the case vehicle and one occupant in vehicle #2. The driver of vehicle #2 sustained police-reported "C" (possible) injuries and declined treatment at the scene. No other person sustained any police reported injury and no ambulance came to the scene.			
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Background

This on-site investigation was brought to the NHTSA's attention on November 11, 1997 by NASS/CDS sampling activities. The crash involved a 1998 Chevrolet Cavalier (case vehicle) and a 1984 Oldsmobile Delta 88 (vehicle #2). This case is of special interest because the case vehicle was equipped with depowered/second generation air bags that deployed as a result of the collision events. The investigating agency was contacted in mid-December, 1997. The case vehicle was not inspected but insurance photographs of the case vehicle were acquired on March 30, 1998. The scene was inspected on January 24, 1998 and the driver of the case vehicle was interviewed on April 1, 1998.

Crash Circumstances

The crash occurred in October 1997, in Texas, at 12:30 p.m., and was investigated by the applicable city police agency. The case vehicle was southbound in the southbound left turn lane of a divided local road (three southbound through lanes, a southbound left turn lane, a grass median, three northbound through lanes and two northbound left turn lanes), approaching an intersection and intending to turn left to travel east on the intersecting road (see Figure 1). Vehicle #2 was northbound in the center northbound through lane of the same divided local road, intending to continue straight. The speed limit for both vehicles was 80 km.p.h. (50 m.p.h.). The case vehicle turned left as vehicle #2 was passing through the intersection. The crash occurred within the intersection when the front of the case vehicle impacted the left side of vehicle #2, causing the case vehicle's driver and front right air bags to deploy. The case vehicle was traveling approximately 24 km.p.h. (15 m.p.h.) and the driver did not attempt any avoidance action. Vehicle #2 was traveling 32 - 40 km.p.h. (20 - 25 m.p.h.). The case vehicle rotated counterclockwise and vehicle #2 rotated clockwise, with both vehicles coming to rest in the intersection a short distance from the point of impact. Both vehicles were towed from the scene due to disabling damage. There were four occupants in the case vehicle and one occupant in vehicle #2. The driver of vehicle #2 sustained police-reported "C" (possible) injuries and declined treatment at the scene. No other person sustained any police reported injury and no ambulance came to the scene.

Case Vehicle

The case vehicle was a front wheel drive 1998 Chevrolet Cavalier two-door coupe (VIN: 1G1JC1244W7------). The case vehicle was not available to be inspected, but insurance photographs were acquired. The impact was at the front left corner area, with direct contact damage to the bumper, the headlight area, the engine hood and the left fender (see Figure 2). The CDC, estimated from the photographs, was determined to be **01-FYEW-1**. A CDC-only ROLDMIS reconstruction indicated that the Total, Longitudinal, and Lateral Delta Vs were, respectively: 16 km.p.h. (10 m.p.h.), -14 km.p.h. (-7 m.p.h.) and -8 km.p.h. (-5 m.p.h.). This was a crash of low severity for the case vehicle.

The vehicle interior was not inspected. The available insurance photographs provide limited confirmation of the driver's description of the vehicle interior, as presented below in the discussion of occupant kinematics.

There were four occupants in the case vehicle. The driver [14-year-old female--not pregnant, 168 centimeters, 55 kilograms, (66 inches, 121 pounds)] and was restrained by her available, manual, three-point lap-and-shoulder safety belt. The driver's self-reported injuries consisted of bruising on the left side of her face and on the inside surface of her left elbow. She did not seek any medical treatment. The front right passenger [17-year-old female--not pregnant, 165 centimeters, 52 kilograms, (65 inches, 115 pounds)] and was restrained by her available, manual, three-point lap-and-shoulder safety belt. The front right passenger did not sustain any injuries and did not seek any medical treatment. The left-rear passenger [18-year-old female--not pregnant, 165 centimeters, 61 kilograms (65 inches, 135 pounds)] and the right-rear passenger [26-year-old male, 170 centimeters, 91 kilograms (67 inches, 200 pounds)]. Neither of the rear seat occupants was wearing a safety belt; neither sustained any injury, and neither sought any medical attention.

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	Contusion left face	290402.1 minor	Air bag, driver's side	Probable	Interviewee (same person)
2	Contusion left elbow/forearm	790402.1 minor	Air bag, driver's side	Probable	Interviewee (same person)

The following reconstruction of the occupant kinematics in the case vehicle is based on the driver's interview-reported data. The case vehicle was fitted with bucket seats with folding backs in the front seat row and the steering column was not adjustable. The driver's seat track was adjusted at the middle position and the seat back was slightly reclined. The driver was seated with her back against the seat back, her right foot on the accelerator and her left foot on the floor, her left hand on the steering wheel and her right arm resting on the center console. The driver's air bag was located in the steering wheel hub. The driver was executing a left turn maneuver, leaning slightly to the left. She did not attempt any avoidance actions. The impact with vehicle #2 caused the air bags to deploy and thrust the driver forward and to the right, toward the center of the instrument panel. Because she was wearing her safety belt, her movement was restricted and she encountered the deployed air bag in an essentially upright posture, with her torso and head rotated slightly to the right. The left side of her face sustained minor bruising as a result of contact with the air bag. In addition, her left arm was bruised by contact with the air bag.

The right front passenger's seat track was adjusted at the center position and the seat back was slightly reclined. The driver indicated that the right front passenger was seated in an upright posture, with further details unknown. The front right air bag was located in the top of the instrument panel. The impact caused the right front passenger to move forward and to the right, toward the right A-pillar. Because she was wearing her safety belt, her movement was restricted and she encountered the deployed air bag in an essentially upright posture, with her torso and head rotated to the right. She did not sustain any injuries.

Vehicle #2

Vehicle #2 was a rear wheel drive 1984 Oldsmobile Delta 88 Royale four-door sedan (VIN: 1G3AN69YEX------). Vehicle #2 could not be located and was not inspected.

Selected Photographs

Figure 1: Case vehicle's southbound approach to left turn (case photo #2)

Figure 2: Case vehicle, front and left side (case photo #9)