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REMOTE AIR BAG DEPLOYMENT REPORT

CASE NUMBER - IN99-084

LOCATION - LOUISIANA

VEHICLE - 1998 PONTIAC BONNEVILLE SE

CRASH DATE - November, 1998

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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 air bag deployment investigation involving a 1998 Pontiac Bonneville SE, with manual safety belts and dual redesigned front air bags, and a concrete culvert					
16. <i>Abstract</i> This report covers a remote investigation of an air bag deployment crash that involved a 1998 Pontiac Bonneville SE (case vehicle) and a concrete culvert. This crash is of special interest because the case vehicle was equipped with redesigned air bags that deployed as a result of the crash events, and the case vehicle's restrained front right passenger [83-year-old, White (non-Hispanic) female] was killed and the restrained driver [66-year-old, White (unknown if Hispanic) female] sustained police-reported "moderate" injuries. The case vehicle was traveling west in the westbound lane of a two-lane, undivided, state highway. The crash occurred off the right (west) pavement edge as the case vehicle went down an embankment. The front right corner of the case vehicle impacted the east end of a concrete culvert, causing the case vehicle's driver and front right passenger air bags to deploy. The case vehicle slid along the top of the concrete culvert for 15.2 meters (50 feet) and came to rest atop the culvert, facing west. There is no knowledge of the pre-crash posture or seat adjustments for the two case vehicle occupants. The front right passenger was restrained by her available, active, three-point, lap-and-shoulder, safety belt system and sustained, according to her death certificate, closed head and chest injuries. She was pronounced dead 37 minutes post-crash and no autopsy was performed. The driver was restrained by her available, active, three-point, lap-and-shoulder, safety belt system, and sustained, according to the Police Crash Report, "moderate" injuries.					
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Additional photographs are available in SCI EDCS case IN99-084

This case was brought to the NHTSA's attention by a review of the 1998 Fatality Analysis Reporting System (FARS) in June 1999. The crash involved a 1998 Pontiac Bonneville SE (case vehicle) and a concrete culvert. The crash occurred in November 1998, at 1:30 p.m., in Louisiana, and was investigated by the applicable state police. This crash is of special interest because the case vehicle was equipped with redesigned air bags that deployed as a result of collision events, with the case vehicle's restrained front right passenger (83-year-old female) receiving fatal injuries and the restrained driver (66-year-old female) sustaining moderate injuries. The Police Crash Report was received in September 1999, while the police photographs and the front right passenger's death certificate were both received in October. No autopsy was performed on the case vehicle's front right passenger. This report is based on the Police Crash Report, the front right passenger's death certificate, police photographs, occupant kinematic principles, and this contractor's evaluation of the evidence.

CRASH CIRCUMSTANCES

The case vehicle was traveling west in the westbound lane of a two-lane, undivided, state highway and intended to continue its westerly travel path (**Figure 1**). It was daylight and there was no adverse weather. The roadway was bituminous, dry, straight, and level. The posted speed limit was 89 km.p.h. (55 m.p.h.). The only traffic control devices present were a double solid yellow centerline and a single solid white edge line on each side of the roadway. All pavement markings were clearly visible. A witnesses said she had been following the case vehicle and saw it cross the centerline several times and then veer off the road to the right (north). The driver admitted that she had fallen asleep. The investigating officer stated that there was evidence that the case vehicle driver attempted to turn (left) in an attempt to regain the roadway but was unsuccessful. The case vehicle continued its travel path along the embankment and struck a concrete culvert. The crash occurred off the north road edge.

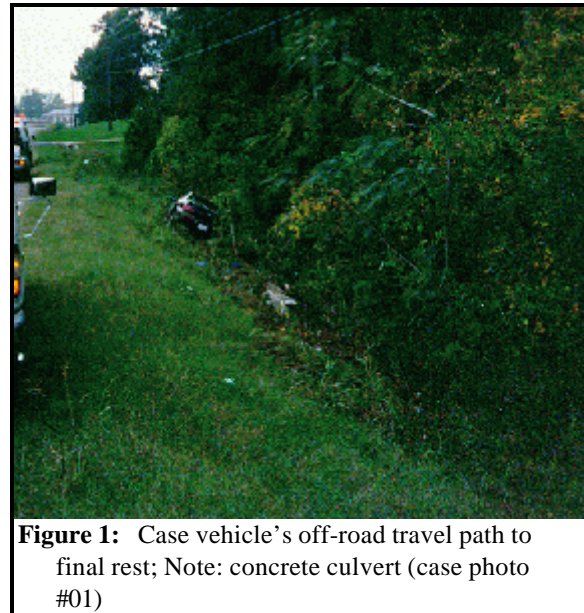


Figure 1: Case vehicle's off-road travel path to final rest; Note: concrete culvert (case photo #01)

The front right corner of the case vehicle and its right side undercarriage impacted the east end of a concrete culvert, causing the case vehicle's driver and front right passenger air bags to deploy. The case vehicle's right side undercarriage continued in contact with the top of the concrete culvert for an additional 15.2 meters (50 feet) and was facing west at final rest (**Figure 2**). The crash severity for the case vehicle was high [greater than 40 km.p.h. (25 m.p.h.)].

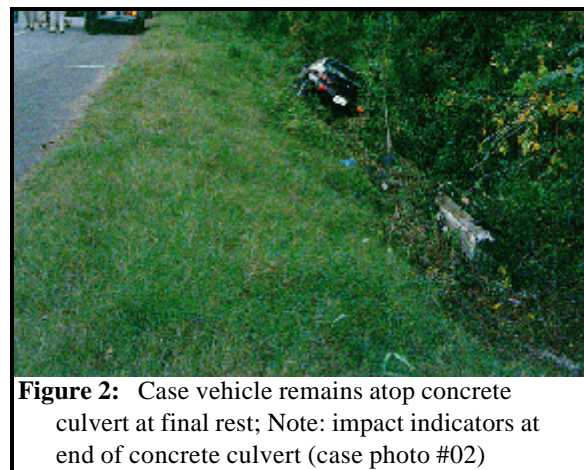


Figure 2: Case vehicle remains atop concrete culvert at final rest; Note: impact indicators at end of concrete culvert (case photo #02)

The case vehicle was a front wheel drive, 1998 Pontiac Bonneville SE, six-passenger, four-door sedan (VIN: 1G2HX52K7WH-----) equipped with a 3.8 liter, V-6 gasoline engine and a four-speed automatic transmission with column-mounted transmission selector lever. It was equipped with four-wheel anti-lock brakes. The wheelbase for the case vehicle was 281 centimeters (110.8 inches). No odometer reading was reported. The case vehicle was towed from the scene due to disabling damage (**Figure 3**).

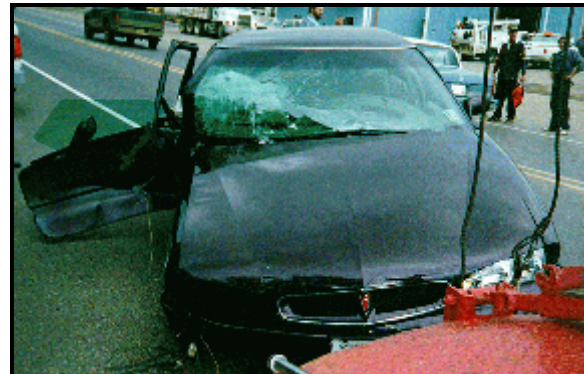


Figure 3: Case vehicle's frontal plane damage; Note: right front door panel position is thought to be a result of removal operations (case photo #05)

The case vehicle sustained direct contact damage to the front right corner and right side undercarriage. The front right wheel and suspension were displaced rearward almost to the B-pillar. Damaged components included: the air dam's right corner, the front right headlamp assembly, the right front tire and wheel assembly, the right front suspension, and the right side front door sill and rocker panel. Indirect damage included: right front fender, the upper and lower right A-pillar, the right third of the windshield (splintered), the right side roof rail, and the right front door. Based on police photographs, the CDC for the case vehicle was estimated as: **12-FREE-8** (principal direction of force 10 degrees). The WinSMASH reconstruction program, with CDC-only estimated crush profile, provided a borderline reconstruction. The calculated results appear to be somewhat high but are reasonable. The case vehicle's estimated Total, Longitudinal, and Lateral Delta Vs are, respectively: 65.9 km.p.h. (40.9 m.p.h.), -64.9 km.p.h. (-40.3 m.p.h.), and -11.4 km.p.h. (-7.1 m.p.h.).

There are no photographs available to assess damage to the interior. It is apparent that there was substantial intrusion in the right front passenger area, including the toe pan, the floor, the right lower A-pillar and the right instrument panel. The front right seating area was probably moved upward as a result of the floor intrusion. The right instrument panel appears to have been moved upward and rearward. The interior rearview mirror was dislodged and laying atop the instrument panel in front of the driver's position. It is likely that the left side of the instrument panel was also displaced upwards.



Figure 4: Case vehicle's undercarriage damage to right side; Note: right front wheel assembly and suspension under passenger's seat (case photo #07)

CASE VEHICLE DRIVER

The case vehicle's driver [66-year-old female, White (unknown if Hispanic), unknown height and weight] was reportedly wearing her available, active, three-point, lap-and-shoulder, safety belt system. Her pre-crash seat adjustments, steering wheel position, and posture are not known, but she admitted having fallen asleep at the wheel and may have been slumped.

The driver was probably seated in a normal driving posture with her back against the seat back, at least one hand on the steering wheel, and her feet on a foot control and the floor. The investigating officer indicated there was some evidence that the driver tried steering left in an unsuccessful attempt to regain the roadway and the case vehicle may have been in a counterclockwise yaw. The impact with the concrete culvert caused the case vehicle’s driver and front right passenger air bags to deploy. The driver likely moved forward and to the right, loading her safety belt and encountering the deployed driver’s air bag. The impact probably caused the vehicle rotate clockwise, causing the driver to move back to the left. As the right side undercarriage of the case vehicle stayed atop the concrete culvert for 15.2 meters (50 feet) to final rest, it is probable that the driver’s posture did not change over that distance. She sustained police-reported “moderate” injuries. She was transported to a hospital via ambulance, but there is no knowledge of her specific injuries or treatment.

CASE VEHICLE FRONT RIGHT PASSENGER

The case vehicle’s front right passenger [86-year-old female, White (non-Hispanic), height and weight unknown] was reportedly wearing her available, active, three-point, lap-and-shoulder safety belt system. Her pre-crash seat adjustments and posture are not known. She was transported to a hospital by ambulance and was pronounced dead 37 minutes post-crash. No autopsy was performed, but her death certificate indicated that she died of closed head and closed chest injuries.

The front right passenger was probably seated in a normal posture, with her back against the seatback and her feet on the floor. The impact caused her to move forward and slightly to the right, loading her safety belt, compressing her chest and possibly causing the closed chest injuries. Her head probably flexed forward as the rest of her body was restrained by the safety belt system. The front right passenger air bag deployed as the right instrument panel was being displaced rearward and her head and face may have been struck by the deploying air bag, possibly causing the closed head injuries. The vertical intrusion of the floor probably caused the seat to move upward and she may have contacted the interior roof.

CASE VEHICLE FRONT RIGHT PASSENGER 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” (blunt head trauma, NFS)	115099.7 unknown	front right passenger air bag	possible	death certificate
2.	“Closed chest injuries” (blunt chest trauma, NFS)	415099.7 unknown	safety belt webbing	possible	death certificate

OBJECT CONTACTED

The case vehicle hit the top of a long, narrow concrete retaining wall that was part of a culvert protruding from the embankment at the bottom of a ditch (**Figure 2**, above). The retaining wall portion of the culvert structure was parallel with the roadway and the case vehicle slid along the top, coming to rest still on top of the culvert. The concrete was abraded, but there is no evidence that it fractured or was otherwise structurally damaged.