

Remote, Redesigned Air Bag Special Study

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Dynamic Science, Inc., Case Number (1998-049-805E)

1998 Buick Regal

Texas

July/1998

Technical Report Documentation Page

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<p>16. Abstract</p> <p>This remote investigation focused on the redesigned air bag system deployment of a 1998 Buick Regal 4-door sedan. This minor injury crash occurred in July, 1998 in the afternoon. The weather was clear and the concrete roadway was dry. The crash occurred in a three-leg intersection. The eastbound leg of the intersection is a two-way undivided roadway that is comprised of one eastbound lane and one westbound lane. Eastbound traffic is controlled by a single stop sign. The roadway is level at this location. The speed limit is 56 km/h (30 mph). The southbound leg of the intersection is a two-way divided roadway and is comprised of seven travel lanes; one southbound left hand turn lane, three southbound through lanes, and three northbound through lanes. The northbound and southbound roadways are divided by a raised median strip. The speed limit is 48 km/h (35 mph). There are no controls for northbound and southbound traffic. Vehicle 1, a 1998 Buick Regal 4-door sedan driven by a restrained 40-year-old male (178 cm/70 in., 100 kg/220 lbs.), was initially stopped at the eastbound leg of the intersection. Vehicle 2, a 1989 Oldsmobile Ninety Eight 4-door sedan driven by a restrained 55-year-old female, was traveling southbound in the third lane from the right approaching the intersection. The front right seat was occupied by a restrained 57-year-old female. The rear seat was occupied by a restrained 34-year-old male.</p> <p>As Vehicle 2 reached the intersection, Vehicle 1 pulled out from the stop sign to begin a left turn to go north. The right front of Vehicle 2 (12FREE9) struck the front of Vehicle 1 (11FDEW2). Vehicle 1 sustained a longitudinal delta v of -24 km/h (-15 mph) and a lateral delta v of 20 km/h (12 mph). As a result of the frontal impact, the supplemental restraint system (driver's and passenger's frontal redesigned air bags) of the case vehicle deployed. Vehicle 1 was pushed in a clockwise rotation and came to rest in the southern leg of the intersection facing southeast. Vehicle 2 was redirected to the left and came to rest in the northbound lanes of the northern leg of the intersection facing southeast.</p> <p>The driver of Vehicle 1 sustained a minor contusion to his left hip from contact with the seat belt. The police indicate that the driver and the front right occupant of Vehicle 2 did not sustain any injuries. The rear seat occupant of Vehicle 2 was transported by ambulance to a local hospital with unknown injuries.</p> <p>Both vehicles were towed from the scene due to damage.</p>			
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Summary

This remote investigation focused on the redesigned air bag system deployment of a 1998 Buick Regal 4-door sedan. This minor injury crash occurred in July, 1998 in the afternoon. The weather was clear and the concrete roadway was dry. The crash occurred in a three-leg intersection. The eastbound leg of the intersection is a two-way undivided roadway that is comprised of one eastbound lane and one westbound lane. Eastbound traffic is controlled by a single stop sign. The roadway is level at this location. The speed limit is 56 km/h (30 mph). The southbound leg of the intersection is a two-way divided roadway and is comprised of seven travel lanes; one southbound left hand turn lane, three southbound through lanes, and three northbound through lanes. The northbound and southbound roadways are divided by a raised median strip. The speed limit is 48 km/h (35 mph). There are no controls for northbound and southbound traffic.

Vehicle 1, a 1998 Buick Regal 4-door sedan driven by a restrained 40-year-old male (178 cm/70 in., 100 kg/220 lbs.), was initially stopped at the eastbound leg of the intersection. Vehicle 2, a 1989 Oldsmobile Ninety Eight 4-door sedan driven by a restrained 55-year-old female, was traveling southbound in the third lane from the right approaching the intersection. The front right seat was occupied by a restrained 57-year-old female. The rear seat was occupied by a restrained 34-year-old male.



Figure 1. Paths of both vehicles to area of impact



Figure 2. Front view of Vehicle 1 (1998 Buick Regal)

Crash Events

As Vehicle 2 reached the intersection, Vehicle 1 pulled out from the stop sign to begin a left turn to go north. The right front of Vehicle 2 (12FREE9) struck the front of Vehicle 1 (11FDEW2).

Vehicle 1 sustained a longitudinal delta v of -24 km/h (-15 mph) and a lateral delta v of 20 km/h (12 mph). As a result of the frontal impact, the supplemental restraint system (driver's and passenger's frontal redesigned air bags) of the case vehicle deployed.

Vehicle 1 was pushed in a clockwise rotation and came to rest in the southern leg of the intersection facing southeast. Vehicle 2 was redirected to the left and came to rest in the northbound lanes of the northern leg of the intersection facing southeast.

The driver of Vehicle 1 sustained a minor contusion to his left hip from contact with the seat belt. The police indicate that the driver and the front right occupant of Vehicle 2 did not sustain any injuries. The rear seat occupant of Vehicle 2 was transported by ambulance to a local hospital with unknown injuries.

Both vehicles were towed from the scene due to damage.



Figure 3. Front view of Vehicle 2 (1989 Oldsmobile 98)



Figure 4. Front right view of Vehicle 2

Table 1. Delta V

	Case Vehicle		Other Vehicle	
	km/h	mph	km/h	mph
Total	31	19.3	20	12.4
Longitudinal	-24	-14.9	-20	-12.4
Lateral	20	12.4	-4	-2.5

Exterior of Case Vehicle

Table 2. Vehicle Information

Model year, make and model	1998 Buick Regal
VIN	2G4WF5219W1xxxxxx
CDC	11FDEW2



Figure 5. Front right view of Vehicle 1

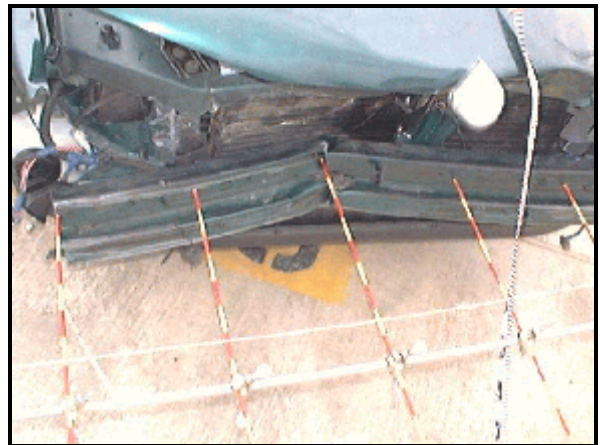


Figure 6. Close up of front right bumper, Vehicle 1

Table 3. Crush Measurements

Plane of Impact	Field L cm/in.	C1 cm/in.	C2 cm/in.	C3 cm/in.	C4 cm/in.	C5 cm/in.	C6 cm/in.
Bumper	144	10	18	29	37	24	22
	56.7	3.9	7.1	11.4	14.6	9.4	8.7

Interior of Case Vehicle

The interior of the Buick Regal did sustain any appreciable damage. There was no integrity loss nor was there any intrusion.

The case vehicle was equipped with bucket seats with adjustable head restraints in the front left and front right seating positions. The rear of the vehicle was equipped with bench seats in all three seating positions. The outboard rear seats were equipped with integral head restraints while the center rear seat was not equipped with a head restraint system.

Case Vehicle Occupant Protection Systems

The Buick Regal 4-door sedan was equipped with a redesigned air bag system which consisted of front left and front right air bag modules which housed air bags and depowered inflator units.

The front left air bag was housed in the steering wheel hub and was concealed by I configuration cover flaps that were not damaged in the crash. The circular air bag was equipped with two tether straps and two vent ports. No contact evidence was found on the air bag and the bag was not damaged.

The front right air bag was housed in the top-instrument panel position and was concealed by a single rectangular cover flap which was not damaged in the crash. The rectangular air bag was equipped with one tether and no vent ports. No contact evidence was found on the bag.



Figure 7. Front view of vehicle interior



Figure 8. Driver's frontal air bag



Figure 9. Passenger frontal air bag

Case Vehicle Occupant Demographics

	Occupant 1	
Age/Sex:	40/Male	
Seated Position:	Front left	
Seat Type:	Bucket	
Height (cm/in):	178	70.1
Weight (kg/lbs):	100	220
Pre-existing Medical Condition:	None noted	
Body Posture:	Normal, upright	
Hand Position:	Both on steering wheel	
Foot Position:	Right on accelerator, left on floor board	
Restraint Usage:	Lap and shoulder belt used	
Air bag:	Deployed during crash	

Occupant Injuries

Table 4. Injuries

Injury	Injury Severity (AIS)	Injury Mechanism
Contusion, left hip	89004021	Seat belt

Occupant Kinematics

The driver (case occupant) of the Buick Regal was seated in a normal upright posture in the front left position of the vehicle. He was wearing the manual lap and shoulder restraint. Seat belt usage was determined through visual inspection by the researcher and the lack of prominent frontal contact evidence in the vehicle's interior. The driver reported that no pre-impact avoidance maneuvers were performed, so the case occupant should not have been out of position prior to impact.

At impact, the driver responded to the 320 degree direction of force by moving forward and to the left, loading the manual lap and shoulder restraint. As the restraints locked, further forward movement of the case occupant was prevented. The driver engaged the lap portion of the seat belt with his left hip, causing the minor contusion.

Scene Diagram

