Remote, Redesigned Air Bag Special Study

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Dynamic Science, Inc., Case Number (1998-49-193E)

1998 Dodge Neon

Texas

November 22, 1998

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16. Abstract

This remote investigation focused on the redesigned air bag system deployment of a 1998 Dodge Neon 2-door. This minor injury crash occurred in November, 1998 in the mid-afternoon. The weather was clear and the bituminous roadway was dry. The crash occurred at a four-leg intersection. The eastbound roadway is one-way and is comprised of five travel lanes. The southbound roadway is divided and is comprised to three southbound lanes, one turn lane, and three northbound travel lanes. The speed limit in all directions is 48 km/h (30 mph). The intersection is controlled by tri-color traffic signals. The roadway is level. The coefficient of friction was estimated to be 0.65.

Vehicle 1, a 1998 Dodge Neon two-door (case vehicle) driven by a 22-year-old male (178 cm/70 in., 73 kg/161 lbs.), was traveling eastbound through the intersection. The driver was restrained by the available manual lap/shoulder restraint.

Vehicle 2, a 1985 Mercedes Benz 300SD driven by a 55-year-old male, was traveling southbound through the intersection. The front right seat of this vehicle was occupied by a 61-year-old female.

As Vehicle 2 entered the intersection it was struck in the right side (02RYEW3) by the front of Vehicle 1 (11FDEW1). Vehicle 1 sustained a longitudinal delta v of -16 km/h (-9.9 mph). Both the driver and passenger side air bags deployed at this point. Vehicle 2 sustained a lateral delta v of -10 km/h (-6.2 mph). Vehicle 1 was pushed in a clockwise rotation and came to rest in the intersection 90E from the original path of travel. Vehicle 1 was redirected to the left and came to rest near the median in the southern leg of the intersection.

The driver of Vehicle 1 sustained minor injuries, including: a left knee sprain, a right forearm abrasion, a lower back strain, and a neck strain.

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Summary

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Vehicle 2, a 1985 Mercedes Benz 300SD driven by a 55-year-old male, was traveling southbound through the intersection. The front right seat of this vehicle was occupied by a 61-year-old female.

Figure 1. Exterior, Vehicle 1

Crash Events

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Table 1. Delta V

	Case Vehicle		Other Vehicle	
	km/h	mph	km/h	mph
Total	21	13	13	8.1
Longitudinal	-16	-9.9	-9	-5.6
Lateral	13	8.1	-10	-6.2

Exterior of Case Vehicle

Table 2. Vehicle Information

Model year, make and model	1998 Dodge Neon
VIN	1B3ES42Y4WD
CDC	11FDEW1

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	136	10	9	11	12	12	15
	53.5	3.9	3.5	4.3	4.7	4.7	5.9

Figure 2. Exterior, case vehicle

Interior of Case Vehicle

The case vehicle was equipped with bucket seats with folding backs in the front left and the front right seating positions. The front left seat was adjusted to the rear most track position. Both front seats were equipped with adjustable head restraints which were not damaged. The rear of the vehicle was equipped with bench seats with folding backs. The vehicle was equipped with a tilt column–which was found in the full up position at the time of inspection. There was no steering wheel rim deformation.

This vehicle did not sustain any intrusion or any integrity loss.

Figure 3. Vehicle interior, front view

Case Vehicle Occupant Protection Systems

The Dodge Neon was equipped with "Next Generation" driver and front-passenger air bags. The front left air bag was housed in the steering wheel hub and was concealed by a single module cover. The circular air bag was tethered by two tether straps and contained two vent ports. There was a scuff located on the left side of the face of the air bag module cover.

The front right passenger air bag was located on the instrument panel, top surface plane. There was a single, essentially rectangular module cover.

The front bucket seats were equipped with active three-point lap and shoulder restraints.

Figure 4. Vehicle interior, side view

Case Vehicle Occupant Demographics

	Occupant 1	
Age/Sex:	22/Male	
Seated Position:	Front left	
Seat Type:	Bucket with folding back	
Height (cm/in:):	178	70.1
Weight (kg/lbs).:	73	161
Pre-existing Medical Condition:	None noted	
Body Posture:	Normal, upright	
Hand Position:	Both hands on steering wheel	
Foot Position:	Left foot on floor, right foot on brake	
Restraint Usage:	Lap and shoulder belt used properly	
Air bag:	Deployed as a result of impact	

Occupant Injuries

Table 4. Injuries

Injury	Injury Severity (AIS)	Injury Mechanism
Left knee sprain	1	Lower instrument panel / Toe pan
Right forearm abrasion	1	Air bag
Cervical spine strain	1	Impact forces
Lumbar spine strain	1	Impact forces

Occupant Kinematics

The 22-year-old male driver of Vehicle 1 was seated in a proper forward facing fashion. He was using the available lap and shoulder belts. The seat was adjusted to the rearmost track position and was slightly inclined rearward. Prior to impact, the driver began braking. Both hands were on the steering wheel. At impact, the driver of the case vehicle was projected forward and slightly to the left. There was likely a small amount of loading on the seat belt, but this would have been mitigated by the driver gripping the wheel while braking prior to the crash. This occupant sustained a minor knee sprain which likely came about as a result of loading to the left foot during braking and impact. At impact, the air bag deployed. The deploying air bag appears to have caused an abrasion to this occupant's right forearm. The driver also sustained neck and lower back strains. These were likely caused by the impact forces–as opposed to being generated by contact with the deploying air bag.

Scene Diagram