Remote Investigation / Vehicle to vehicle
Dynamic Science, Inc. / Case Number: DS97022
1998 Pontiac Sunfire
Washington
October/1997

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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.

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16. Abstract

This collision occurred at 1505 hours. The weather was overcast and the asphalt roadway was dry. Vehicle 1, a 1998 Pontiac Sunfire driven by a 38-year-old female (163 cm/64 in. - 59 kgs/130 lbs.), was traveling northbound in the far right lane of a four-lane, undivided roadway approaching a four-leg intersection. The right rear of the vehicle was occupied by an 8-year-old female (137 cm/54 in. - 36 kg/80 lbs.). Both occupants were wearing the available lap and shoulder belts. Vehicle 1 was equipped with GM "Next Generation" air bags. This was a rental vehicle that had been driven for less than one day. The driver had been involved in another accident and was using this vehicle until repairs were made. She was not aware of either the vehicle year or the depowered air bag. Vehicle 2, a 1993 Ford pickup driven by a 44-year-old male, was traveling southbound in the second lane from the right approaching the same intersection. A non-contact vehicle to the left of Vehicle 1 had stopped to allow Vehicle 2 to make a left hand turn. As Vehicle 2 entered the intersection the driver attempted to make a left hand turn to go east. The left front of Vehicle 1 struck the right front of Vehicle 2 while in the turn. Both air bags in Vehicle 1 deployed at this point. Vehicle 1 had moderate damage to the hood, grille, and left fender (CDC = 11FYEW2), as well as damage to the right side of the windshield from the deploying passenger side air bag. The vehicle sustained a longitudinal delta V of -12.5 km/h (-8.1 MPH).

The driver of Vehicle 1 sustained a large contusion to her right knee due to contact with the instrument panel; she also sustained a neck strain which she attributes to contact and the rearward motion from the deploying air bag. The driver was wearing wire-framed sunglasses at impact. These were bent and knocked off her face by the deploying driver's side air bag. No injuries resulted from this activity. She was wearing a shortsleeve T-shirt and long sweat pants. She had no injuries to her arms and hands, however the knee of her sweat pants had been torn due to contact with the lower instrument panel. The right rear occupant sustained abrasions to her shoulder, chest, and abdomen from engagement with the lap and shoulder belt. Both were initially treated on-scene and then transported.

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Dynamic Science, Inc.
Accident Investigation
Case Number: DS97022

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BACKGROUND:

Description:	This case was initiated in response to a report of de-powered air bag deployment in a 1998 Pontiac Sunfire.
Investigation Type:	Remote
Crash Location:	Washington
Crash Date:	October 1997
Notification Date:	October 21, 1997
Field Work Completed:	October 30, 1997

SUMMARY:

Figure 1. Exterior Vehicle 1, front view

This collision occurred at 1505 hours. The weather was overcast and the asphalt roadway was dry. Vehicle 1, a 1998 Pontiac Sunfire driven by a 38-year-old female (163 cm/64 in. - 59 kgs/130 lbs.), was traveling northbound in the far right lane of a four-lane, undivided roadway approaching a four-leg intersection. The right rear of the vehicle was occupied by an 8-year-old female (137 cm/54 in. - 36 kg/80 lbs.). Both occupants were wearing the available lap and shoulder belts. Vehicle 1 was equipped with GM "Next Generation" air bags. This was a rental vehicle that had been driven for less than one day. The driver had been involved in another accident and was using this vehicle until repairs were made. She was not aware of either the vehicle year or the depowered air bag. Vehicle 2, a 1993 Ford pickup driven by a 44-year-old male, was traveling southbound in the second lane from the right approaching the same intersection. A non-contact vehicle to the left of Vehicle 1 had stopped to allow Vehicle 2 to make a left hand turn. As Vehicle 2 entered the intersection the driver attempted to make a left hand turn to go east. The left front of Vehicle 1 struck the right front of Vehicle 2 while in the turn. Both air bags in Vehicle 1 deployed at this point. Vehicle 1 had moderate damage to the hood, grille, and left fender (CDC = 11FYEW2), as well as damage to the right side of the windshield from the deploying passenger side air bag. The vehicle sustained a longitudinal delta V of -12.5 km/h (-8.1 MPH)[1].

The driver of Vehicle 1 sustained a large contusion to her right knee due to contact with the instrument panel; she also sustained a neck strain which she attributes to contact and the rearward motion from the deploying air bag. The driver was wearing wire-framed sunglasses at impact. These were bent and

[1]Computed using WinSmash Missing Vehicle program

knocked off her face by the deploying driver's side air bag. No injuries resulted from this activity. She was wearing a shortsleeve T-shirt and long sweat pants. She had no injuries to her arms and hands, however the knee of her sweat pants had been torn due to contact with the lower instrument panel. The right rear occupant sustained abrasions to her shoulder, chest, and abdomen from engagement with the lap and shoulder belt. Both were initially treated on-scene and then transported for medical treatment.

Scene Diagram

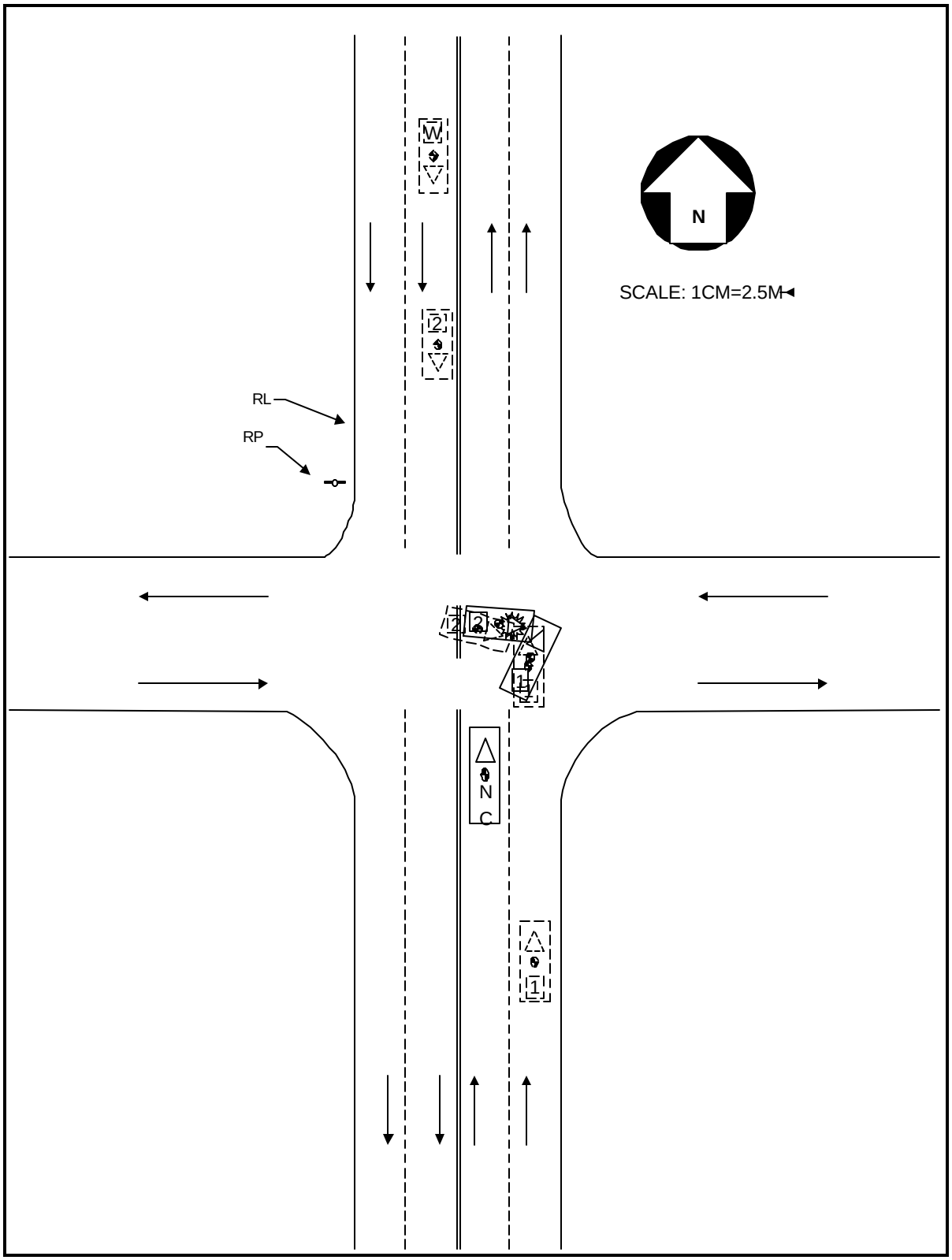

Figure 2. Accident Diagram

DETAILED INFORMATION

Vehicles

Vehicle 1[2]

Description:	1998 Pontiac Sunfire four-door sedan	
VIN:	1G2JB52T5W7xxxxxx	
Odometer:	3537 km (2198 miles)	
Engine:	2.4 L L4	
Reported Defects:	None	
Cargo:	None	
Damage Description:	Moderate contact to left front bumper, extending down left fender. Hood bent backwards and to the right.	
CDC:	11FYEW2	
Delta V:	Total	14.5 km/h (9.4 MPH)
	Longitudinal	-12.5 km/h (-8.1 MPH)
	Latitudinal	7.2 km/h (4.7 MPH)
	Energy	16,293 joules (12,022 ft-lbs)

This vehicle is equipped with bucket seats in the front and a bench seat in the rear. Both front seats were in the rear most position at the time of vehicle inspection. Both seats were slightly reclined. The steering wheel mounted driver's side airbag was 60 cm (23.6 in.) in diameter and had a maximum excursion of 44 cm (17.3 in.). It had no tethers and two vents. The passenger side airbag measures 52 cm (20.4 in.) wide by 46 cm (18.1 in.) high and was

Figure 3. Exterior of Vehicle 1, left side view

[2]Inspected by local NASS team

enclosed in a mid-mount module. The module cover measured 34 cm (13.4 in.) wide by 24 cm (9.6 in.) high. The airbag had two tethers and one vent. Neither airbag sustained any damage. This vehicle sustained some minor intrusion in the left front area. There was no integrity loss to the interior of the vehicle.

Figure 4. Vehicle exterior, damage to windshield from passenger side air bag

Vehicle 2

Description:	1993 Ford F250 4 x 2 pickup truck	
VIN:	1FTEF25Y5PLxxxxx	
Odometer:	Unknown	
Engine:	4.9L EFI I6	
Reported Defects:	None noted	
Cargo:	Unknown	
Damage Description:	Moderate frontal damage estimated at $1500 by investigating officer	
CDC:	Unknown	
Delta V:	Total	8.8 km/h (5.7 MPH)
	Longitudinal	-6.7 km/h (-4.4 MPH)
	Latitudinal	-5.7 km/h (-3.7 MPH)
	Energy	10,702 joules (7.896 ft-lbs)

Occupants

Vehicle 1	Occupant 1	Occupant 2
Age/Sex:	38/Female	8/Female
Seated Position:	Left front	Right rear
Seat Type:	Bucket	Bench
Height:	163 cm (64 in.)	137 cm (54 in.)
Weight:	59 kg (130 lbs.)	36 kg (80 lbs.)
Occupation:	Unknown	None
Pre-existing Medical Condition:	None	None
Alcohol/Drug Involvement:	None	None
Driving Experience:	> 20 years	NA
Body Posture:	Normal, upright.	Normal, upright.
Hand Position:	Both hands on steering wheel at 10-2 o'clock positions.	Unknown
Foot Position:	Unknown. Driver was not sure that she had time to brake.	Unknown
Restraint Usage:	Lap and shoulder belts used properly	Lap and shoulder belts used properly

Vehicle 2	Occupant 1
Age/Sex:	44/Male
Seated Position:	Left front
Seat Type:	Unknown
Height:	175 cm (69 in.)
Weight:	68 kg (150 lbs.)
Occupation:	Unknown
Pre-existing Medical Condition:	None noted
Alcohol/Drug Involvement:	None
Driving Experience:	> 20 years
Body Posture:	Unknown
Hand Position:	Unknown
Foot Position:	Unknown
Restraint Usage:	Lap and shoulder belt used, per police

Injuries and Injury Mechanisms

Vehicle 1

	INJURY	OIC CODE	ICD-9	SOURCE
Driver:	Neck strain	640278.1,6	847.0	Air bag
	Contusion, right knee	890402.1,1	924.11	Instrument panel
	Abrasion, right knee	890202.1,1	916.0	Instrument panel
Right rear occupant:	Shoulder abrasion, right	790202.1,1	912.0	Seat belt
	Chest abrasion, right	490202.1,1	911.0	Seat belt
	Abdomen abrasion, central	590202.1,4	911.0	Seat belt

Occupant Kinematics

The driver of Vehicle 1 was seated in a normal, upright position. The seat was at the mid position according to the driver, and slightly reclined rearward. Both hands were on the steering wheel at the 10 and 2 o'clock positions. Her right foot was on the accelerator. The lap and shoulder belts were being used in the proper fashion. The seat was adjusted to the rear most position at the time of the vehicle inspection, placing the top of the steering wheel 73 cm (28.7 in.) from the seat back, and the bottom of the steering wheel 52 cm (20.5 in.) from the seat back. The steering wheel mounted driver's side air bag was 60 cm (23.6 in) in diameter and had an estimated maximum excursion of 44 cm (17.3 in).

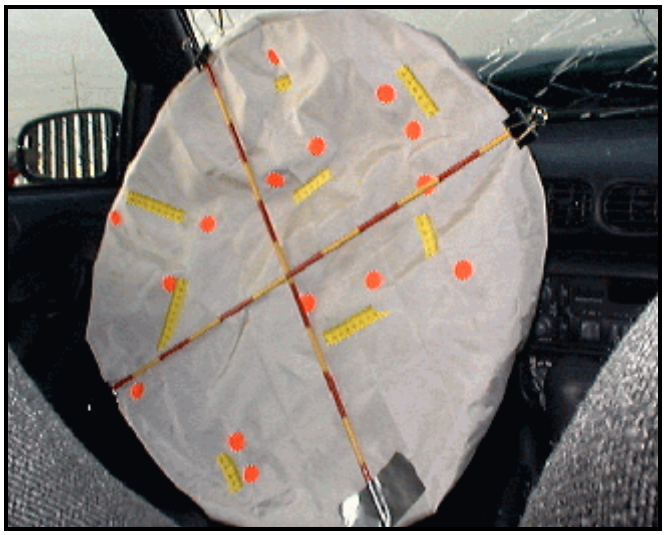

Figure 5. Driver's side air bag

The driver recalls the accident as a sudden event where there was no time for braking. During the early portion of the impact, the driver began moving forward and to the left, loading the seat belts. Her right knee contacted the lower instrument panel.

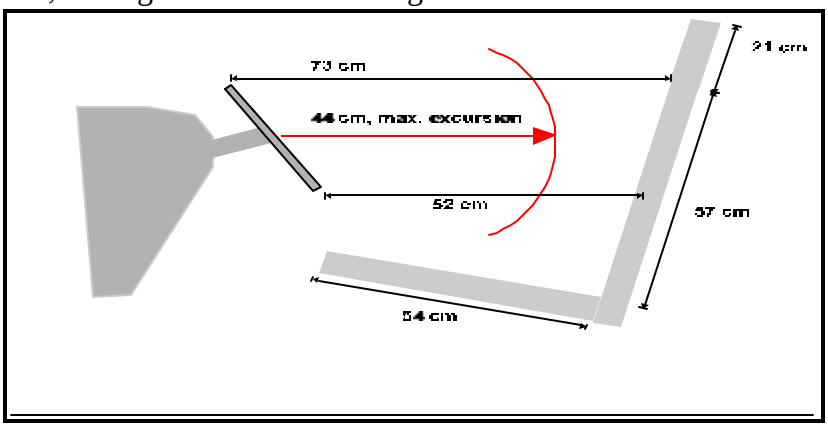

Figure 6. Driver's seat position

The driver of Vehicle 1 sustained a large contusion to her right knee due to contact with the instrument panel; she also sustained a neck strain which she attributes to contact and the rearward motion from the deploying air bag. The driver was wearing wire-framed sunglasses at impact. These were bent and knocked off her face by the deploying driver's side air bag. No injuries resulted from this activity. She was wearing a shortsleeve T-shirt and long sweat pants. She had no injuries to her arms and hands, however the knee of her sweat pants had been torn due to contact with the lower instrument panel.

The right rear occupant sustained abrasions to her shoulder, chest, and abdomen from engagement with the lap and shoulder belt. Both were initially treated on-scene and then transported.