

On-Scene / Vehicle to Fixed Object  
Dynamic Science, Inc. / Case Number: DS9712  
1996 Infiniti I30  
California  
November, 1996

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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 case was initiated in response to a report of an airbag-related fatal injury to a driver.  This collision occurred in California in November 1996 at 1359 hours. The weather was clear and there were no unusual road conditions. Vehicle 1, a 1996 Infiniti I30 driven by a 58-year-old female (160 cm/63 in., 68 kg/150 lbs.), had originally backed out of a parking space going north and then began traveling southbound down an alley at approximately 18.5 km/h (11.5 MPH). Police arriving on scene indicate that the driver was using the lap and shoulder belts. It appears that it was the driver's intent to park the case vehicle in her garage--which is to the right in Figure 1. According to the engineer who notified the NHTSA, the driver had pressed the button on the garage door opener and the garage door had opened to some small extent. For reasons which may never be known (the driver has a history of seizures), the vehicle went to the left and struck a concrete wall which was parallel to the roadway. Both air bags deployed. Vehicle 1 sustained moderate damage (12FLEN1) with a delta V of 18.2 km/h (11.3 MPH). Investigating police officers did not see any indications of skid marks on the roadway or on the dirt shoulder leading to the impact area. The first witness on scene indicated that the driver was found sitting upright in the vehicle, leaning back against the seatback. She was transported to a local community hospital. She arrived in full arrest and was pronounced dead at 1430 hours. The autopsy revealed that she sustained a laceration of the ascending aorta, anterolateral fractures of ribs 1-5 on the left and 1-5 on the right, a sternal fracture, bilateral lung contusions, abrasions to the lips, contusions to the frontal and occipital scalp, and abrasions and contusions to the dorsal aspect of both hands.					
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**Dynamic Science, Inc.**  
**Accident Investigation**  
**Case Number: DS9712**

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**BACKGROUND:**

Description: This case was initiated in response to a report of an airbag-related fatal injury to a driver. Vehicle 1 was a 1996 Infiniti I30 driven by a 58-year-old female.

Investigation Type: On-Scene

Crash Location: California

Crash Date: November 1996

Notification Date: June 4, 1997

Field Work Completed: June 5, 1997

**SUMMARY:**

This collision occurred in California in November 1996 at 1359 hours. The weather was clear and there were no unusual road conditions. Vehicle 1, a 1996 Infiniti I30 driven by a 58-year-old female (160 cm/63 in., 68 kg/150 lbs.), had originally backed out of a parking space going north and then began traveling southbound down an alley at approximately 18.5 km/h (11.5 MPH)<sup>1</sup>. Police arriving on scene indicate that the driver was using the lap and shoulder belts. It appears that it was the driver's intent to park the case vehicle in her garage--which is to the right in Figure 1. According to the engineer who notified the NHTSA, the driver had pressed the button on the garage door opener and the garage door had opened to some small extent.

For reasons which may never be known (the driver has a history of seizures), the vehicle went to the left and struck a concrete wall which was parallel to the roadway. Both air bags deployed. Vehicle 1 sustained moderate damage (12FLEN1) with a delta V of 18.2 km/h (11.3 MPH). Investigating police officers did not see any indications of skid marks on the roadway or on the dirt shoulder leading to the impact area.

The first witness on scene indicated that the driver was found sitting upright in the vehicle, leaning back against the seatback. According to EMT personnel, she had no pulse and her pupils were dilated. She

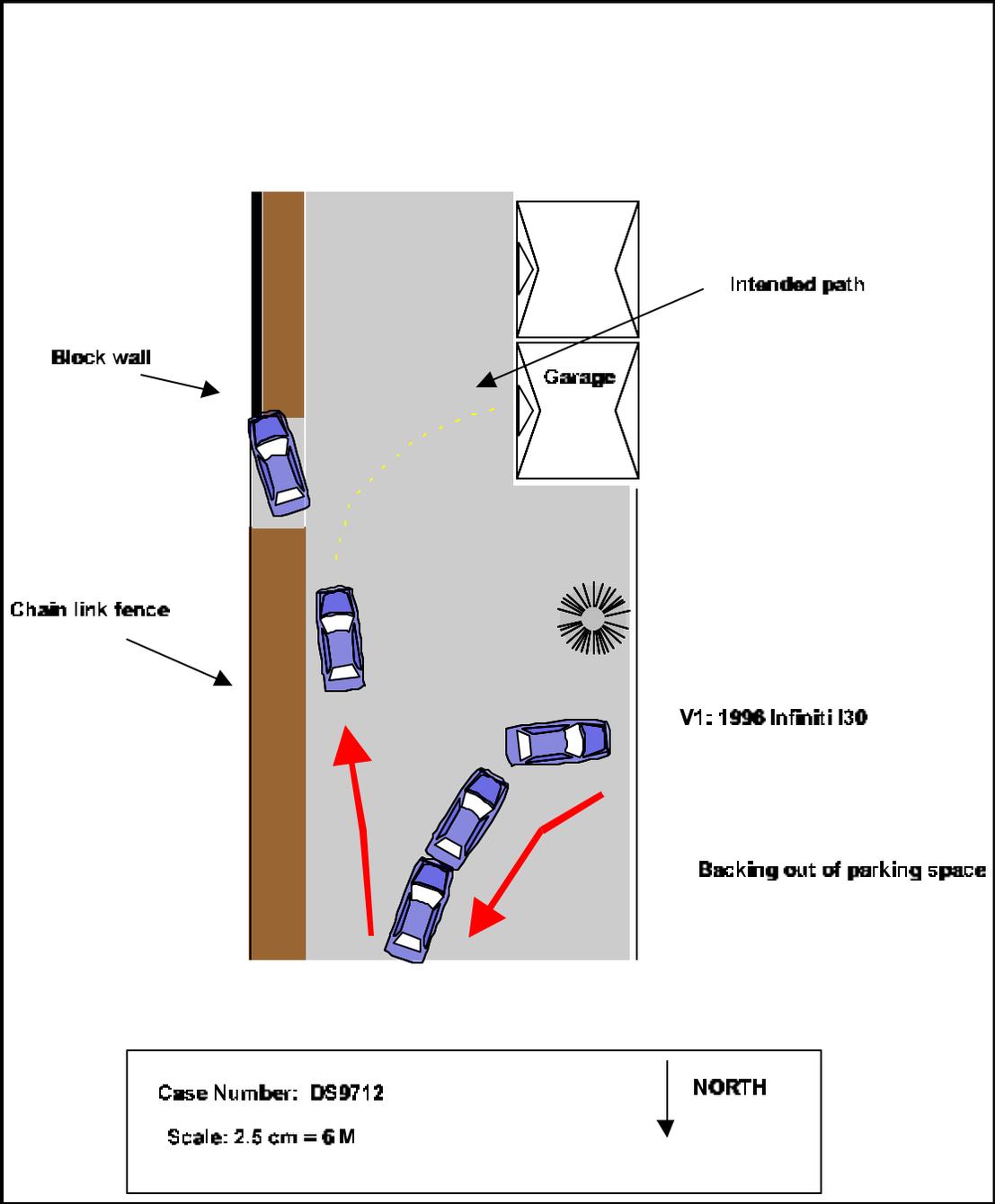
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<sup>1</sup>Based on the distance traveled from the parking space to the wall -- 10.9 m -- (36 ft) and an acceleration rate of 1.2 m/s/s (4 ft/sec/sec).

was transported to a local community hospital (the facility has an emergency area but is not a trauma center). She arrived in full arrest and was pronounced dead at 1430 hours. The autopsy revealed that she sustained a laceration of the ascending aorta, anterolateral fractures of ribs 1-5 on the left and 1-5 on the right, a sternal fracture, bilateral lung contusions, abrasions to the lips, contusions to the frontal and occipital scalp, and abrasions and contusions to the dorsal aspect of both hands. Information regarding post-crash activities is shown below:

Time of accident:	1359
EMT notified:	1359
EMT arrived:	1402
Patient contact:	1404
EMS departure to hospital	1422
Time of death:	1430
EMS arrival at hospital	1435

Scene Diagram



**DETAILED INFORMATION****Vehicles**Vehicle 1

Description:	1996 Infiniti I30 4-door	
VIN:	JNKCA21D5TTxxxx	
Odometer:	8364 km (5197 miles)	
Engine:	Unknown	
Reported Defects:	None	
Cargo:	None	
Damage Description:	Moderate rearward crush of the front bumper; primarily to the left side.	
CDC:	12FLEN1	
Delta V: <sup>2</sup>	Total	18.2 km/h (11.3 MPH)
	Longitudinal	-18.2 km/h (-11.3 MPH)
	Latitudinal	0 km/h (0 MPH)
	Energy	20,764 joules (15314 ft-lb)

This vehicle is equipped with bucket seats in the front and a bench seat in the rear. The left front seat was farther back than the right. Both seats are controlled electronically. The driver's seat was slightly reclined. The driver's side airbag had a single tether and two vents. It had a maximum deployed excursion of 32 cm (12.5 in.). The passenger side airbag was enclosed in a mid-mount module. The airbag had no tethers and two vents. Neither airbag sustained any damage. There were faint indications of facial contact to the back side of the driver's airbag in the area near the vent holes. There was no intrusion nor any integrity loss to the interior of the vehicle.

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<sup>2</sup>WINSMASH barrier run



Figure 2. Exterior, Vehicle 1



Figure 3. Exterior, Vehicle 1

**Occupants**

<u>Vehicle 1</u>	Occupant 1
Age/Sex:	58/Female
Seated Position:	Left front
Seat Type:	Bucket
Height:	161 cm (63.5 in.)
Weight:	68 kg (150 lbs.)
Occupation:	Unknown
Pre-existing Medical Condition:	History of petit mal seizures, suffered from leukopenia possibly due to medications.
Alcohol/Drug Involvement:	None
Driving Experience:	Unknown
Body Posture:	Leaning somewhat forward and to the left
Hand Position:	Right on steering wheel (based on post-impact movement); left possibly off steering wheel holding garage door opener.
Foot Position:	Right on accelerator, left on floorboard.
Restraint Usage:	Lap and shoulder belt used.

**Injuries and Injury Mechanisms**

## Vehicle 1

	<u>INJURY</u>	<u>OIC CODE</u>	<u>ICD-9</u>	<u>SOURCE</u>
Driver:	Laceration of ascending thoracic aorta (6 cm in length)	420208.4,4	901.1	Airbag
	Small intimal lacerations of descending thoracic aorta	420208.4,4	901.1	Airbag
	Bilateral pulmonary contusions	441410.4,3	861.21	Airbag
	Anterolateral rib fractures 1-5 (left)	454240.4,3	807.08	Airbag
	Anterolateral rib fractures 1-5 (right)			
	Sternum fractures	450804.2,4	807.2	Airbag
	Curvilinear abrasion about the helix of the right ear	290202.1,1	910.0	Unknown
	Contusion to back of left hand	790402.1,2	923.20	Unknown
	3 x 3.5 cm contusions across fingers of right hand	790402.1,1	923.20	Mirror
	Small lacerations to back of right hand	790602.1,1	914.9	Mirror
	Frontal scalp contusion	190402.1,5	920.0	Windshield
	Occipital scalp contusion	190402.1,6	920.0	Windshield
	Abrasion, upper lip	290202.1,8	910.0	Airbag
	Abrasion, lower lip	290202.1,8	910.0	Airbag
	Abrasion, below chin	290202.1,8	910.0	Airbag
	Contusion, right chin	290402.1,8	920.0	Airbag
	Contusion, right neck	390402.1,1	920.0	Airbag
	Diagonal abrasion @ mid neck area (4 x 1 cm)	390202.1,5	920.0	Airbag
	Bandlike abrasion below chin (7 x 2 cm)	390303.1,5	910.0	Airbag
	Abrasion to central chest (8 x 6 cm)	490202.1,4	911.0	Airbag

## Occupant Kinematics

It appears that all the injuries sustained were as a result of the airbag deployment. The driver likely leaning forward. At impact, the driver would have gone further forward. At deployment the driver's head was driven upward and to the left into the windshield, causing the frontal scalp contusion and the contusions to the right chin and neck (note the relationship between the windshield strike and the steering wheel rim shown in Figure 4). The deploying airbag then struck the driver in the chest causing the rib fractures and aorta laceration and drove the driver backwards into the seatback where she came to rest.



Figure 4. Vehicle Interior, side view



Figure 5. Back side of driver airbag

**Photo Index**

Photo no.	Vehicle No.	Direction of Picture	Subject Matter
01-03	1	South	Approach of vehicle to impact with concrete wall. Note: open garage door to the right of Photo #02 was the initial destination for this vehicle.
04	1	South	Impact
05	1	East	Looking across struck wall. Note: wall has <u>not</u> been repaired.
06	1	North	Looking back along the path of the vehicle.
07-20	1	CW	Exterior of vehicle.
21-51	1	NA	Interior of vehicle.  #26 shows relationship between steering wheel and windshield contact  #29-31 show closeup views of head contact  #32 shows possible contact to back of airbag  #37-38 show possible contact to steering wheel rim  #47 shows brownish liquid and glass fragments from an unknown source