

Remote Investigation/Passenger Vehicle vs. Heavy Truck/Front to Side Impact
Dynamic Science, Inc./ Case Number:DS98009
1998 Ford Crown Victoria, Four Door Sedan
Texas
February 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.

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16. Abstract <p>The case vehicle was a 1998 Ford Crown Victoria four-door sedan that was being driven by a 71-year-old male. A 74-year-old female was seated in the right front seat. Both occupants were fully restrained by the available manual three-point lap and shoulder belts. The other vehicle was a 1988 Mack dump truck which was being driven by a 25-year-old male who reportedly was wearing the available three-point lap and shoulder belt. Vehicle 1 was traveling southbound in lane 1 of the three lane (one way) roadway. The case vehicle was approaching a four-leg intersection at a driver estimated speed of 72 km/h to 80 km/h (45-50 mph).</p> <p>The other vehicle was stopped at the southeast leg of the intersection. This leg of the intersection is controlled by a stop sign. The driver of the other vehicle started from a stop and proceeded to traverse the intersection heading westbound. The driver of the case vehicle detected the other vehicle slowly entering the intersection directly in front of his lane of travel. The driver steered to the left and applied his brakes, locking up the front tires, and initiating a longitudinal skid pattern. The front right of the case vehicle underrode the left front overhang of the other vehicle resulting in an estimated CDC of 12-FRME-6. The impact was sufficient enough to deploy both the left front and right front air bags.</p> <p>The case vehicle rotated approximately 30 degrees in a clockwise rotation before coming to rest still fully engaged with the other vehicle. The case vehicle sustained no intruding components and the damage severity rating would be considered minor. The hood was displaced rearward and folded at the designated fold points. At maximum engagement the top surface of the hood made contact and broke the windshield glazing directly in front of the right front seated position.</p> <p>A local EMS team responded to the crash scene approximately 13 minutes post-crash and transported all of the involved occupants to a local hospital where they were treated and released the same day. The case vehicle was removed from the scene by a local towing agency.</p>					
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Dynamic Science, Inc.
Crash Investigation
Case Number:DS98009

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BACKGROUND:

Description: This case was initiated in response to a report of a depowered air bag deployment. This case is being conducted as a remote investigation. NHTSA was notified by the NASS. This collision occurred in the state of Texas in February, 1998 at 0937 hours. DSI was notified on March 23, 1998.

The case vehicle was a 1998 Ford Crown Victoria four-door sedan that was being driven by a 71-year-old male. A 74-year-old female was seated in the right front seat. Both occupants were fully restrained by the available manual three-point lap and shoulder belts. The other vehicle was a 1988 Mack dump truck which was being driven by a 25-year-old male who reportedly was wearing the available three-point lap and shoulder belt.

Investigation Type: Remote

Crash Location: Texas

Crash Date: February 1998

Notification Date: March 23, 1998

Field Work Completed: N/A Remote Investigation Only

CRASH CIRCUMSTANCES:

The case vehicle was traveling southbound in lane 1 of the three lane (one way) roadway. The case vehicle was approaching a four-leg intersection at a driver estimated speed of 72 km/h to 80 km/h (45-50 mph).

The other vehicle was stopped at the southeast leg of the intersection. This leg of the intersection is controlled by a stop sign. The driver of the other vehicle started from a stop and proceeded to traverse the intersection heading westbound. The driver of the case vehicle detected the other vehicle slowly entering the intersection directly in front of his lane of travel. The driver steered to the left and applied his brakes, locking up the front tires, and initiating a longitudinal skid pattern. The front right of the case vehicle underrode the left front overhang of the other vehicle resulting in an estimated CDC of 12FRME6. The impact was sufficient enough to deploy both the left front and right front air bags.

The case vehicle rotated approximately 30 degrees in a clockwise rotation before coming to rest still fully engaged with Vehicle 2. The case vehicle sustained no intruding components and the damage severity rating would be considered minor. The hood was displaced rearward and folded

at the designated fold points. At maximum engagement the top surface of the hood made contact and broke the windshield glazing directly in front of the right front seated position.

A local EMS team responded to the crash scene approximately 13 minutes post-crash and transported all of the involved occupants to a local hospital where they were treated and released the same day. The case vehicle was removed from the scene by a local towing agency.

Diagram

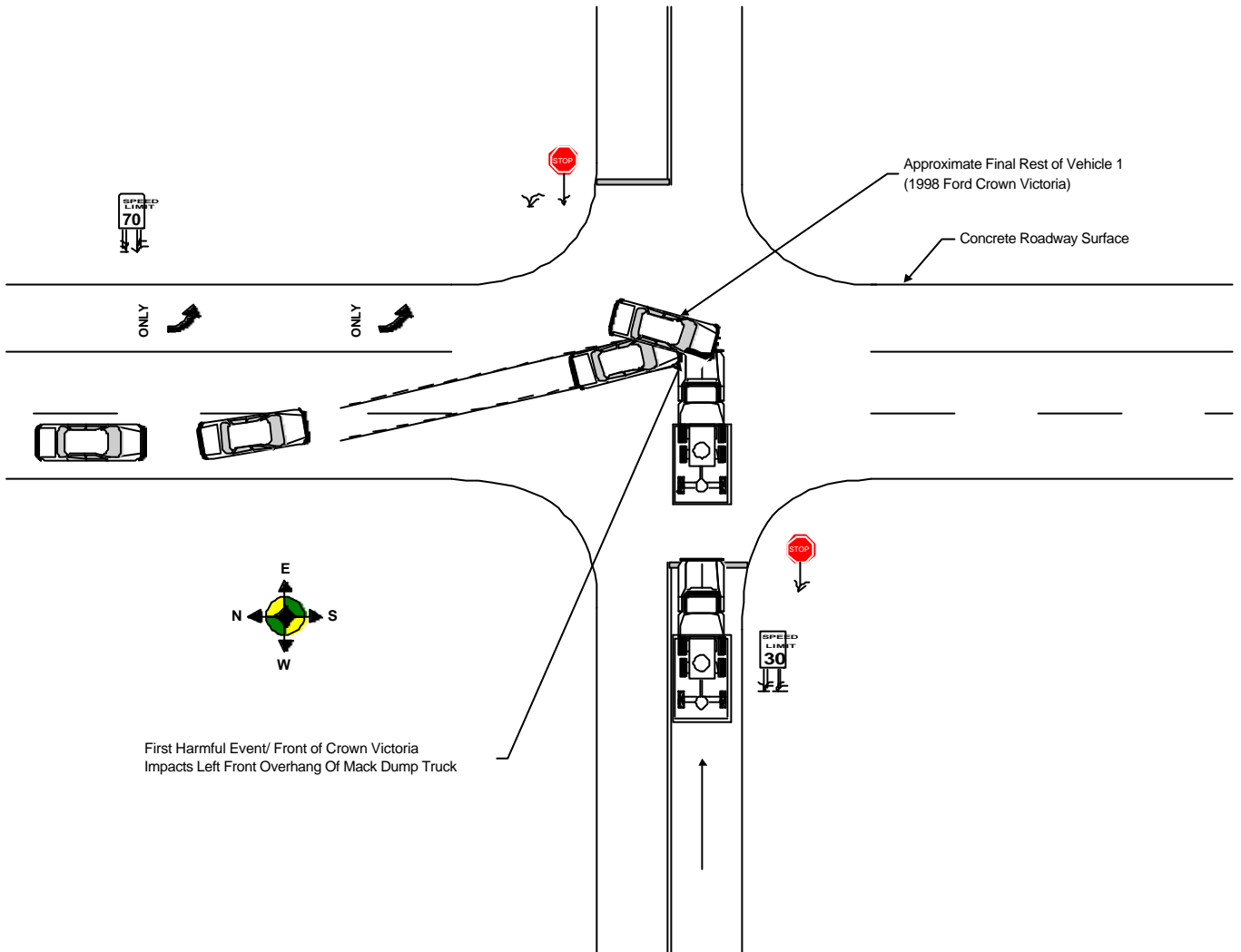


Figure 1. Scene diagram

DETAILED INFORMATION**Vehicles**Case vehicle

Description:	1998 Ford Crown Victoria four-door sedan
VIN:	2FAPP73W6WX
Odometer:	Unknown
Engine:	4.6 liter/ V8 cylinder
Reported Defects:	None
Cargo:	None Reported
Damage Description:	Minor- Underride damage isolated to the front right and above the bumper. Direct contact damage was estimated to be approximately 33 cm (13") which began at the right front corner. Direct contact extended beyond the leading edge (base) of the windshield glazing.
CDC:	12FRME6
Delta V:	Crash is beyond the scope of the WinSmash 1.2.1 program

This vehicle is designed with two front bucket seats and one rear bench seat. The driver's seat track was reportedly adjusted between the middle position and rearmost position. The right front seat track was reportedly in the middle location. The driver's air bag was encapsulated within the steering assembly. The module flap appears to have opened at its designated tear points with no damage to the flap cover. The driver's air bag had two vent ports located at 10 and 2 o'clock respectively. The front right passenger air bag was a mid-mount system with one module cover flap. The module cover flap opened at the designated tear points and there is no visible damage to the flap cover. Upon deployment, the front right passenger air bag made contact with the rearview mirror, displacing its original adjustment. There was no integrity loss and no intrusion to the passenger compartment.



Figure 2. Case vehicle, Exterior



Figure 3. Case vehicle, Exterior

Other vehicle

Description: 1988 Mack dump truck (GVWR 33,001 lbs. and over)

VIN: 1M2AY04Y7JM

Odometer: Unknown

Engine: Unknown

Reported Defects: None reported

Cargo: Unknown

Damage Description: Minor- damage isolated to the left front overhang/ fender area.
Vehicle 2 was driven from the crash scene.

TDC: Unknown

Occupants

<u>Case vehicle</u>	Occupant 1	Occupant 2
Age/Sex	71 /Male	74/Female
Seated Position:	Left Front	Right Front
Seat Type:	Bucket	Bucket
Height:	185cm (73 in.)	165cm (65 in.)
Weight:	88 kg (193 lbs.)	81 kg (179 lbs.)
Occupation:	Retired	Retired
Pre-existing Medical Condition:	None Reported	None Reported
Alcohol/Drug Involvement:	None	None
Driving Experience:	Over 30 years	N/A
Body Posture:	Upright, facing forward	Upright, facing forward
Hand Position:	(Pre-Crash)Right hand on steering wheel rim at the 11 o'clock position. Driver placed hands on steering wheel rim upon braking, at 9 and 3 o'clock positions.	Both hands on lap
Foot Position:	Right foot on brake pedal, Left foot on floor pan.	Both feet on floor pan
Restraint Usage:	Manual lap and shoulder belt reportedly worn snug.	Manual lap and shoulder belt reportedly worn proper and snug.

Injuries and Injury Causing MechanismsCase vehicle

	<u>INJURY</u>	<u>OIC CODE</u>	<u>ICD-9</u>	<u>SOURCE</u>
Driver	Right hand thermal burn (dorsal aspect)	792000.1	944.10	Exhaust gases from driver's air bag
	Chest wall contusion	490402.1	922.1	Shoulder belt webbing
Occupant 2	Upper thoracic strain	640478.1	847.1	Passenger air bag
	Right hand thermal burn	792000.1	944.10	Exhaust gases from passenger air bag
	Right knee contusion	890402.1	924.11	Instrument panel

Occupant Kinematics

The fully restrained 71 year old male driver was braking with sufficient force to initiate a pre-crash longitudinal skid pattern. This pre-impact deceleration allowed the driver to move slightly forward. The driver braced with both hands at 9 and 3 o'clock positions on the steering wheel rim. The driver responded to the frontal impact by moving forward and fully loading the manual lap and shoulder belt webbing which resulted in a chest wall contusion (AIS=1). The driver's air bag deployed which resulted in a thermal burn to the dorsal aspect of the driver's right hand (AIS=1). As the driver's upper torso was restricted from further forward motion, his head pitched downward impacting the inflated air bag. This did not result in injury and the driver was not wearing any eye wear.

The fully restrained 74 year old female passenger was probably slightly displaced forward during the pre-impact skidding. She responded to the 12 o'clock direction of force by moving forward and loading the shoulder belt webbing. This did not result in injury. The restraint webbing restricted her from further forward motion. As the front right passenger air bag deployed, her head pitched downward impacting the air bag material. Her right hand sustained a minor thermal burn from the air bag exhaust gases (AIS-1). She also sustained an upper thoracic strain (AIS-1) due to her interaction with the deploying air bag. Her right knee made contact with the instrument panel resulting in a contusion (AIS-1). After maximum engagement, the passenger rebounded rearward into the seatback support which did not result in further injury.