

On-scene Investigation / Vehicle to Vehicle
Dynamic Science, Inc. / Case Number:DS00004
2000 Ford Taurus
Washington
February 2000

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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.

Technical Report Documentation Page

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16. Abstract This single vehicle crash occurred in the state of Washington in February, 2000 at 0913 hours. The crash took place on a curved, two lane country road. It was raining at the time of the crash. The speed limit is 56 km/h (35 mph). The case vehicle, a 2000 Ford Taurus SE four-door sedan driven by a restrained 30-year-old female (160 cm/63 in., 68 kg/150 lbs), was traveling eastbound through a left hand curve. The case vehicle was equipped with a steering wheel mounted driver's air bag, an instrument panel mounted front right passenger's air bag, a driver's side air bag, a right front passenger's side air bag, and seat belt pretensioners at the front left and front right seating positions. As the case vehicle entered the curve, the driver lost control and the vehicle went into a counterclockwise rotation. The case vehicle rotated approximately 180 degrees while crossing through the westbound lanes. The case vehicle departed the roadway with its right side leading. As the case vehicle departed the roadway the vehicle tripped as it went into a shallow ditch. and rolled onto its right side (00RDAO2) and its roof. The right front passenger's side air bag deployed at this time. The vehicle came to rest at 45 degree angle on its roof and right side. The Ford Taurus sustained minor damage to the front right fender, the front right door, and the roof rail. Both right side doors were jammed shut. Witnesses approached the vehicle and released the seatbelt securing the driver of the case vehicle. The driver of the case vehicle complained of numbness to her legs. She was examined on the scene by a passing physician. She was transported from the scene by ambulance to a local hospital where she was treated and released. She sustained a contusion to her left breast from the shoulder belt and had a neck and upper back strain.					
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Dynamic Science, Inc.
Accident Investigation
Case Number:DS00004

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BACKGROUND:

Description: This Advanced Occupant Protection Systems case was generated by DSI through existing insurance contacts. NHTSA was notified of the case on July 6, 2000. DSI was assigned the case on July 6, 2000. Field work was completed on July 28, 2000.

Investigation Type: On-scene

Crash Location: Washington
 Crash Date: February, 2000
 Notification Date: July, 2000
 Field Work Completed: July 28, 2000



Figure 1. Overview of crash location and final rest (police photos)

SUMMARY:

This single vehicle crash occurred in the state of Washington in February, 2000 at 0913 hours. The crash took place on a curved, two lane country road. It was raining at the time of the crash. The speed limit is 56 km/h (35 mph).

The case vehicle, a 2000 Ford Taurus SE four-door sedan driven by a restrained 30-year-old female (160 cm/63 in., 68 kg/150 lbs), was traveling eastbound through a left hand curve.



Figure 2. Exterior, 2000 Ford Taurus

The case vehicle was equipped with a steering wheel mounted driver's air bag, an instrument panel mounted front right passenger's air bag, a driver's side air bag, a right front passenger's side air bag, and seat belt pretensioners at the front left and front right seating positions.

As the case vehicle entered the curve, the driver lost control and the vehicle went into a counterclockwise rotation. The case vehicle rotated approximately 180 degrees while crossing through the westbound lanes. The case vehicle departed the roadway with its right side leading. As the case vehicle departed the roadway the vehicle tripped as it went into a shallow ditch, and rolled onto its right side (00RDAO2) and its roof. The right front passenger's side air bag deployed at this time. The vehicle came to rest at a 45 degree angle on its roof and right side. The Ford Taurus sustained minor damage to the front right fender, the front right door, and the roof rail. Both right side doors were jammed shut.



Figure 3. Exterior, case vehicle

Witnesses approached the vehicle and released the seatbelt securing the driver of the case vehicle. The driver of the case vehicle complained of numbness to her legs. She was examined on the scene by a passing physician. She was transported from the scene by ambulance to a local hospital where she was treated and released. She sustained a contusion to her left breast from the shoulder belt and had a neck and upper back strain.

The front right seat position was equipped with a seat-mounted side air bag. The air bag was equipped with a single tether and no vent ports. The bag is vaguely rectangular and measures 64 cm (25 in.) high by 29 cm (11.4 in.) wide at its base. There was no indication of a contact to the air bag nor any damage.

Both front seat positions were equipped with seat belt pretensioners. The pretensioner barrels were checked and measured 11 cm (4.3 in.), indicating that they had not fired.

The data from the RCM module was downloaded, but no results were found.

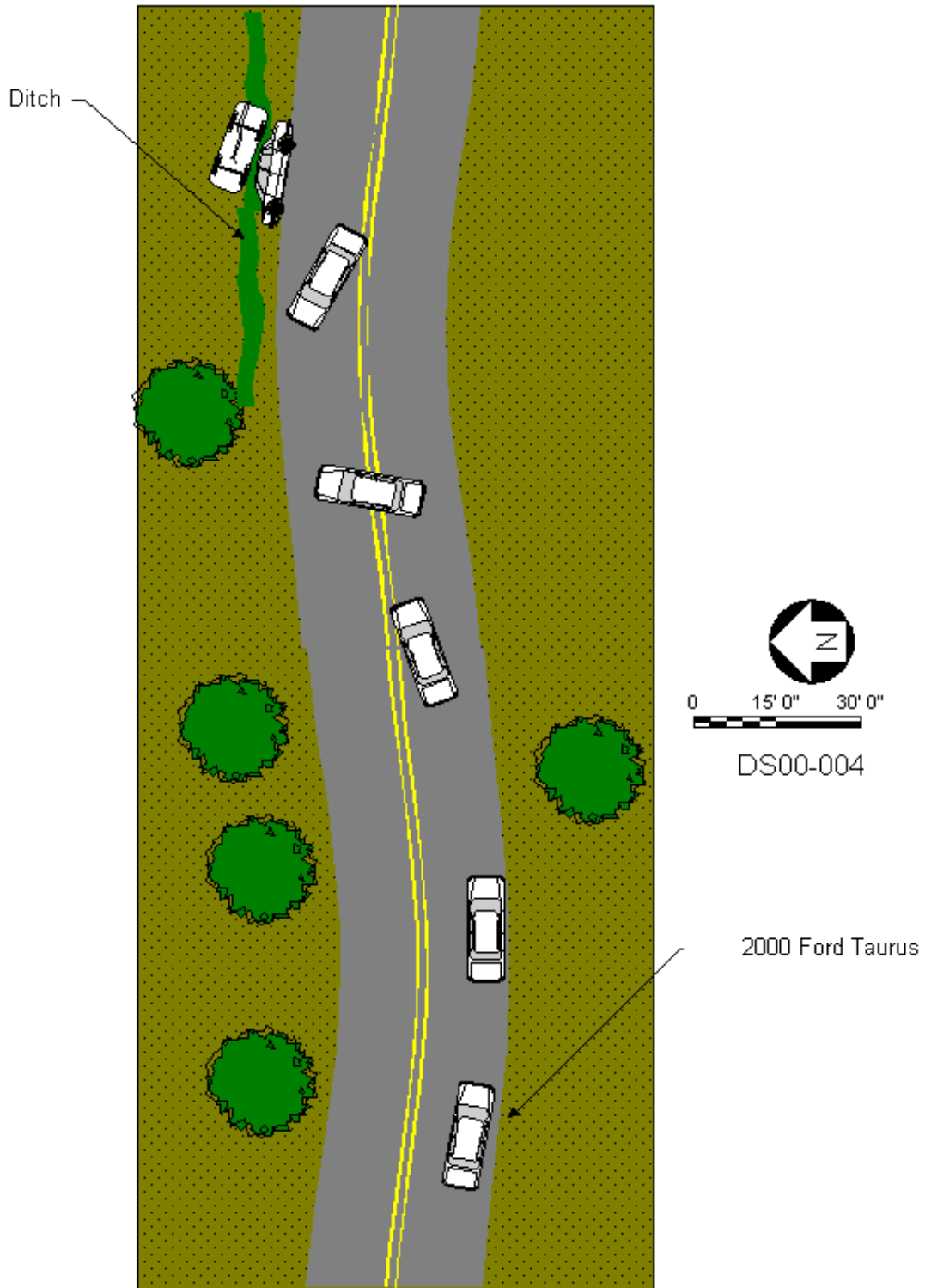


Figure 4. Driver's seating area



Figure 5. Deployed right front passenger's side air bag

Scene Diagram



DETAILED INFORMATION

Vehicles

2000 Ford Taurus

Description:	2000 Ford Taurus
VIN:	1FAFP53U4YGxxxxxx
Odometer:	4,970 km (3,088 miles)
Engine:	3.0 L 6 cylinder
Reported Defects:	None
Cargo:	None
Damage Description:	Minor damage to front right fender, front right door, and the roof rail. Both right doors were jammed shut. There was intrusion on the right side (B pillar) and through the roof.
CDC:	00RDA02
Delta V:	Unknown



Figure 7. Case vehicle final rest configuration

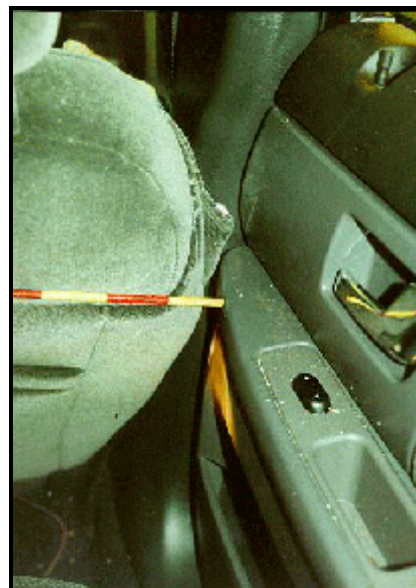


Figure 8. Right side B pillar intrusion

Occupants

<u>2000 Ford Taurus</u>	Occupant 1
Age/Sex:	30/Female
Seated Position:	Front left
Seat Type:	Bucket
Height:	160 cm (63 in.)
Weight:	68 kg (150 lbs.)
Occupation:	Unknown
Pre-existing Medical Condition:	None
Alcohol/Drug Involvement:	None
Driving Experience:	14 years
Body Posture:	Normal, upright
Hand Position:	Both hands on steering wheel, trying to steer out of rotation.
Foot Position:	Right foot on brake, left on floorboard.
Restraint Usage:	Lap and shoulder belt available–used
Air bag:	Left steering wheel mounted front air bag–not deployed.. Left B-pillar mounted side air bag–not deployed.

Injuries and Injury Mechanisms

2000 Ford Taurus

	<u>INJURY</u>	<u>OIC CODE</u>	<u>ICD-9</u>	<u>SOURCE</u>
Driver:	Contusion, left chest	490402.1,2	922.0	Shoulder belt
	Neck strain	640278.1,6	847.0	Impact forces
	Upper back strain	640478.1,1	847.1	Impact forces

Occupant Kinematics

The 30-year-old female driver of the case vehicle was seated in a normal, upright fashion. She was wearing the available lap and shoulder belts. The belt anchorage was in the full down position and the tilt steering wheel was in the middle position. The seat track was in the rear most position and the seat back was set a 4 degrees from vertical. As the case vehicle went into the curve, the driver lost control and the vehicle went into a counterclockwise rotation. This movement would have caused the driver to move to the right. The vehicle continued this motion until tripping onto its right side. As the vehicle went over, the driver engaged the torso belt in a mostly vertical fashion—causing the contusion to the breast area. The tripping motion and rollover impact would have caused the driver to further load the seat belts to the right. Witnesses opened the vehicle and released the driver from the seat belts.



Figure 9. Load marks to driver's seat belt