

**TRANSPORTATION SCIENCES
CRASH RESEARCH SECTION**

Calspan Corporation
Buffalo, New York 14225

CALSPAN REMOTE ASYMMETRICAL AIR BAG DEPLOYMENT

INVESTIGATION

CALSPAN CASE NO. CA98-011

SUBJECT VEHICLE - 1996 FORD TAURUS

LOCATION - STATE OF NEW YORK

CRASH DATE - FEBRUARY, 1998

Contract No. DTNH22-94-D-07058

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590

DISCLAIMER

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no responsibility for the contents or use thereof.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the National Highway Traffic Safety Administration.

The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are 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 STANDARD TITLE PAGE

<p>1. <i>Report No.</i> CA98-011</p>	<p>2. <i>Government Accession No.</i></p>	<p>3. <i>Recipient's Catalog No.</i></p>	
<p>4. <i>Title and Subtitle</i> Calspan Remote Asymmetrical Air Bag Deployment Investigation Subject Vehicle - 1996 Ford Taurus Location - State of New York</p>		<p>5. <i>Report Date:</i> August, 1998</p>	
		<p>6. <i>Performing Organization Code</i></p>	
<p>7. <i>Author(s)</i> Crash Research Section</p>		<p>8. <i>Performing Organization Report No.</i></p>	
<p>9. <i>Performing Organization Name and Address</i> Transportation Sciences Crash Research Section Calspan Corporation P.O. Box 400 Buffalo, New York 14225</p>		<p>10. <i>Work Unit No.</i> 1115 (8330-8339)</p>	
		<p>11. <i>Contract or Grant No.</i> DTNH22-94-D-07058</p>	
<p>12. <i>Sponsoring Agency Name and Address</i> U.S. Department of Transportation National Highway Traffic Safety Administration Washington, D.C. 20590</p>		<p>13. <i>Type of Report and Period Covered</i> Technical Report Crash Date: February, 1998</p>	
		<p>14. <i>Sponsoring Agency Code</i></p>	
<p>15. <i>Supplementary Notes</i></p> <p>A remote investigation of a probable intersection type crash which involved the left and right side planes of a 1996 Ford Taurus. The initial left side longitudinal impact resulted in the deployment of the front right air bag but not the front left air bag.</p>			
<p>16. <i>Abstract</i></p> <p>This remote investigation focused on the asymmetrical deployment of a 1996 Ford Taurus air bag system. The Taurus* crash sequence involved a left side 11 o'clock impact which was of sufficient delta V to deploy the front right air bag, however the front left air bag did not deploy. It was unknown if the driver and possible occupants of the Taurus were injured. The body shop refused to supply the SCI team with the name of the owner, therefore, the location and crash details were unknown.</p>			
<p>17. <i>Key Words</i> 1996 Ford Taurus, Asymmetrical Air Bag Deployment</p>		<p>18. <i>Distribution Statement</i> General Public</p>	
<p>19. <i>Security Classif. (of this report)</i> Unclassified</p>	<p>20. <i>Security Classif. (of this page)</i> Unclassified</p>	<p>21. <i>No. of Pages</i> 3</p>	<p>22. <i>Price</i></p>

TABLE OF CONTENTS

Background	1
Summary	1
Crash Events	2
Vehicle Damage	2
Automatic Restraint System	3

**CALSPAN REMOTE ASYMMETRICAL AIR BAG
DEPLOYMENT INVESTIGATION
CALSPAN CASE NO. CA98-011
VEHICLE: 1996 FORD TAURUS
LOCATION: STATE OF NEW YORK
CRASH DATE: FEBRUARY, 1998**

Background

This remote investigation focused on the asymmetrical deployment of a 1996 Ford Taurus air bag system. The Taurus* crash sequence involved a left side 11 o'clock impact which was of sufficient delta V to deploy the front right air bag, however the front left air bag did not deploy. **Figures 1 and 2** identify the left side longitudinal damage to the Ford Taurus and the non-deployed front left air bag and deployed front right air bag, respectively. It was unknown if the driver and possible occupants of the Taurus were injured. The body shop refused to supply the SCI team with the name of the owner, therefore, the location and crash details were unknown.



Figure 1. Left side damage to the Ford Taurus.



Figure 2. View of the non-deployed front left air bag and deployed front right air bag

This task was assigned to Calspan*s Special Crash Investigation team on February 18, 1998, following the notification of this crash to the SCI team by a local auto body repair shop. An on-site inspection of the vehicle, which documented the asymmetrical deployment, was requested by the NHTSA.

Summary

The 1996 Ford Taurus LX, 4-door sedan (3.0 L, V-6), was identified by vehicle identification number (V.I.N.) 1FALPS3SXTG (production number deleted). The Taurus was equipped with front left and front right air bags and 3-point manual lap and shoulder belts with height adjusters for the front outboard seated positions. The rear outboard belt systems were equipped with 3-point manual lap and shoulder belts and the center rear seated position was equipped with a four point manual lap and shoulder belt system. The Taurus was manufactured in December 1995, and had 69,090 kilometers (42,932 miles) on the odometer at the time of inspection.

Crash Events

Although the actual crash events which resulted in the damage to the Ford Taurus are unknown, it was reasonable to speculate that the initial impact was resultant of an intersection type crash with another vehicle. The Taurus sustained a left side, 11 o'clock direction of force impact with another unknown vehicle. The Barrier Equivalent application of WinSMASH calculated the total delta V for this impact at 19.6 km/h (12.2 mph) and longitudinal delta V at -17.0 km/h (-10.6 mph). The initial impact with the other vehicle displaced the Taurus from the travel lanes to the road side where it impacted its right fender and wheel with a utility pole. Estimated delta V for this impact was 13 km/h (8 mph). During the off-road displacement, the right side quarter panel area impacted with an unknown roadside object which resulted in minor surface damage. The estimated delta V for this impact was 5 km/h (3 mph).

Vehicle Damage

The initial impact to the left front fender and passenger compartment area resulted in moderate damage which initiated the deployment of the front right air bag, but not the front left air bag. Direct damage for the left side impact began 181.0 cm (71.3 in) forward of the left rear axle and extended 181.6 cm (71.5 in) forward. Maximum crush was located 147.0 cm (57.9 in) forward of the left rear axle and measured 14.6 cm (5.7 in). The damage resulted in a Collision Deformation Classification (CDC) of 11-LZEW-2.

The right plane of the Taurus sustained two impacts. The first moderate severity impact produced direct contact damage which began 274 cm (108 in) forward of the right rear axle and extended 61 cm (24 in) forward. Maximum crush was measured at 5 cm (2 in). A CDC of 03-RFEW-1 was assigned for this impact. **Figure 3** identifies the damage sustained by the right front fender of the Taurus. This impact resulted in the separation of the right front lower ball joint from the lower control arm (**Figure 4**). In addition, the right front drive axle separated from the transmission.



Figure 3. Right front damage to the Ford Taurus



Figure 4. Separation of right front ball joint from the spindle and the fractured rod shaft

The secondary impact (Event #3) to the right side was located to the rear aspect of the quarter panel and displayed minimal crush. The impact was assigned a CDC of 03-RBEN-1.

Automatic Restraint System

The non-deployed front left air bag module was located in the hub of a four-spoke steering wheel. The module cover flap was an asymmetrical H-configuration. The air bag did not deploy from the module during this crash (**Figure 5**).



Figure 5. Ford Taurus' non-deployed front left air bag

The front right air bag was housed in a top mount module in the right instrument panel area. The module cover flap was tethered by two nylon straps which measured approximately 3.8 cm (1.5 in) in width. The air bag was not equipped with vent ports, but was tethered with one wide band. The front right air bag deployed as a result of the crash (**Figure 2**).

Information pertaining to the occupant/s of the Ford Taurus and their possible injuries was not available.