



U.S. Department  
of Transportation  
**National Highway  
Traffic Safety  
Administration**

# ODI RESUME

Investigation: EA 03-014  
 Prompted By: PE03-011  
 Date Opened: 08/22/2003      Date Closed: 08/12/2004  
 Principal Investigator: Thomas Cooper  
 Subject: Inadvertent Side Air Bag Deployment

Manufacturer: Ford Motor Company  
 Products: 2001-2003 Lincoln Town Car  
 Population: 151,318

Problem Description: The side air bags may deploy during certain non-crash events.

## FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	16	166	182
Crashes/Fires:	0	0	0
Injury Incidents:	0	0	0
# Injuries:	5	18	23
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other*:	0	0	0

\*Description of Other:

Action: This Engineering Analysis has been closed.

Engineer: Thomas Z. Cooper *JFA For T. Cooper*  
 Div. Chief: Thomas Z. Cooper  
 Office Dir.: Kathleen C. DeMeter

Date: 08/12/2004  
 Date: 08/12/2004  
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Summary: This investigation identified a total of 182 reports alleging inadvertent or non-crash deployment of the side air bags. The data examined during the investigation suggest that the side air bag crash sensing system's algorithm may recognize certain non-crash incidents as deployable events. ODI has not, however, identified any failed component that relates to the alleged defect in the subject vehicles. Also, ODI has not identified any trend in the manufacture dates of complaint vehicles that may indicate a component or vehicle-manufacturing problem.

A safety-related defect trend has not been identified at this time. Further use of agency resources does not appear to be warranted. Accordingly, this investigation is closed. The closing of this investigation does not constitute a finding by NHTSA that a safety-related defect does not exist. The agency will take further action if warranted by the circumstances.

See attached summary report.

*8.12.04*  
*(Signature)*

## SUMMARY REPORT

**BACKGROUND:** On March 14, 2003, ODI opened a Preliminary Evaluation (PE03-011) to investigate alleged inadvertent side air bag deployments in model year (MY) 2001 Lincoln Town Car vehicles. During the PE, ODI requested information about MY 1999 through 2003 Town Car vehicles because side air bags were first introduced into the subject vehicles in MY 1999. On August 22, 2003, ODI upgraded the PE to an Engineering Analysis (EA03-014) that covered MY 2001 through 2003 Town Car vehicles.

**THE ALLEGED DEFECT:** The side air bags may deploy during certain non-crash events.

**DESCRIPTION OF COMPONENT OR VEHICLE SYSTEM:** The MY 2001 through 2003 Lincoln Town Car vehicles are equipped with combination head and thorax side air bags for the driver and front passenger. The side air bags deploy from the outboard side of the driver and front passenger seat backs and are designed to provide head and thorax protection during moderate-to-severe side-impact crashes. Crash sensors for side impact detection were originally located under the front seats and mounted to the floor pan. When the crash sensor detects an acceleration signal that is consistent with a side impact, it sends a signal to the Restraint Control Module (RCM) to deploy the side air bag on the impact side. The RCM also contains a safing sensor for side impact detection.

Ford made several changes to the side air bag system that relate to the alleged defect in the Town Car vehicles. Table 1 shows a summary of the changes by model year and production period (where applicable).

**Table 1**

<b>Model Year</b>	<b>Production Period</b>	<b>Description of Change</b>
2001	All MY 2001	New supplier (Takata) for crash sensors and RCM. New algorithm designed to provide improved levels of occupant protection in moderate pole side impacts.
2002	All MY 2002	Add front passenger seat weight sensor for occupant classification system. Among other things, RCM suppresses deployment of passenger side air bag if passenger seat is unoccupied.
2003.0	Manufactured before 12/2/02	New sensor calibration due to front structural changes. More rigorous "abuse and rough road" (inadvertent deployment avoidance) testing.
2003.5	Manufactured on or after 12/2/02	Move crash sensors from floor of vehicle to near base of B-pillar in order to meet additional pole side impact test and reduce inadvertent side air bag deployments.

**VEHICLE POPULATION:** Table 2 shows the vehicle population of the Lincoln Town Car vehicles by model year.

**Table 2**

<b>Model Year</b>	<b>Population</b>
2001	65,736
2002	35,666
2003.0	39,030
2003.5	10,886
Total	151,318

**MANUFACTURER’S EVALUATION OF THE ALLEGED DEFECT:**

In its December 11, 2003 response to ODI's Information Request letter, Ford stated:

“Ford designed the side air bag system in the MY 2001-2003 Town Car vehicles to provide head, neck and thorax protection in a variety of impact events while minimizing the potential for injury from a deploying air bag, even with occupants out-of-position. This combination head and thorax side air bag restraint system is state-of-the-art and balances excellent out-of-position occupant performance with the critical time to fire requirements necessary to provide a high level of occupant protection ... the low number of reports alleging any injuries and the minor nature of those that are alleged confirms this excellent out-of-position performance in the real world.

“The perceived elevated rate of alleged unwanted deployments in the MY 2001-2003 Town Car is due to severe underbody impacts that (collectively) are indistinguishable from the earliest onset of a serious side crash within the short period of time the system has to make its decision. Because side air bag systems are a developing technology, Ford has continued to revise its design and testing to further refine sensor capabilities to avoid some of these deployments while enhancing occupant protection.

“Based on the excellent head and thorax protection afforded occupants of the MY 2001-2003 Town Car vehicles in side impacts, the minimal risk of minor injury resulting from a bag deployment in the subject vehicles, the extremely low number of reports alleging any injury and the minor nature of those that are alleged, and because unwanted deployments are typically the result of severe undercarriage impacts, we do not believe the reported occurrences demonstrate a defect or the existence of an unreasonable risk to safety in the side air bag systems of MY 2001-2003 Town Car vehicles.”

**ODI ANALYSIS:** ODI has identified a total of 182 complaints and reports that relate to the alleged defect in the subject vehicles. They consist of 16 ODI consumer complaints and 166 non-duplicate manufacturer reports. Table 3 shows the number of reports for the Lincoln Town Car vehicles by model year. Four of the reports also alleged that the deployment of the side air bag caused the driver to lose vehicle control but no crash occurred. Injuries reported are minor in nature, mostly bruises and abrasions.

**Table 3**

<b>Model Year</b>	<b>No. of Reports</b>
2001	147
2002	28
2003.0	7
2003.5	0
Total	182

Many reports indicated that a side air bag deployed without an impact or while driving on gravel roads, over bumps or road debris. The remaining reports had insufficient details about the circumstances of air bag deployment. Some of the complaint vehicles that Lincoln dealership and/or Ford Motor Company personnel inspected did not reveal direct evidence of impact or damage on the vehicle while other inspected vehicles showed evidence of undercarriage impact such as dents and scrapes near the crash sensor location.

Many of Ford's field reports, including those that reported no impact or no damage, indicated that a deployment code (B1231) was stored in the vehicle's Restraint Control Module. This indicates that the crash sensor detected a lateral acceleration signal sufficient to deploy the air bag.

The data examined during the investigation suggest that the side air bag crash sensing system's algorithm may recognize certain non-crash incidents as deployable events. ODI has not, however, identified any failed component that relates to the alleged defect in the subject vehicles. Also, ODI has not identified any trend in the manufacture dates of complaint vehicles that may indicate a component or vehicle-manufacturing problem.

As shown in Table 3, the number of reports (as well as exposure-adjusted report rates) declined each model year from MY 2001 to MY 2003.5. Starting in MY 2002, deployment of the passenger side air bag is suppressed if the passenger seat is unoccupied. Reports of inadvertent passenger bag deployment declined significantly from MY 2001 to MY 2002-2003. The new calibration for crash sensors in MY 2003.0 that incorporates a more rigorous set of "abuse and rough road" tests appears to have reduced the occurrences of non-crash air bag deployment. Finally, although the field data are limited due to limited exposure and population, the relocation of crash sensors from the floor of vehicle to near the base of B-pillars in MY 2003.5 appears to have further reduced the occurrences of non-crash air bag deployment.

**CONCLUSION:** A safety-related defect trend has not been identified at this time. Further use of agency resources does not appear to be warranted. Accordingly, this investigation is closed. The closing of this investigation does not constitute a finding by NHTSA that a safety-related defect does not exist. The agency will take further action if warranted by the circumstances.