



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

# ODI RESUME

Investigation: EA 05-022  
 Prompted By: PE05-046  
 Date Opened: 12/27/2005      Date Closed: 12/21/2006  
 Principal Investigator: John Abbott  
 Subject: Front Seat Belt Buckle Malfunction

Manufacturer: DaimlerChrysler Corporation  
 Products: 2002 Jeep Liberty  
 Population: 208,710

Problem Description: Alleged failure of the driver's seat belt buckle to latch, as well as, allegations of difficult to latch and unlatch.

## FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	31	97	128
Crashes/Fires:	0	0	0
Injury Incidents:	0	0	0
# Injuries:	0	0	0
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other*:	0	2370	2370

\*Description of Other: Warranty

Action: Close investigation

Engineer: John Abbott *JA*  
 Div. Chief: Thomas Z. Cooper  
 Office Dir.: Kathleen C. DeMeter

Date: 12/21/2006  
 Date: 12/21/2006  
 Date: 12/21/2006

Summary: The Office of Defects Investigation (ODI) has closed the investigation of front seat belt buckles in model year 2002 jeep liberty vehicles.

On August 26, 2006, ODI opened Preliminary Evaluation (PE)05-046 to investigate complaint reports that alleged problems with latching and unlatching the front seat belt buckle. Several of the complaints reported that something was broken inside of the buckle. The investigation found that some buckles may experience failure and separation of one, or both, of the internal latch guide leaf springs. Lack of leaf spring function does not appear to inhibit buckle operation because there is another spring that returns the release button. However, a separated leaf spring may impede the motion of the buckle release button if it becomes engaged with moving parts. Analysis of the available data show that vehicles experiencing problems with the buckles were early production vehicles produced primarily in calendar year (CY) 2001. In early CY 2002, a change was made to the tooling used to produce the buckles. This change affected the leaf springs and appears to have had a positive effect in correcting the buckle issues that were experienced in the early production vehicles. The complaint report trend is down and the frequency of consumer reports in CY 2006 has declined to that of CY 2004.

**BASIS:** This investigation was opened as Preliminary Evaluation (PE) PE05-046 on August 26, 2006 based on seven consumer reports. The complainants alleged the buckles would not latch or were difficult to latch or unlatch. Some of the complainants alleged something was broken inside of the buckle and others alleged that the "button" would stick down inside the buckle housing and had to be pried back up in order to latch the seatbelt. Based on additional consumer reports and other information in DaimlerChrysler's (DCC) PE response, the investigation was upgraded to Engineering Analysis EA05-022 on December 27, 2005.

**SUBJECT VEHICLES:** 2002 Jeep Liberty

**ALLEGED DEFECT:** The alleged defect was defined as any failure of the front seatbelt buckle that either prevents or inhibits the buckle's ability to latch or unlatch, or cause the buckle to false latch.

**SUBJECT BUCKLES:** The subject buckle is an end release type, manufactured by TRW, Inc.

**CORRESPONDENCE:**

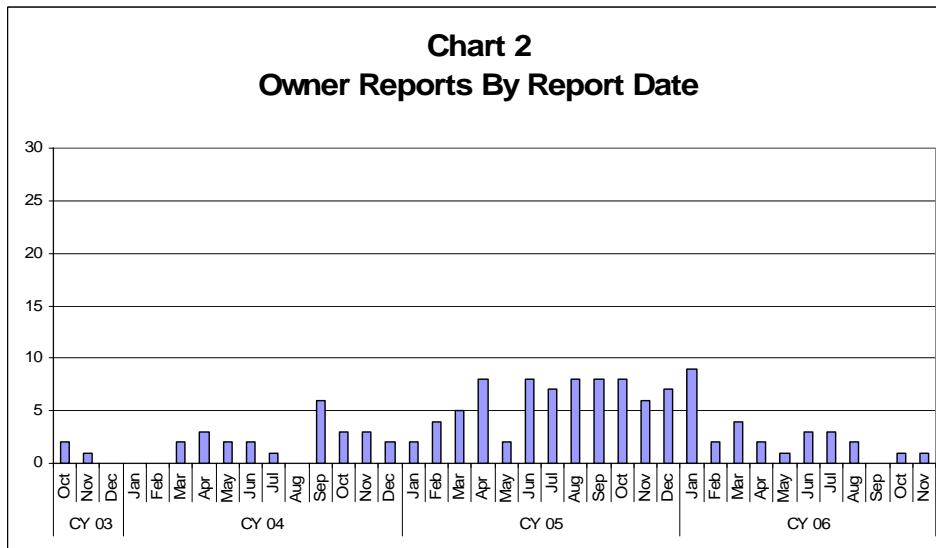
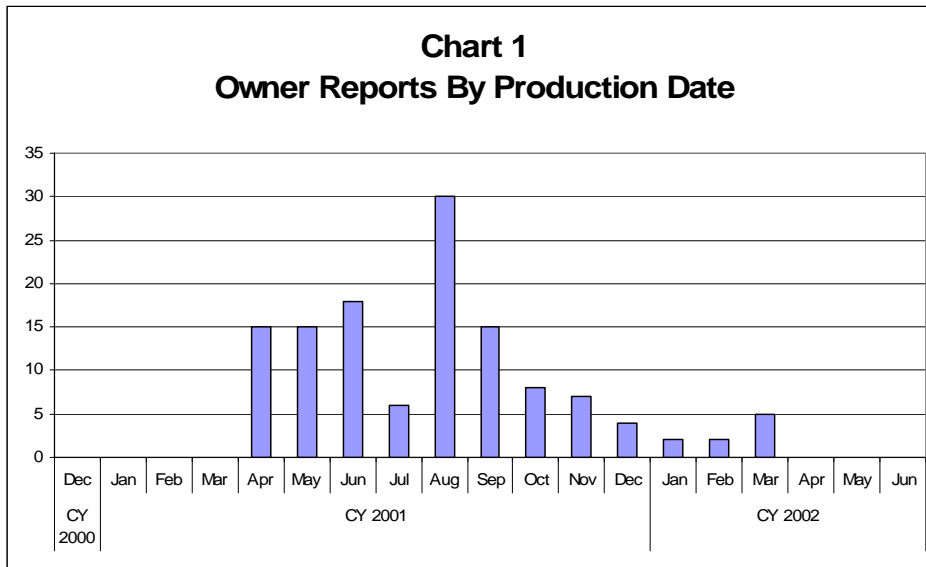
Table 1. EA Correspondence						
NHTSA to MFR.	MFR to NHTSA	NHTSA to MFR (Supplemental)	MFR to NHTSA (Supplemental)	CONFIDENTIALITY		
				Date of Request	Date of NCC Response	Items Confidential
1/30/06	03/22/06	N/A	6/16/06	03/22/06	6/6/06	Enclosure 10 pp.1-5, 8, 11-13

**PROBLEM EXPERIENCE:** There are 128 total reports that appear to relate to the alleged defect. The DCC reports include 93 "owner reports" and four "field reports." There are 31 ODI reports. Duplicate reports have been excluded.

The reports are predominantly from early production vehicles produced in calendar year 2001. Table No. 2 below provides a distribution of reports by production year and this is also shown in Chart No. 1. In Chart No. 2 the reports are shown by report date.

**PROBLEM EXPERIENCE:**

<b>Table 2. Reports</b>				
<b>Production Year</b>	<b>Production</b>	<b>Reports</b>	<b>Rate/100K Vehicles</b>	<b>% of Reports</b>
2000	174	0	0	0
2001	117,646	117	99	92
2002	90,890	10	11	8
Unknown	NA	1	NA	NA
<b>Totals</b>	<b>208,710</b>	<b>128</b>	<b>61</b>	<b>100</b>



**VEHICLE POPULATION:** Model year (MY) 2002 total production is 208,710.

**WARRANTY:** DCC reported 2,370 warranty claims for front seatbelt buckle replacement. Labor operation code 23130104 identifies the passenger buckle and labor operation code 23130105 identifies the driver's side buckle.

<b>Table 3. Warranty</b>				
<b>Failure Code</b>	<b>Description</b>	<b>Labor Operation</b>	<b>Claims</b>	<b>% of Claims</b>
11	Broken/Cracked	23130104	130	5
		23130105	481	20
		<b>Total</b>	<b>611</b>	<b>25</b>
4R	Push Button Broken	23130104	61	3
		23130105	449	19
		<b>Total</b>	<b>510</b>	<b>22</b>
61	Intermittent Operation	23130104	233	10
		23130105	751	32
		<b>Total</b>	<b>984</b>	<b>42</b>
UC	Uncodeable	23130104	92	4
		23130105	173	7
		<b>Total</b>	<b>265</b>	<b>11</b>
<b>Grand Total</b>			<b>2,370</b>	<b>100</b>

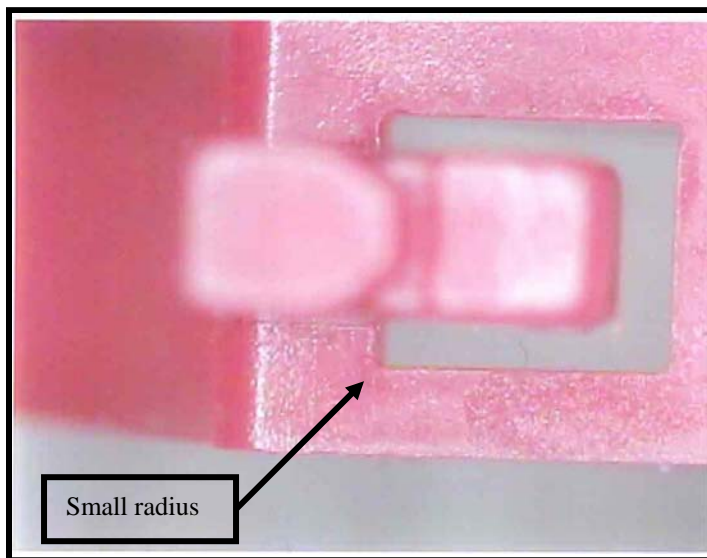
**SERVICE BULLETINS:** None

**DESIGN AND PRODUCTION MODIFICATIONS:** Enclosure 10 of DCC's March 22, 2006 EA response letter contains information relating to design changes made to the buckle assembly. This information was granted confidential treatment by NHTSA's Office of Chief Counsel on June 6, 2006.

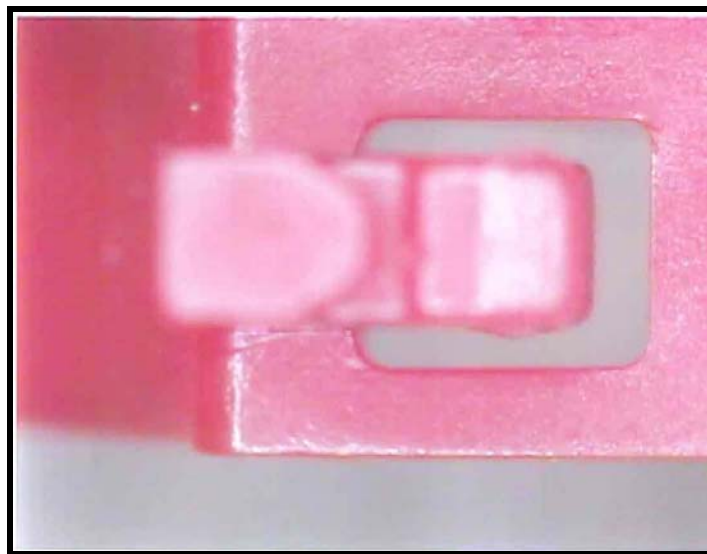
In their October 12, 2005 PE response letter, DCC stated that the driver and front passenger seatbelt buckles had a "common part number" at the start of production of the 2002 MY. Changes were made in subsequent years and the buckles remained interchangeable with prior model years. The buckle part numbers became unique after a change in calendar year 2004 to the front passenger buckle only. The latch plate (the part attached to the retractor webbing that fits into the buckle) has not had any changes and has been used from the start of the 2002 MY production through current 2006 production.

**TOOL REVISION:** The subject buckles incorporate two plastic leaf springs, known as "Latch Guide Leaf Springs" (LGLS). The purpose of these springs is to aid the return of the red push button to its normal position after latching and unlatching the belt. In early calendar year 2002, a revision was made to the tool that is used to produce the LGLS. The revision enlarged the inside corner radii of the LGLS (see figures 1 and 2) which would, as DCC states "facilitate buckle assembly." DCC also stated that this revision appears to correspond to a "cessation" of warranty

claims relating to separated LGLS and to consumer complaints associated with the alleged defect. DCC is not aware of any instances of separated LGLS in buckles produced after the radii change.



**Figure 1. Original Production LGLS**



**Figure 2. LGLS with Enlarged Inside Corners**

**TESTING/ANALYSIS:**

**DCC TESTS:** DCC conducted both material tests and functional tests on the subject buckles. The materials testing results indicated that the LGLS fractured from overload. The functional tests, conducted by the supplier, TRW, were designed to determine how separated LGLS affected the buckles integrity and its ability to function properly. The tests included 100 latching/unlatching cycles, insertion force measurement for the latch plate, button release force measurement, and tensile force measurement of the buckle/latch plate assembly. The buckles functioned properly in all phases of the tests.

**WARRANTY PARTS RETURN ANALYSIS:** DCC conducted analysis on 50 front seat buckles returned through warranty. Twenty-two of the buckles exhibited conditions other than separated LGLS, including “contamination,” “no trouble found,” and “damage/abuse.” The remaining 28 buckles all had separated LGLS and exhibited conditions consistent with those identified in the owner reports, i.e., does not latch because the red release button remained depressed after unlatching, difficult to latch, and difficult to unlatch.

DCC further states: “...all 28 samples could be fully latched and unlatched. DCC testing (as described in the response to PE05-046) indicates that, whether or not latch guide leaf springs are intact, the integrity of the connection is not compromised once the latch plate is fully engaged into the buckle.”

**VEHICLE RESEARCH AND TEST CENTER (VRTC):** The Office of Defects Investigation (ODI) collected five complaint sample buckles from consumers. The buckles exhibited some of the conditions noted in the owner reports, i.e., will not latch because the red release button remained depressed after unlatching, button stuck down but will latch, and difficult to latch.

All five of the buckles had separated LGLS but only four of them had LGLS present. VRTC was able to identify only one buckle that was in a no latch condition, as the button was stuck in the release position. Please see VRTC report number VRTC-DCD-6102 for complete details.

**WARNING SYMPTOMS:** None known.

**CONTRIBUTING FACTORS:** None known

**FAILURE/MALFUNCTION MODES:** There were three failure modes reported by the complainants, i.e., does not latch because the red release button remained depressed after unlatching, difficult to latch, and difficult to unlatch.

**MANUFACTURER’S EVALUATION OF THE ALLEGED DEFECT:** “Based on the nature of the complaints and evaluation of the related components, DCC does not believe this presents any unreasonable risk to motor vehicle safety.”

DCC states that they have received a small number of owner reports alleging difficulty in latching or unlatching, and no reports of false latching, of front seatbelt buckles in MY 2002 Jeep Liberty vehicles. DCC tested and analyzed owner complaint buckles, warranty return buckles, survey sample buckles, and two ODI complainant buckles. Their analysis of these buckles is that all of the buckles were able to fully latch and did not compromise the integrity of the latch plate engagement. Further DCC stated in part: “The latch guide leaf spring acts to aid the return of the button to the original position after latching or unlatching. A fractured and/or separated latch guide leaf spring does not prevent the full and complete engagement of the latch plate into the buckle.”

**ODI ANALYSIS:** The LGLS in the front seatbelt buckles of early production MY 2002 vehicles can fracture and separate from the latch guide. The LGLS are small and can migrate around inside of the buckle housing and interfere with the operation of the release button. Depending upon the location of the LGLS and their relative position to other parts of the internal buckle mechanism, various conditions occur. The button can stick in the down position, and in some instances it must be manipulated up in order to re-latch the belt. In other instances the release button can also require more force than usual to push in. ODI's discussions with owners found instances in which the buckle function subsequently returned to its normal operation with no further problems. From interviews with owners, ODI was unable to identify any trend of the alleged defect condition preventing proper belt use.

The current data shows a declining trend. As charts 1 and 2 show, the vehicles that have experienced the problem are early production vehicles built primarily in CY 2001, and the frequency of complaints in CY 2006 has dropped to that of CY 2004. As a result of the tooling change, it is expected that the trend will continue to decline.

**REASONS FOR CLOSING:** Based on the declining trend, a safety-related defect has not been identified at this time and 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.