



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

ODI RESUME

Investigation: EA 02-029

Prompted By: PE02-045

Date Opened: 10/16/2002

Date Closed: 02/10/2004

Principal Investigator: Cheryl Tuosto

Subject: Hood Latch Failure

Manufacturer: DaimlerChrysler Corporation

Products: 1993-1998 Jeep Grand Cherokee

Population: 1,516,343

Problem Description: The hood latch assembly on model year (MY) 1993-1998 Jeep Grand Cherokee sport utility vehicles allegedly fails, causing the hood to open without warning while the vehicle is in motion.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	20	58	71
Crashes/Fires:	0	0	0
Injury Incidents:	1	0	1
# Injuries:	1	0	1
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other*:	0	0	0

*Description of Other: Injury resulted when the passenger hit her head on the side window as the driver turned to get the vehicle off the road

Action: This Engineering Analysis (EA) has been closed.

Engineer: Cheryl Tuosto CAT

Date: 02/10/2004

Div. Chief: Jeffrey L. Quandt

Date: 02/10/2004

Office Dir.: Kathleen C. DeMeter

Date: 02/10/2004

Summary: ODI opened EA02-029 to determine whether a safety-related defect trend existed in the MY 1997 Jeep Grand Cherokee hood latch assemblies. During EA02-029, there was no specific failure mechanism identified that could differentiate the MY 1997 Jeep Grand Cherokee vehicles from other vehicles containing this same hood latch assembly or account for their higher complaint rate. As a result, ODI expanded the scope of this investigation to include all Grand Cherokees vehicles with the subject hood latch assemblies.

In performing EA02-029, it was determined that some of the secondary hood latches in the subject vehicles may exhibit increased operating frictional resistance; however, since none of the primary hood latches showed any evidence of mechanical or operational deficiency and the complaint rate of hood fly-ups measured over an extended exposure time was low, a safety-related defect trend has not been identified at this time.

WAT
2-10-04

ENGINEERING ANALYSIS CLOSING REPORT**SUBJECT:** Hood Latch Failure**EA No:** EA02-029**DATE OPENED:** 16-Oct 2002**DATE CLOSED:** 10-Feb-2004**SUBJECT VEHICLES:** Model Year (MY) 1993-1998 Jeep Grand Cherokee vehicles manufactured for sale or lease in the United States**SUBJECT COMPONENT:** All hood latch assemblies manufactured for use on the subject vehicles**ALLEGED DEFECT:** The alleged defect is the failure, malfunction, or other unsatisfactory performance of the primary and secondary hood latches, including the failure of the hood latches to secure the hood during vehicle motion.

BASIS: This investigation was opened as a result of upgrading Preliminary Evaluation (PE) 02-045. The Office of Defects Investigation (ODI) opened PE02-045 based on eight (8) complaints of alleged primary and secondary hood latch failure in MY 1996-1998 Jeep Grand Cherokee vehicles, which caused the hood to open unexpectedly. Two (2) of the eight (8) complaints alleged that the secondary hood latch failed due to rust or corrosion, which caused the latch to bind or stick in the open position. ODI received two (2) additional complaints for the alleged defect in the subject vehicles after the PE was opened. Although none of the reported incidents resulted in crashes or injuries, the failure of both hood latches could have caused the driver to lose driver visibility and possibly crash, which could result in property damage, injuries, and possibly death.

As part of PE02-045, an Information Request (IR) was sent to DaimlerChrysler on 29-May-02 and a partial response was received on 16-Jul-02. The remainder of the information requested was provided from 31-Jul-02 through 30-Sep-02. Since the hood latch assembly for the subject vehicles was the same for MY 1993-1998 vehicles, most of the information requested in the IR pertained to those model years.

ODI's PE analysis generally showed low hood fly-up complaint rates; however, the analysis revealed the complaint rate for MY 1997 Jeep Grand Cherokee vehicles was higher than the average rate for the three (3) previous years. Approximately 95% of MY 1997 complaints involved vehicles built from August through December 1996. In addition, 79% of MY 1997 complaints originated in salt belt states, whereas the average for the previous three (3) years was 50%.

ODI's analysis of data received from a major insurance company also showed that the number of paid claims regarding a hood fly-up condition on MY 1997 Jeep Grand Cherokees was 2.4 times the average for MYs 1994-1996.

During PE02-045, DaimlerChrysler conducted two field surveys on ZJ (MY 1993-1998 Jeep Grand Cherokee) vehicles to evaluate the function of the hood latch assembly. The first survey included thirty eight (38) Michigan based vehicles. This survey showed that although there were no primary hood latch performance issues, 13.2% of the secondary hood latches exhibited increased operating frictional resistance ("sticky" latches) and all but one (1) secondary hood

latch hook and base were below DaimlerChrysler's zinc plating specifications (see Manufacturer's Analysis section).

The second field survey was conducted on 184 ZJ vehicles taken from various regions; however, only seventeen (17) percent of the vehicles were taken from salt belt states so ODI did not consider the results of this study to be indicative of the overall performance of the hood latch assembly (see Manufacturer's Analysis section).

In light of these findings, ODI opened Engineering Analysis (EA) 02-029 for MY 1997 Jeep Grand Cherokee vehicles to further evaluate the causal factors and trend of the alleged defect in these vehicles.

CORRESPONDENCE:

Date	Description
5/17/02	PE Opening Resume
5/29/02	PE Information Request (from NHTSA to Manufacturer (Mfr))
7/9/02	Email from DaimlerChrysler requesting response extension
7/16/02	PE Information Request (IR) Response (from Mfr to NHTSA)
7/25/02	Emails from DaimlerChrysler - PE02-045 IR Response Supplemental Information
7/31/02	Email from DaimlerChrysler - NHTSA PE02-045 Supplemental Information - Jeep Grand Cherokee Hood Latch
9/30/02	Results of Manufacturer Hood Latch Assembly Field Survey
10/16/02	PE Upgrade Resume and Engineering Analysis (EA) Opening Resume
4/4/03	Results of Manufacturer Secondary Hood Latch Dimensional Analysis
7/24/03	1997 Jeep Grand Cherokee Hood Latch Investigation (Mfr Presentation at NHTSA Quarterly Review)
8/5/03	EA Information Request (from NHTSA to Mfr)
8/29/03	EA Information Request Response (from Mfr to NHTSA)
12/9/03	1997 Jeep Grand Cherokee Hood Latch Investigation (Mfr Presentation at NHTSA Quarterly Review)
12/17/03	Additional Grand Cherokee Hood Latch Information (from Mfr to NHTSA)
12/19/03	Revision to 12/17/03 Additional Grand Cherokee Hood Latch Information letter (from Mfr to NHTSA)

PROBLEM EXPERIENCE: ODI has received 20 complaints related to the alleged defect in the subject vehicles. DaimlerChrysler has received 58 complaints. In all, the complaints referenced 71 subject vehicles with 67.6 percent of the complaints coming from salt belt state vehicles. The complaints allege that the hood latch assembly failed causing the hood to pop open and hindering the driver's vision while the vehicle was in motion.

ODI has received one report of an injury that occurred to a passenger who hit her head on the side window as the driver made a sharp turn to get the vehicle off the road once the hood flew open. Neither ODI nor DaimlerChrysler has received any reports of crashes or fatalities.

Warranty claims on primary and secondary hood latches were 1430 (0.07%) and 396 (0.03%), respectively.

VEHICLE POPULATION: DaimlerChrysler has sold or leased 1,516,343 subject vehicles in the United States.

COMPONENT DESCRIPTION: The subject vehicles were equipped with a hood latch assembly consisting of separate primary and secondary hood latch systems as shown in Figures 1 and 2 below:



Figure 1: Primary Hood Latch



Figure 2: Secondary Hood Latch

SERVICE BULLETINS: DaimlerChrysler has not issued any technical service bulletins related to the alleged defect in the subject vehicles.

DESIGN, MATERIAL, AND/OR PRODUCTION MODIFICATIONS: The only design modification that occurred to the hood latch assembly on the subject vehicle was a change made to the secondary hood latch by the supplier in April 1997. This change increased the spring tang tab width from 3.8 mm to 5.8 mm as shown in Figure 3 below:

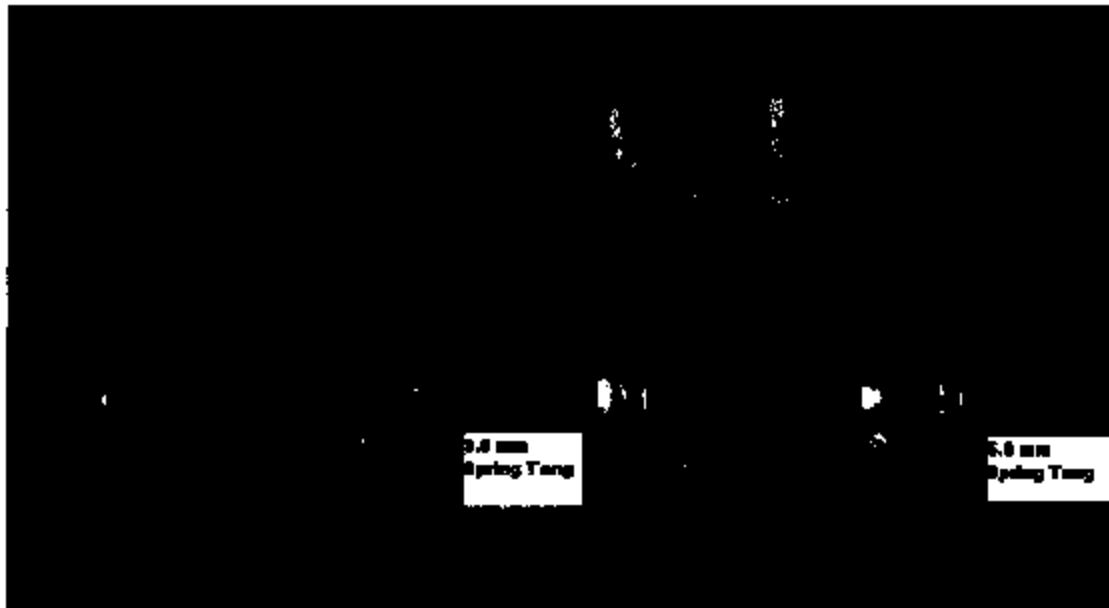


Figure 3: Secondary Hood Latch Design Change

In addition to the original equipment secondary hood latch design change, DaimlerChrysler modified the design of the secondary hood latch service part used on the subject vehicles. These modifications were similar to those made for secondary hood latch in the 1994-1999 Dodge Ram pickup (BR/BE vehicles) recall (NHTSA recall #01V040). The revisions to the Grand Cherokee secondary hood latch were incorporated into the service parts inventory with obsolescence of previous level parts in April 2003.

MANUFACTURER'S ANALYSIS:

DaimlerChrysler's analysis of the alleged defect centers around its analysis of consumer and warranty claims, the hood geometry of the subject vehicle, subject component part sales, a comparison of the subject vehicle hood latch to the previously recalled MY 1994-1999 Dodge Ram hood latch (NHTSA recall number 01V-040), and DaimlerChrysler's vehicle field surveys and hood latch dimensional analysis.

As part PE02-045, DaimlerChrysler conducted a limited field survey on thirty-eight (38) Michigan-owned vehicles ZJ (MY 1993-1998 Jeep Grand Cherokee) vehicles to evaluate the function of the hood latch assembly, including the primary and secondary hood latch systems. The vehicles in this survey were 100% salt belt state vehicles and included seven (7) vehicles that had over 150,000 miles on them. As reported in their July 16, 2002 PE02-045 Response, DaimlerChrysler found the following findings:

- The primary hood latch on all of these salt-belt vehicles examined operated satisfactorily.

- There were no secondary hood latch performance issues identified for 1994-1996 model years.
- Four (4) secondary hood latches from MY 1997-98 vehicles and one (1) from MY 1993 vehicles were observed to exhibit increased operating frictional resistance ("sticky" latches).
- There was no cause identified for the increased operational resistance experienced in the later model years.

During their July 16, 2002 PE02-045 IR response, DaimlerChrysler also submitted a partial assessment and maintained that the overall complaint rate for the hood opening while driving was very low for the subject vehicles and was based on a variety of issues that contributed to the alleged hood opening while driving incidents, including operator error.

In addition, they stated:

"The secondary latch design for the 1993-1998 Jeep Grand Cherokee is significantly different than that of the Dodge Ram pickup secondary hood latch studied earlier. The Dodge Ram secondary latch utilized an additional linkage mechanism to activate the latch, which provided increased frictional resistance to latch operation and makes this system more susceptible to the added effects of corrosion potentially binding its operation. It should also be noted that the hood configuration of the Jeep Grand Cherokee is significantly different than the Dodge Ram pickup truck. Unlike the Dodge Ram, the Jeep Grand Cherokee hood is designed flush to the fenders when in the closed and latch position. This flush hood design makes it clearly evident both outside the vehicle and when seated in the driver's seat, that the hood is not completely latched. This visible indication offers significant operator warning that the hood is not properly latched, unlike the dissimilar design of the Dodge Ram pickup truck.

Jeep Grand Cherokee hood latch part sales are also well within those typical for vehicles approaching and beyond 10 years in service age, and do not indicate there is any significant concern with the durability of the latching system on these vehicles. The majority of these part sales are for the frontal collision repairs.

Based on the low complaint rate, the hood geometry and visibility, the overall age of the vehicle fleet, and the absence of significant part sales, it is Daimler Chrysler's assessment that the hood latching system for the 1993-1998 Jeep Grand Cherokee vehicles poses no significant risk to motor vehicle safety."

As a follow-up to their PE02-045 IR Response, DaimlerChrysler conducted another field survey on 184 ZJ (MY 1993-1998 Jeep Grand Cherokee) vehicles to further evaluate the function of the hood latch assembly, including the primary and secondary hood latch systems. The 184 vehicles surveyed were taken from one of five geographic areas (Atlanta, Georgia; St. Louis, Missouri; Montreal, Canada; Phoenix, Arizona; Los Angeles, California). Seventeen (17) percent of the vehicles surveyed during this study were taken from salt belt states and eighty-three (83) percent were taken from non-salt belt states. As reported in their September 30, 2002 letter to ODI, DaimlerChrysler found the following hood latch survey findings:

"The primary latch system has been evaluated on all survey vehicles and we have found no operational concerns with any of the inspected vehicle latches. We have no reason to

believe there is any problem with this system and it constitutes no risk to motor vehicle safety. This finding is consistent with our earlier preliminary findings, reported July 16, 2002 [Response to PE02-045 Information Request]."

"Of the 184 vehicles inspected in the survey, none of the secondary hood latches was found to be inoperative. Of the vehicles surveyed, only five [2.7%] had hood secondary latches that could possibly be characterized as "sticky", but they clearly were functional."

"DaimlerChrysler has found that the hood latching system in these vehicles is functioning properly. We believe that the alleged cases of hood fly-ups reported to NHTSA are isolated, and it is our opinion, as stated in the response to PE02-045, that they are due to customers not fully closing the hood of their vehicle."

As part of EA02-029, which was opened up on MY 1997 Jeep Grand Cherokee vehicles, DaimlerChrysler conducted a secondary hood latch dimensional analysis to determine if there were any dimensional differences in the MY 1997 Jeep Grand Cherokee vehicles latches versus other vehicle model years. As stated in their April 4, 2003 letter to ODI, DaimlerChrysler reported the following findings:

"DaimlerChrysler's review of this detailed dimensional information has not identified any dimensional factor with any of these latches which would cause abnormal latch performance."

DaimlerChrysler does not believe that an engineering change or manufacturing deviation is responsible for the few reported hood fly-up conditions on the subject vehicles. Our analysis indicates that these latches would have safely retained the hood if the primary hood latch was not engaged. It continues to be our belief that the limited number of hood fly-up reports which exist on the 1997 Jeep Grand Cherokee are primarily due to customers who did not properly close the hood and engage the primary and secondary latches."

In its December 9, 2003 presentation to ODI at the NHTSA Quarterly Review, DaimlerChrysler summarized their findings regarding the alleged defect in the subject vehicles as follows:

- DaimlerChrysler has not found any indication of any defect with these subject secondary hood latches.
- The complaint rate for these vehicles is low, and is not increasing significantly.
- Complaints rates do not nearly approach the level of previously recalled (1994-1999) Dodge Ram hood latches.
- Number of complaints remains low, considering there were over 1.5 million 1993-1998 Grand Cherokee vehicles sold or leased in the United States, and that these vehicles are now approaching 11 model years old.
- DaimlerChrysler's review of detailed dimensional information from 184 vehicle survey did not identify any dimensional factors with any latches which would cause abnormal latch performance.
- There were no part design or process changes identified which would cause improper latch function.
- The driver of a ZJ has visual warning when hood is not fully closed.
- Alleged hood fly-ups have largely resulted from customers not fully closing the hood

VEHICLE RESEARCH AND TEST CENTER (VRTC) SURVEY AND TEST RESULTS:

VRTC conducted a Vehicle Owner Hood Latch Field Survey (DCD3050/EA02-029 survey) on the hood latch assembly of 32 salt belt state vehicles in the state of Ohio. The Jeep Grand Cherokee vehicles surveyed ranged from MY 1995 through 1998 (4 Pre-MY 1997, 25 MY 1997, and 3 Post MY 1997 with 16 MY 1997 vehicles built between August and December 1996). As part of the survey, the VRTC personnel performed a function check of the hood latch system. Specifically the VRTC checked for the proper functioning of the secondary hood latch when the primary latch was activated. During the survey, VRTC found the following regarding the performance of the hood latch assembly:

- None of the primary hood latches showed any evidence of mechanical or operational deficiency.
- One MY 1997 secondary hood latch (vehicle month of build and mileage: 12/96 and 96,210 miles, respectively) was stuck in the released position and when the primary hood latch was released did not hold the hood closed.
- One MY 1997 secondary hood latch (vehicle month of build and mileage: 11/96 and 70,908 miles, respectively) stuck in the full open position when the secondary hood latch was opened; however, when the hood was subsequently closed, the secondary hood latch hook struck the rear edge of grille on the front of the vehicle, which enabled the latch to engage.
- One MY 1996 and one MY 1997 secondary hood latch (vehicle month of builds and mileages: 12/95 and 135,602 miles and 11/96 and 84,468 miles, respectively) failed to fully return to the rest position when the secondary hood latch was opened; however, when the primary latch was subsequently actuated, the secondary hood latch did prevent the hood from opening.

As part of the survey, the VRTC personnel replaced the in-service secondary hood latches with new DaimlerChrysler replacement latches. The 32 in-service latches that were collected, along with 12 new DaimlerChrysler replacement latches, were tested in the laboratory on a device specifically designed to measure the force-deflection characteristics of these latches. The new replacement latches appear to be based on an approved design. During the testing, VRTC found the following regarding the efficiency performance of the secondary hood latches:

- The mean efficiency of the 12 new replacement latches was 69.0% with a standard deviation of 4.2%.
- The mean efficiency of the 32 in-service vehicle latches was 27.8% with a standard deviation of 14.5%.
- The efficiency of the in-service secondary hood latches on MY 1997 vehicles or those specifically built from August through December 1996 were not significantly different than any of the other in service latches tested.

It is possible that had the secondary hood latches been properly lubricated routinely throughout the life of the vehicle, the mean efficiencies would have remained higher.

The VRTC also conducted a peer vehicle owner hood latch survey on the hood latch assemblies of 33 MY 1996-1998 Chevrolet S/T Blazer, Jimmy, and Bravada vehicles from the same geographic area as the Jeep Grand Cherokee Hood Latch Survey. During this survey, the VRTC personnel inspected the latches to determine if the hood latch assembly was functioning properly when the primary hood latch was activated and when the secondary hood latch was released.

During the peer vehicle survey, the VRTC found the following regarding the performance of the hood latch assembly:

- None of secondary hood latches failed to return to the rest position.
- The mean efficiency of the 33 peer vehicle latches was estimated to be approximately 54 percent.

ODI ANALYSIS:

ODI initially opened EA02-029 to determine whether a safety-related defect trend existed in the MY 1997 Jeep Grand Cherokee hood latch assemblies. During EA02-029, there was no specific failure mechanism identified that could differentiate the MY 1997 Jeep Grand Cherokee vehicles from other vehicles containing this same hood latch assembly or account for their higher complaint rate. As a result, ODI expanded the scope of this investigation to include all MY 1993 – 1998 Jeep Grand Cherokees vehicles, which contained the same hood latch assembly.

In its review of consumer complaints pertaining to the alleged defect, ODI found that the complaint rate for the subject vehicle was lower than most of the previous hood latch assembly investigations resulting in a recall.¹

ODI's analysis of RQ00-012 and the MY 1994-1999 Dodge Ram hood latch regional (salt-belt states) recall (NHTSA recall number 01V-040) showed that although there was component material similarities between the MY 1994-1999 Dodge Ram hood latches and those of the subject vehicles, there were significant differences between the hood and the hood latch assembly designs in these vehicles (see Manufacturer's Analysis section). These differences could account for the significantly higher complaint rate and the safety-related defect trend that led to the MY 1994-1999 Dodge Ram recall. Although the subject vehicles are significantly older than the Ram trucks investigated in RQ00-012, their complaint rates in both salt-belt states and non-salt belt states are lower than the rate observed in the non-salt belt Ram trucks that were excluded from the 2001 recall (Figure 4).

¹ See Recall 01V-040, 1994-1999 Dodge Ram (secondary hood latch return spring may corrode and cause mechanism to bind in "release" position); Recall 95V-151, 1991-1992 Lincoln Town Car (secondary latch may not engage when hood is closed); Recall 93V-189, 1989-1993 Geo Metro and 1989-1993 Swift (mis-located spot welds resulting in hood inner liner cracking and improper striker engagement); Recall 91V-147, 1991 Lincoln Town Car (secondary latch may not engage when hood is closed); Recall 91V-135, 1987-1988 Chevrolet Beretta, Corsica (secondary hood latch assembly improper adjustment resulting in bent latch); Recall 98V-160, 1993-1996 Volkswagen Golf, GTI, Jetta (bolts securing hood can loosen over time, causing disengagement of striker from front hood latch); and Recall 84V-111, 1983-1984 Ford Ranger (secondary hood latch component mis-positioned).

The chart below shows a comparison of the MY 1995 – 1997 BR Dodge Ram² and MY 1993-1998 ZJ Jeep Grand Cherokee³ secondary hood latch complaint rates:

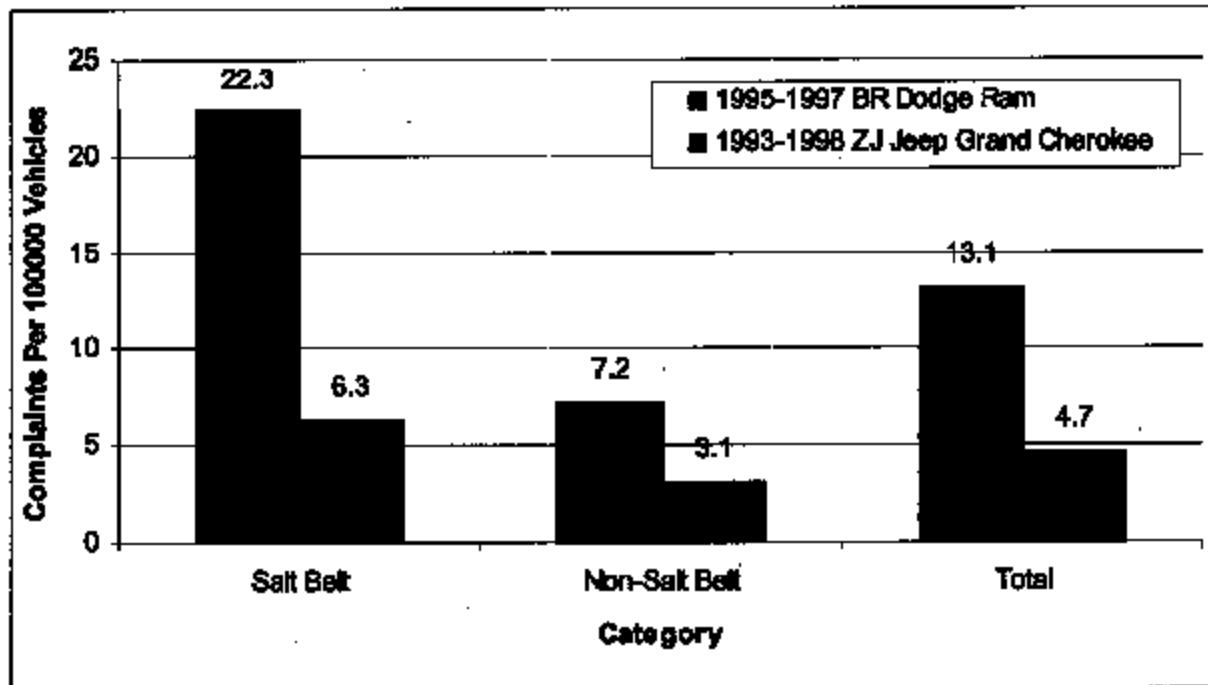


Figure 4: Dodge Ram vs. Jeep Grand Cherokee Secondary Hood Latch Complaint Rates

ODI's analysis of DaimlerChrysler's 184 ZJ vehicle survey showed that the vehicle population surveyed was not representative of the subject vehicle population. In DaimlerChrysler's survey, eighty-three (83) percent of the vehicles surveyed were taken from non-salt belt states and the data from the PE02-045 analysis indicated that the highest complaint rate of hood latch fly-ups was coming from vehicles located in the salt belt states. As a result, ODI requested that the VRTC conduct an independent survey to provide more information regarding the alleged defect in the subject vehicle and the effect that the salt belt region had on ZJ vehicle hood latch assembly performance.

Although the VRTC survey and testing showed that the efficiency of secondary hood latches had deteriorated over time, that one of the secondary hood latches was stuck in the released position, and that three other secondary hood latches failed to return to the rest position, the low overall warranty and complaint rate for hood fly-ups, as well as, the operational and mechanical effectiveness of the primary hood latch indicated that these conditions were not necessarily leading to a safety-related defect trend.

² The BR Dodge Ram rates were taken from DaimlerChrysler's December 9, 2003 presentation to ODI and only include 157 complaints received on vehicles produced outside of the Recall 95V-056 population (January 1995 through the end of MY 1997 production). These rates did not include the additional 159 complaints referenced in the ODI RQ00-012 closing report, which were received on MY 1994 – 1995 vehicles within the Recall 95V-056 population, but that occurred after the original recall work was completed.

³ The ZJ Jeep Grand Cherokee rates include all 71 complaints previously referenced in this report.

REASON FOR CLOSING:

In performing this Engineering Analysis, it was determined that some of the secondary hood latches in the subject vehicles may exhibit increased operating frictional resistance; however, since none of the primary hood latches showed any evidence of mechanical or operational deficiency and the complaint rate of hood fly-ups measured over an extended exposure time was low, a safety-related defect trend has not been identified at this time.

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 reserves the right to take further action if warranted by the circumstances.

Cheryl Truote
Safety Defects Engineer

2/10/04
Date

[Signature]
Chief, Vehicle Control Division

2/10/04
Date

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Director, Office of Defects Investigation

2-10-04
Date