U.S. Department of Transportation

National Highway Traffic Safety Administration

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION

NHTSA

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Investigation: EA 12-005
Prompted by: DP09-005, PE10-031, FARS data
Date Opened: 06/12/2012 **Date Closed:** 11/14/2014
Investigator: Peter Ong
Subject: Crash Related Fuel Tank Fires

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Chrysler Group LLC
Products: 93-04 Grand Cherokee, 93-01 Cherokee & 02-07 Liberty
Population: 5,100,000

Problem Description: Fuel tank system integrity in rear-impacts or crashes.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	18	63	69
Crashes/Fires:	16	59	63
Injury Incidents:	9	47	53
Number of Injuries:	9	34	38
Fatality Incidents:	8	38	38
Number of Fatalities:	12	44	56
Other*:	21	0	21

***Description of Other:** 18 fatal fires and 3 non-fatal fires (19 fatalities/20 injuries) from other sources (FARS, news media and consumer groups)

ACTION / SUMMARY INFORMATION

Action: Close this Engineering Analysis (13V-252)

Summary:

ODI has completed an extensive analysis of rear crash fuel tank system integrity data for the subject Jeep Cherokee, Grand Cherokee and Liberty vehicles (SVs). As of June 2013, ODI knew of 56 post-collision fatal fires, 28 non-fatal fires, and 6 fuel leak incidents (totaling 90 incidents, 75 fatalities and 58 injuries) involving the SVs. Based on this analysis, ODI issued a Recall Request Letter (RRL) on June 3, 2013 requesting that Chrysler recall the Grand Cherokee and Liberty vehicles due to the rate of fatal, non-fatal fire, and fuel leak incidents when compared to peer vehicles (compact and medium SUVs) built during the same time period. In the RRL, ODI described how the location of the aft-mounted fuel tank made the SVs vulnerable to rear impact crash fuel tank failures. During the analysis, besides the high speed/high severity crashes present in both the SV and peer vehicles, ODI observed a significant number of low and moderate speed rear impact crash related fires and leaks, particularly in the Liberty. The data also demonstrated that SVs originally equipped with towing hitch receivers (trailer hitches) appeared to be under-represented in rear-impact related fuel tank failures. In the RRL, ODI requested that Chrysler provide its response by June 18, 2013, otherwise NHTSA might proceed to an Initial Decision that the SVs contain a safety-related defect.

Chrysler responded to the RRL on June 4, 2013 and vigorously disputed the tentative findings of the RRL. Among other things, Chrysler argued that the SVs had an overall safety record superior to their peers, met or exceeded all applicable federal motor vehicle safety standards (FMVSS) and only experienced fires in severe high energy rear impacts. Nonetheless, while continuing to maintain that the SVs did not contain a safety-related defect, Chrysler proposed a recall (13V-252) of approximately 2.5M (1.6M currently registered) model year (MY) 1993 - 1998 Grand Cherokee (ZJ) and MY 2002-2007 Liberty (KJ) vehicles on June 18, 2013. The recall remedy submitted by Chrysler

would employ a hitch receiver assembly consisting of a steel cross-member behind the fuel tank with forward-projecting arms bolted to the frame rails on either side of the fuel tank. For the MY 1999 - 2004 Grand Cherokee, Chrysler indicated it would conduct a customer satisfaction campaign and inspect vehicles equipped with aftermarket tow hitch receivers, and if necessary, replace any such hitch receivers whose condition may increase the risk of fuel system failure in rear crashes. Examination of the available data established that the MY 1999 - 2004 Grand Cherokee did not pose the same magnitude of safety risk as the MY 1993 - 1998 Grand Cherokee and MY 2002-2007 Liberty, particularly in low and moderate speed rear impacts. Because the agency has concluded that the vehicles do not present an unreasonable risk to safety, ODI is closing its investigation of the MY 1999 - 2004 Grand Cherokee. Although it was not within the scope of the Petition initiating this investigation or the Preliminary Evaluation preceding this EA, ODI also examined the performance of the MY 1993 - 2001 Cherokee as part of this investigation. NHTSA's assessment of the available data for the Cherokee did not establish an unreasonable risk in comparison to peer vehicles.

ODI does not approve proposed defect remedies. While offering to install hitch receiver assemblies on the MY 1993-1998 Grand Cherokees and 2002-2007 Liberty, Chrysler did not, in ODI's view, provide enough evidence demonstrating the effectiveness of the proposed remedy in rear impacts. Recognizing the nature of the concern in EA12-005 and its potential for injury and death, ODI took the unusual step of requesting that NHTSA's Vehicle Research Test Center (VRTC) conduct crash reconstruction tests of actual crash incidents that were identified during the investigation to evaluate the remedy.

The proposed ZJ remedy was examined through 5 reconstruction tests (based on an August 2000 crash - ODI 869217/Chrysler 7575045) performed using a 1996 Cadillac Deville striking the rear of the ZJ at 35 mph, the estimated closing speed from the actual crash incident. In that incident, the fuel tank of the ZJ ruptured, resulting in a fire. The first three reconstructions were performed without a hitch receiver installed. For these tests, during which the striking vehicle ride height was varied to evaluate the effects of pre-impact braking, a fuel leak occurred for the first two ride-height cases. Two additional reconstructions were performed with the hitch receiver installed and using the ride height most representative of the actual crash incident (and one which previously produced a fuel leak). Neither of the reconstructions using the hitch receiver resulted in a fuel leak. Through the five reconstructions, VRTC was also able to evaluate the effects of under-ride and rear frame rail corrosion of the ZJ vehicle. VRTC's report provides additional details of the ZJ reconstructions.

The proposed Liberty remedy was examined by conducting reconstruction tests of a September 2004 rear impact fire crash (VOQ 10138726/Chrysler 1161999) where a MY 1997 Plymouth/Dodge Neon passenger car hit the rear of a Liberty at 40 mph and caused a fire that consumed the vehicle (an under-ride crash mode). The initial reconstruction test was performed without the hitch receiver, resulting in a significant fuel leak from a ruptured fuel tank. No fire occurred because the tank contained a non-flammable gasoline substitute. This reconstruction test was then followed by a second reconstruction with a hitch receiver installed. The fuel tank did not leak with the hitch receiver installed.

In addition, shortly after the RRL was issued, ODI learned of a May 2013 rear crash (VOQ 10512282) involving a large pickup (traveling at 43mph) that struck a Liberty equipped with an original equipment hitch receiver. A towing draw bar was installed in the hitch receiver at the time of the crash. An inspection indicated that the striking vehicle had hit the draw bar, fracturing the hitch receiver's transverse cross-member and puncturing the fuel tank. Because the presence of the removable draw bar appeared to cause the hitch failure and subsequent fuel leak, ODI further requested that VRTC perform an additional test to reconstruct this incident without the removable draw bar installed in the Jeep hitch receiver. VRTC's eighth and final reconstruction test showed that when the draw bar was not installed, the hitch receiver did not break, and the fuel tank was not punctured as it was in the actual crash incident. Additional information on each of the above crash reconstruction tests is provided in VRTC's EA12-005 Reconstruction Test Report, available at http://www-odi.nhtsa.dot.gov/acms/cs/jaxrs/download/doc/UCM458003/INRP-EA12005-59675.pdf.

VRTC's testing demonstrates that the Chrysler hitch receiver provides incremental safety benefits in certain low and moderate speed crash incidents (particularly those where the Liberty and ZJ Grand Cherokee without hitch receivers performed poorly compared to their peers). Once the reconstruction tests were completed and analyzed, ODI notified Chrysler that the proposed remedy demonstrated incremental improvements in rear crash performance and the agency did not have any reservations about Chrysler implementing the remedy. Chrysler then determined that it would proceed with its remedy plan. ODI notes that in terms of crash severity, the VRTC reconstruction tests involved vehicle to vehicle impacts with crash energies ranging from ~154,000 to ~370,000 ft./lbs. (~209,000 to ~502,000 N m). In addition, ODI requested that Chrysler notify owners that the draw bar should be removed from the hitch receiver when not towing a trailer. The remedy will not necessarily be effective in the most severe crashes - where peer vehicles performed similarly to the Liberty and ZJ Grand Cherokee - but ODI believes the Chrysler remedy will

produce safety benefits sufficient to increase the fuel tank system integrity of the recalled vehicle population to a level similar to that of their peers. Accordingly the investigation is closed.

The ODI reports cited in the table above can be reviewed online at http://www-odi.nhtsa.dot.gov/owners/SearchSafetyIssues under the following identification (ODI) numbers:

Grand Cherokee: 506249, 549376, 734783, 869217, 10009553, 10335943, 10351589, 10351980, 10357528, 10465228, 10499041, 10515310

Liberty: 10138726, 10149256, 10181332, 10357195, 10366653 (duplicate of 10357195)

Cherokee: 10409104