U S. Department of Transportation
National Highway Traffic Safety Administration

ODI RESUME

Investigation: PE09-026
Date Opened: 05/18/2009 Date Closed: 09/18/2009
Principal Investigator: Robert Young
Subject: Motorcycle Front Wheel Separation

Manufacturer: BMW of North America, LLC, Bayerische Motoren Werke
Products: BMW MY 2000-2003 F650GS
Population: 4,294

Problem Description: Full or partial front wheel separation when the lug that secures the axle to the fork fractures.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	1	3	4
Crashes/Fires:	1	3	4
Injury Incidents:	1	3	4
# Injuries:	1	3	4
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other:	0	0	0

Description of Other:

Action: A safety related defect trend has not been identified at this time. This investigation is closed. A technical report is attached.

Engineer: *Bob Young* Date: *09/18/2009*
Div. Chief: *Richard Boyd* Date: *09/18/2009*
Office Dir.: *Kathleen C. DeMeter* Date: *09/18/2009*

Summary:

This PE was opened after NHTSA received 3 VOQs concerning alleged front axle separations on certain BMW F650 GS model motorcycles sold for use in the United States (the subject vehicles). Complaints involving motorcycles in non-US markets are not counted in this total.

After gathering additional information about this subject, we are now aware of four confirmed incidents involving Model Year 2001-2003 subject vehicles. All four bikes were built before September, 2002. Of these, two involve MY 2001 bikes and the other two, MY's 2002 and 2003, respectively. The incidents occurred in 2002, 2003 and two in 2008. In each instance, the lug fractures are forced fractures rather than fatigue-related.

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Between October, 1999 and September, 2002, BMW built approximately 4,300 subject vehicles. After September 12, 2002, all F650gs's were built with reinforced lower fork tubes to reduce, according to BMW, "the possibility of any significant fracture that could occur at the fork leg axle lug area" during a crash. BMW took this action because the subject vehicles are designed for off-road use where crashes (many minor) are common and did not want riders to have to deal with a broken fork as a result.

Currently, there is no data conclusively establishing that the subject fork lugs are separating before an alleged crash occurs. Additionally, the infrequent, sporadic and random nature of the failures fails to establish a defect trend currently exists.

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.

Attachment

Memorandum

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

Subject: BMW F650GS Fork Failures **Date:** September 18, 2009

From: Bob Young - ODI

To: Public File, PE09-026

1.0 INTRODUCTION

On May 18, 2009, NHTSA opened Preliminary Evaluation (PE) 09-026 to investigate allegations of spontaneous front axle separations on certain 2000-2003-model year (MY) BMW F650GS (and Dakar variant) motorcycles. It was alleged that crashes were occurring when the axle retaining lug(s) separated from the lower fork tube(s) while riding normally. After establishing a foundation of knowledge, ODI focused on determining whether the part was failing prior to a crash (and thus contributing to the crash) or if the part was failing as a result of the crash.

While gathering information for the PE, we did the following:
* Reviewed material gathered/provided by interested consumers related to this issue;
* Reviewed various web forums for related postings;
* Discussed the issue with various BMW authorized dealers;
* Discussed the issue with other motorcycle dealers;
* Discussed the issue with a representative of the Australian government's Department of Infrastructure, Transport, and Regional Development (DOTARS);
* Discussed the issue with a representative of the British government's Vehicle and Operator Services Agency (VOSA);
* Discussed the issue with a plaintiff's attorney representing a rider injured when a subject failure allegedly occurred involving a subject motorcycle; and
* Reviewed material provided by BMW responsive to our May 22nd Information Request.

2.0 THE ALLEGED FAILURE

The alleged defective component is the lower fork tube, specifically, the interface between the fork tube and the front axle lug.

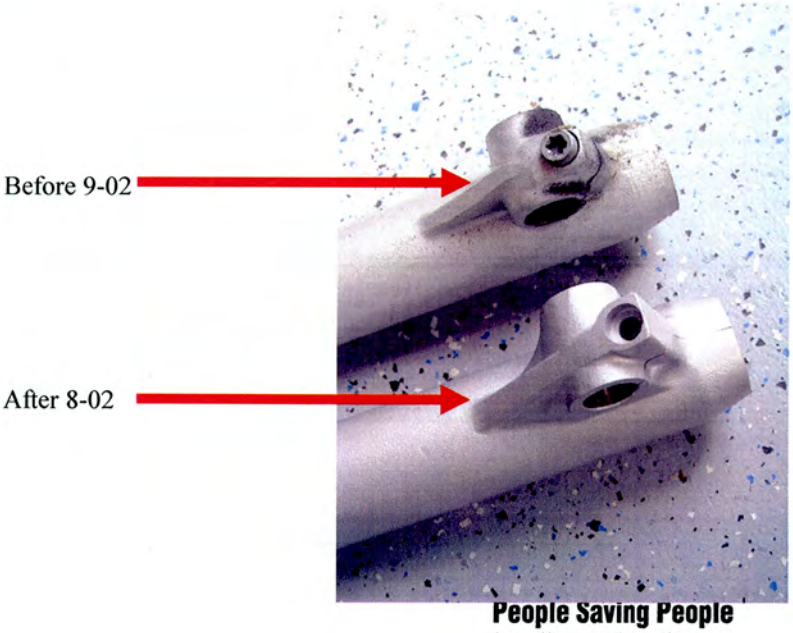
The alleged failure involves a spontaneous separation of the lug from the fork tube.

Following each event, metallurgical analyses conducted by BMW, independent analysts, or both, found the fracture occurred due to impact force (a "forced fracture") rather than fatigue (a weakening of material over time). BMW's testing found that these fractures would only occur if a force substantially greater than what would be found during normal riding were applied perpendicular to the wheel rim at this point with the fork at full lock.

This later point is important…with the fork at full lock, the assembly cannot rotate around the steering axis and maximum leverage is therefore applied. The type of force needed to break the lug can only be found in crash events (even minor ones) when the fork is bearing against the steering stop. Simply riding over a railroad crossing (as alleged by one ODI complainant), or hitting potholes or rocks while riding normally will not produce the unique combination of force, direction, and geometry needed to separate the lug. It is precisely this unique combination that explains why failures are infrequent. If simply riding over a railroad crossing, for example, would produce this failure, we would expect there to be many, many more failures since rail crossings are so common.

3.0 BMW'S DESIGN CHANGE

Beginning in September 2002, BMW began producing F650GS's with a reinforced lug/fork interface.



According to BMW, this change was made to ensure that riders were not stranded while riding in remote sections of the world simply because a lug separation occurred as a result of a minor crash.[1] The change has been effective for, while the occurrence frequency was already low with the early design, no lug separations have occurred involving the current design.

4.0 FOREIGN GOVERNMENTS

ODI contacted both DOTARS and the VOSA to learn what they knew about this issue. Neither the Australian (DOTARS) or British (VOSA) governments have conducted an investigation of this subject nor are there plans to do so in the near future. As with ODI, this could change if additional facts warrant.

VOSA advises it is aware of one "complaint" related to this subject. We are told it comes from a rider with over 36,000 km of world-wide riding experience, some in severe environments, who has not had a failure but is concerned about the possibility of one occurring.

DOTARS advises it is aware of one related complaint. A crash is alleged. We are told it comes from a rider who coincidently, also reported to ODI (VOQ 10244404). Subsequently, BMW performed a metallurgical evaluation of the subject fork leg. According to BMW, the separation is consistent with a "forced fracture" and no material anomalies were found.

5.0 CONCLUSION

This PE was opened after NHTSA received 3 VOQs concerning alleged front axle separations on certain BMW F650 GS model motorcycles sold for use in the US (the subject vehicles). Complaints involving motorcycles in non-US markets are not counted in this total.

After gathering additional information about this subject, we are now aware of four confirmed incidents involving MY 2001-2003 subject vehicles. All four bikes were built before September, 2002. Of these, two involve MY 2001 bikes and the other two, MY's 2002 and 2003, respectively. The incidents occurred in 2002, 2003, and two in 2008. In each instance, the lug fractures are forced fractures rather than fatigue-related.

Between October 1999 and September, 2002, BMW built approximately 4,300 subject vehicles. After September 12, 2002, all F650GS's were built with reinforced lower fork tubes to reduce, according to BMW, "the possibility of any significant fracture that could occur at the fork leg axle lug area" during a crash. BMW took this action because the subject vehicles are designed for off-road use where crashes (many minor) are common and did not want riders to have to deal with a broken fork as a result.

Currently, there is no data conclusively establishing that the subject fork lugs are separating before an alleged crash occurs. Additionally, the infrequent, sporadic, and random nature of the failures fails to establish that a defect trend currently exists.

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[1] The F650GS and "Dakar" variant are intended by BMW to be used off-road . In some cases, "no road." Minor crashes are common in this environment (while riding in dry creek bed, in the rain on smooth rocks, for example.)