U.S. Department of Transportation

National Highway Traffic Safety Administration

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION

NHTSA

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Investigation: PE 10-050
Date Opened: 12/21/2010 **Date Closed:** 05/04/2011
Investigator: Ali Motamedamin **Reviewer:** Scott Yon
Approver: Frank Borris
Subject: Brake lamp switch failure.

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: MERCEDES-BENZ USA, LLC.
Products: MY 2000-2002 Mercedes Benz M Class
Population: 136,751

Problem Description: Brake lamp switch failure that could potentially prevent the cruise control from disengaging when the brake pedal is applied.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	18	30	48
Crashes/Fires:	0	0	0
Injury Incidents:	0	0	0
Fatality Incidents:	0	0	0
Other*:	0	13,077	13,077

***Description of Other:** Warranty claims for brake lamp switch replacement (~60 may involve cruise control disengagement).

ACTION / SUMMARY INFORMATION

Action: The investigation is closed. Mercedes Benz (MB) is conducting NHTSA safety recall 11V-208.

Summary:

ODI opened the investigation based on reports that the subject vehicle brake lamp switch (switch) failure caused 1) inoperative brake lamps (stay on or fail to illuminate), and/or 2) shift interlock failure (shifter locked in park), and/or 3) the cruise control to fail to cancel with brake application. Consumers also reported the illumination of a warning lamp on the instrument panel.

The switch contains three sets of electrical contacts and a (normally extended) spring loaded plunger that actuates the contacts as it moves. As installed in the vehicle, the plunger contacts the brake pedal arm and is pushed into the switch; as the driver applies the pedal the plunger extends. One set of contacts (BLS) operates the stop lamps, a second set (EWM) controls the shift interlock system, and a third set (BS) is used by an on-board diagnostic (OBD) system to monitor switch operation. The cruise control monitors the BLS signal to determine when the brake is applied, the primary way the system is disabled when set. The relative timing of contact actuation in response to plunger movement allows the OBD system to detect a switch fault. When a fault is detected a malfunction indication lamp (MIL) is illuminated (driver alert), a diagnostic trouble code (DTC) is stored (for the service technician), and cruise control operation is inhibited (as a failsafe).

In its response to ODI's January 2011 information request letter, MB explained its assessment of switch failures which was based primarily on evaluation of field return failures. MB identified both 1) electrical contact and 2) mechanical switch failure mechanisms. According to MB's analysis, electrical contact failure is the predominate failure type and the failure consequence depends on which contact fails. For instance MB claims that BLS contact failures are momentary in nature and do not affect brake light operation but are nonetheless detected by the OBD system, resulting in a DTC and subsequent replacement. Electrical contact failures of the BS and EWM contacts result in a

DTC also, and EWM contact failures result in the shifter being stuck in the park (which can be overridden by the consumer). Accordingly MB maintains that electrical contact failures of the switch have no safety consequence since the brake lamps remain operational and the cruise control is always disabled.

MB determined that mechanical failures of the switch, which are rare in their assessment, can result from internal wear and/or increased switch operating temperatures. High temperatures occur due to overheating of the BLS contacts and can cause the internal plastic components to melt. In one scenario overheated BLS contacts may melt to the extended plunger and are damaged when the brake pedal is released resulting in the brake lights staying on. In another scenario the increased temperatures and/or internal wear can cause the plunger to stick in the fully depressed position. In this case the cruise may not cancel when the brake is applied and the driver may have to use high brake pedal forces or other means (shifting to neutral or using the cruise master switch) to disengage the cruise. Additionally the vacuum assist can be depleted if the driver pumps the brakes resulting in reduced braking effectiveness and even higher pedal forces.

In its March 31, 2011 defect notification, MB stated that to remediate the potential need for excessive brake force it would conduct a safety recall (11V-208) to replace the switch with a more robustly designed component. The recall includes 136,751 model year 2000 - 2002 M-Class and model year 2000 - 2004 M-Class AMG vehicles. Owner notification letters will be mailed to consumers in September 2011. This action taken by MB is sufficient to resolve the issues raised by this investigation.