



U.S. Department  
of Transportation

**National Highway  
Traffic Safety  
Administration**

# ODI RESUME

**Investigation:** EA 11-009  
**Prompted by:** PE11-003  
**Date Opened:** 07/26/2011  
**Investigator:** Kyle Bowker  
**Approver:** Frank Borris  
**Subject:** Wheel Mounting Stud Fracture

**Date Closed:** 01/20/2012  
**Reviewer:** Jeff Quandt

## MANUFACTURER & PRODUCT INFORMATION

**Manufacturer:** FORD MOTOR COMPANY  
**Products:** 2010 Ford Fusion and Mercury Milan  
**Population:** 317,315

**Problem Description:** One or more wheel mounting studs allegedly fractures, which may result in wheel separation.

## FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
<b>Complaints:</b>	20	75	84**
<b>Crashes/Fires:</b>	0	0	0
<b>Injury Incidents:</b>	0	0	0
<b>Fatality Incidents:</b>	0	0	0
<b>Other*:</b>	0	361	361

\***Description of Other:** Warranty claims paid by the manufacturer to repair or replace fractured wheel studs.

\*\* Count indicates duplicate reports received by ODI and manufacturer.

## ACTION / SUMMARY INFORMATION

**Action:** This Engineering Analysis has been closed. The manufacturer initiated a safety recall (11V-574).

### Summary:

To date, the agency is aware of 84 consumer complaints and 361 warranty claims related to the alleged defect in the subject vehicles. In total, 382 subject vehicles reportedly experienced one or more wheel stud fractures, resulting in 7 alleged wheel separation incidents. Most of the reported wheel stud fractures occurred on subject vehicles originally equipped with 17 inch diameter steel wheels (368 of 382) as did all 7 alleged wheel separation incidents. Of the 7 alleged wheel separation incidents, 5 reportedly involved a wheel becoming detached from the subject vehicle's rear axle.

The subject vehicles are designed with a safety margin that requires validation of proper wheel joint function with one missing lug nut and all other lug nuts at the minimum torque specification. If multiple stud fractures occur at a wheel location, analysis of reports indicates that the operator may observe vehicle vibration. If the vibration is ignored and the vehicle continues to be driven the remaining studs may fracture, resulting in a wheel separation.

By letter dated December 5, 2011, the manufacturer notified the agency that it will conduct a safety recall (identified by NHTSA Recall No. 11V-574 and Ford Recall No. 11S23) on certain 2010 and 2011 model year Ford Fusion and Mercury Milan vehicles to address the potential for wheel separation. The recall vehicles were originally equipped with 17 inch diameter steel wheels and were built from April 1, 2009, through April 30, 2009, and from December 1, 2009, through November 13, 2010. Approximately 128,616 vehicles are potentially affected as well as approximately 2,940 service steel wheels distributed to authorized Ford dealers.

Ford has identified two distinct root causes of wheel stud fracture in the recall vehicles. First, certain steel wheel centers may have been stamped improperly such that the mounting pad lacks the necessary concavity, which reduces the diameter of the outermost radial points of contact with the brake rotor. This reduces the Belleville washer effect, which reduces the clamp load of the joint. Second, the wheel mounting face on certain rear brake discs may have

been machined improperly due to a damaged dust boot on a gauge that measures rear brake rotor parallelism (flatness), resulting in a wheel mounting face that is convex. One or both conditions may induce bending fatigue in the wheel studs. Ford's analysis of manufacturing process information showed that one or both of these two conditions may have been out of control during parts of one or both production ranges covered by the recall.

Owners will be notified by mail and instructed to take their vehicles to an authorized Ford or Lincoln dealer to have the lug nuts replaced on all four wheels with new lug nuts treated with a proprietary low-friction coating that improves clamp load given the same applied torque value, and to have the rear brake discs inspected for wheel mounting surface flatness and replaced, if required. Ford will instruct dealers to notify customers who purchased service steel wheels, where information is available, to return vehicles for lug nut replacement.

Accordingly, this investigation is closed.

The ODI reports cited above can be reviewed at [www-odi.nhtsa.dot.gov/complaints](http://www-odi.nhtsa.dot.gov/complaints) under the following identification (ODI) numbers: 10364337, 10373257, 10378953, 10381431, 10389641, 10389940, 10392373, 10395676, 10396577, 10400071, 10402309, 10416653, 10419175, 10419734, 10420116, 10424191, 10432393, 10434188, 10436471, 10438725 and 10440830.