



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: PE 20-005
Date Opened: 04/28/2020
Investigator: Xiaoming Tan
Approver: Stephen Ridella
Subject: mDrive Transmission Failure to Disengage
Date Closed: 04/04/2022
Reviewer: Joshua Neff

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Mack Trucks, Inc.
Products: 2013-2016 CHU and CXU Trucks w/Automated Manual Transmission
Population: 10,725 (Estimated)
Problem Description: The mDRIVE transmission clutch fails to disengage causing the truck to push through the service brakes.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	1	0	1
Crashes/Fires:	0	0	0
Injury Incidents:	0	0	0
Fatality Incidents:	0	0	0
Other*:	0	Confidential	Confidential

*Description of Other: Manufacturer field reports

ACTION / SUMMARY INFORMATION

Action: This Preliminary Evaluation is closed.

Summary:

On April 28, 2020, the Office of Defects Investigation (ODI) opened PE20-005 to investigate reports of 2013-2015 Mack CHU and CXU trucks equipped with mDrive transmissions continuing to push forward when stopping, possibly increasing the risk of a crash. After more field reports were discovered, the scope of the investigation was expanded to cover MY 2013-2016 vehicles. The mDrive transmission is Mack's version of Volvo's I-Shift transmission, an automated manual transmission that allows gear shifting without the use of a clutch pedal. Early I-Shift transmissions were recalled (13V-268) to address a missing redundant clutch disengagement switch that could prevent the clutch from automatically disengaging when the brake was applied. If a loss of signal from the brake air pressure switch occurred, the clutch would remain engaged while braking.

Although Mack's mDrive transmission adopted the latest Volvo I-Shift design and was built with the redundant clutch switch, ODI received field reports alleging that the mDrive transmission would not disengage when coming to a stop like the Volvo I-Shift transmissions in recall 13V-268.

After more than a year of information requests, data exchanges and grouping, and analyzing data, ODI was able to correlate two versions of transmission software (ID 23084009 and ID 23084004), with two frequently replaced parts ('solenoid valve' and 'cylinder assy clutch') as outliers. However, Mack dismissed the replacement parts as being normal service parts for worn clutch systems.

According to Mack, unlike the I-Shift recall, loss of one or more of the switches would not keep the clutch engaged but might cause a delay in the clutch disengaging, possibly due to the software/control system settings, the worn parts and system reaction time.

To demonstrate the possible switch failure outcomes, Mack outfitted a subject model truck with a panel that could disable each switch on command. During test drives at the Mack facility, the demonstrator truck stopped when the brake was applied each time, and the truck did not stall when the brake was applied, even when the clutch was engaged. Even though failure of one of the switches could delay clutch disengagement, the stopping distance would still be shorter than one of the recalled Volvo I-Shift transmission trucks.

With this information, as well as a lack of known crash incidents related to this complaint, ODI concludes that the Mack vehicles do not present an unreasonable risk to motor vehicle safety. Although ODI is closing this PE, Mack/Volvo should continue improving the transmission control unit software to further refine the clutch disengagement strategy. The closing of this investigation does not constitute a finding by NHTSA that a safety-related defect does not exist. Claims are still being submitted and the Agency will continue to monitor the issue and reserves the right to take further action if warranted by new circumstances.