



U.S. Department of Transportation  
National Highway Traffic Safety Administration

# ODI RESUME

OFFICE OF DEFECTS INVESTIGATION



**Investigation:** PE19007  
**Prompted By:** Early Warning Reporting Data  
**Date Opened:** 06/18/2019      **Date Closed:** 10/17/2023  
**Investigator:** Jason Williams      **Reviewer:** Joshua Neff  
**Approver:** Tanya Topka  
**Subject:** Rear Leaf Spring Fractures

## MANUFACTURER & PRODUCT INFORMATION

**Manufacturer:** Daimler Trucks North America, LLC  
**Products:** 2008-2018 THOMAS BUILT BUSES SAF-T-LINER C2  
**Population:** 21,438

**Problem Description:** Rear leaf spring fragment detachments can create a road hazard to operators and occupants of other vehicles, and can result in a crash or personal injury without warning.

## FAILURE REPORT SUMMARY

	ODI	Manufacturer	EWR D&I	Other	Total	EWR Field Reports
<b>All Incidents:</b>	0	16	1	141	157	CONF
<b>Crashes/Fires:</b>	0	0	0	0	0	0
<b>Injury Incidents:</b>	0	0	0	0	0	0
<b>Number of Injuries:</b>	0	0	0	0	0	0
<b>Fatality Incidents:</b>	0	0	0	0	0	0
<b>Number of Fatalities:</b>	0	0	0	0	0	0

**Description of Other:** Other-DTNA Warranty Data

## ACTION/SUMMARY INFORMATION

**Action:** This (PE) Preliminary Evaluation is closed with the manufacturer sending letters to fleets to remind them of the suspension maintenance needs.

**Summary:**

On June 18, 2019, the Office of Defects Investigation (ODI) opened PE19-007 to investigate instances of leaf-style suspension springs fracturing in various model 2008-2018 Thomas Built Buses (TBB) school buses, which could lead to a road hazard if a piece of the leaf spring detaches from the vehicle while driving. This investigation was prompted by ODI's review of field reports in Daimler Truck North America's (DTNA) Early Warning Reporting (EWR) data, describing cracked rear leaf-style suspension springs in Thomas Built school buses. ODI contacted three municipal school bus fleets with subject

vehicles. These fleets described similar failures where a fractured piece of leaf spring separated from the vehicle while driving. In addition, ODI contacted a nationwide school bus transportation service provider who identified several failures of this component.

DTNA's response to NHTSA's Information Request (IR) in this investigation acknowledged that TBB school bus leaf springs may corrode and fracture. DTNA data provided in response to the IR did not show a high frequency of failures that result in portions of a cracked leaf spring detaching from the vehicle. In the response, the majority of the information concerned C2 springs. While the C2 represents approximately 71% of the sales, 136 of 141 warranty claims (97%) were for C2 buses, and 94% of all of the replacement parts sales were for C2 springs.

In 2021, DTNA retained Exponent to assess reports of rear leaf spring fractures on TBB C2 school buses. As part of its assessment, Exponent inspected in-service buses and leaf springs, conducted material and metallurgical analyses of exemplar leaf springs, and analyzed manufacturer- and fleet-generated claims data. Exponent concluded based on its assessment that DTNA's leaf springs are typical for the industry and within DTNA's specification, and it found a low frequency of a cracked leaf

springs detaching from vehicles. Exponent also asserted that it could not confirm any instance of detachment while driving, resulting in roadway debris.

In 2022, in response to NHTSA's ongoing investigation, Exponent conducted additional analysis of the metallurgical characteristics of new and used (in-service) subject leaf springs and reviewed data from a major nationwide school bus transportation provider that had obtained leaf spring replacements. Similar to its initial findings, Exponent determined that the leaf spring material specified by DTNA is commonly used for leaf springs and adheres to industry-adopted standards. Exponent's metallurgical analysis also showed that DTNA's springs are coated with a corrosion inhibitor. Exponent's failure analysis of fractured

leaf springs found that the fractures were due to fatigue crack initiation and growth, a common fracture mode for this component. Exponent's inspection of in-service leaf springs found surface corrosion within the expected range. Exponent also found that corrosion pitting may play a role in fatigue crack initiation. Exponent's analysis of DTNA warranty data found one claim in which part of the leaf spring was described as missing.

Based on NHTSA's investigation, including its careful review and assessment of the analysis provided by DTNA's consultant Exponent, there is insufficient information at this time to conclude that a defect results in detached leaf springs creating a hazard for other roadway users. However, ODI does acknowledge that most roadway users encountering this type of debris would not know what it was or where it came from. For reporting purposes, using roadway debris as a measure could result in this issue being under-reported. Additionally, leaf springs are generally considered wear components that need routine

inspection. If signs of corrosion or fracture are present, leaf springs should be immediately replaced. During NHTSA's investigation, DTNA did share messaging with school bus fleets reminding them of the importance of routine and required inspection of school bus wear components, including leaf springs.

Considering the nature of this component and available information, including the metallurgical analysis of DTNA's in-use components and low rate of broken or missing leaf springs for the subject population, this Preliminary Evaluation is closed. The closing of this investigation does not constitute a finding by NHTSA that a safety-related defect does not exist. The Agency reserves the right to take additional action if warranted by future circumstances.