

Ford Motor Company (Ford) Recall No. 23S65 Chronology

CERTAIN 2021-2023 MODEL YEAR FORD F-150 VEHICLES EQUIPPED WITH A 9.75-INCH HEAVY DUTY ¾ FLOAT AXLE – STRIPPED HUB SPLINES

Date of Submission: December 22, 2023

Chronology of Defect / Noncompliance Determination

Provide the chronology of events leading up to the defect decision or test data for the noncompliance decision.

On June 6, 2022, NHTSA contacted Ford regarding three Vehicle Owner's Questionnaire reports of broken rear axle hub bolts on 2021-2022 model year F-150 vehicles equipped with the 9.75-inch HD ¾ float axle. Ford had online meetings with NHTSA on June 15 and June 22, 2022 to discuss the VOQs and to provide responses to NHTSA's requests for information.

On September 23, 2022, Ford's Field Review Committee (FRC) approved Customer Satisfaction Field Service Actions to address loose or broken rear axle hub bolts on certain 2021-2022 model year F-150 vehicles equipped with the 9.75-inch HD ¾ float axle. The FRC's approval came at the end of a Ford Critical Concern Review Group (CCRG) investigation that opened in February, 2022. At the time of the FRC approval of the Customer Satisfaction programs, warranty data indicated that the noise of a loose or broken bolt inside the wheel cap was apparent to most customers, who then sought service. In other instances, dealer technicians identified the broken axle hub bolt during routine maintenance that typically occurs within the warranty period (i.e. oil change or tire rotation). In nearly all of the claims at the time, either the noise from the rattling bolt or vehicle maintenance identified the broken bolt. At the time, Ford understood that it was possible for an unrepaired broken bolt to lead to spline fretting; however, Ford believed that broken bolts would be detectable and approved a one-time repair program for a five-month production window that was the source of most of the claims.

On November 17, 2022, NHTSA contacted Ford regarding Vehicle Owner's Questionnaire reports indicating that Ford dealer technicians were telling customers that the wheel end may detach from the vehicle in the event of a rear axle hub bolt fracture. There is no potential for the wheel to separate from the vehicle due to this condition because there are four (4) bolts that retain the rear axle wheel end hub and bearing assembly to the brake bracket, which is welded to the axle tube. November 22, 2022, Ford reviewed the axle system design and the effect on vehicle of a broken rear axle hub bolt with NHTSA, describing that bolt head fracture would not result in wheel separation from a vehicle. Ford published a dealer communication on February 14, 2023, specifying that if the rear axle hub bolt breaks, the wheel hub will remain attached and will not separate from the rear axle shaft.

On August 31, 2023, the CCRG opened an investigation into reports of broken rear axle hub bolts that had progressed to stripped wheel-end hub splines on 2021-2022 model year F-150 vehicles equipped with the 9.75-inch HD ¾ float axle. The CCRG reviewed warranty reports related to the topic and identified reports of loss of motive power and unintended vehicle movement while in park for vehicles with stripped wheel-end hub splines.

As part the CCRG investigation, Ford obtained field-returned parts for analysis. Ford Engineering performed fracture mechanics analysis and metallurgical analysis on the field-returned parts to understand the failure mechanism. Additionally, the engineering team designed and built a fixture to replicate the failure mode. Concurrent to these workstreams,

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engineering conducted a vehicle durability test which ultimately did not recreate the stripped spline condition. These activities took place from September through mid-December 2023.

Based on the investigation, the CCRG believes that after the rear axle bolt fractures, spline fretting can occur over time due to micro-movements between the hub splines and the axle splines, with corrosion playing a significant factor. Because spline fretting is an issue that occurs over time with corrosion, early reports were only related to the bolt breakage.

As of December 02, 2023, there were 376 warranty reports related to rear axle bolt breakage and stripped hub splines resulting in loss of motive power and/or loss of park, received from January 8, 2022, through November 27, 2023.

On December 15, 2023, Ford's Field Review Committee reviewed the concern and approved a field action.

Ford is not aware of any reports of accident or injury related to this condition.