

# Rapid Lesson Sharing

**Event Type:** Type 6 Engine Wheel Stud Malfunction and Torque Requirements

**Date:** September 26, 2017

**Location:** State Highway 78  
Near Princeton, Oregon

*... a wheel from the driver-side rear duals passed them and came to rest in an agricultural field. The second wheel came off and crossed the northbound lane in to a sage flat.*

## NARRATIVE

Vale District BLM Engine 3651 was traveling south on State Highway 78 near Princeton, Oregon. They were returning back to station at Burns Junction from a two-week fire assignment.

As the Operator felt a change in driving characteristics in the engine handling, a wheel from the driver-side rear duals passed them and came to rest in an agricultural field. The second wheel came off and crossed the northbound lane into a sage flat. (This wheel remains unrecovered.)

The Operator did not immediately apply brakes—but calmly maintained the engine in the highway lane—and was able to safely maneuver the vehicle to the right side of the highway into a driveway, out of traffic.

No one was injured. The engine was towed to a service center and repaired within two days.

### **Recently Assigned Spare Engine Sent on Two-Week Off-District Fire Assignment**

Engine 3651 is a spare engine and not the Operator's regular engine. The Operator was assigned the spare engine only two days prior to a two-week fire assignment near Eugene, Oregon.

During this assignment, the Operator reported many days of driving on rough, pot-hole filled roads.



The indentation/mark left on highway by the rotor.



Condition of the hub and rotor when the engine came to rest.

### **Engine's Maintenance History**

While reviewing the maintenance history of this engine and checking with the local tire center records, it was found that on June 14, 2017 the local tire center had replaced both tires on the driver side rear duals and the vehicle's spare tire. At the time of this event, the engine had slightly more than 2,000 miles of use on these tires.

The Fire Equipment Maintenance and Procedure Record (FEMPR) shows no tires replaced or re-torquing of replaced tires.



Photo shows lug nut wear on the wheel.

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### **SUCSESSES**

- ✓ There were no injuries.
- ✓ Minimal damage was done to the engine.
- ✓ The Operator maintained control of the vehicle, stayed calm and made a plan to slow and safely stop the vehicle.
- ✓ The Operator handled the towing and started the repair process quickly.

### **CHALLENGES**

- ✓ The engine was a District spare engine. Due to a required day off, the Operator only had one day to familiarize himself with this Engine before the 14-day off-District assignment.
- ✓ Conditions on this off-District fire included rough, pothole-filled roads.
- ✓ The Operator was unfamiliar with the history of the truck and what maintenance had been previously performed. The agency-required Fire Equipment Maintenance and Procedure Record (FEMPR) was not up to date and much of the required information and maintenance history is missing.

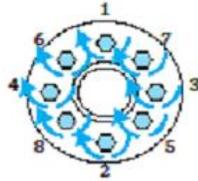
### **KEY TAKEAWAYS**

- ✓ Operators of vehicles who have had any reason to remove a tire from a vehicle, should follow re-torquing of the wheels as stated in the Owner's Manual. (See relevant Owner's Manual information on next page.)
- ✓ All types of service and repairs need to be documented in the FEMPR. This should include the re-torquing of the wheels.
- ✓ Spare District engines need to be better maintained and have all repairs and maintenance documented in the FEMPR for all Operators.

**Page 173 of the 2002 Ford F550 Owner's Manual:**

The following steps apply to all vehicles:

- 19. Remove the jack and fully tighten the lug nuts in the order shown.
- 20. Stow the flat tire. Refer to *Stowing the spare tire* if the vehicle is equipped with a spare tire carrier.
- 21. Stow the jack, jack handle and lug wrench. Make sure the jack is securely fastened so it does not rattle when driving.
- 22. Unblock the wheels.



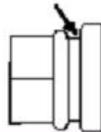
On vehicles equipped with single rear wheels, retighten the lug nuts to the specified torque at 800 km (500 miles) after any wheel disturbance (tire rotation, changing a flat tire, wheel removal, etc.).

On vehicles equipped with dual rear wheels, retighten the wheel lug nuts to the specified torque at 160 km (100 miles), and again at 800 km (500 miles) of new vehicle operation and after any wheel disturbance (tire rotation, changing a flat tire, wheel removal, etc.).

Bolt size	Wheel lug nut torque*	
	Nm	Lb-ft
M14 x 1.5	200-225	150-165

\* Torque specifications are for nut and bolt threads free of dirt and rust. Use only Ford recommended replacement fasteners.

On all two-piece flat wheel nuts, apply one drop of motor oil between the flat washer and the nut. Do not apply motor oil to the wheel nut threads or the wheel stud threads.



⚠ When a wheel is installed, always remove any corrosion, dirt or foreign materials present on the mounting surfaces of the wheel or the surface of the front disc brake hub and rotor that contacts the wheel. Installing wheels without correct metal-to-metal contact at the wheel mounting surfaces can cause the wheel nuts to loosen and the wheel to come off while the vehicle is in motion, resulting in loss of control.

This RLS was submitted by:

The Accident Review Team

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**Check Out the Lessons and from Two Other Similar Engine Wheel/Torque Incidents:**



**Type 6 Engine Wheel Torque Malfunction RLS**

<https://www.wildfirelessons.net/viewdocument/engine-wheel-torque-rls-2016>

*While driving their engine down Interstate 40, the Operator suddenly feels a change in driving characteristics as one of their passenger-side rear duals suddenly passes them!*

**Engine 2423 Lessons Learned Review**

<https://www.wildfirelessons.net/viewdocument/engine-2423-wheel-incident-2011>

*The purpose of this paper is to document the sequence of events that occurred before and after the incident involving this engine and identify learning points for future operations.*

