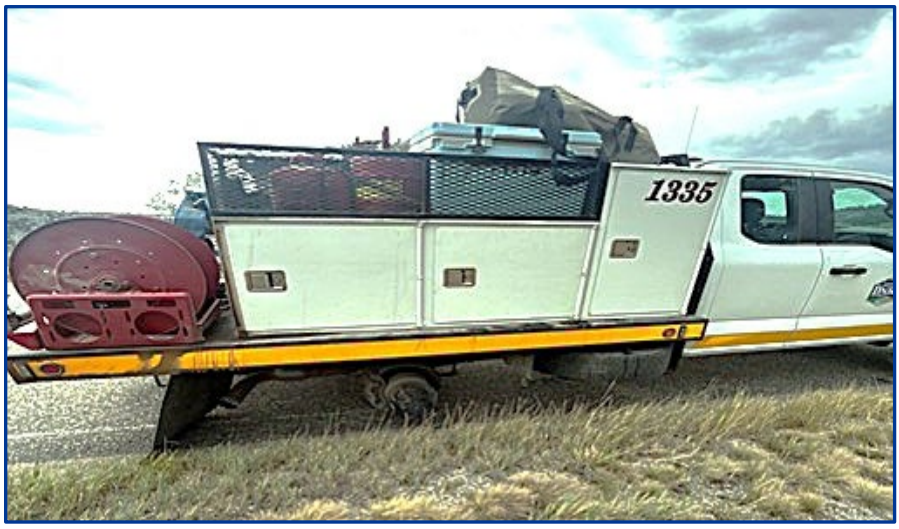
Rapid Lesson Sharing

Event Type: Engine Dual Tire Incident

Date: September 22, 2025

Location: Montana



The engine after the passenger-side outer dual tire "exploded" and the inner dual tire rolled off.

The Story and Lessons from this Engine Dual Tire Incident

Driving southeast on I-90 in Montana in a Type 5 wildland fire engine, the driver started to feel the engine "float"—"feeling like it was gliding on ice"—when making slight turns. Shortly after, the passenger-side outer dual tire "exploded" and the inner dual tire rolled off.

The driver was able to pull the vehicle safely over to the shoulder. No major accident occurred, nor were any injuries sustained.

Upon inspecting the engine and the rear driveline for damage, the driver noticed that multiple studs had broken off at the base of the right-side wheel hub. In most cases, this can indicate either under- or over-tightening of the lug nuts.

The driver was the only one who had recently tightened the lug nuts on this engine, having replaced the dual tire on that side after a puncture and repair two to three weeks prior.

Lessons

What Went Well

- Operating at the posted truck speed limit, with seat belts worn.
- Maintained control of the vehicle, preventing another accident or further damage to the engine.
- The engine build and design limit the vehicle's capacity to 80 percent of its gross vehicle weight (GVW) or payload capacity to avoid overloading.

Recommendations

Daily Physical/Visual Inspections

Conduct thorough walk-around inspections on a daily basis. Check for:

- Equal thread exposure on all lug nuts and studs, signs of movement or shifting in wheel components.
- Presence of any metal shards or debris, oblong or odd-shaped wheel stud holes.

Visual Torque Indicators

After torquing lug nuts to factory specifications:

- Apply visual indicators such as paint marks across the lug nuts and studs.
- Alternatively, use plastic lug nut position indicators to detect any loosening.

Torque Wrench Usage

- This unit has purchased torque wrenches to ensure all lug nuts are tightened to the manufacturer's specifications.

Post-Flat Tire Procedure

- After changing a flat tire, the torque pattern should be completed twice to ensure even tightening.
- Lug nuts must be rechecked with a torque wrench within 50 miles (or soon after) to confirm they remain at the correct torque specifications.

This RLS was submitted by:

Montana DNRC

Do you have a Rapid Lesson to share?

(https://lessons.wildfire.gov/submit-a-lesson)

Share Your Lessons

We Have Seen This Before

Information collected from multiple related events and published in Data Points:

Over a 10-year span we have recorded 13 separate incidents of wheels nearly or completely separating from Type 6 engines due to problems related to lug nuts and studs.

Recurring Lesson: Torque to specifications, mark lug nut and stud. Inspect daily.

The Problem: Problems are traced to issues related to lug nut tightening. In most cases, lug nuts are overtightened which compromises the strength of the wheel studs (also called lugs), eventually resulting in broken wheel studs. In some cases, loose lug nuts are not noticed and simply rattle off.

Recommended Action: Use a system to mark lug nuts after each torque to factory setting. This can be achieved with specifically designed wheel nut indicators or other forms of colorful marking (paint marker, torque seal).

Wheel Nut Indicators

Torque Seal Paint