General Equipment Safety Bulletin

Technical Support Department

Bulletin 003/2015

Subject	Stored Energy in Front Suspension Cylinders
Affected Product	Caterpillar Off-Highway Trucks/Tractors
Risk identified	Property damage, Personal injury

Problem Overview

Caterpillar Off-Highway Truck (OHT) front suspension cylinders have two types of grease fitting on the outside diameter of cylinder. Refer Figure 1 below. The grease nipples allow the supply of lubricant to the grease cavity that lubricates the outside of the suspension cylinder rod and its bearing areas. The grease vents allow old grease to purge as new grease is added, to prevent excess pressure build up.

The cylinders also have a separate chamber containing pressurised nitrogen and oil to provide the suspension function of the cylinder. As the internal seals wear, the nitrogen gas charge in the cylinder can leak past the rod gland seals, and enter the cylinder grease cavity. This nitrogen can then vent via the grease vent valves and allow the loss of the nitrogen charge from cylinder. This compromises suspension cylinder performance. As a temporary fix, some maintenance personnel remove the standard grease vent fittings and install screw-in plugs to maintain the nitrogen charge. There have also been reports of grease vent valve/port blockage, due to deterioration of internal components. In both cases, Nitrogen gas under pressure can be trapped in the grease cavity, even after normal discharge procedures have been followed.

Caterpillar service procedures advise that all pressure is to be released from a suspension cylinder before the removal of any grease-fitting, valve, or plug from the cylinder. It has been identified that if a screw-in plug has been installed in place of the grease vent valve, or the vent valve is blocked, there is a possibility that nitrogen gas at pressures of up to 3600 kPa can be trapped in the grease cavity, even after the main cylinder pressure is released. The nitrogen in the grease cavity then becomes a source of unexpected stored energy that needs to be released safely before undertaking cylinder disassembly. Failure to do so may result in ejection of parts during cylinder disassembly, and personal injury.

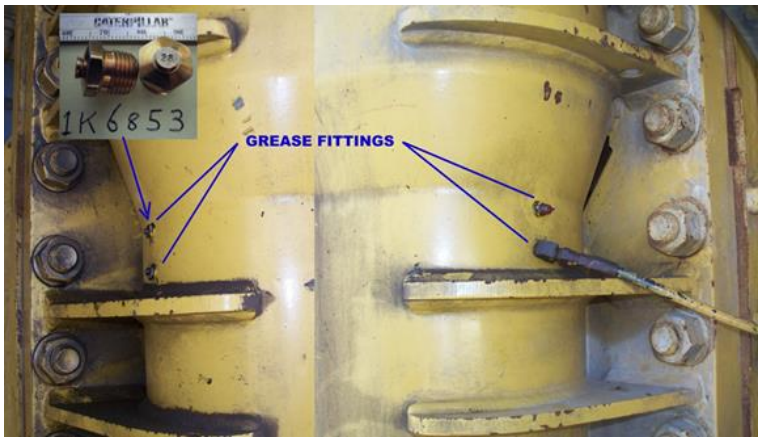

Figure 1 – Grease Fittings

Recommended Management Actions

- Before commencing work on suspension cylinders, refer to the latest information in Caterpillar Service Literature, relevant to the appropriate truck model. In addition, Caterpillar Special Instructions SEHS9411 (784 to 797F) and REHS4445 (769 to 777G) provide the servicing and adjustment details for all Caterpillar Off-Highway Truck suspension cylinders. All this information is available via Caterpillar SISWeb.
- Read and understand all Safety Warnings, Instructions, and ensure the correct tooling is available before commencing work. Refer Figure 2 below for typical warning example.
- Do not remove any grease fittings, valves, covers or plugs unless the suspension cylinder rod is fully retracted, and all Nitrogen pressure has been released.
- Do not remove a suspension cylinder from a truck until all Nitrogen pressure has been released.
- Observe the Caterpillar instruction to leave check valves open for at least 5 minutes after suspension cylinders have bottomed out. This will assist any nitrogen trapped in the grease cavity to bleed out.
- Loosen, but do not remove all grease fittings, vent valves or plugs connected to grease cavity. Leave these plugs loose during removal, and shipment of removed cylinders. These fittings can be removed after any trapped Nitrogen has vented. Retighten when servicing/repair of cylinder is complete.
- **DO NOT** install plugs in place of grease vent valves.
- Observe the scheduled cylinder maintenance instructions in the appropriate Operation and Maintenance Manual.

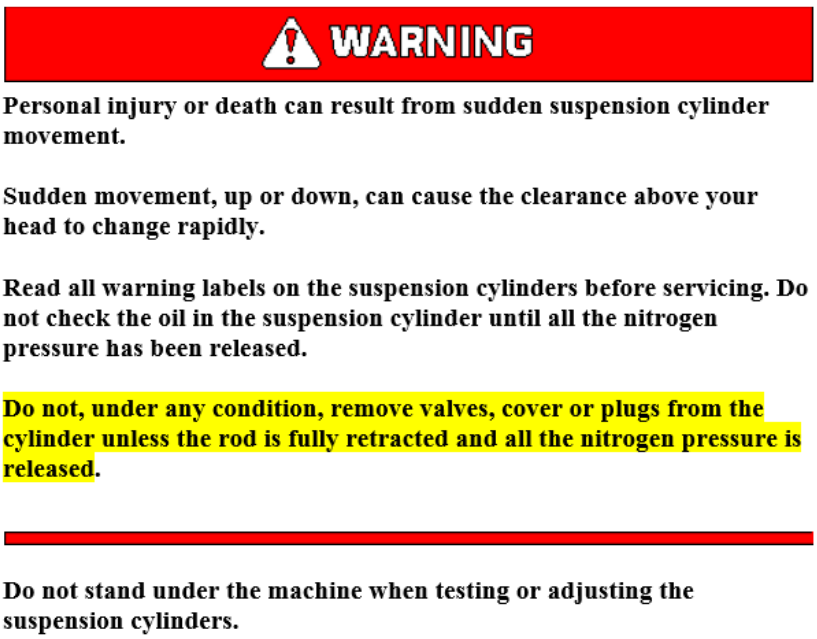

Figure 2 - Typical warning example

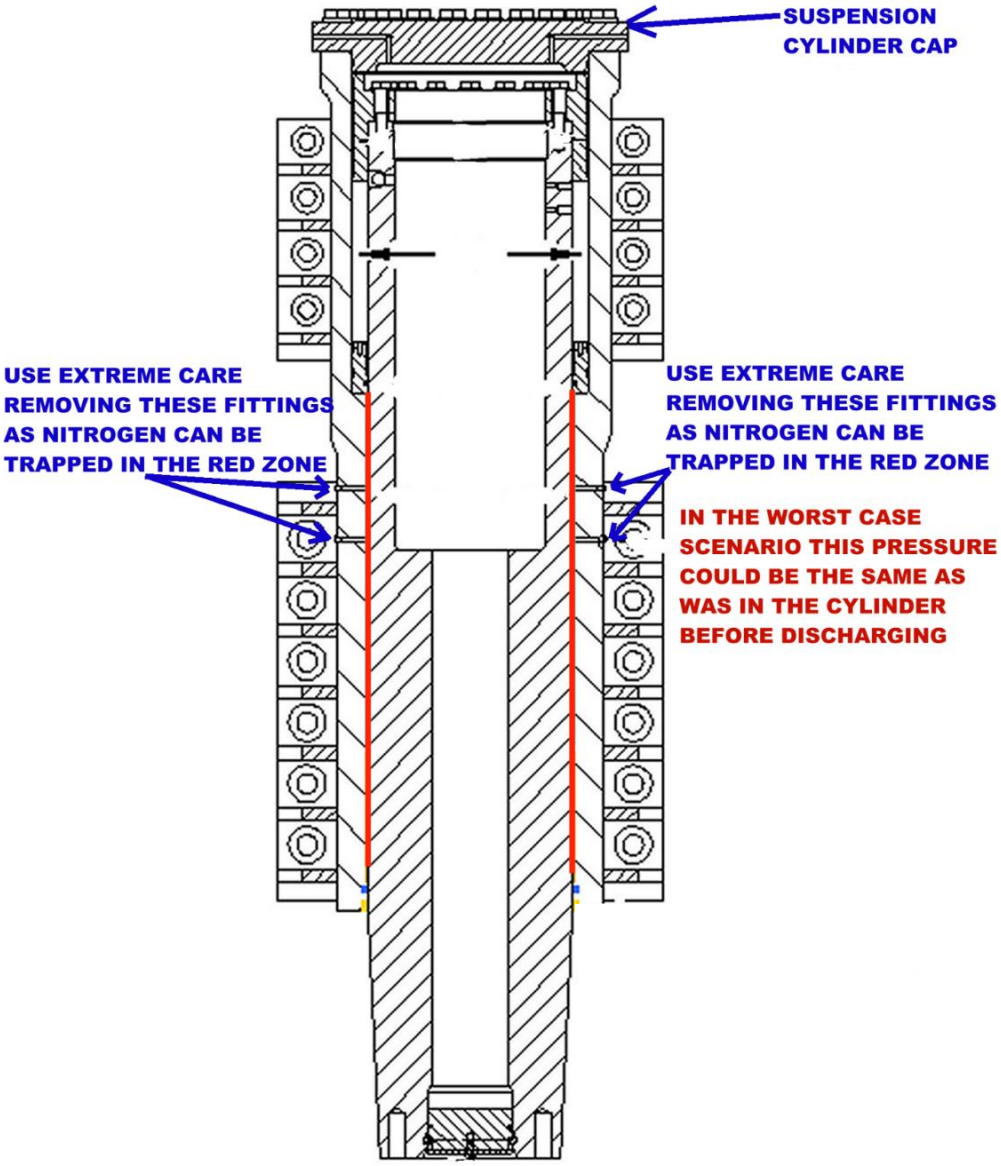

Figure 3 Suspension cylinder cross section

Contact Details:

If further information is required about this bulletin, contact your nearest Hastings Deering branch on 131 228 and ask to speak to a Mining or Product Support Representative.

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