Hastings Deering CAT

Equipment Safety Bulletin

Technical Support Department

Reference Number	Bulletin 01 – 2019*
Affected Product	Potential failure of large motor grader front wheel spindles
Risks Identified	Failure to apply the recommendations in this Equipment Safety Bulletin may increase the risk of spindle failure
Release Date	18 January 2019

**This bulletin replaces Bulletin 013 2013 which has been cancelled*

Problem Overview

Fractures have occurred in front wheel spindles on Large Motor Graders used in mining applications. The images below demonstrate damage from the two failure modes observed.

If a front wheel spindle fractures, the front wheel assembly may separate from the machine resulting in loss of control by the operator. A failure of this nature has the potential to cause personal injury and/or property damage. The separated wheel also has the potential to impact property or personnel in its path.

Caterpillar have provided the following advice and released publications to assist with the management of this potential issue:

- **"The front wheel spindles will fail in certain applications due to impact or overload conditions. The anticipated design life of the front wheel spindles is 24,000 hours. Actual life achieved will vary according to outside influences such as site conditions, machine operation, machine application, and optional attachments fitted to the specific machines."**

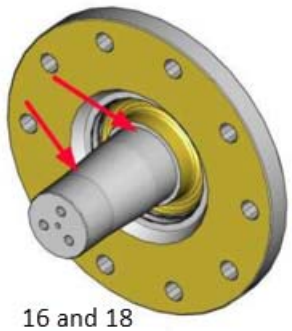
- Service Magazine media number SEPD1533* advises of the availability of a more robust 383-1185 front wheel spindle assembly which is adaptable to the following 24H and 24M machines: 7KK1-UP, B9K1-UP, B931-UP.

- Service Magazine media number SEPD1701* advises of the availability of a more robust 437-8983 front wheel spindle assembly which is adaptable to the following 16G, 16H, and 16M machines: 93U1-UP, 6ZJ1-UP, ATS1-UP, B9H1-UP, R9H1-UP.

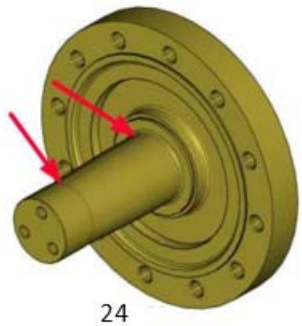
- Service Magazine media number M0082055* advises of an updated inspection procedure for front wheel spindles on the following 16G, 16H, 16M, 16M3, 18M3, 24H, 24M and 24 machines: 93U1-UP, 6ZJ1-UP, ATS1-UP, B9H1-UP, R9H1-UP, E9Y1-UP, E9W1-UP, 7KK1-UP, B9K1-UP, B931-UP and E9Z1-UP.

- Special Instruction M0068684* – Procedure for Ultrasonic Inspection of Large Motor Grader front wheel spindles.

Front wheel spindle fractures have occurred at the base of the spindle behind the outer tapered roller bearing, and near the bottom of the retainer bolt holes. Current part number spindles have a radius at bottom of bolt holes and an improved hardening process to make the spindle more durable.



16 and 18
Front Spindle



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Front Spindle

To reduce the risk of an unexpected spindle failure, this bulletin outlines recommendations for additional inspection for the spindle and replacement of the spindle at 24,000 service hours. It is recommended to record the outcome of all inspections performed in accordance with this bulletin in the machine's maintenance log.

Recommendations

At 12,000 spindle hours or first life overhaul, remove and inspect the front wheel spindles. Perform visual inspection and 100% magnetic particle examination of the spindle. Also perform ultrasonic testing in the area around the retaining bolt holes. Do not reuse spindles that have crack indications at any location.

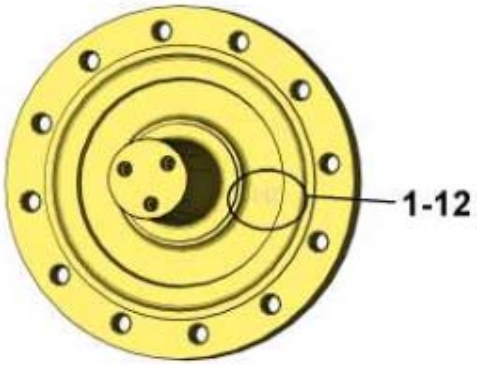
At 24,000-part hours or second life overhaul, replace the spindles with new parts. A crack inspection is not required at 24,000 hours or the second life overhaul.

In accordance with the criteria outlined in Service Magazine M0082055*, Hastings Deering recommends that Motor Graders used in mining applications should have inspections performed immediately and then every 3000 operating hours after any of the following events:

- When a wheel and spindle are involved in a collision or high impact event.
- High-speed operation on uneven or rough roads resulting in frequent high impacts to the tire or wheel.
- Frequent operation during which the front and rear axles are contacting the oscillation stops.
- Frequent operation where mounds of spoil or dump material exceeding one third of the tyre diameter are traversed or knocked down.
- Frequent steering in deep ruts or against wind rows or ridges resulting in high machine steering effort or pressure.

Immediately remove machines from service that have crack indications in the locations identified in Special Instruction M0068684*. Discard the front wheel spindle and replace with new, using the latest part available. Replace any other damaged parts. Operation of a machine with a cracked spindle can lead to catastrophic failure and result in property damage and injury.

If no cracks are detected, mark the front wheel spindle as an acceptable reusable part with an air engraver or steel stamp set. Mark all front wheel spindles on the inboard face of the rim flange as per the illustration below.



If "1 - 12" was marked on a front wheel spindle, the "1" would indicate the first inspection, and the "12" would indicate that there were 12,000 hours on the part at the time of inspection.

If you have any queries regarding the contents of this bulletin, please contact your Hastings Deering Mining Support Representative.

** Always Check WebSIS to ensure the latest version of this document is referenced.*