



PRODUCT BULLETIN 36235

Steering Column Failure – Incident Notification and Preventative Actions

Date: 17/02/2023

Prepared for: Owners and End Users of Cougar Mining Equipment Installed with Mechanical steering columns Graders, LongWall Carriers, MineCruiser & Predators

Applicable Machines: Graders, LongWall Carriers, MineCruiser & Predators, PETs

Prepared by: Cougar Mining Equipment

Revision: A

Communication: Steering Column Failure

Cougar Mining Equipment were recently made aware of an incident whereby a steering column failure occurred on a LongWall Carrier. During brake testing on the surface of the mine, the roller bearing that holds and retains the steering wheel and shaft, collapsed entirely.

The shaft could be fully removed from the column and a loss of steering occurred.

The vehicle was brought safety to rest. No persons were injured.



Failed Steering Column: Collapse of the retaining bearing had occurred allowing the Wheel and shaft to be pulled out of the column.

Recommended Action:

1. At the next available opportunity, inspect steering columns for bearing wear as a leading indicator to failure. An inspection procedure for the LWC is provided as an appendix to this Bulletin. Environmental factors include high moisture, dust and water ingress. Particular care should be given to inspect the rubber boot at the top of the column is intact and in place.
2. Inspection should include periodic removal of the steer column at approximately 2 yr intervals to confirm smooth bearing operation. With the steering column to be replaced every 4000 hrs or 4 yearly. This maintenance recommendation should be added to maintenance management systems for the respective vehicles.

Please distribute this bulletin to all relevant personnel

Cougar Mining Equipment Contacts in respect to this bulletin:

| | | |
|-----------------------------|---------------|--------------|
| Technical Services Manager | Bill Davidson | 0409 562 385 |
| Operations Manager NSW | Garrad Latham | 0407 272 296 |
| Operations Manager QLD | Herb Cranston | 0411 742 079 |
| Engineering Manager | Ben de Rooy | 0439 714 737 |
| Electrical Workshop Manager | Matt Grice | 0410 577 310 |

Appendix:

MP-294 Steering Column Inspection Procedure LWC

LWC Steering Column Inspection Procedure

1.0 SAFETY AND ENVIRONMENT

WARNING:

Inherent hazards may pose a risk to the health and safety of operators, maintainers and/or the environment. Risks may include, but are not necessarily limited to, the following:

1. Risks intrinsic to stored energy within hydraulic and/or other fluid systems.
2. Risks intrinsic to stored energy within pneumatic and/or other gaseous systems
3. Risks intrinsic to electrical energy within the underground coal mining environment.
4. Risks intrinsic to high temperature whether it be a surface, fluid, gas or other.
5. Risks intrinsic to the motion / relative motion of the machine, its implements and subsystems (e.g. shearing, crushing, un-planned movement, high potential energy, etc.).
6. Risks inherent to hydrocarbons and other chemicals in the workplace.

All maintenance should be conducted by appropriately trained and accredited personnel.

All maintenance should be carried out in a designated safe area in compliance with job specific risk assessments, work instructions and the machine's maintenance manual.

Prior to conducting maintenance, the machine, its implements and systems should be positively isolated, de-energized and locked/tagged out in compliance with site specific procedures.

2.0 PURPOSE

The purpose of this procedure is to document the necessary steps and tools required to correctly *inspect the steering column* on the LWC.



3.0 PROCEDURE

3.1 Immobilisation

There are many circumstances in which the mobile machine must be immobilized, or in other words, “restrained from unintended movement”. Australian Mining Equipment recommends the use of two independent means of immobilisation before commencing any maintenance or repair operation or function.

- If possible, park on a level surface.
- Move the drive control levers to the NEUTRAL position and move the engine speed control to LOW IDLE position.
- Engage the park brake button.
- Chock the wheels with suitably rated wheel chocks to prevent the machine from rolling.
- After the machine has been operated under load, allow at least several minutes at engine idle to allow all systems temperature to stabilise before stopping the engine.
- Place the engine on / off valve into the ‘off’ position, (toggle up). The engine will shut down within 10 seconds.

3.2 Isolation

Most procedures necessary for the correct care of the machine will require that it have all on board sources of stored power isolated and “locked out” or “tagged”.

Site or company specific procedures must be followed when isolating. Forms of stored power found on AME machines that require isolation include:

3.2.1 Electrical

AME machines that have NTMS type methane detection systems fitted will have an isolator that has provision for tagging or locking.



Ex'd' enclosures that contain devices capable of storing charge are so labelled and engineered to be self dis-charging.

3.2.2 Hydraulic



WARNING

Check the lift steer pressure has bled down to zero prior to doing this test. The steering accumulator automatically bleeds to zero but if residual pressure is present it may lead to the machine moving when the steering wheel is turned.

3.2.5 Steering Inspection (weekly inspection)

1. With the Machine Isolated and all personnel clear from the Hitch Area, Stand over or sit in front of the steer column in the operator's compartment.
2. Check the retaining nut is not loose and the column mounting bolts are snug and the rubber boot is covering the end of the tube.

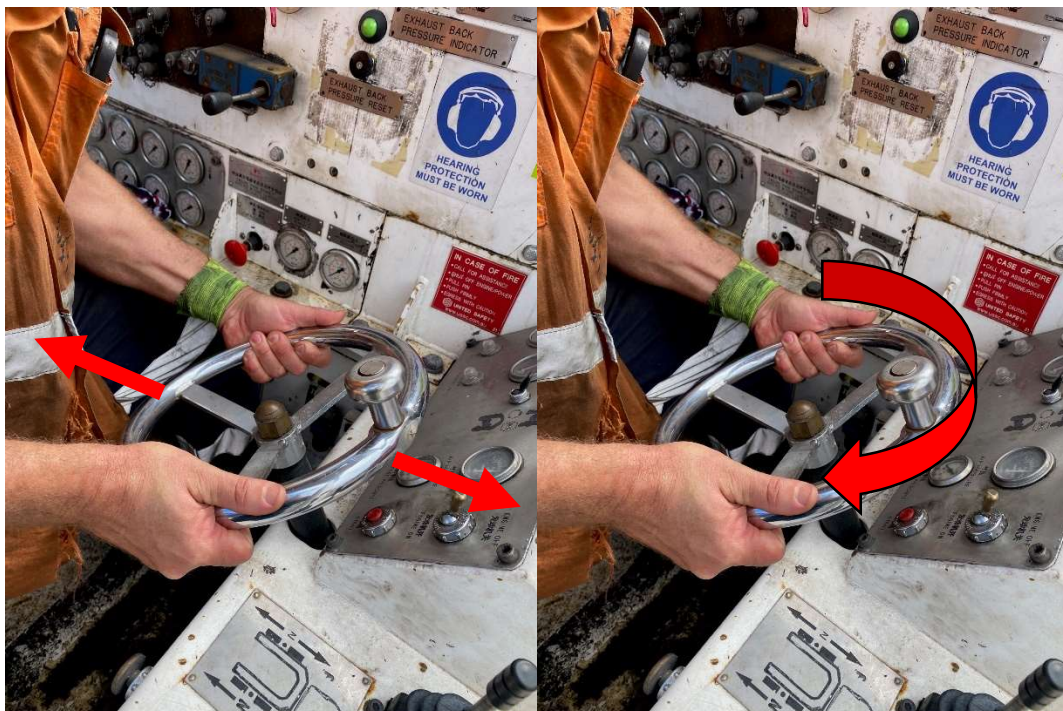
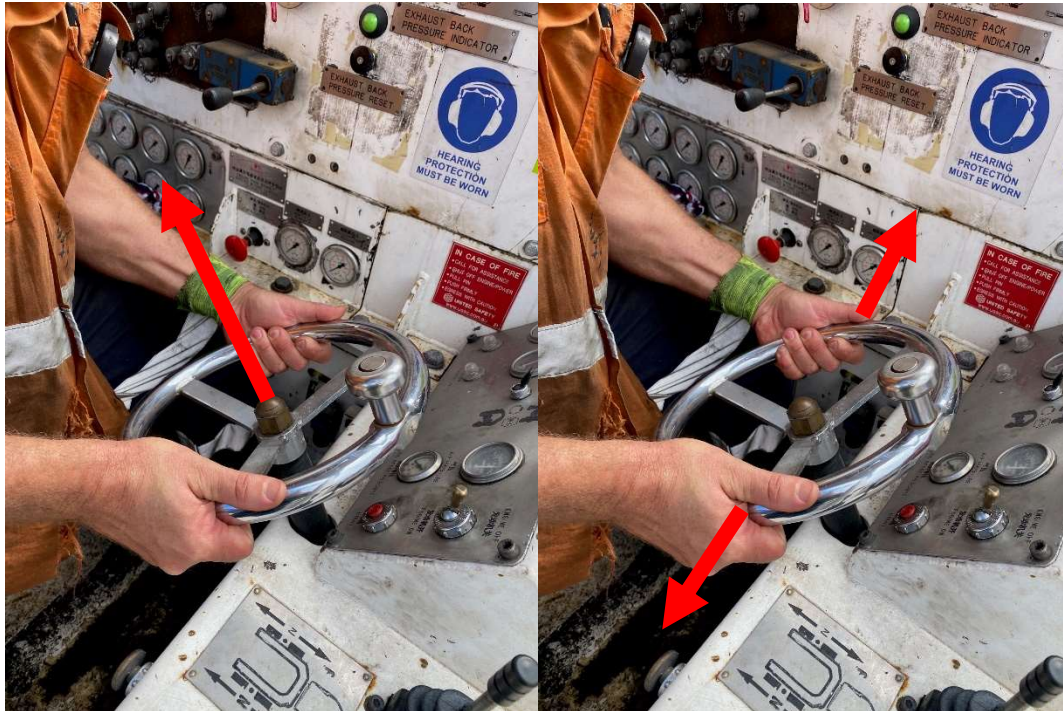


2. place both hands of the wheel and apply an axial force on the column in a pulsing motion. Approx. 10-15kg of load.

The steering wheel should not move excessively.
Using a dial gauge on the wheel or nut, the maximum axial freeplay should be 0.25mm – 0.5mm.
The column should not 'clunk'

If it does, the machine should be tagged out of service and the column investigated.

3. with both hands on the wheel apply a radial force front to back on the column, it should not move or 'clunk'



4. with both hands on the wheel apply a radial force side to side on the column, it should not move or 'clunk'.

If it does, the machine should be tagged out of service and the column investigated. Do not return the machine to service.

5. With both hands on the wheel rotate it 5 degrees either way. The wheel should rotate which some resistance from the hydraulic steering valve. It should not deviate from the axis of rotation. It should not 'grind' or make excessive noise.

If it does, the machine should be tagged out of service and the column investigated.

If all inspections have found to be satisfactory, the steering column is in satisfactory condition to recommence operation.

Two Yearly or 2000hr Maintenance

Remove the steering column and check;

The bearing seals are in place

The bearing spins freely and does not grind or 'grumble'

The rubber boot at the top of the column is in place

The circlip is in place and in good condition

The spline is not pitted / corroded or worn

If any of the above conditions are not met the steering column should be replaced.

Four Yearly or 4000hr Maintenance

Replace the steering column

Inspection Record

Record the machine inspection data and place in the plant safety file with the machine hours recorded.

| Machine Plant number | Machine engine hours | Inspection date | Inspections satisfactory | Inspection comments (eg. Was the column replaced?) |
|----------------------|----------------------|-----------------|--------------------------|--|
| | | | Y / N | |
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