

# SAFETY BULLETIN

Ref Document No.	SB23001	Issue No.	2
Subject	COALTRAM® CT08/CT10LP Crowd Cylinder Failures		
Release Date	8 <sup>th</sup> November 2023		

**Purpose**

To notify owners and operators of failures of crowd cylinders.

This is an update to SB23001 Issue No. 1 to inform of another incident and to provide recommendations for clamp bolt replacement.

**Applicability**

COALTRAM® CT08 and CT10LP model crowd cylinders Part No. - 5520003190

**Background**

The crowd cylinder on CT08 and CT10LP models utilises a split clevis rod eye design. The cylinder rod has a threaded end, which mates with a female thread in the rod eye. The rod eye has a split clevis design, which clamps the rod using three M12 grade 12.9 bolts.



PPK Mining Equipment have received reports of two incidents where the crowd cylinder clevis eye has separated from the cylinder rod end during normal operation.

**Update:** PPKME has been made aware of a third incident, involving a clevis separating from the cylinder rod.

### Investigation /Findings

Inspections indicate that in each case the clamp bolts had come loose. In at least one case, the rod had partially unwound from the clevis prior to losing engagement and separating from the rod eye.

### Recommendations

1. It is recommended that all applicable crowd cylinders be inspected to ensure there are no visible signs the cylinder rod has moved in relation to the clevis. The clevis end wall must be seated firmly against the crowd cylinder rod end shoulder, with no gap present.
2. Inspect all the clevis clamp bolts are in place and secure with no visible signs of movement. **The correct tension of all clamp bolts must be confirmed.**
  - a. To ensure clevis security, it is critical that the clamp bolts are tensioned correctly. If the clamp bolts are required to be replaced, the recommended procedure is given in **SWP CT 6.72** attached.
3. If any signs of movement between the clevis end wall and cylinder rod shoulder are found, it is recommended that the cylinder be removed from service for repair or replacement and PPK Mining Equipment be contacted.

All recommendations must be considered in the context of site-specific conditions, hazards, procedures and risk control methods. For further information, please contact PPKME Engineering Department.

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**SWP CT 6.72  
COALTRAM CT08 / CT10LP Crowd Cylinder Clevis Inspection.**

**Scope:**

The objective of this SWP is to provide recommended method for **INSPECTION OF CROWD CYLINDER CLEVIS AND REPLACEMENT OF CLEVIS CLAMP BOLTS.**

**PPE requirements:**

Protective Clothing	Protective Footwear	Hard Hat (if required)
Safety Glasses	Hearing protection	

**Plant / equipment / materials:**





3/4" drive impact gun	1-1/2" x 3/4" drive socket	Machine chocks
Certified Torque Wrench 150 Nm	10mm x 1/2" drive InHex	M12 x 1.75 Thread Hand Tap
Certified Torque Wrench 2000 Nm	1-1/2" x 1" drive socket	

**Safety and Legislative requirements:**

Lock out lock	Personal Danger LOCK	Out of Service Tag
<b>SAFETY INFORMATION PAGE 2 OF THIS DOCUMENT</b>		

**COALTRAM MAINTENANCE SAFETY INFORMATION**

- Ensure that all safety information is read and understood before maintenance or repair task is performed
- The person who is undertaking the repair or maintenance task must be qualified and competent to complete the task being undertaken

<p>1. PPE. Appropriate PPE must be worn including Hi Visibility Clothing, Safety glasses, Protective Footwear, Hand Protection (as required) Hearing Protection (as required), hard hat (as required), Dust Masks (as required).</p> <p>2. Isolation locks, Danger Tags and Out of Service tags MUST be used in accordance with site requirements and machine specific isolation procedure.</p> <p>3. All lifting gear must have current inspection tag, be suitably rated for item being lifted, and be in good condition.</p> <p>4. Lifts requiring mechanical aids must only be conducted by trained and competent personnel.</p> <p>5. When lifting objects with mechanical aid, keep clear of all potential crush or pinch points.</p> <p>6. Keep clear of suspended loads. Use Safety line to control load when required.</p> <p>7. Manual Handling. Do not lift or move objects by hand that are too heavy to do so. When manual handling objects use correct manual handling techniques.</p> <p>8. Pinch Points. Keep all body parts clear of pinch points. Ensure hands and feet are clear when lifting and lowering objects</p> <p>9. Machine support stands. Ensure machine support stands are of suitable capacity and in serviceable condition.</p> <p>10. Slips, trips, falls. Ensure work area is clear of objects that could cause a slip, trip, Fall hazard.</p>	<p>13. Information labels on machine must be observed.</p> <p>14. Service points on machine must be observed</p> <p>15. Climbing on top of machine. Always maintain 3 point contact when climbing on top of machine.</p> <p>16. Hot surfaces. Be aware of hot surfaces when machine has been running.</p> <p>17. Hot fluids. Be aware hot pressurised fluids. This includes engine coolant, hydraulic oil, transmission oil, diesel fuel.</p> <p>18. Chemical injuries: ensure that Material Safety Data Sheets are available and understood for all fluids used on machine.</p> <p>19. Stored energy. Ensure all stored energy has been depleted and raised cylinders supported before conducting repairs or maintenance.</p> <p>20. Accumulator pre-charge pressure. When all stored energy has been depleted the Nitrogen Pressure in the Brake Accumulator is 83 Bar (1,200 psi). DO NOT attempt to release pressure without correct equipment. DO NOT disassemble accumulator without releasing Nitrogen pressure to zero.</p> <p>21. Falling objects. Do not work under unsupported roof or in area where there is risk of falling objects.</p> <p>22. Live Testing: Live testing must only be done after a task specific risk assessment (take 5 or similar) and in accordance with site requirements. The person operating the machine during live testing must be competent to operate the machine.</p> <p>23. Crush points: Ensure that Articulation lock is fitted when conducting maintenance or repairs in crush zones.</p>	<p>24. Working under boom: Do not enter under boom unless boom rated, designed for purpose supports have been fitted, boom has been lowered onto supports and machine is isolated.</p> <p>25. Hydraulic injection: Ensure that all stored hydraulic energy has been depleted before disconnecting hydraulic hose or fitting. Do not use your hand to find a hydraulic leak. Use a piece of Cardboard or similar to check for leaks. In the event of a suspected hydraulic injection refer to site specific procedure for fluid injection</p> <p>26. Compressed air: Ensure air receiver has been isolated before conducting repairs on air system. If working on air receiver the air receiver must be depressurised before commencing work. NOTE: The accumulator on the transmission de clutch valve will maintain a small volume of compressed air. Follow instructions on how to remove air accumulator pressure (behind gauge panel) to discharge.</p> <p>27. Current information: Ensure current information is available prior to commencing maintenance or repair task.</p> <p>28. Guards: Ensure all guards and covers removed during maintenance or repairs are replaced prior to starting machine.</p> <p>29. Ventilation Ensure adequate ventilation when testing machine.</p> <p>30. Do not conduct electric welding on machine unless the battery has been removed and Alternator disconnected by competent and authorised person.</p> <p>31. Stay clear of rotating parts.</p> <p>32. Always use tools that are in good serviceable condition.</p> <p>33. Take care to not damage wiring, hydraulic or air lines during repairs and maintenance.</p> <p>34. Ensure all electrical cables are placed in positions away from any possible mechanical damage and away from fuel lines.</p> <p>35. Gas Struts.(used on covers) contain compressed gas even when fully extended. Before removing, check for damage. Damage may cause an uncontrolled release of energy or exploding parts when removing strut.</p>
<p>11. Warning labels on machine must be observed.</p> <p>12. Prohibition labels on machine must be observed.</p>	 	 

	Steps	Hazards	Controls
1.	Lower the boom until it rests on the load frame stops and crowd forward the QDS/KAT/RAS plate until the bucket attachment is resting level on the ground. Refer to Figure 1 on page 6.	Pinch/crush	Keep clear of pinch points/ Crush zones. Barricade work area off
2.	Isolate vehicle, as per <b>SWP CT 1.07 Vehicle Isolation</b> . Also Refer to Item 2. on page 2 of this document.	Unplanned movement	Wheel chocks
3.	Inspect the security of the crowd cylinder clevis, make sure the clevis is installed hard against the cylinder rod end shoulder with no visible gap detected or any signs of movement. Refer to Figure 2 on page 6. If a gap is found, the crowd cylinder will need to be replaced, therefore notify supervisor of the issue. Refer to <b>SWP CT 6.50 CT08 Crowd Cylinder R &amp; R</b> for crowd cylinder replacement procedure.		
4.	Using suitable wrench and socket, remove <b>ONLY</b> the RH (ODS) cylinder pin end cap at the QDS/KAT/RAS rod end of the cylinder. This will allow sufficient access to examine and/or replace the clevis clamp bolts. Refer to Figure 3 on page 6.	Manual handling	Use correct manual handling techniques and certified torque wrench.
<b>Clevis Clamp Bolts Replacement Procedure</b>			
5.	All clamp bolts are required to be replaced in the sequence as stipulated below. <b>DO NOT tension any original bolts, all bolts to be replaced with new bolts.</b> Install recommend new bolts, size and grade: - <b>M12 x 1.75 x 60 Grade 12.9 Socket Head Bolts.</b>		

6.	<p>Using suitable torque wrench and InHex socket, remove clamp bolt No.1 only. Refer to Figure 5 on page 6.</p> <p>The clamp bolts are to be removed and replaced individually in the numbered sequence, one bolt at a time. Refer to Figure 4 on page 6, for bolt numbered sequence.</p>	Manual handling	Use correct manual handling techniques and certified torque wrench.
7.	<p>Clean the No.1 bolt hole thread tapped thru the clevis body, using M12 x 1.75 hand tap, then inspect the thread condition after completion.</p> <p>Refer to Figure 6 on page 7.</p> <p>If there are any defects found with the threads in the clevis, the crowd cylinder will need to be replaced.</p>		
8.	<p>Select a new clamp bolt and apply a small quantity of Loctite 243 along the thread before installing the new bolt into the clevis. Refer to Figure 7 on page 7.</p>		
9.	<p>Tension this bolt to recommended torque of 120Nm.</p> <p>Refer to Figure 8 on page 7.</p>	Manual handling	Use correct manual handling techniques and certified torque wrench.
10.	<p>No.2 clamp bolt – repeat the previous sequenced steps 7,8,9 and 10.</p>	Manual handling	Use correct manual handling techniques and certified torque wrench.
11.	<p>No.3 clamp bolt – repeat the previous sequenced steps 7,8,9 and 10.</p> <p>Refr to Figure 9 on page 7.</p>	Manual handling	Use correct manual handling techniques and certified torque wrench.
12.	<p>Re-torque all the clamp bolts in the sequence 1,2,3, several times until all bolts are torqued to the recommended 120Nm.</p> <p>Mark across the bolt heads and adjacent clevis body with a marking/paint pen to highlight the bolts have been tensioned.</p> <p>Refer to Figure 10 on page 7.</p>	Manual handling	Use correct manual handling techniques and certified torque wrench.
13.	<p>Replace the RH (ODS) cylinder pin end cap at the QDS/KAT/RAS rod end of the cylinder.</p> <p>Install the 5 1/2" x 1-1/4" UNC FLGHD end cap bolts with Loctite Molypaste or equivalent applied to thread.</p> <p>Refer to Figure 11 on page 7.</p>	Manual handling	Use correct manual handling techniques and certified torque wrench.

14.	Torque bolts to a minimum torque value whilst maintaining an even gap between the clamp and QDS body. Then torque bolts to the recommended value 1480 Nm.	Manual handling	Use correct manual handling techniques and certified torque wrench.
15.	Remove vehicle isolation and test crowd cylinder operation.		

## Reference Images



Figure 1. QDS/KAT/RAS crowd forward with bucket resting on the ground.



Figure 2. Inspect security of clevis against rod end shoulder.



Figure 3. RH cylinder pin end cap removed

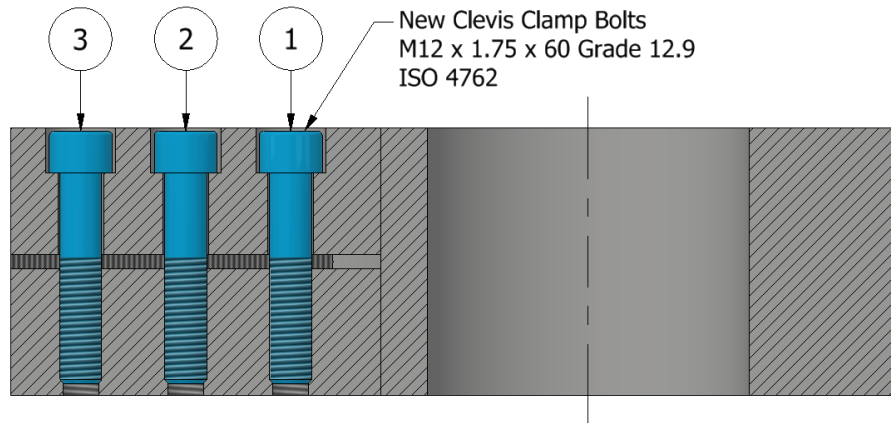


Figure 4. Clevis section view diagram showing the clamp bolts numbered sequence.



Figure 5. No.1 clamp bolt removed.





Figure 6. Clean No.1 bolt hole with M12 x 1.75 thread tap.



Figure 7. Install new bolt M12 x 1.75 x 60 Grade 12.9 with Loctite 243 applied to the thread.



Figure 8. Tension new bolt to the recommended torque of 120 Nm.



Figure 9. Repeat the replacement sequence for bolts 2 & 3 then check bolt torque of 120 Nm in same sequence.



Figure 10. Mark each bolt head corresponding with the clevis body on completion of bolt torque sequence.



Figure 11. Replace cylinder pin end cap and torque retaining bolts to 1480 Nm whilst maintaining an even clamp gap.

**NOTE:** All personnel must read and understand this procedure before signing the document and commencing any task or associated task.

**Non Consensus Items**

Participant	Item/Concern	Comments

Recommendations to change any instructions are to be listed and communicated to your supervisor.

**SWG Sign Off** Signoff should not take place unless this procedure has been read, understood, and all personnel associated with this task must follow this standard work procedure.

Employee Name	Signature	Date Undertaken