

TECHNICAL BULLETIN

Ref Document No.	TB16001	Issue No.	1
Subject	Crowd cylinder Gland Bush Bolt Failure		
Release Date	8 th March 2016		

Purpose – Advise COALTRAM® owners/operators of the possibility of the crowd cylinder gland bush retaining bolts failing.

Applicability – All in service COALTRAM® model CT10 only

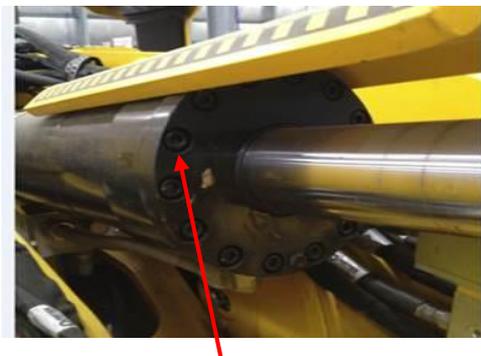
Background

A Coaltram CT10 with an original style crowd cylinder installed experienced the gland bush / cap separating from the cylinder barrel due to the retaining bolts failing.

Investigations/Findings

PPK attended site to view the crowd cylinder and determine the cause of failure.

The crowd cylinder was of the older style (figure 1) using a counter bored gland cap and retaining bolts.



Original style Crowd
Cylinder with bolts heads
counter bored



New style Crowd Cylinder
with bolt heads proud

Figure 1

The newer cylinder design does not have the counter bores in the gland cap and has larger bolts with the bolt heads standing proud of the gland cap, (Figure 1) split washers are fitted under the bolts.

During the incident all gland cap retaining bolts had failed allowing the gland cap to separate from the cylinder body. Oil was expelled from the annulus end and the attachment crowded forward hitting the ground. The cylinder body dropped onto the rod due to it no longer being supported by the gland. This misalignment then caused damage to the counterbalance valve block mounted on the cylinder.

Seven of the gland cap retain bolts were recovered from site. From examination of the bolt failure surfaces it was evident that all bolts had experienced tensional failures (Figure 2).



Figure 2

The bolts were confirmed as being the correct grade, 12.9.

From examination of the bolts, it was determined that the bolts had been exposed to a tensional load that exceeding their upper yield value.

The bolt diameter was measured and an average reduction of diameter of 17.75% was recorded (commonly referred to as necking).

The failure surface of each bolt presented the typical cup and cone failure associated with a tensional load failures. (Figure 3)

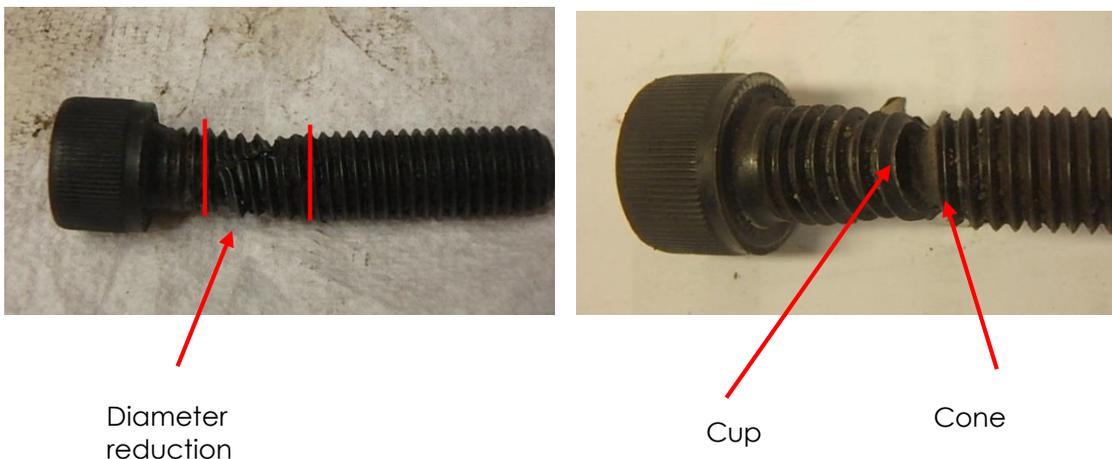


Figure 3

When originally supplied from the manufacturer, the older style of crowd cylinders were fitted with a mild steel washer under the bolt heads that retained the gland cap.

The soft washers were removed and replace them with harden steel Schnorr safety washers (Figure 4). This was done to stop the soft washer from crushing and eventually allowing the bolts to become loose (Figure 5).



Schnorr safety washer now fitted to old style crowd cylinder

Figure 4

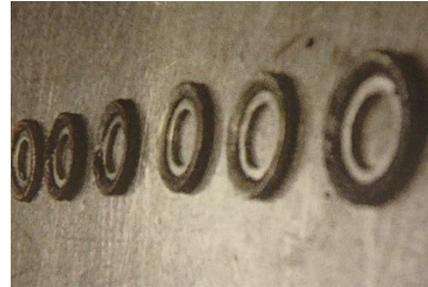


Figure 5

The crowd cylinder that experienced the failure did have the correct Schnorr safety washers installed. The underside surface of the bolt heads showed witness marks produced when using a Schnorr washer (Figure 6).



Figure 6

No failures or reports of bolts coming loose has been reported or recorded for the new style of crowd cylinder with the bolt heads sitting proud.

Recommendations

1. PPK recommends that all CT10 Coaltram owners/operators inspect their CT10 Coaltrams at the next available service for loose crowd cylinder gland / bush retaining bolts.
2. For the original style crowd cylinder the M12 x 50mm SHCS 12.9 grade are to be torqued to 143 Nm dry. For the new style crowd cylinder the M16 x 50mm SHCS grade 12.9 are to be torqued to 330 Nm dry. This torque is to be checked without the removal of the bolt.
3. If there are any bolts require tightening then all of the bolts and washers should be removed and replaced.
4. PPK can supply a replacement kit for the bolts and washers upon request – old style crowd cylinder P/No. 5520010076, new style crowd cylinder P/No. 55200010081.
5. If new fasteners are installed the additional use of Loctite 263 is to be incorporated into the assembly procedure. M12 cap screws should be torqued to 110 Nm (wet/Loctite applied), M16 cap screws should be torqued to 260 Nm (wet/Loctite applied).
6. A work instruction is available and accompanies this technical bulletin.

7. Please contact your PPK service centre for the supply of the bolt kit P/no. 5520010076 or 5520010081, refer to SWP CT6.56 for the recommended installation procedure.
8. A line item should be added to the 1,000 hour/6 month service of Coaltram CT10's to check for loose fasteners on the crowd cylinder gland. An updated PPK 1,000 hour/6 month service sheet has been attached with this bulletin.

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