

SAFETY ALERT

DATE: February 2020

Brake pad dislodged from calliper during winder testing

This safety alert provides safety advice for the NSW mining industry.

Issue

During an overspeed test of a drift winder, a brake pad dislodged from the brake calliper when the brakes were applied.

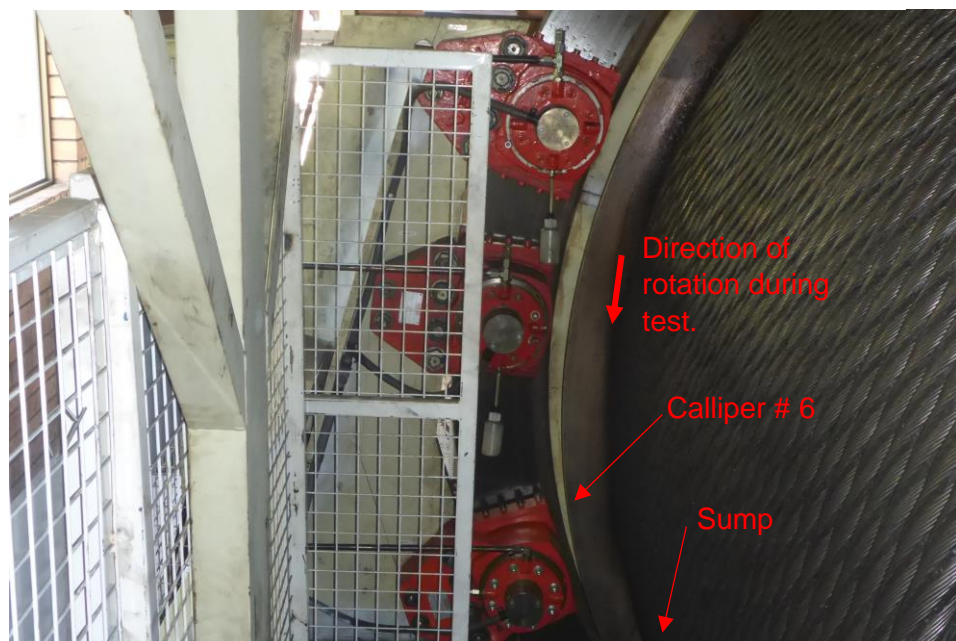
Circumstances

The incident occurred at 2:00am on 11 February 2020 following shift change.

Two maintenance workers started the weekly electrical function testing. During the overspeed test, the winder registered a fault on the data log, as a failure to apply number 6 low speed brake calliper. This corresponded to a trip due to exceedance of the brake pad wear limit.

Upon initial investigation, workers found the brake friction pad, retaining plate and four of the five retaining plate bolts in the sump below the brake calliper. They also found the fifth bolt broken with part of the thread still engaged in the calliper.

Figure 1 - Showing winder drum and three of the ten Svendborg brake callipers



Investigation

The failed bolt was determined to be the consequence of the force exerted by the brake pad on the retainer, which overloaded the bolt.

The investigation revealed that the key contributing factors that caused the other four bolts to come loose were:

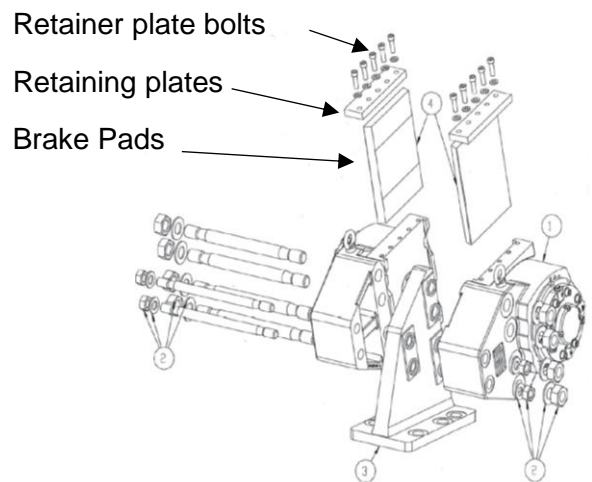
- The retainer plate bolts were M12 by 40 millimetres long class 12.9 socket head cap screws (bolts). The manufacturer specification is for class 8.8 bolts. Class 12.9 bolts had been supplied on overhauled callipers primarily because 8.8 class were special order and not readily available.
- Retainer plate bolts had been installed without the use of a torque wrench to the specified torque setting of 64Nm set by the manufacturer for class 8.8 bolts. Due to the bolts being class 12.9, a higher torque setting would have been needed to induce the required strain to prevent the bolt loosening over time.
- Thread wear or stretch was found in the tapped holes of the calliper. This presented as excessive axial play when inserting a new bolt into the thread.
- While no fasteners were found without washers fitted, it was noted that without the washer, the M12 by 40 millimetres long bolts could bottom out in the blind tapped hole with a slight gap underneath the head of the bolt (less than 1 millimetre). This highlighted the fitment and thickness of the washer critical to the assembly.

Recommendations

Mine operators should consider the following with respect to safety critical fastener applications such as winding system brakes and mountings:

- Conduct a review of winder brakes to ensure the correct grade of fastener, specified by the designer or manufacturer, is being used for the application.
- Review the details of work scopes and information provided to maintenance workers. These should include all necessary technical information (i.e. part re-order codes, fastener grade, length, material protection, lubrication, torque setting, application of thread locking compounds, washer details, fastener re-use or discard criteria).

Figure 2 - The brake calliper assembly. Note the retaining plates are duplicated on the underside of the calliper.



- Review the availability of specialised tools and consumables (i.e. as torque wrenches, measuring devices, thread locking compounds) in the workplace.
- Torque wrenches and other measurement equipment should be securely stored and protected from damage when being handled or transported and calibrated at a suitable frequency considering frequency of use, environment and manufacturer recommendations.
- Identify instances of safety critical blind threaded holes. Undertake regular inspection and testing to ensure threaded holes remain within tolerances nominated by the manufacturer. A 'go/no-go' thread gauge or other techniques for this purpose may be suitable. Training and the competency of workers to perform the inspection and testing of threads should also be considered.
- Overhaul work scopes should include quality checks for fastener grades, torques, thread tolerance checks, components replaced when exceeding design life cycle, machining tolerances, surface finishes or other performance critical specifications.

NOTE: Please ensure all relevant people in your organisation receive a copy of this safety alert and are informed of its content and recommendations. This safety alert should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's common area, such as your notice board where appropriate.

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DOCUMENT CONTROL

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