

# SAFETY BULLETIN

## Exploding lead acid batteries

### INCIDENT

There have been four reported explosions involving lead-acid batteries in NSW open cut coal mines since November 2015.

In two of these events, people were in close proximity to the explosions and in one of these a tradesman was sprayed with acid, although he did not suffer any injuries.



Image 1: Failed battery in Cat 993K front end loader



Image 2: Failed battery in 100kVA generator



Image 3 – Failed battery in portable charging trolley



Image 4 – Damaged enclosure on back of utility

## **CIRCUMSTANCES**

The batteries were installed in mobile and fixed plant applications.

In three events, the batteries were sealed “maintenance free” units, and in the other event a vented “maintainable” battery was involved.

Three of the events occurred while maintenance activities were in progress on the equipment.

In events where the battery cases actually failed, debris was scattered up to 10 metres from the equipment.

## **INVESTIGATION**

Investigations revealed several contributing factors, some of which were common to more than one of the events.

1. The installed batteries were not the correct size or type for their intended duty. In one event the batteries were substantially undersized when compared to the required cold cranking amps (CCA) for the machine on which they were installed. In another event a sealed battery was installed in an application where it was subjected to constant charging, without sufficient consideration to the potential hazards arising from over-charging this battery type.
2. Workers with responsibility for inspecting and testing batteries did not have clear guidance or information with regard to assessing whether or not the battery condition was acceptable. In two events, the battery voltage was checked before the incident, and the measured battery voltage provided an indication the battery may no longer have been suitable for service.
3. Consideration was not given to the provision of adequate ventilation of battery enclosures to prevent accumulation of hydrogen released while a battery was being charged.
4. Appropriate consideration was not given to ensuring batteries were securely mounted and protected from the harmful effects of vibration.

## **RECOMMENDATIONS**

1. Mine operators should follow the guidance provided in sub-section 2.5 of AS/NZS 4871.6:2013 *Electrical equipment for mines and quarries – Part 6: Diesel powered machinery and ancillary equipment*, and equipment manufacturer’s recommendations when determining whether battery installations on plant and equipment are fit for purpose.
2. Mine operators should ensure maintenance, inspection, and fault-finding procedures for battery installations contain adequate detail so workers can perform these tasks safely, and detailed guidance to allow workers to make appropriate determinations as to whether these installations are fit for purpose.
3. Mine operators should ensure that only suitably competent workers undertake maintenance, inspections and fault-finding on battery installations.
4. Mine operators should ensure that battery enclosures on plant and equipment are kept closed and secured at all times other than when battery inspections or maintenance are being undertaken

**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 notice board.

Issued by

**Gary Parker**

**Chief Inspector of Mines**

**Appointed pursuant to Work Health & Safety (Mines) Act 2013**

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