

Failure of explosion-protection characteristics of flameproof equipment

BACKGROUND

There have been several incidents recently where explosion protected (Ex) electrical equipment has been supplied for use at underground coal mines with non-Ex blanking plugs fitted to gland entries. The equipment has subsequently been installed on plant and used in hazardous zones at those mines without the non-Ex blanking plugs being replaced with appropriate certified blanking plugs.

INCIDENT No.1

During a routine inspection, the flameproof alternator of a diesel powered personnel transport vehicle was found to be fitted with a plastic blanking plug in an unused gland entry of the alternator. The alternator had been in service for several months prior to identification of this defect.

CIRCUMSTANCES

The alternator has two threaded cable gland entry holes, however only one cable entry hole is used on this vehicle. An electrician found the plastic blanking plug in the unused gland entry during a routine examination.

The vehicle had made regular entries into hazardous zones during the time that the alternator had been fitted to the transport.

INVESTIGATION

The alternator was overhauled at a licensed facility for the repair and overhaul of electrical Ex apparatus. It was routine practice at the licensed facility to fit plastic blanking plugs in all threaded gland entry holes of new and repaired alternators prior to painting to prevent ingress of dirt or water during delivery to a customer. The alternators are subsequently supplied to mines with the plastic blanking plugs still fitted.

The alternator was installed on the vehicle as an in-service replacement by mine site personnel and had been in use for several months in a non-Ex condition. The unused gland entry was overlooked during installation at the mine, and by subsequent scheduled examinations.



Photo shows a certified blanking plug in the unused entry hole.

INCIDENT No.2

The flameproof motor of a Breaker Line Support (BSL) was found with a non-flameproof blanking plug fitted to an unused gland entry in the motor junction box. The BSL had been in service for several weeks and had been visually inspected several times since being placed into service.

CIRCUMSTANCES

During the replacement of a flameproof motor on a BLS an electrician identified that the newly supplied motor had been fitted with a plastic, non-Ex hexagonal-headed blanking plug. The plastic plug was located on the underside of the motor junction box and had been painted the colour of the motor. This motor was new but had been rewound from 415 to 1000 volts by the motor repair workshop prior to being installed.

The electrician subsequently inspected another BLS that was in service. The in-service BLS had previously been fitted with a replacement motor by a licensed overhaul workshop before delivery to the mine site. The BLS had been in service for 4 weeks within the hazardous zone with Code A inspections being undertaken daily. This motor was also found to be fitted with a plastic hexagonal-headed blanking plug on the bottom side of the motor junction box.

INVESTIGATION

The original motor had been replaced by a licensed electrical workshop prior to the BLS being returned to site. The motor had been fitted by a fourth year apprentice and the paperwork signed off by a tradesman that had not inspected the installation.

The mine had inspected the BLS under the sites 'introduction to site' management system prior to the BLS being placed into service. The inspections which include an internal inspection failed to identify the non-flameproof plastic plug. Several external visual inspections had also failed to identify the plastic plug.



Photo of BLS Motor J/Box

RECOMMENDATIONS

- Mines should review their systems for the introduction of equipment to site and for in-service maintenance activities for electrical equipment and plant. This review should ensure the requirements of Australian Standard AS/NZS 2290.1 '*Electrical equipment for coal mines – Introduction and maintenance*' have been addressed, including requirements for the inspection of Ex areas and component parts that are not readily accessible.
- Training systems for personnel that undertake work on Ex equipment at the mine should be reviewed to ensure periodic review of the competency and standards of workmanship of these personnel.

- Mine operators should implement purchase and supply processes that require all unused cable entries on Ex electrical equipment be fitted with certified blanking elements prior to the supply of the equipment to the mine.
- Suppliers of Ex electrical plant and equipment should only supply Ex electrical plant and equipment with all unused gland entries fitted with suitably certified blanking elements.
- Safety alerts SA04-23 '*Unsafe Flameproof Enclosure*' and SA05-02 '*Unsafe Flameproof Enclosure – Overhauled Auxiliary Fan*' should also be reviewed.

NOTE: Please ensure all relevant people in your organisation receive a copy of this Safety Bulletin, and are informed of its content and recommendations. This Safety Bulletin 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.

Signed



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