

# SAFETY ALERT

## Failure of explosion protected diesel engine system

### INCIDENT

Operators witnessed sparks being emitted from the diesel engine system of an underground man transport vehicle, when an after market extension tube (1/4" copper pipe) fitted to an exhaust manifold gas sampling point catastrophically failed.

### CIRCUMSTANCES

The vehicle was being driven along a main underground transport road when the operator witnessed sparks coming from under the dash. A copper pipe used to gather raw gas samples from the exhaust manifold test point had catastrophically failed.



Cu pipe fatigue crack.

Raw exhaust & sparks coming out of here

*Aftermarket 1/4" Cu pipe extension tube*

### INVESTIGATION

The copper pipe extension was installed to assist in routine raw exhaust gas sampling. While it is uncertain, the sparks were most likely from hot carbon particles in the raw exhaust of the diesel engine system, glowing as they become oxygenated in the atmosphere.

Subsequently, a number of other diesel engine systems were also found to be operating with copper sample pipes from the raw exhaust manifold test point to a convenient location within the engine compartment.

Any extension to the gas test point connection at the exhaust manifold is subject to significant vibration, potential inadvertent damage, fatigue and/or heat affected failure. Copper pipe may become brittle and be subject to fatigue cracking in situations of frequent vibration and/or excessive heat.

The extensions to the gas test point were not covered by the detailed registration documents for the diesel engine systems.

The engine system as tested for registration did not include a gas sample point extension line.

## RECOMMENDATIONS

1. Diesel engine systems should not be altered unless the alteration is design registered.
2. All mines and owners of diesel engine systems should check their diesel engine raw exhaust gas points for unauthorised alteration, such as copper pipe extensions, wrong fittings and exhaust flametraps in lieu of caps.
3. If found, immediately remove all extension pipes to the gas sample point and plug the test point with an appropriate fitting, where this has not been accessed as part of the design registration for the diesel engine system.
4. If remote sample points are required for raw gas testing, then use an appropriately purpose built sample line and immediately after testing is complete, remove the sample line and block off the sample point back at the exhaust manifold with the appropriate fitting

**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.

**Signed**



**Rob Regan**  
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