

Causal investigation: catastrophic engine failure in underground coal mine

- **Incident date:** 4 July 2017
- **Event:** Catastrophic failure of diesel engine system
- **Location:** Wongawilli Colliery, Wollongong, NSW

Overview

The NSW Resources Regulator will undertake a causal investigation into a catastrophic engine failure at Wongawilli Colliery, to ensure there are no ongoing risks to worker health and safety.

While operating in an underground coal mine, a catastrophic failure of a diesel engine system occurred, resulting in the mine atmosphere being exposed to internal combustion components. This created an ignition source which has the potential to cause an explosion of methane gas.

The purpose of the causal investigation policy is to enable the full understanding of the causes of this incident.

The mine

Wongawilli Colliery is located near Wollongong. Delta SBD was the mine operator at the time of the incident.

The incident

The incident occurred on 4 July 2017, and involved the failure of an unloaded Bucyrus 3126DITC engine, operating in the main intake airway. The failure caused internal engine components, such as the conrod cap, to be exited from the engine block, exposing the mine atmosphere to the high-temperature engine components and possibly the combustion chamber. No person was injured as a result of the incident.

Diesel engine systems used at underground coal mines are explosion-protected to ensure they do not create an ignition source in methane-rich atmospheres. The catastrophic failure of a diesel engine system, where the internal combustion chamber is potentially exposed to a methane-rich environment, presents a significant risk of initiating an explosion.

This type of engine failure is rare and it is essential an understanding of the mechanisms that caused the catastrophic failure are understood.

Engine failure: The FBL10 involved in the incident (left), and internal engine components (right). Photos: Resources Regulator.



The investigation

A scene preservation notice was issued to enable the plant to be removed off-site for inspection by an independent assessor. A preliminary investigation indicated a damaged oil supply pipe, possibly as a result of or as a precursor to, a big-end conrod damaging the engine block. The focus of the causal investigation will centre on the exact causes of the failure.

A preliminary assessment undertaken by the regulator of the incident has not identified any material breaches of the *Work Health and Safety Act 2011* and the regulator has no intention of conducting any further investigation into any potential non-compliance issues or taking any criminal enforcement action. The focus of ongoing inquiries is to identify the causal factors associated with the event, in accordance with the regulator's [Causal Investigation Policy](#). Stakeholders will be invited to participate and will generally include the mine operator, other persons conducting a business or undertaking (involved in the incident), workers, health and safety representatives and industry and mine safety and health representatives.

Recommendations

The Resources Regulator recommends:

- mine operators ensure maintenance of diesel engine systems and inspection and testing of the safety related controls be carried out in accordance with the vehicle and the engine manufacturers' recommendations
- when designing explosion-protected diesel engine systems, it is essential that consideration of the likelihood for a rare malfunction be given in the design ignition risk assessment. Refer to [MDG 43 Technical Standard for the design of diesel engine systems for use in underground coal mines](#).

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