NSW DEPARTMENT OF
PRIMARY INDUSTRIES

SAFETY ALERT

Diesel engines run on methane-enriched atmosphere

INCIDENT

Methane-enriched mine air passed over two diesel explosion-protected load haul dump (LHD) vehicles which were operating in a return airway during a longwall relocation. The methane caused both diesel engines to increase in speed and rev in excess of maximum engine speed. Both diesel engines suffered major internal damage. No one was injured as a result of the incident.

CIRCUMSTANCES

Two turbo-charged CAT 3126 engine-powered LHD vehicles were being operated in tandem in a return heading, towing a longwall tailgate drive assembly out of the panel. Because of the length of the train it was necessary to open two consecutive doors of the ventilation double doors at the same time, which allowed the return air from the longwall face to short-circuit over the diesel vehicles. It is most likely that this ventilation disruption caused excess methane to be drawn from the goaf into the return air.

Both diesel engines then commenced revving at a high speed and out of control. One of the LHD operators activated the emergency shutdown system (strangler valve) on his vehicle after about 30 seconds, which shut the engine down as required. The second diesel engine shut down of its own accord after approximately 50 seconds of high revving. Neither diesel engine could be restarted, however they had not seized.

At this point the train had travelled far enough to allow the inbye set of doors to be closed, returning the ventilation circuit to normal. A nearby methane gas monitoring point indicated that the level of methane in the return air reached 3% at the time of the incident and remained at that level for four minutes. It was noted that the methane gas monitoring equipment was calibrated to read a maximum of 3%.

INVESTIGATION

The ventilation arrangements for the longwall panel were disrupted when both sets of doors were opened at the same time, resulting in the return air short-circuiting. The air velocity across the longwall face probably increased, which in turn drew a body of methane from the goaf. The methane-charged air entered the fuel system of the diesel vehicles, causing the resultant out-of-control revving and substantial engine damage. The length of the train was such that both sets of double doors had to be opened at the one time to allow passage.

Initial investigations and inspections have indicated both diesel engines were in an ‘explosion protection’ condition at the time of the incident. The poor state of the roadway

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surface in the return roadway contributed to the need for two vehicles to be used to tow the tail gate assembly.

RECOMMENDATIONS

Operators of underground coal mines must develop and implement management plans, procedures and standards to control all risks associated with the movement of equipment and vehicles in return airways by:

1. Designing and locating ventilation structures such as to allow safe passage of vehicles and equipment without damage or disruption to the ventilation circuit. In particular, adequate roadway dimensions and clearances around equipment and vehicles during passage must be maintained when installing such structures.
2. Maintaining high-standard roadway surfaces.
3. Ensuring all vehicles have gas detection on board as required by Clause 18 (e) of the Coal Mine Health and Safety Regulation 2006.
4. Ensuring vehicle operators, including contractors:
   a) are competent to operate the vehicle, have been fully instructed/trained on the task to be performed and understand hazards associated with altering ventilation circuits
   b) Are trained on the requirements for operation of vehicles in return airways, including carrying and using a methane detector, withdrawal requirements, and emergency shutdown of a diesel engine.
5. Reviewing the following:
   - Preventive maintenance on explosion-protected diesel equipment. The review should be compared against the original equipment manufacturer (OEM) maintenance recommendations.
   - Competency of mechanical tradespeople to inspect, service and repair explosion-protected diesel equipment.
   - Periodic audits of the Mechanical Engineering Management Plan and ensure the same is being implemented.

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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