

SA17-10 September 2017

Response times of gas detectors

This safety alert provides information on a serious incident and safety advice for the NSW mining industry.

Incident

Following entry into an underground roadway at a coal mine, a longwall deputy's gas detector alarmed at 2% methane. The gas detector peaked at 3.5% during the deputy's retreat from this roadway. This incident occurred on 5 September 2017.

Circumstances

An LHD vehicle hit a water trap on the methane drainage line underground causing the water trap to break off at a 'T' piece. The operator of the vehicle was unaware of the damage. The gas drainage plant had been shut down for maintenance activities resulting in the gas drainage range being pressurised. The damage to the drainage pipe range led to methane gas issuing under pressure into the underground roadway.

While inspecting roadways inbye of the damaged water trap, a deputy's gas detector alarmed at 2% methane. He retreated from the roadway with his gas detector peaking at 3.5%. The deputy had entered a methane concentration greater than 2% without being aware. This was because of the inability of the gas detection instrument to instantaneously measure the actual concentration of methane in this situation.

Gas detector requirements

Methane detectors for underground coal mines in NSW are required to be design registered. To achieve registration, a methane detector must comply with the requirements of *Australian Standard AS/NZS 60079.29.1*. This standard requires the time for a sensor to reach 50% of the test gas concentration (t(50)) of no greater than 10 seconds and the time for the sensor to reach 90% of the test gas concentration (t(90)) of no greater than 30 seconds.

Note: AS/NZS 4641 covers requirements for toxic gas sensors and oxygen sensors. The t(50) and the t(90) for these gases is 20 seconds and 60 seconds respectively.

Note that t(50) and t(90) values are determined by the design of the gas detector and not by the concentration of the gas to which the detector is exposed. The following table shows the gas detector reading and the times to reach t(50) and t(90) values respectively when a methane detector is moved from 0.0% methane to the prescribed methane concentration

Methane concentration	t(50)		t(90)	
	Reading	Time	Reading	Time
5.0%	2.5%	<10 secs	4.5%	<30 secs
2.5%	1.25%	<10 secs	2.25%	<30 secs
1.25%	0.63%	<10 secs	1.13%	<30 secs

The average person will walk between three and four metres per second. At this pace, a person may travel a significant distance into a hazardous or dangerous environment before a gas detector alarms and starts to indicate elevated levels of gas.

Recommendations

Mine operators should:

- identify the response times for gas detectors in use at their mine
- review the operational risk assessments relating to the use of gas detectors at the mine to ensure that actions and protocols associated with gas detection are appropriate for the response times of the gas detectors and the environmental conditions that may be encountered. In addition to gas detectors used by deputies undertaking inspections, this review should consider operating speeds of vehicles and the distances travelled by those vehicles if gas is detected.
- update the mine's safety management system, as required by the above reviews
- ensure all personnel who are required to carry a gas detector are trained in the requirements of the mine's safety management system relating to their duties, and are aware of the time lag response of gas detectors in use at the mine
- Refer to [SA10-04 Portable gas monitors](#) for additional information relating to response times of gas detectors.

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

Dave McLean

Chief Inspector

Appointed pursuant to *Work Health and Safety (Mines and Petroleum Sites) Act 2013*

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