



## **Abrasive blaster dies of carbon monoxide poisoning**

***Proper maintenance and proper use of compressor may have prevented this death***

### **Hazard Summary**

A 43-year old, self-employed male sandblaster died of carbon monoxide poisoning at his outdoor work station.

The victim was working alone and wearing personal protective equipment that included a NIOSH-approved Type CE sandblasting helmet. The helmet was supplied with breathing air by a manifold from a diesel-powered, oil-lubricated rotary screw compressor. This compressor also provided the sandblasting air. The equipment was old (circa 1970) and in very poor repair. Between the manifold and helmet were an in-line lubricator, a polycarbonate particulate filter, and a freestanding carbon filter. There was no aftercooler and no carbon monoxide removal or detection/alarm equipment in the system.

Testing of the breathing air produced from this system showed that it contained in excess of 960 ppm of carbon monoxide. The CSA standard Z180.1-M85 "Compressed Breathing Air" recommends a maximum concentration of 5 ppm carbon monoxide. Also present were more than 3900 ppm of carbon dioxide, 55.5 ppm of methane, various hydrocarbons, and an unacceptable odour. The recommended maximum levels of carbon dioxide and methane are 500 ppm and 25 ppm, respectively. The oxygen content of the sample was deficient as well.

### **Hazard Location**

This hazard may occur whenever breathing air is supplied from an air compressor. There are two potential sources of carbon monoxide in breathing air from this type of system.

- Oil lubricants in air compressors may break down at high temperatures and produce dangerous carbon monoxide levels.
- The compressor intake may draw air that is contaminated by exhaust emissions from the diesel engine or another nearby source.

In this case, the compressor and air purification system used were not designed to produce breathing air meeting the quality specifications of the CSA standard. The equipment was so poorly maintained that both sources of carbon monoxide might have been involved. The hydrocarbon contaminants and low oxygen level in the breathing air sample indicate that overheating of the lubricant was the principal carbon monoxide source.

## Precautions

Where an oil-lubricated compressor is used to supply breathing air:

- the compressor must be designed for safe use with supplied-air respirators,
- the intake air must be drawn from a clean outdoor source,
- the compressor equipment must be maintained according to the manufacturer's instructions,
- the carbon monoxide level of the breathing air should be monitored with a properly calibrated and maintained direct-reading instrument preferably equipped with an alarm, and
- the breathing air from the system must be tested by a qualified laboratory at least twice per year for compliance with the CSA compressed breathing air quality specifications.

Alternatively, a safe source of breathing air can be provided by:

- a) using an oil-less breathing air system that draws air from a clean outdoor source and is maintained according to the manufacturer's instructions, or
- b) using a compressed breathing air cylinder source certified by the supplier as meeting the quality specifications of CSA Standard Z180.1-M85.

## Legal Requirements

The *Occupational Health and Safety Act* places a responsibility on constructors, employers, and supervisors to ensure the health and safety of workers and to provide workers with appropriate training. Suppliers of rental or leasing equipment used in a workplace have a responsibility to ensure that the equipment supplied is in good condition and complies with the *Occupational Health and Safety Act*. Refer to Sections 25(1)(b), 25(2)(h), and 31 of the *Occupational Health and Safety Act*.

For further information or assistance, please contact your local office of the Ministry of Labour, the Industrial Accident Prevention Association, the Construction Safety Association of Ontario or other safe workplace association.

***Remember that while complying with occupational health and safety laws, you are also required to comply with applicable environmental laws.***