DEPARTMENT OF MINERALS AND ENERGY WESTERN AUSTRALIA

S A F E T Y B U L L E T I N No. 49

USE OF COMPRESSED AIR FOR CLEANING PURPOSES

THE HAZARD

This document outlines the general requirements for the safe use of compressed air for cleaning purposes. The inappropriate use of compressed air on minesites may result in the following occupational health and safety hazards,

- injury, when high pressure air is contacted with skin, eyes, or body (cavities orifices)
- exposure to dust and noise

WHAT CAN HAPPEN

Compressed air is widely used in the mining industry for cleaning purposes. For example, in sample preparation laboratories, hand held compressed air nozzles are used for cleaning of sampling equipment to avoid cross contamination of samples. Similarly high velocity air nozzles are used to dry parts of equipment which have been cleaned in workshop degreasing baths.

Compressed air jets from these nozzles can cause serious injuries when misused. A jet of compressed air when applied to the human body can introduce air into the bloodstream through the skin and consequently lead to an embolism (or obstruction of an artery), a potentially lethal condition.

Mechanical damage to tissue can also be caused when air under pressure is introduced into body cavities, again with potentially fatal results.

Solvent, oil or grease can also be injected into the skin by use of a degreasing bath air jet, particularly when the equipment is hand held.

High velocity air movement from a single jet nozzle can create dust problems and thus contravene regulation 4.12 of the Mines Safety and Inspection Act Regulations (See Note 8 below).

Such nozzles have also been found to produce noise levels as high as 98 dB(A) when used at an operating pressure of 500 kPa. Regulation 7.4 calls for the introduction of noise control measures, which need to be considered when compressed air nozzles are used.

SAFE WORKING PRACTICES FOR USE OF COMPRESSED AIR IN CLEANING APPLICATIONS:

1. An in-line pressure regulator complete with gauge should be installed to reduce a high mains supply pressure to a secondary working pressure of 210 kPa, when a single jet nozzle is used.

2. Use alternative nozzles such as a multi-cut (star-tip) type nozzle capable of reducing contact pressure to 210 kPa, or those nozzles with an in-built pressure regulator which acts to prevent the outlet pressure from exceeding a maximum of 50 kPa. Note that the above nozzles are generally currently operated with supply pressure between 500 and 600 kPa.

3. Work stations where compressed air nozzles are used require a dust extraction system to remove any dust generated during cleaning operations from the workplace atmosphere.

4. Compressed air nozzles should not be used for removal of dust from a machine or clothing. A brush or vacuum cleaner should be used instead.

5. Air nozzles should not be applied to generate mist or solvent droplets when used at a degreasing bath. Equipment being cleaned should not be hand held, and air jets are not to be deflected back to the operator.

6. The use of pressure regulated or modified compressed air nozzles described above will reduce the operator's noise exposure by between 10 and 14 dB(A).

7. Employees may not be aware of the potential hazards of compressed air. Clear and definite instruction regarding its safe use should be included in training programs, and if necessary, signs warning of hazards and controls on use should be displayed in each workplace where it is used in the above applications.

8. A particular application of compressed air, (in a different context from the above), is blowing off shaft and winze floors in sinking, and cleaning off the floors of drill headings to check for misfires prior to drilling downholes in rings.

   The exception made in regulation 4.12 recognises that atmospheric contamination will result, and therefore respiratory protection and eye and hearing protection, together with gloves will be necessary for operator protection in carrying out these short duration activities.

   Similar precautions are required for operator protection when using compressed air to clean out blastholes.

REFERENCE

- Mines Safety and Inspection Regulations 4.12, 4.13 and 7.4;
- Australian Standard AS 2243;
- OSHA Standard 1910.242b.

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