NSW GOVERNMENT

NSW Resources Regulator

SAFETY BULLETIN

DATE: JANUARY 2022

Welding fume extraction fans

This safety bulletin provides safety advice for the NSW mining industry.

The International Agency for Research on Cancer (IARC) determined in 2017 there was enough evidence to upgrade the carcinogenic status of welding fumes from Group 2B Carcinogen (possibly carcinogenic to humans) to Group 1 Carcinogen (carcinogenic to humans). Refer to SB18-17 Welding fume safety.

Issue

Site assessments by Mine Safety Inspectors have identified issues related to fume management equipment in hot work areas at mine sites and processing plants. Local Exhaust Ventilation (LEV) units have been used to manage welding fumes without considering where the LEV system exhausts to and the inspection and maintenance of LEV units.

Figure 1: Typical portable LEV unit. (Note the snorkel hanging in the foreground)

Figure 2: exhaust vent shown on side of unit.

Circumstances

Fixed snorkel type extraction systems attached to the wall of hot work bays have been used at mine sites for many years. These systems typically duct exhaust gases outside the building envelope. However, the arm length, articulation, or configuration may not suit all applications in the welding bay and they cannot be used in other work areas. Consequently, there has been a recent trend to changing to portable local exhaust ventilation (LEV) welding fume extraction units similar to those below.

Figure 3: Typical range of Local Exhaust Ventilation (LEV) units

The issue relates to what LEV units do with the fumes and gases at the LEV base module, and the units inspection and maintenance practices in place.

Figure 4: Typical mine hot work bay with LEV unit directly beside work area.

Investigation

Planned inspections on site with boilermakers, fitters, and staff identified the following issues:

- Some welding bays were enclosed areas of the workshop, or a separate enclosed bay, of which some were reliant on natural ventilation through an open door or window.
- Inadequate change management processes have been used when mines replaced fixed fume extraction systems with LEV units.
- LEV portable welding fume extractor fans typically exhausted through either bottom or side of the base unit. As the snorkel is typically 3 metres or less, so the fan base is often near the workers. This may also potentially raise dust.
- LEV filters were often designed to capture particulates only and did not treat the noxious gaseous components. Some were fitted with automatic reverse pulse filters, so filters were not regularly inspected for cleanliness, relying on the automatic process.
- Filtered air breathing apparatus were not used in combination with the LEV unit.
- Maintenance regimes and safe work procedures for inspection, cleaning and changing filters were often not set up in work order system. PPE and disposal requirements were often not defined.

Recommendations

- Risk assess the requirements for managing welding fume particulates and gasses.
- Consider undertaking static airborne contaminant monitoring of hot work areas in the workshop and adjacent workshop areas while portable LEV systems are in use to determine the risk of the exposure of both welders and bystanders to welding particulates and/or gases.
- Review the extraction fan capacity of LEV systems to remove fume from the work area.
- Ensure the filtered exhaust from portable LEV systems is directed away from personnel to avoid recirculation. Consider ducting exhausted gases outside enclosed welding bays or workshops, and away from personnel.
- Confirm suitable maintenance regimes are in place for extraction systems. Review the trigger for routine inspection, cleaning, and/or changing filters.

- Review safe work procedures to including PPE requirements for the inspection, cleaning, changing and disposal of filters and collection trays.

References

- NSW Resources Regulator – *Technical Reference Guide Hot Work (Cutting and Welding) at Mines and Petroleum Sites*
- SafeWork NSW – Code of Practice – Welding Processes
- NSW Resources Regulator Safety Bulletin SB18-17 Welding processes declared a carcinogen
- *Weld Australia Guidance Note TGN-SW01 Fume Minimisation Guidelines: Welding, Cutting, Brazing and Soldering*

NOTE: Please ensure all relevant people in your organisation receive a copy of this safety bulletin and are informed of its content and recommendations. This safety bulletin should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's common area, such as your notice board where appropriate.

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