EXTENDED ABSTRACT

Evaluation of controls during concrete cutting and grinding works in a transient work environment

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Objectives

Transient construction sites encounter difficulties identifying effective and practical controls required to minimise respirable crystalline silica (RCS) exposures during concrete cutting and grinding works. This project aimed to evaluate the effectiveness of controls used in these work environments.

Methods

Worker feedback was obtained to gain an understanding of the perceived effectiveness and practicality of controls used. RCS exposure and background monitoring data were obtained during cutting and grinding works and statistically analysed.

Results

Three different phases of work were encountered at the site and categorised into separate similar exposure groups based on controls used. Controls reviewed included work zone enclosures; engineering controls to capture dust including Negative Pressure Units (NPU), on-tool Local Exhaust Ventilation (LEV) and shadow vacuuming techniques; and personal protective equipment including Powered Air-Purifying Respirators (PAPR).

Results indicated enclosed work zones proved effective in minimising airborne RCS concentrations encountered in adjacent work areas.

Statistical analysis of exposure monitoring data confirmed the following for all work phases:

- The conservative estimate of the mean (MVUE) exceeded the Workplace Exposure Standards (WES);
- The percentage above WES approached or equalled 100%; and
- The 95th percentile significantly exceeded the WES confirming exposures are poorly controlled for all three phases.

Conclusions and Recommendations

Data indicated RCS exposures are poorly controlled, requiring the introduction of additional engineering controls aimed at reducing RCS concentrations in transient work environments.

Engineering controls such as the on-tool LEV proved unsuitable to meet the demands of the required works encountered at this work site. Works required grinding edges of materials, preventing the shroud positioning close to the work surface creating gaps allowing dust to escape. Issues were also encountered completing required works due to limited manoeuvrability associated with positioning of the shroud. It is important worksites consult with

workers and manufacturers to identify appropriate equipment for the task. The utilisation of shadow vacuuming techniques reported limited effectiveness particularly during grinding due to difficulties capturing dust from the air. While the site indicated they were unable to introduce wet methods of control, it is important these methods are trailed in combination with other controls to reduce RCS exposures below WES and achieve legislative compliance. Transient workplaces must consider a combination of controls to reduce RCS exposures. Appropriate RPE is essential considering the high RCS exposures encountered during this study. Other administrative controls including the maintenance of equipment (including the replacement of filters), operating equipment at lower speeds, good housekeeping practices, providing workers with training and information, conduct annual health monitoring are also important.

(Respirable Crystalline Silica, Exposure, Controls, Local Exhaust Ventilation, Negative Pressure Unit, Powered Air-Purifying Respirator)

EXAMPLE

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Selection and Use of Respiratory Protection by Healthcare Workers to Protect from Infectious Diseases in Hospital Settings

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Objectives
Infection control policies and guidelines recommend using facemasks and respirators to protect healthcare workers (HCWs) from respiratory infections. Common types of respirators used in healthcare settings are filtering facepiece respirators (FFRs) and powered air-purifying respirators (PAPRs). Aims of this study were to examine the current attitudes and practices of HCWs regarding the selection and use of respiratory protection and determine the acceptability of a novel PAPR.

Methods
In-depth interviews were undertaken with 20 HCWs from a large tertiary hospital in Sydney, Australia. Participants were fit tested with a lightweight tight-fitting half-facepiece PAPR (CleanSpace2™ Power Unit, PAF-0034, by CleanSpace Technology®) using the TSI™ Portacount quantitative fit test method.

Results
Interview results showed that HCWs had a limited role in the selection and use of facemasks and respirators and had been using the devices provided by the hospital. The majority of subjects had no knowledge of hospital policy for the use of facemasks and respirators, had not been trained on the use of respirators, and had not been fit tested previously. Compliance with the use of facemasks and respirators was perceived as being low and facemasks and respirators were typically used only for short periods of time.
All 20 participants were successfully fit tested to the CleanSpace2™ PAPR (overall geometric mean fit factor—6768). According to the exit surveys, CleanSpace2™ PAPRs were easy to don (14/20) and doff (15/20) and comfortable to wear (14/20). Most participants believed that PAPRs provide higher protection, comfort and reusability over N95 FFR and can be used during pandemics and other high-risk situations.

Conclusions

HCWs should be aware of infection control policies and training should be provided on the correct use of respiratory protective devices. PAPRs can be used in hospital settings to protect HCWs from certain highly infectious and emerging pathogens, however, HCWs require adequate training on storage, use, and cleaning of PAPRs.

Keywords

facemask, healthcare workers, infections, infection control, personal protective equipment, powered air-purifying respirator, respirator