Alberta Construction Association

HSEOP SILICA PROTECTION

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1.0 PURPOSE

The purpose of this procedure is to specify methods to protect workers who may be exposed to respirable crystalline silica in construction activities.

2.0 SCOPE

This procedure applies to all work sites within Alberta.

3.0 RESPONSIBILITY

3.1 Project Management

- Responsible to ensure that a hazard assessment has been completed by project supervision, and work with the other responsible parties in this section to see that necessary programs and control measures are formulated, implemented, and complied with.

3.2 Project Supervision

- Become familiar with the program requirements and procedures relative to silica;
- Ensure that employees being supervised are complying with program requirements;
- Initiate and follow up with compliance measures;
- Conduct hazard assessments ensuring silica hazards and controls are in place where applicable and work with the Health, Safety and Environment Manager to assess work operations on site (including subcontractors) to determine if operations could lead to silica exposure;
- In conjunction with the Health, Safety and Environment Manager and Project Manager, develop and implement a project specific program to limit or eliminate the hazard as per legislative jurisdictional requirements;
- If an exposure to silica could occur, definitive steps are to be taken to protect exposed workers (materials substitution, administrative controls, engineering controls, and/or PPE) as appropriate;
- Incorporate silica information, hazards and controls into the weekly HSE meetings where applicable and work with the Health, Safety and Environment Manager to assess work operations on site (including subcontractors) to determine if operations could lead to silica exposure;
- If option two in section 6.0 is chosen, the superintendent will verify that all criteria requirements are implemented;
- Ensure training is done, evaluated to ensure effectiveness and followed up on regular intervals;
- Monitor and enforce employee/subcontractor compliance with site specific silica protection procedure; and
- Notify the Health, Safety and Environment Manager of changes in construction operations, which may create and/or alter a worker's exposure to silica.

3.3 Health Safety Environment Representative

- Assist the Project Manager and Project Supervision in the completion of a hazard assessment, assessment of job inventories, development, implementation, and monitoring of this program;
- Arrange for testing, or other reference material, of workplace environments to determine if exposures exist;
- Provide for accurate and qualitative information to project personnel relative to the work procedures and controls required and training of personnel;
- Validate that up-to-date, pertinent data is available for use on applicable projects to comply with existing legislation;
- Ensure required documentation to be completed and retained as required; and
- Monitor silica control operations and levels for exposure compliance requirements.

3.4 Workers

- Follow procedures and program requirements to minimize or prevent exposures;
- Attend and participate in education/training to familiarize themselves with program elements;
- Approach their supervisor with any questions, concerns, or uncertainties they may have or encounter; and
- Report to their supervisor any defects, non-compliance items or other issues that may arise.

4.0 REFERENCES

- Legislative Jurisdictional Requirements
- Company Policy Statements

5.0 DEFINITIONS

5.1 CIH / ROH

Certified Industrial Hygienist./Registered Occupational Hygienist

5.2 High Efficiency Particulate Air (HEPA) Filter

A filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter.

5.3 OEL

Occupational Exposure limit is an eight (8) hour time airborne concentration to which it is believed most workers may be exposed, 40 hours per week, without suffering adverse health effects.

5.4 Personal Protective Equipment (PPE)

Personal protective equipment is the final line of defense against hazards in the workplace. It is implemented only after other reasonably practicable means of eliminating a hazard have been attempted.

5.5 Respiratory Protective Equipment Code of Practice

Provides practical guidance to achieve health and safety requirements in the Alberta regulation with respect to respiratory equipment requirements.

5.6 Hazard Assessment

The assessment of potential hazards completed pursuant to OH&S legislation and Company policy, Hazard Identification and Control.

5.7 Silicosis

Silicosis is a lung disease caused by breathing in dust containing silica. These dusts damage the air sacs in the lungs. The presence of silica in the air sacs of the lungs causes a body defense reaction that results in the formation of scar tissue in the lungs.

Initially, workers with silicosis may have no symptoms. As silicosis progresses, there may be difficulty in breathing.

6.0 AIR SAMPLING

Air sampling can be accomplished as follows:

1) Contract with a competent firm that utilizes a Registered Occupational Hygienist (ROH) or a Certified Industrial Hygienist (CIH) familiar with applicable testing protocol (refer to local legislation) and procedures to do the testing on the required jobsites
   or
2) Become proficient in the required protocol and procedures (trained in conducting exposure assessments, trained in the calibration, operation, and maintenance, of the equipment used to conduct exposure measurements and can explain the method used for measurement – see local legislation for details), and purchase the necessary equipment to collect the samples for analysis.

If you choose the first option, check credentials and qualifications of both collection and testing firms to validate, as much as possible, that proper protocol and procedures (refer to local legislation) are followed for accurate results.

If you choose the second option, the following points are guidelines you should adhere to: NIOSH 7500 covers the bullets below

- Contract a certified lab to do the analysis and purchase pre-weighed PVC cartridges;
- Contact a Certified Industrial Hygienist/Registered Occupational Hygienist (CIH/ROH) or vendor who will advise/ train/ consult with you on what equipment to purchase, how to use your equipment, and how to calibrate it;
- Have a designated person receive this training;
- Monitor exposed workers according to task;
- Be sure to send in an unused cartridge (also referred to as a "blank") from the carton. This is to establish lack of contamination of the cartridges. NIOHS Method 7500 calls for one cartridge (minimum) or 10% of samples sent to lab;
- Retain all test data to verify levels of exposure. If silica levels are less than OEL, then no action is required;

7.0 PROCEDURE

Silica is the name given to a group of minerals containing silicon and oxygen combined as a general formula SI O2. Of most concern to workers for health effects is respirable crystalline silica.

Quartz is a principal form of silica and is the second most common mineral found in the earth's crust. Igneous and sedimentary rocks both contain quartz. Both forms of rock are used in construction in vast quantities. The amount of silica in the rock varies dependent upon the makeup of the aggregates and where those aggregates were quarried.

7.1 Exposure Potential During Construction

Concrete, stone and masonry products contain silica sand and rock containing silica. Since these products are primary materials for construction, workers may be exposed to respirable crystalline silica during the following activities:

- Chipping, hammering, and drilling of rock;
- Crushing, loading, hauling, and dumping of rock;
- Abrasive blasting;
- Sawing, cutting, hammering (jack hammering and bush hammering), drilling, grinding, and chipping of concrete or masonry;
- Demolition (including interiors, concrete and masonry structures);
- Dry sweeping or pressurized air blowing of concrete, rock, or sand dusts and disposal of bagged materials;
- Excavation and soil stabilization;
- Maintenance of access roads;
- Tunneling operations;
- Hoe ram operations;
- Cutting, thinset/thickset mixing on ceramic tile processes;
- Accidental release of hazardous products through handling of materials;
- Mortar mixing, tuck-pointing and demolition when working with brick structures;
- Drywall sanding;
- Fire stopping;
- Insulation;
- Stucco / EIFS (exterior Insulation Finishing System);
- Surrounding area / site conditions (dry, windy, open fields, neighbors' operations)

7.2 Control Measures

In order to prevent a potential overexposure to silica, control measures shall be considered prior to implementing each phase of construction. Awareness and planning are keys to exposure prevention.

The first consideration is materials substitution (no or low silica content) wherever practical to do so.

The next consideration is to review the Safety Data Sheet (SDSs) or information from the manufacturer for materials which are intended to be used to determine the most likely sources of silica dust.

7.2.1 Silica Dust Control

When silica dust is produced, control measures are required to prevent potential overexposure.

There are three basic options for controlling dust in the workplace which include:

- Control the source (i.e. Non silica product, water misting);
- Control along the path between source and worker (i.e. hoardings with proper ventilation); and
- Control at the worker (i.e. respirators).

7.2.2 Engineering Controls

Based on hazard assessment for each site and where practicable, controls may include:

- Vehicles/equipment with engineered ventilation;
- Redesign to use non-silica materials;
- Alter processes to reduce or eliminate dust production;
- Install vacuum attachments on tools to capture dust;
- Use water streams to reduce dust;
- Enclose or isolate process and exposure; and
- Use engineered ventilation fans to induct or exhaust particulates in compliance with regulatory requirements.

7.2.3 Administrative Controls

Based on hazard assessment for each site and where practicable, controls may include:

- Plan and monitor dust generating activities;
- Provide education and training to sensitize workforce on silica hazards using orientations, hazard assessment, tailgate meetings, or other more intensive education/ training as required by the site specific procedure;
- Provide health assessments for workers who may be or may have been exposed to silica to determine their pre-condition and post-condition;
- Schedule dust generating activities to minimize workforce exposure (off-hours or weekends or isolate task);
- Rotate workers in and out of dust generating areas to limit exposure;
- Conduct air monitoring to evaluate exposure levels to verify that controls are acceptable;
- Wear disposable or washable protective clothing and PPE at the work site and leave them there;
- Shower and change into clean clothes before leaving the work site to prevent contamination of other work-sites, cars, and home;
- Post warning signs to identify areas where silica may be present;
- Maintain proper housekeeping;
- Practice good personal hygiene before eating or smoking; and

- Use protective equipment, such as respirators when other controls cannot maintain the silica levels below the OEL or when engineering controls are being investigated or installed.

7.3 Personal Protective Equipment

All workers must follow site specific requirements for personal protective equipment and employer's procedures, including the care and maintenance based on manufacturer's specifications.

For respirator usage, a Respiratory Protective Equipment Code of Practice must be in place.

Required in writing and should, at a minimum, state:

- Whether the use of the respiratory protective equipment is mandatory or not and for what tasks;
- That the employer is responsible for selecting, providing, and maintaining respiratory protective equipment;
- Select appropriate respiratory equipment, in accordance with the most current Canadian Standards Association (CSA) Standard on Selection, Use and Care of Respirators, based on:
    - Nature of contaminant,
    - Concentration or likely concentration of airborne contaminants,
    - Duration of exposure,
    - Toxicity of contaminants,
    - Oxygen concentration in the work area,
    - Warning properties of the contaminants,
    - Emergency escape planning.
    - Selected based on the most current Canadian Standards Association (CSA) Standard for the Selection, Use and Care of Respirator.
    - Respirators must be NIOHS approved;
- Procedures to ensure proper maintenance and cleaning of all respiratory protection equipment;
- Follow the most current Canadian Standards Association (CSA) Standard on Selection, Use and Care of Respirators. For more information, refer to the Occupational Health and Safety Bulletin on Respiratory Protection.

7.4 Exposure Limits

Adhere to the current Occupational Exposure Limits (OELs) for silica as per legislative jurisdictional requirements.

7.5 Air Testing and Monitoring

It is extremely important to determine whether or not an employee or group of employees in the workplace will be exposed to airborne respirable silica dust. To accomplish this, testing and monitoring of the atmosphere (air) must be taken in the work area(s) where the airborne dust is being produced.

A respirator program (commensurate with maximum expected exposure levels) must be established until testing and monitoring proves that the concentrations are below the OELs.

- If silica levels are less than OEL, then no action is required;
- If silica test levels are over the OEL, re-assess the hazards through a hazard assessment and establish a procedure with appropriate respiratory Code of Practice for personnel who will be exposed; and re test.

7.6 Summary

The goal when determining whether or not you have exposure to respirable silica is to take necessary measures to try to verify you do not reach or exceed established OELs legislated within your jurisdiction. If you do not reach the established OEL, firstly you are not exposing workers and others, and secondly, voluntary conditions are simpler to follow and administer.

If you cannot reduce exposures to levels below the OEL, you will be required to provide the following:

- Implement a written Silica Code of Practice;
- Implement a written respiratory protection program;
- Ongoing personal air monitoring program;
- Training and information program;
- Record keeping program;
- Medical testing and surveillance program with availability to applicable workers;
- Housekeeping program; and
- Construction safety and health program.

8.0 ATTACHMENTS

Silica Exposure Code of Practice
Best Practice