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Appendix A – Hearing Conservation Program

Policy Statement

We recognize that noise is a serious problem in the construction workplace. Over time, if noise from machinery, processes or equipment is too loud, it can cause permanent hearing loss. WorkSafeBC OHSR sets maximum allowable limits for noise exposure at 85 dBA $_{Lex}$ (85 dBA average noise exposure over an eight-hour period) and a peak noise level of 140 dBA.

In the construction industry, equipment and power tool operators and workers in proximity to the equipment may be exposed to noise greater than the allowable limits for unprotected hearing. As a result of the noise levels inherent in our industry, a hearing conservation program in compliance with regulatory requirements has been developed.

Where noise above acceptable levels are present, supervisory staff is responsible for determining whether there are any "engineering controls" that can be practicably applied. Where engineering controls are impracticable, operators of equipment that produce noise more than exposure limits, workers in proximity to such equipment, and workers exposed to other job site noise more than the limits are required to wear CSA approved hearing protection appropriate for the noise level. This will be provided by the company. Noise hazard areas under the company's control will be identified with warning signs.

Our workforce will be provided hearing conservation educational materials, an opportunity to discuss hearing conservation, and ready access to hearing protection as part of our program. Educational materials, which will be presented through supervisor instructions and Toolbox Talks, will address effects of noise on hearing, the purpose of annual hearing testing and proper use and maintenance of hearing protection.

Workers exposed to noise in excess of allowable limits are required to have annual hearing tests to monitor their hearing. Hearing testing records will be treated as confidential and maintained for the duration of the workers' employment with the company.

The Hearing Conservation Program will be reviewed on an annual basis to ensure its on-going effectiveness.

Recognizing Hearing Loss

One quarter of all workers in BC are exposed to noise in the workplace loud enough to damage their hearing. Noise is the most common hazard in industry. Hearing loss can occur so gradually that you may not even know it is happening - until too late. Noise induced hearing loss is permanent - it can't be cured or improved.

Excessive noise damages tiny sensory cells deep inside your ears. The first danger sign of occupational hearing loss is the inability to hear high-pitched sounds. As the damage continues, the loss will affect your ability to understand speech. Noise can also cause ringing in your ears.

How much noise is too much?

1. There are maximum limits for worker exposure to noise in the workplace, both for loudness and duration.
2. A simple way to test the noise level is to stand at arm's length from someone and talk to them. If you must raise your voice to be heard, the noise in the vicinity is probably too loud (or the person you are speaking to has hearing loss).
3. The length of time that you are exposed to noise is as critical as the volume of the noise. Exposure to continuous noise for 8 hours is far more damaging than 8 hours of noise exposure spread over a few days.

4. If your ears ring, or sounds seem muffled after the noise stops, your hearing has been affected, at least temporarily. A continuous noise level greater than 85 decibels over an eight-hour period can damage hearing.

Noise Control

The most desirable way to reduce noise is to control it at its source. For example, proper maintenance and lubrication of a noisy piece of equipment may make it quieter, or the noise source can be housed in a noise muffling enclosure. If this isn't practical workers can be isolated from the noise source by putting them in noise muffling enclosures. These noise control activities are called engineered controls.

Another noise control method is called administrative control. Administrative controls include decreasing time in noisy areas through job rotation or scheduling equipment operation when most workers are off shift. The remaining noise control solution is wearing appropriate hearing protection. This is the most common solution for construction industry workers as their employer frequently has little or no ability to control the source of the noise (e.g., the client's equipment in a construction location).

Hearing Protection Devices

If it is not practical to reduce noise levels to or below the exposure limits, the employer must:

1. Reduce noise exposure to the lowest level practical
2. Provide and maintain hearing protection to all workers in accordance with CSA Standard Z94.2-94
3. Provide hearing protection and ensure that all hearing protection is worn effectively.

It is the responsibility of the workers to wear hearing protection when exposed noise levels above exposure limits or where a Noise Hazard Sign has been posted. It is also a requirement that workers must periodically replace any damaged ear protection and properly clean earplugs or earmuffs to maximize its life span.

The following chart outlines some common construction decibel levels:

Examples of noise level ranges (in dBA) by equipment type	
Equipment Type	**dBA**
Dump Truck	**84-88**
Crane	**78-103**
Backhoe	**85-104**
Dozer	**89-103**
Scissor Lift	**79**
Generator	**108**
Compactor	**90-112**
Belt/Palm Sander	**93-104**
Grinder	**101-106**
Circular Saw	**120+**
Jackhammer	**100-115**
Chainsaw	**106-115**
Pile Driver	**119-125**

The purpose of recognizing and evaluating noise hazards is to enable them to be controlled by taking appropriate action to ensure that the hazards do not cause harm.
The three main types of control are (1) Engineering, (2) Administrative and (3) Personal Protective Equipment (PPE). The priority is to reduce noise hazard levels through engineering or administrative controls. Personal

Protective Equipment (PPE) is required if the hazard remains above permissible levels after other measures to reduce or eliminate the hazard have been instituted and during the time when controls are being implemented.

Engineering Controls

- Reduction at its source
- Reduction of noise transmitted.
- Source isolation / dampening.
- Substituting less hazardous processes for a more harmful one
- Changing a process to reduce exposure.
- Enclosing a process so that its harmful effects aren't transferred to workers.
- Regular maintenance

Engineered noise-control measures can be split into two major categories: passive and active. Passive measures include traditional solutions such as:

- Enclosures
- Silencers
- Acoustical screens; and,
- Sound absorbing materials.

Administrative Controls

Having a Hearing Conservation Program is the primary administrative control.
The following examples of administrative actions, which can be taken to reduce noise exposure:

a) High noise level areas should be identified by posting labels.
b) Hearing protection should be made mandatory in noisy areas.
c) Access to noisy areas should be restricted to authorized personnel.
d) Employers should conduct periodic training (especially for new workers) to reinforce understanding of the risks of noise exposure, and the methods of reducing noise induced hearing loss.

PPE (Personal Protective Equipment)

If it is not practical to reduce noise levels to or below the exposure limits, the employer/supervisor must:

- Supply all workers in such an area with appropriate hearing protection based on the worker's eight-hour noise exposure.

Refer to Class of Hearing Protection below:

Maximum equivalent noise level	Recommended class of hearing protector
Less than 85 dBA	No protection required
Up to 89 dBA	Class C
Up to 95 dBA	Class B
Up to 105 dBA	Class A
Up to 110 dBA	Class A plug plus Class A or Class B muff

More than 110 dBA	Class A plug plus Class A or Class B muff and limited exposure

Ensure that all workers in such an area are always wearing hearing protection.

It is the responsibility of all employees to wear hearing protection in all posted noise hazard areas in accordance with the instructions received by the supervisor/employer.

In our operations, noise hazards are power tools such as grinder or drill used in our operations, and compressor and generator at our shop.

Employee Training

A key element of an effective Hearing Conservation Program is worker education and training with respect to hearing loss and hearing loss awareness, proper fitting of hearing protection and proper training in the proper selection use and care of hearing protection devices.

All workers shall be trained in noise hazards and how they can affect their health. This can be completed during Orientations and Toolbox meetings. The subject matter covered by this training shall include, but not be limited to potential health hazards, noise sampling, engineering and administrative controls and the selection, use and care of appropriate hearing protection.

During the training workers shall be made aware of the levels of noise in their work areas and the damage that could be done over time if they do not wear hearing protection. In addition to the personal health consequences, it shall be made clear that refusal to wear required hearing protection might result in disciplinary action up to and including dismissal. The annual training program shall also include an explanation of audiometric test procedures and the purpose of the audiometric testing.

For new employees, training in the Hearing Conservation program shall be a part of their initial safety orientation. All workers will be sent for a “Baseline” audiometric test and instructed on the use of the appropriate hearing protection.

Instructions for Using Disposable Earplug

1. Select the right size and rating



2. With clean hands roll plug into a tight, crease free, small cylinder.
3. Start gently so there are no creases and press more firmly as the earplug gets compressed.

4. Reach over the head and pull top of ear up and away from head. Immediately insert one plug firmly into each ear canal.



5. Plug should remain snug in ear canal during noise exposure. Check for signs of a good fit; they should be invisible or barely visible from the front. Your own voice should sound lower and muffled to you.
6. To remove when no longer required, pull plug straight out of ear canal and discard to waste.

Hearing Testing

The only way to ensure that the hearing conservation program is effective is by periodically measuring the hearing of workers. Hearing tests are required for most construction trades workers.

Hearing tests are vital because they identify the beginning of noise induced hearing loss long before workers notice it. As part of the test, workers are individually counselled about the results, the follow-up required, and when a repeat test will occur. Workers are also counselled about the type of hearing protection to use. Hearing tests will be conducted annually to effectively monitor the hearing of noise-exposed workers. The hearing test, including counselling, takes approximately 15 to 20 minutes.

During a hearing test, a worker is seated in a sound-proof booth with a window and a set of earphones are placed over the ears. When the worker is ready, the audiometric technician sends a series of tones through the earphones to one ear, and then the other. The worker signals the technician as the tones are heard. The workers' responses are recorded for each ear. Then the results are graphed on a chart called an audiogram.

The audiogram shows how loud a tone must be to be barely heard by the worker, at several different pitches or frequencies. In the early stages of noise-induced hearing loss, the audiogram will show some hearing loss for high-pitched sounds. As hearing loss advances, the audiogram shows hearing loss for many pitches. Workers with more advanced hearing loss will notice the sounds of speech and surrounding sounds becoming muffled.

As part of the hearing test, workers are counselled about the necessity, use, maintenance, and replacement of hearing protection. Hearing testing and counselling must be performed by authorized technicians. The first hearing test a worker has is called the baseline test.

The results are categorized as:

Normal - test is normal or near normal

Early Warning - test shows the start of noise-induced hearing loss

Abnormal - test shows significant hearing loss requiring medical follow-up Repeat tests are called periodic tests. They are categorized as:

Normal Change - test shows no significant change from previous test; hearing has remained stable.

Early Warning Change - test shows there has been a high-frequency deteriorationin hearing, likely due to noise exposure.

Abnormal Change - test shows significant change from the previous test requiring medical follow-up.

The technician is not qualified to determine the cause of abnormal or abnormal change hearing tests.

Program Review

This Hearing conservation program will be reviewed on an annual basis.

Appendix B – WHMIS Program

Workplace Hazardous Materials Information System (WHMIS)

It is our policy to promote and sustain the efficient application of a program for WHMIS to ensure that workers receive the fullest knowledge and protection in the handling of products, which could be harmful to their health.

WHMIS Responsibilities

What is WHMIS?

WHMIS (short for Workplace Hazardous Materials Information System) is a comprehensive plan for providing information on the safe use of hazardous materials used in Canadian workplaces.

Information is provided by means of **product labels, safety data sheets** (SDS) and **worker education programs**.

Employer requirements include:

- Ensure controlled products are properly labeled. WHMIS labels alert the worker to the identity of the product, hazards, and precautionary measures;
- Ensure Safety Data Sheets (SDS) are available, current and readily available for all controlled products being used and stored. Safety Data Sheets (SDS) provide detailed hazard and precautionary information and;
- Educate and train employees about WHMIS, hazardous materials, and protective measure to work safely with the controlled products.

Worker requirements:

- Participate in WHMIS training and other health and safety training required for your job;
- Use your WHMIS training and adhere to WHMIS requirements;
- Follow safe work procedures and rules;
- Know where SDS's are located in your workplace and how to use them;
- Inform your supervisor about any hazards you see in the workplace and;
- Inform your supervisor of deficiencies such as labels on containers that are no longer readable, damaged or lost.

Workplace-specific training is the most important part of WHMIS training. Your supervisor must provide you with training on the specific hazardous materials you will be working with.

Under the British Columbia Occupational Health and Safety Regulations, all individuals handling or working with hazardous materials must receive training on the Workplace Hazardous Material Information System (WHMIS) to ensure they know:

- How to recognize hazardous materials;
- How to identify hazards associated with these materials and;
- how to safely use, handle, store and dispose of hazardous materials.

WHMIS is the national hazardous materials classification system intended to provide workplace standards for the control, handling, storage, and disposal of controlled products, which can impact the health and safety of the workplace and its employees.

A product that is classified as hazardous under WHMIS is called a **controlled or hazardous product**. WHMIS classification of controlled products is based on properties such as flammability, reactivity and toxicity of the material. A list of controlled products covered under WHMIS can be found in the Hazardous Products Act.

Global Harmonized System (GHS)

The GHS is an internationally agreed-upon system, created by the United Nations in 1992. In February 2015, Canada Amended the Hazardous Products Act and published the Hazardous Products regulations to incorporate the GHS into WHMIS. The new WHMIS in Canada is identified as **WHMIS 2015** (replacing WHMIS 1988).

The GHS system covers all hazardous products and may be adopted to cover products in the workplace, transport, consumer products, pesticides, and pharmaceuticals. The target audiences for GHS include workers, transport workers, emergency responders and consumers.

Pictograms, Hazard Classes and Categories

Pictograms

Pictograms are graphic images that immediately show the user of a hazardous product what type of hazard is present. With a quick glance, you can see, for example, that the product is flammable, or that it is a health hazard etc.

Most pictograms have a distinctive red "square set on one of its points" border. Inside this border is a symbol that represents the potential hazard (e.g., fire, health hazard, corrosive, etc.). Together, the symbol and the border are referred to as a pictogram. Pictograms are assigned to specific hazard classes or categories.

WHMIS 2015 Pictograms

	This pictogram is used for indicating flammable gases, aerosols, liquids and solids; pyrophoric liquids, gases and solids; self-heating substances and mixtures; substances and mixtures that produce flammable gases when in contact with water; organic peroxides; and self-reactive substances and mixtures.		For hazardous products that can cause death or acute toxicity after exposure to small amounts of the products, this Pictogram is used to warn users of the potential dangers. It is placed on labels of materials with acute oral, dermal and inhalation toxicity. For instance, the pictogram can be used on containers for cleaning chemicals
	The pictogram is flame over a circle plus a distinctive red “diamond” shaped border. It is used to indicate oxidizing gases, liquids and solids.		This Pictogram is used to indicate a product that causes or is suspected of causing serious health effects. It forms part of labels of products that cause respiratory sensitivity, skin toxicity, germ cell mutagenicity, carcinogenicity, reproductive toxicity, aspiration hazard, specific target organ toxicity after single exposure, and specific target organ toxicity after repeated exposure.
	This pictogram is used to indicate the hazard of gases under pressure such as dissolved gas, liquefied gas, compressed gas and refrigerated liquefied gas.		Used for hazardous products that cause less serious health effects, the Exclamation Mark Pictogram indicates acute toxicity (oral, dermal or inhalation), skin corrosion (irritation), eye irritation, skin sensitivity, respiratory damage, and specific target organ toxicity on single exposure.
	The corrosive pictogram indicates a substance that can irritate the skin and eyes, and damage metals. It is used for hazardous products that are corrosive to metals, cause skin irritation (corrosion), and cause serious eye irritation or damage.		Indicates the presence of organisms or toxins that can cause diseases in humans and animals, The Biohazardous Infectious Materials pictogram has been retained from WHMIS 1988. The pictogram is used on labels of biohazardous infectious materials. For instance, it is used on growths of micro-organisms like E. coli or salmonella bacteria cultures.
	Used to indicate explosion or reactivity hazards, the Exploding Bomb Pictogram is placed on the labels of self-reactive substances and mixtures, and on labels of organic peroxides.		This GHS pictogram has not been integrated into WHMIS, however it stands for Environmental Hazards.

Hazard Classes

Hazard classes are a way of grouping together products that have similar properties. Most of the hazard classes are common to GHS and will be used worldwide by all countries that have adopted GHS. Some hazard classes are specific to WHMIS 2015.

Hazard Category

Each hazard class contains at least one category. The hazard categories are assigned a number (e.g., 1, 2, etc.) Categories may also be called "types". Types are assigned an alphabetical letter (e.g., A, B, etc.). In a few cases, sub-categories are also specified. Subcategories are identified with a number and a letter (e.g., 1A and 1B).

Some hazard classes have only one category (e.g., corrosive to metals), others may have two categories (e.g., carcinogenicity (cancer)) or three categories (e.g., oxidizing liquids). There are a few hazard classes with five or more categories (e.g., organic peroxides).

The category tells you about how hazardous the product is (that is, the severity of hazard).

- **Category 1** is always the greatest level of hazard (that is, it is the most hazardous within that class). If Category 1 is further divided, Category 1A within the same hazard class is a greater hazard than category 1B.
- **Category 2** within the same hazard class is more hazardous than category 3, and so on.

There are a few exceptions to this rule. For example, for the Gases under pressure hazard class, the hazard categories are "Compressed gas", "Liquefied gas", "Refrigerated liquefied gas" and "Dissolved gas". These classes relate to the physical state of the gas when packaged and do not describe the degree of hazard.

Hazard Class Details

Flammable & Combustible Material



Flammable and combustible materials are those that can ignite, explode or react with other chemicals.

Flammable materials are more dangerous than combustible because they ignite more easily. During use, they must be kept away from ignition sources such as sparks or open flames. When not in use, flammable materials must be stored in fire- resistant cabinets or other specified storage areas. Flammable storage cabinets must be grounded.

Oxidizing Material



Oxidizing material, or oxidizers, are hazardous materials that cause or contribute to the combustion of other materials.

An oxidizer may react with a combustible material to cause a fire without a source of ignition. Consequently, oxidizing material greatly increase the risk of fire, if they come in contact with materials that can burn.

Oxidizers can be in the form of gases (e.g. oxygen, ozone), liquids (e.g. nitric acid, perchloric acid solutions) and solids (e.g. potassium permanganate, sodium chlorite).

Some oxidizers such as the organic peroxide family are extremely hazardous because they will burn (they are combustible) as well as they have the ability to provide oxygen for the fire. They can have strong reactions which can result in an explosion.

These materials should never be stored or used near flammable or combustible materials. For example, do not store oil- based paints or solvents like toluene or xylene near oxidizers such as hydrogen peroxide or bleach. Any spills of oxidizing materials need to be cleaned up immediately and thoroughly. All appropriate PPE, gloves, glasses and lab coat need to be worn.

Compressed Gasses



These hazardous materials include gases under pressure or which are chilled.

The main hazards associated with compressed gases are:

- A leaking cylinder can rapidly release extremely large amounts of gas into the workplace, which may be toxic or lower the oxygen concentration.
- Leaking gas cylinders can be very cold and may cause frostbite if it touches your skin.
- If a pressurized cylinder is punctured because it is dropped or exposed to excessive heat, the exploding fragments or rocket-like projectiles present a serious physical hazard.
- Compressed gas cylinders can be large and heavy and can pose physical safety hazards when handling them (e.g. risk of musculoskeletal injuries).

Examples of compressed gases include propane, chlorine gas as disinfectant, oxygen and oxyacetylene for welding.

Compressed gases may have additional hazardous properties. Chlorine is a compressed gas but is also toxic. Propane is a compressed gas but is also flammable.

When working with compressed gases they must be securely fastened to a stable structure such as a bench top or wall mount bracket. When not in use the protective cap must always be put back on and when transporting full or empty cylinders the proper cylinder cart must be used.

Corrosive Material



Corrosive materials are hazardous materials that can cause severe burns to the skin, eyes and respiratory tract.

Corrosive materials can also attack metals and eat through containers resulting in spills, reactivity and fire hazards.

Examples of corrosive material include acids and bases (alkalis) such as hydrochloric acid, hydrofluoric acid, and sodium hydroxide.

The degree of damage caused by a corrosive material will depend on the pH, concentration of the corrosive, and the length of exposure.

When handling corrosive acids and bases additional protective equipment may be required such as aprons, goggles, face shields and heavy gloves.

Reactive Substances & Mixtures



This class of hazardous materials are unstable or extremely reactive.

Dangerously reactive materials may:

- Explode or catch fire if shocked, pressurized, or heated;
- React vigorously with water or air to release poisonous gas;
- Undergo vigorous polymerization, decomposition or condensation and;
- Reactive explosively on their own at normal temperatures and pressures.

Examples of dangerously reactive materials include hydrogen cyanide, benzoyl peroxide, chlorine dioxide, organic peroxides.

Acute Toxic Products



This class of materials covers a wide range of hazardous materials that can cause adverse health effects upon a single exposure.

Effects of exposure these materials may include nausea, dizziness, breathing difficulty, headaches and, in severe cases, loss of consciousness, coma, or death. Adverse health effects which occur shortly after exposure are termed acute effects.

Examples include arsenic, methylene chloride, formaldehyde, hydrogen sulphide.

Depending upon the toxicity of the material, work with these chemicals may require the use of a glove box if the potential for airborne contaminants is great. Personal protective equipment required would include safety goggles, gloves and lab coat.

All spills of these types of materials need to be cleaned up immediately and thoroughly. Also, if it is practicable to substitute to something less toxic the employer must do so.

Health Hazards



Materials in this subclass are toxic but do not cause immediate (acute) adverse health effects.

Possible adverse health effects include:

- Immediate skin or eye irritation;
- Chronic health effects on body organs, cardiovascular or nervous system;
- Sensitivities (allergies);
- Cancers and;
- Birth defects.

Examples of materials causing other toxic effects include asbestos, benzene, formaldehyde, xylene, calcium chloride, mercury.

Work with these types of materials in a properly functioning fume hood and wear safety googles, gloves, and lab coat.

Exclamation Mark



These materials may cause less serious health effects (compared to Health Hazard class materials), or the materials may be harmful to the ozone.

The exclamation mark pictogram is used for indicating products that could cause the following:

- Acute toxicity (Oral, Dermal, Inhalation);
- Skin corrosion/irritation;
- Serious eye damage/irritation
- Respiratory or skin sensitization;
- Specific target organ toxicity—single exposure.

These materials are considered “irritants’ and should be handled with care.

Biohazardous Infectious Material



These materials are organisms (and the toxins they produce) that cause disease in people or animals.

Bacteria, viruses, fungi and parasites are examples of organisms included in this class. Because biohazardous organisms can live in body tissues or fluids (blood, sputum, urine, body tissues), these materials are included within this class and class.

Environmental Hazards



GHS also defines an Environmental hazards group. This group (and its classes) was not adopted in WHMIS 2015. However, you may see the environmental classes listed on labels and Safety Data Sheets (SDSs). Including information about environmental hazards is allowed by WHMIS 2015.

Labels

Under WHMIS 2015, hazardous products used in the workplace must be properly labeled. These labels provide information about workplace hazards using key visual notations to alert readers.

Most often, suppliers are the ones responsible for initially labeling products, whereas employers must ensure that products entering the workplace are properly labeled.

WHMIS 2015 specifies two main types of labels:

Supplier labels – These labels are attached to hazardous products by suppliers and should appear on all hazardous products in workplaces across Canada. If a hazardous product is always used in its original container with a supplier label, no other label is required. Labels must be available in both English and French, either as one label with both languages or two separate labels, one in English and one in French.

Workplace labels – These types of labels can appear on hazardous products in a number of situations. Specifically, workplace labels are necessary when a hazardous product is made in the workplace, transferred into another container or the original supplier label is illegible. Workplace labels should be written in all languages commonly used in the workplace.

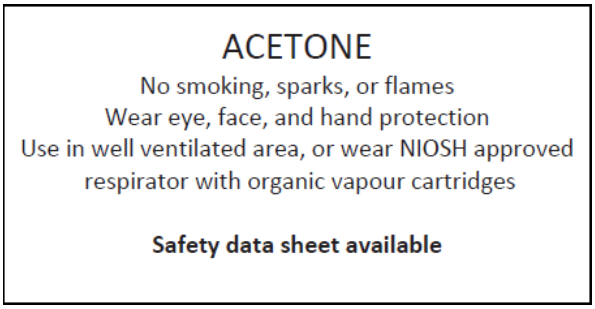
Workplace Labels

As previously stated, workplace labels generally appear when a hazardous product is made in the workplace, gets transferred into another container or the original supplier label becomes illegible.

Like supplier labels, there is no set format for how they must be displayed. However, workplace labels should include the following:

- A product identifier, such as a chemical or common name, similar to the one found on its associated SDS
- Information on how to safely handle and treat the product
- Details on whether or not an SDS is available

Workplace Label Sample



Unlike supplier labels, workplace labels don't have to be bilingual. However, the label should correspond to the needs of the individual workplace.

Workplace labels are unnecessary if a hazardous product will be used immediately following its transfer to a new container or other vessel. However, when in doubt, it's a good idea to create a workplace label in order to ensure the safety of workers.

Updating Workplace Labels

Similar to supplier labels, workplace labels will need to be updated in the event that new information around a specific hazard becomes available.

When are Workplace Labels Reqiured?

There are several instances where a workplace label may be required. Particularly, you should utilize workplace labels when:

- A hazardous product is produced at the workplace and used in that workplace;
- A hazardous product is decanted (for example, transferred or poured) into another container;
- A supplier label becomes lost or illegible;

You do not need to create a workplace label if the hazardous material being transferred into a container will be used immediately or if it will be under the control of the person who decanted it.

Other Identification and Labelling Systems

While supplier and workplace labels are the most common labels you'll encounter in the workplace, other indicators may be acceptable.

A WHMIS label can also be a mark, sign, stamp, sticker, seal, ticket, tag or wrapper. It can be attached, imprinted, stenciled or embossed on the hazardous product or its container. These distinctions typically occur when the following criteria are met:

Bulk shipments – A labeling exemption exists for products sold without packaging

100 mL or less – Exempt only from requirement to have precautionary or hazard statements on the label

3mL or less – Where the label will interfere with normal use of the product, the product would be required to have a label that is durable and legible for transport and storage, but may be removable during use

Safety Data Sheets (SDS)

WHMIS requires suppliers to provide their customers with information about any material under the *Hazardous Product Regulations.* A Safety Data Sheet (SDS) is a technical document developed by the supplier that provides information specific to the hazardous material such as hazards, controls, safe handling and storage guidelines, emergency procedures for the controlled product etc.

It is important for a worker to always be familiar with the hazards of a product **before** they start using it. One should look at an SDS, match the name of the product on the container to the one on the SDS, know the hazards, understand safe handling and storage instructions, as well as understand what to do in an emergency.

Think of an SDS as having **four main purposes.**

It provides information on:

- **Identification**: for the product and supplier.
- **Hazards:** physical (fire and reactivity) and health.
- **Prevention:** steps you can take to work safely, reduce or prevent exposure, or in an emergency.
- **Response**: appropriate responses in various situations (e.g., first-aid, fire, accidental release).

The SDS is critical for developing safe work procedures or standard operating procedures involving hazardous materials. One of the key elements for developing procedures is worker education and on-going training. Education and on-going training is intended as a proactive measure, administrative control and is directly related to the health and safety any individual potentially affected by a hazardous material.

SDSs are required to be accurate at the time of sale. An SDS will be required to be updated when the supplier becomes aware of any "significant new data". The definition of "significant new data" is:

"New data regarding the hazard presented by a hazardous product that change its classification in a category or subcategory of a hazard class, or result in its classification in another hazard class, or change the ways to protect against the hazard presented by the hazardous product." (Source: Canada Gazette, Part II, Hazardous Products Regulations, Section 5.12 (1))

This definition means that an SDS must be updated when there is new information that changes how the hazardous product is classified, or when there are changes to the way you will handle or store or protect yourself from the hazards of the product.

SDSs will be required to be updated within 90 days of the supplier being aware of the new information. If you purchase a product within this 90 day time period, the supplier must inform you of the significant new data and the date on which it became available in writing.

Safety Data Sheets (SDS) Categories

Safety Data Sheets Requirement Summary		
1	**Identification**	Product identifier, recommended use and restrictions on use, supplier contact information, emergency phone number
2	**Hazard Identification**	Classification (hazard class and category), label elements (including hazard pictogram, signal word, hazard statement and precautionary statements) and other hazards (e.g. thermal hazards).
3	**Composition / Ingredients Information**	For a hazardous product that is a substance: the chemical name, synonyms, CAS No. and the chemical name of impurities, stabilizing solvents and stabilizing additives where classified and that contribute to the classification of the product. For a hazardous product that is a mixture: for ingredients that present a health hazard, the chemical name, synonyms, CAS No. and concentration. Note: Confidential Business Information Rules may apply.
4	**First Aid Measures**	First-aid measures by route of exposure as well as most important symptoms/effects.
5	**Fire Fighting Measures**	Suitable (and unsuitable) extinguishing media, specific hazards, special equipment and precautions for fire fighters.
6	**Accidental Release Measures**	Protective equipment, emergency procedures, methods and materials for containment and clean up.
7	**Handling and Storage**	Precautions for safe handling, conditions for storage, including any incompatibilities.
8	**Exposure Controls / Personal Protection**	Exposure limits, engineering controls, personal protective equipment.
9	**Physical and Chemical Properties**	Appearance, odour, odour threshold, pH, melting/freezing point, boiling point and range, flash point, upper and lower flammable or explosive limits.
10	**Stability and Reactivity**	Reactivity, chemical stability, possible hazardous reactions, conditions to avoid, incompatible materials, hazardous decomposition products.
11	**Toxicological Information**	Description of various toxic effects by route of entry, including effects of acute or chronic exposure, carcinogenicity, reproductive effects, respiratory sensitization.
12	**Ecological Information**	Aquatic and terrestrial toxicity (if available), persistence and degradability, bioaccumulative potential, mobility in soil
13	**Disposal Considerations**	Safe handling and methods of disposal, including contaminated packaging.
14	**Transport Information**	UN number and proper shipping name, hazard classes, packing group.
15	**Regulatory Information**	Safety, health and environmental regulations specific to the product.
16	**Other Information**	Other information, including date of the latest revision of the SDS.

Appendix C – Respiratory Protection Program

Introduction

A respirator is a protective device that covers a worker's nose and mouth, or the entire face and head to keep airborne contaminants out of a worker's respiratory system and to provide a safe air supply.

Purpose and Responsibilities

The purpose of this respiratory program is to ensure is that the respirators provide workers with effective protection against airborne contaminants to which they may be exposed to and against oxygen deficiency.

Employers Responsibilities

General occupational health and safety responsibilities as pertaining to respirators include:

- Ensuring that the worksite is evaluated for respiratory hazards;
- Eliminating or minimizing all respiratory related hazards;
- Providing and maintaining the respiratory protective equipment needed for any airborne hazards present at the worksite, and ensuring that the company employees use the equipment, when required;
- Providing all required materials for respiratory equipment cleaning;
- Providing supervisors with the education, training and fit-testing necessary to ensure that workers use respirators safely;
- Developing adequate emergency evacuation procedures and ensuring that workers and supervisors receive appropriate training in any workplace where workers may need to be rescued or evacuated due to respiratory related hazards;
- Ensuring that all illnesses or injuries resulting from respiratory hazards and requiring medical aid are reported and recorded;
- Requiring a medical assessment if there is a concern about a workers ability to wear a respirator;

Supervisors Responsibilities

Supervisors play a crucial role in workplace safety. They must ensure the health and safety of all workers under their direct supervision. Supervisors are responsible for ensuring:

- Workers are aware of potential existing respiratory;
- Respirators are available, when required;
- Workers use respirators correctly, as needed;
- Respirators are properly cleaned, inspected, maintained and stored as per the manufacturer's requirements.

In addition, supervisors must be alert to situations that could interfere with the safe use of respirators, which may include:

- The use of other equipment or clothing that may interfere with respirator use;
- Changes in working conditions that could result in exposure to higher concentrations or to new / other contaminants;
- Problems experienced by workers during respiratory protection use, such as discomfort, skin irritation or breakthrough of contaminants causing breathing difficulty.
- Because of their knowledge of the workplace, supervisors can also play an important role in:

- Identifying present or potential breathing hazards and making suggestions as to how they can be controlled;
- Bring alert to changes in the workplace that could require a change in the type of respiratory protection measures being used.

Workers Responsibilities

Workers have a responsibility for their own health and safety, as well as the health and safety of their co-workers. Workers have the following responsibilities, as pertaining to the respiratory program:

- Understanding and following all safe work practices and procedures;
- Using the respirator, as instructed;
- Understanding the limitations of the respirator they are using and following all manufacturer's instructions carefully;
- Inspecting all respirator components prior to use;
- Immediately reporting any equipment malfunction or other problems to their supervisor;
- Properly cleaning, maintain and storing the respirator.
- Reporting all symptoms related to respirator use to their supervisor or the first aid attendant;
- Reporting unsafe or harmful conditions;
- Notifying the supervisor if they have medical, or other concerns about using the respirator.

When a Respirator is Required

Respiratory protection is to be worn if:

- Workers may be exposed to any airborne contaminants with concentrations exceeding exposure limits set by Regulation, such as during a Silica Process.
- Whenever instructed by SDS, such as when applying waterproofing.
- Atmosphere is oxygen deficient or enriched, or any other IDLH Atmosphere (supplied air respirators).
- Whenever required in a written procedure.

Respiratory Hazards

- Particles in the atmosphere: These may be in the form of dust or mist. Mist is liquid droplets suspended in the atmosphere, typically due to spray.
- Gasses in the atmosphere: in this category a chemical is in a gaseous state.
- Hazardous or toxic vapors or fumes.
- Oxygen deficiency or enrichment.

Types of Respiratory Protection

- Half/Full face with particulate filters.
- Half/Full face with gas/vapor/fumes cartridge, or a combination of cartridge and filter.
- Supplied air respirators / Self-Contained Breathing Apparatus. Not commonly used in our scope.

Respiratory Selection

Respirators must be NIOSH approved as required by WorkSafeBC.

Respirators must be appropriate to contaminant, its concentration and the level of protection provided by the respirator (APF) considering the exposure limits set by regulation and/or as specified in the SDS.

Factors to be considered include:

- Nature of the hazard.
- Characteristics of the hazardous operation in process.
- Escape routes.
- Use duration and concentration.
- Physical characteristics, functional capabilities, and limitations of various respirator types.
- Respirator fit.
- Interaction of respirator with other protective equipment worn

The selection process will include:

- Information on the substance(s) of concern. Refer to MSDS / SDS.
- The physical state of the substance:
  a. Gas or vapor.
  b. Particulate *(dust, fume or mist).*
  c. A combination of the above.

The following respirators are available to our employees:

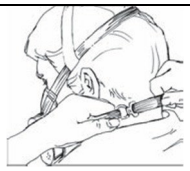
Make/Model	Hazard Types	Use
Half-face respirator with a P100 particulate filter and N95 disposable dust masks	Silica dust from concrete during: • Drilling & Coring • Grinding • Chipping • Cutting & Sawing • Housekeeping & Cleanup • Any other process generating Air-borne Respirable Crystalline Silica	Areas where workers are exposed to silica dust, or when performing work activities with the potential of exposing them to silica dust (Silica process). Typical Silica processes are identified in the *Silica Exposure Control Plan (ECP)* part of this OHS Program, and site specific ECP.
Full-face respirator with a P100 particulate filter		Areas where engineering controls may not be practical, which may increase concentrations of RCS in air to high levels.

Cartridges and Filters

Always read cartridge or filter labels and instruction manual prior to use and be certain the correct cartridge and/or filter is selected. For example: a particulate filter will not protect against organic vapors. Cartridges and filters to be changed as per manufacturer's instructions and frequency of use.

Putting on a Respirator

In order to work properly, the respirator must be properly fitted to your face. This includes ensuring that nothing comes between the seal and your face, including facial hair.

Position the head harness	
Grip the straps and tighten accordingly	
Fasten the buckle	
Adjust the fit	

User Seal Check

You must do a seal check each time you put on your respirator. Ensure you put on all your PPE (hearing protection, safety glasses etc.) prior to performing the seal check. Additional PPE may interfere with the seal.

This test is called a “negative pressure” seal check because you create a slightly negative air pressure inside the respirator by inhaling.

1. Put on the respirator and the other required PPE. Tighten the straps until the respirator feels snug, but comfortable. Wear the respirator for a few minutes so that can warm up and conform to your face better;
2. Close off the inlet opening of the cartridges or filters by covering them gently with the palms of your hands (In some cases, you may have to remove the cartridges or filters so you can cover the inlet valves);
3. Breathe in slightly to create a vacuum;
4. Hold for several seconds;
5. If you have an adequate seal, the face piece should collapse slightly against your face and stay collapsed. **NO AIR SHOULD LEAK INTO THE FACEPIECE.**

Seal Check Failures

If the seal check fails (air leaks in or out) check the valves and try repositioning the respirator on your face and adjusting the head straps. If you cannot get a seal after a few attempts, try another size or make or model of a respirator. **(Remember workers must be fit tested by a qualified person for each unit of respirators they may be required to use)**

Respirator Use

1. Respirators are required to be worn any time there is a risk of exposure to airborne contaminants higher than the occupational exposure limits set out in the BC Occupational Health and Safety Regulation.
2. A seal check (noted above) must be done each time a tight-fitting respirator is put on.
3. With tight-fitting, sealing respirators, workers must be clean shaven and must not wear any clothing or protective equipment that can interfere with the seal;
4. Fit testing must be done on an annual basis, for all types of respiratory equipment that may be used (this does not include dust masks).
5. A worker must leave the work area in the event of any respirator problems (including breakthrough of a contaminant, face piece leaks, changes in breathing resistance, dizziness, eye irritation etc.)

Inspections

Missing valves cracked or warped face pieces, used-up cartridges, frayed and knotted head straps. These items mentioned are just a few problems that could lead to a respirator not providing adequate protection. All respirators must be inspected prior to each use and during the cleaning stage. Workers must check for damaged or worn parts. The rated level of protection provided by the respirator may not be achieved if any of the components are not present, or wrong components have been substituted.

Check the following basic respirator parts:

1. **Facepiece:** Look for warping, excess dirt, holes, tears and /or cracks. The rubber or silicone should be flexible, not stiff. If stiff, remove from service.

2. **Yoke:** Some respirators have a yoke across the facepiece front that's strengthens and supports the facepiece. Check for crack / fractures. Plastic yokes can crack from too much bending. Weak points may show up as black lines on aluminum yokes.

3. **Inhalation and exhalation valves:** Make sure the valves are there! Inspect the valve and the valve seat for cracks, tears, dirt, and curling. The valves should be very flexible and lie flat. Missing, curled or damaged valves won't stop contaminated air from being inhaled Make sire that the exhalation valve cover is present;

4. **Head straps:** Look for breaks or tears. Stretch the straps to test the elasticity. Replace and straps that have knots in them. Make sure all fasteners are present and work properly.

5. **Cartridge and filter holders:** If the respirator uses a snap-on mount to hold the cartridges or filters, all sealing surfaces must be clean. If the respirator uses a screw mount, the threads must not be worn. If the respirator uses gaskets, make sure they're present.

6. **Cartridges and filters:** Look for cracks and other damage such as dents or holes. Replace filters or cartridges if they are heavily coated with dirt / substances etc. (i.e. paint, silica dust etc.). Make sure the

correct type of filter/cartridge is being used for the present hazard. The wrong type of cartridge, or over-used cartridges will render the respirator useless.

If the inspection shows that any parts of the respirator are missing or defective, or if the respirator is not useable for any other reason, it must be removed from service.

Cleaning

We will be responsible to provide cleaning materials and the required time for workers to clean their respirators properly. Respirators must be cleaned regularly to remove dirt and to kill bacteria. Respirators that have not been cleaned properly can be unpleasant to wear and cause skin rashes at the seal. Along with this, an overly dirty respirator may render a respirator useless.

The following list represents an example of the cleaning of half-face and full-face respirators. Refer to the manufacturers instructions for cleaning and sanitizing of the respirator.

1. Remove the filters or cartridges from the respirator facepiece. These must not become wet or damp. Wipe the cartridge exterior with a damp cloth, if necessary. Do not clean the filter/cartridge interior. If the filters/cartridges are coated, replace them.
2. Remove the head straps, gaskets, and valves from the facepiece. Carefully wash the facepiece with warm water. Water that is too hot could warp the facepiece. If possible, use a mild soap or wipes designed to kill bacteria. Use a soft scrub brush to remove any stubborn material. Never use solvents such as turpentine to clean the facepiece as these can damage the rubber or plastic parts. Commercial respirator cleaning solutions, kits and related products are available through safety supply companies.
3. Rinse the facepiece in clean, warm water to remove any soap residue.
4. If you're not using an anti bacterial soap, soak the facepiece in a disinfecting solution for at least 2 minutes. Where possible, always follow the manufacturers recommendation. Always ensure all disinfectant is washed off accordingly as it can cause skin rashes and seal issues.
5. Dry the facepiece on a clean surface to hang dry. If drying with a cloth, use a soft, lint-free cloth.
6. Re-assemble the respirator, making sure all pieces are in their correct positions. Re=attached the filters or cartridges.
7. Respirators used with highly toxic particulates such as asbestos require special decontamination and disinfecting procedures. For details, refer to the manufacturer's instructions and all other applicable requirements and procedures as outlined by regulatory requirements.

Maintenance and Repair

Respiratory equipment must be properly maintain to ensure maximum effectiveness. You can do simple maintenance on your respirator, such as replacing valves or clamps yourself. Make sure all replacement parts you use are specifically approved by the manufacturer for the model you are using.

Using unapproved parts voids the NIOSH approval for the respirator (this refers to all respirator parts, including straps, cartridges, valves, regulators, hoses, and seals).

We will provide an adequate supply of respirator parts or extra respirators to ensure that only well-maintained respirators are used. Any nonfunctioning or defective respirators must be tagged as "out of service" and be removed from use until repaired. More complicated maintenance and repair on respirators must be done by a qualified person only. For example, the manufacturer or another trained person must repair powered air-purifying respirators (PAPRs) and air- supplying systems that include regulators and monitoring and alarm devices.

If respiratory equipment is not repaired properly, it may become ineffective or malfunction. In some cases, even minor modifications can significantly change the performance of the respirator. Make sure only specially trained people repair these types of respirators.

The employer must maintain a record of maintenance for air-supplying respirators, powered air-purifying respirators, and sorbent cartridges and canisters. The sorbent cartridges and canisters should be checked regularly for expiry dates and to make sure they are sealed and stored properly.

Storage

Respirators must be stored according to the manufacturer's instructions. This will often involve storing the system in a sealed bag, so the cartridges remain effective. Always read and follow the manufacturer's instructions.

Instruction and Training

Every worker who may be required to wear a respirator in either routine or emergency situations must be trained in the proper use of the respirator. Workers must be completely trained before they use a respirator in a hazardous area.

The instruction and training component will include:

- The respiratory hazards that are or may be present at a specific workplace and the potential adverse health effects to the worker;
- The capabilities and limitations of the selected respirator;
- Inspection and maintenance procedures;
- Putting on the respirator and completing a seal check (Fit testing by a qualified person);
- Proper use of the respirator in routine and emergency situations, including what to do in the event of malfunction.

Annual retraining will ensure that the worker is prepared to use the appropriate respirator when the need arises. Training records will be kept at head office.

Medical Assessments

If a worker is required to use a respirator and there is any doubt about the worker's ability to use it because of medical reasons, the worker must be examined by a doctor who can advise the employer of the worker's ability to wear a respirator. A re assessment should be performed if there is any change in the worker's health status that might affect respirator use. A medical assessment will be provided when required.

Documentation

We will maintain a record of the following documentation:

- Fit test results;
- Worker instruction and training records;
- Maintenance records for air-supplying respirators, powered air-purifying respirators, and sorbent cartridges and canisters;
- The manufacturer's instructions for the respirators used and for all accessories;
- Annual tests of compressed breathing air for supplied-air respirators.

Program Review

This respiratory program will be evaluated on an annual basis in consultation with the Worker OHS Representative and the workforce, where applicable. The annual review must:

- Assess exposure control plan (i.e. silica, hazardous products etc.) measures to ensure that they're still effective;
- Determine the need for further control measures;
- Evaluate training and instruction;

Assess the adequacy of exposure monitoring data and assess the need for further monitoring;

1. Ensuring the adequacy of the fit test program.

Policy

We are committed to safeguarding our workers and the public from exposure to Silica dust on our projects. This commitment encompasses all individuals potentially affected by our operations, whether directly or indirectly.

In this context, Silica dust refers to Respirable Crystalline Silica (RCS). Prolonged or intense short-term exposure to airborne respirable crystalline silica dust can cause silicosis, a disabling and sometimes fatal lung disease. Additionally, the ACGIH classifies crystalline silica dust as a type A2 carcinogen.

Our workers must be educated on recognizing these hazards. We have developed an Exposure Control Plan (ECP), Safe Work Practices (SWP), and Safe Job Procedures (SJP) tailored to our activities. We expect everyone to understand the content of this section and report any concerns to their immediate Supervisor. To promote awareness of our program, the following minimum requirements will be implemented:

- Understanding what Silica is.
- Recognizing the hazards associated with Silica.
- Defining responsibilities.
- Providing education and training.
- Using respirators and personal protective equipment.
- Conducting inspections.
- Implementing control measures: engineering, administrative controls, etc.
- Monitoring the effectiveness of the site-specific Exposure Control Plan for Silica in the workplace.

Purpose

We have a duty to protect our workers from silica exposure during concrete drilling. Studies show that work tasks involving the drilling of concrete generate airborne silica levels well more than safe levels. Effective controls are available to protect workers from harmful exposure.

A combination of control measures will be required to achieve this objective. We commit to being diligent in our efforts to select the most effective control technologies available, and to ensure that the best practices, as described in this exposure control plan (ECP), are followed at our worksites.

The work procedures we establish for drilling concrete will protect not only our workers but also any other workers on-site who are not involved in these operations.

What is Silica?

Silica is the second most common mineral on Earth, constituting nearly all of what we refer to as “sand” and “rock.” Silica exists in many forms, with “crystalline” silica (such as quartz) being the most abundant and posing the greatest concern for human health.

Common materials containing silica include:

- Rock and sand
- Topsoil and fill
- Concrete, cement, and mortar
- Masonry, brick, and tile
- Granite, sandstone, and slate
- Asphalt (containing rock and stone)
- Fibrous-cement board containing silica

Silica is so prevalent that numerous workplace activities generating dust can expose workers to airborne silica. In British Columbia, the Occupational Health and Safety Regulation has set occupational exposure limits (OELs) for five different forms of silica; three are amorphous, and two are crystalline (quartz and cristobalite). The form most likely to cause serious health issues for workers is quartz.

How are Workers Exposed to Silica?

Silica is a primary component of many common construction materials, and silica-containing dust can be generated during various construction activities, including:

- Abrasive blasting (e.g., of concrete structures)
- Jackhammering, chipping, or drilling rock or concrete
- Cutting brick or tiles
- Sawing or grinding concrete.
- Tuck point grinding.
- Road construction
- Loading, hauling, and dumping gravel.
- Demolition of structures containing concrete
- Sweeping concrete dust

Workers performing these tasks, or those nearby, can be exposed to harmful levels of airborne silica without proper protection. Additionally, workers in other industries may be exposed to silica, such as those involved in the manufacture of toothpaste or pottery, or when loading coal (which can contain quartz) into a ship.

Health Hazards

Crystalline silica dust can cause a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening, and scarring of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.

A worker may develop any of three types of silicosis, depending on the concentrations of silica dust and the duration of exposure:

- Chronic silicosis—develops after 10 or more years of exposure to crystalline silica at relatively low concentrations.
- Accelerated silicosis—develops 5 to 10 years after initial exposure to crystalline silica at high concentrations.
- Acute silicosis—develops within a few weeks, or 4 to 5 years, after exposure to very high concentrations of crystalline silica.

Initially, workers with silicosis may have no symptoms; however, as the disease progresses, a worker may experience:

- Shortness of breath
- Severe cough
- Weakness

These symptoms can worsen over time and lead to death.

Exposure to silica has also been linked to other diseases, including bronchitis, tuberculosis, and lung cancer.

Responsibilities

The employer is responsible for

- Ensuring that the materials (e.g., tools, equipment, personal protective equipment) and other resources (i.e., worker training materials) required to fully implement and maintain this exposure control plan (ECP) are readily available where and when they are required.
- Providing a job specific ECP for each project, which outlines in detail the work methods and practices that will be followed on each site. Considerations will include.
    - Availability and delivery of all required tools/equipment
    - Scope and nature of grinding work to be conducted.
    - Control methods to be used.
    - Level of respiratory protection required.
    - Coordination plan
- Conducting a periodic review of the effectiveness of the ECP. This would include a review of the available dust-control technologies to ensure these are selected and used when practical.
- Initiating sampling of worker exposure to concrete dust when there are non-standard work practices for which the control methods to be used have not been proven to be adequately protective.
- Ensuring that all required tools, equipment, and personal protective equipment are readily available and used as required by the ECP.
- Ensuring supervisors and workers are educated and trained to an acceptable level of competency.
- Maintaining records of training, fit-test results, crew talks, and inspections (equipment, PPE, work methods/practices).
- Coordinating the work with the prime contractor and other employers to ensure a safe work environment.

The supervisor (foreman and lead hand) is responsible for

- Obtaining a copy of the ECP from the employer, and making it available at the worksite
- Selecting, implementing, and documenting the appropriate site-specific control measures
- Providing adequate instruction to workers on the hazards of working with silica-containing materials (e.g., concrete) and on the precautions specified in the job-specific plan covering hazards at the location.
- Ensuring that workers are using the proper respirators and have been fit-tested, and that the results are recorded.
- Directing the work in a manner that ensures the risk to workers is minimized and adequately controlled.
- Communicating with the prime contractor and other trade partners to ensure a safe work environment.

The worker is responsible for

- Knowing the hazards of silica dust exposure
- Using the assigned protective equipment in an effective and safe manner
- Setting up the operation in accordance with the site-specific plan
- Following established work procedures as directed by the supervisor.
- Reporting any unsafe conditions or acts to the supervisor.
- Knowing how and when to report exposure incidents.

Silica Health Hazard

Silica is the second most prevalent mineral in the Earth's crust and a key component of sand, rock, and mineral ores. Quartz is the most common and abundant form of crystalline silica.

Dust generated from activities such as chipping, drilling, and coring concrete is known as Respirable Crystalline Silica (RCS). The amount of silica in cement varies depending on the type of aggregate used. Long-term and repeated exposure to RCS dust can cause silicosis, a disease where fine particles settle in the lungs, leading to thickening and scarring of lung tissue. Silica exposure has also been associated with lung cancer.

Depending on the concentration of silica dust and the duration of exposure, a worker may develop one of three types of silicosis:

1. **Chronic Silicosis -** Develops after more than 10 years of exposure to low concentrations of crystalline silica.
2. **Accelerated Silicosis -** Develops within 5 to 10 years of initial exposure to high concentrations of crystalline silica.
3. **Acute Silicosis -** Symptoms appear within a few weeks to 4-5 years after exposure to very high concentrations of crystalline silica.

At first, workers with silicosis may not show symptoms. As the disease advances, symptoms may include:

- Shortness of breath
- Severe cough
- Chest pain
- Weakness

These symptoms can worsen over time and may be fatal. There is no medical treatment for silicosis. Workers who are regularly exposed to significant levels of silica dust should have annual checkups and discuss any unusual symptoms with their doctor.

Silica exposure occurs through inhaling airborne dust. Workers engaged in tasks that produce silica dust are at the highest risk, but other workers and nearby individuals can also be exposed.

In construction, silica dust exposure is a significant concern because silica is a major component of many construction materials. Common materials containing silica include:

- Asphalt containing rock or stone.
- Sand, fill dirt, topsoil.
- Rock and stone
- Mineral deposits
- Granite, sandstone, quartzite, slate
- Concrete, concrete blocks, cement, mortar
- Brick and refractory brick
- Abrasives for blasting

Exposure Limits

The exposure limit for crystalline silica set by WorkSafeBC is 25 microns (0.025 mg/m^3). Additionally, silica carries an ACGIH A2 designation, indicating it is a suspected human carcinogen.

For designated substances like crystalline silica, WorkSafeBC mandates that employers eliminate exposure where possible through methods such as substitution or process changes. When elimination is impractical, employers must implement an Exposure Control Plan (ECP) to keep workers' exposure As Low As Reasonably Achievable (ALARA) below the established exposure limit.

The ECP outlines our strategy for minimizing worker exposure, incorporating risk identification, assessment, and control measures to ensure exposure levels remain as low as reasonably achievable below the threshold.

Risk Assessment

Before starting any work that may generate RCS dust, a Risk Assessment must be conducted in all areas where workers will be present. Based on this assessment, an Exposure Control Plan (ECP) will be developed, detailing procedures for each scope of work. A Toolbox Safety Meeting must be held before commencing work to review the relevant ECP.

We e are dedicated to enhancing our knowledge and expertise regarding silica exposure controls and establishing policies and procedures to protect workers from harmful exposure. Effective engineering controls, such as HEPA vacuum attachments and wet dust suppression methods, which control silica dust at its source, have been proven to significantly reduce airborne dust levels when properly selected and operated according to best practices.

Since silica is an ALARA substance, employers must reduce exposure to As Low as Reasonably Achievable levels. This means that, in addition to engineering controls, respiratory protection may also be required.

The BCCSA's Silica Control Tool, available at http://silicacontroltool.com/ will be used to obtain the monitoring data required for conducting the risk assessment as per OHSR 6.112.4. The assistance of a qualified person, such as an external consultant, may be sought when necessary.

Hazard Control Measures

We will mitigate worker exposure to silica dust by employing a combination of the following controls, prioritized as follows:

Substitution and Elimination: This involves using products with lower silica content or adopting work methods that eliminate the need for silica processes, such as surface grinding.

Engineering Controls: This includes implementing measures like water usage, local exhaust ventilation, or enclosures to effectively manage dust at its source.

Administrative Controls: These measures involve coordinating tasks with other subcontractors, displaying warning signs, and scheduling work to minimize dust exposure.

Personal Protective Equipment: Providing workers with disposable coveralls and respirators that have been fit-tested.

We are dedicated to enhancing our understanding and proficiency in utilizing these controls, establishing robust policies and procedures to safeguard workers from harmful exposure, and reducing reliance on respirators whenever possible. Workers responsible for generating silica dust must recognize the potential risks to themselves and others in their vicinity and take all necessary precautions to minimize exposure risks to co-workers and the public.

Substitution/Elimination

Efforts will be made to identify practical approaches to eliminate exposure by employing alternative processes and work methods whenever feasible. If it is not feasible to eliminate the hazard entirely, engineering controls should be implemented.

We acknowledge the importance of strategic planning to minimize the generation of silica dust:

- During the project planning phase, we will advocate for the utilization of methods that reduce the necessity for moving gravel, sand or when cutting, grinding, or drilling concrete surfaces.

- Whenever viable, we will schedule work during periods when gravel, sand or concrete is still wet, as this significantly reduces dust emission.
- Tasks that could affect workers or the public will be done by competent employees while under supervision.

Engineering

Choosing the suitable engineering control relies on the nature of the task and the working environment. Depending on the circumstances, one engineering control method may prove more effective than others. Supervisors will opt for the most pragmatically effective approach to minimize exposure.

Dust control systems may utilize one or a combination of the following three established techniques:

- Local exhaust ventilation (LEV)
- Wet dust suppression (WDS)
- Restricting or isolating the work activity with barriers or full enclosures (this may be the only option where LEV or WDS is not practical or effective)

Local Exhaust Ventilation (LEV)

These systems include a shroud, a hose attachment, and a vacuum system. The dust-laden air is collected within the shroud, drawn into the hose attachment, and conveyed the length of the corrugated hose to the vacuum, where it is filtered and discharged.

Many tools such as grinders, drills and saws can have LEV dust control attachments that are tailored to both the equipment and the specific work activity. For instance, there are dedicated grinders with LEV designed specifically for tuck point grinding. In cases where a shroud is unavailable for a grinder, custom shrouds can be fabricated to fit grinders of various sizes. For example, shrouds suitable for corner and 90-degree areas can be custom-made or purchased.

Wet Dust Suppression

A wet Dust Suppression (WDS) involves the application of water to the surface being drilled or ground to suppress dust and prevent it from dispersing into the air. Any resulting slurry must be promptly cleaned and removed while still wet to prevent it from drying and becoming airborne. Many construction tools and equipment types are available with wet spray attachments, allowing for effective dust suppression.

Additionally, water can be manually applied to the concrete surface before and during work such as grinding, drilling, or cutting. WDS is highly effective at reducing dust emission at the source and may, in some cases, outperform local exhaust ventilation, especially for tasks like slab and masonry cutting.

However, a drawback of this method is that the dust is not collected; instead, the wet slurry must be cleaned up to prevent dust from becoming airborne. WDS may not be suitable for certain applications, such as tuck point grinding and cutting fibrous cement board, due to potential issues like material discoloration, expansion, building damage, and the challenge of wastewater disposal.

Furthermore, using water spray controls poses potential safety hazards, including the risk of electrocution, slipping, and even hypothermia.

Enclosures and Barriers

Enclosures are designed to contain dusty environments. They can be either partial structures (such as poly draping or partial plywood hoarding) or full enclosures equipped with the capability to maintain a lower-than-ambient pressure inside (negative pressure). For partial enclosures, airflow can be created by setting up a ventilating (blower) fan, which discharges dusty air to an unoccupied outdoor location. This option should be used only when dust levels are low or to supplement local exhaust ventilation (LEV) or wet methods, such as in stairwells. Full enclosures can be equipped with a negative air unit that extracts air from inside the structure. Negative air units draw dusty air through a large HEPA filter before discharging the air outside the enclosure.

Barriers are utilized to isolate the work area from the rest of the project site and to prevent unauthorized workers from entering. However, they do not prevent dust drift and should only be used when natural ventilation is adequate, and dust release is controlled. These barriers will be constructed to alert other workers that concrete grinding is taking place and to restrict access to the immediate work zone to authorized personnel only.

Administrative Controls

Administrative controls do not physically eliminate the hazard or exposure but involve procedures and processes designed to reduce exposure and enhance the effectiveness of other controls in place.

Some examples of administrative controls include:

- Coordinating work with other employers in the area
- Establishing access control zones
- Relocating unprotected workers to different areas on site
- Scheduling silica-related tasks, such as moving gravel, sand and chipping or grinding, at different times than other activities in the work area
- Posting warning signs

Personal Protective Equipment

Respiratory Protection

Silica given its status as a carcinogen, any worker exposed to RCS must use respiratory protection, even when engineering controls are in use, to ensure exposure is reduced to As Low As Reasonably Achievable (ALARA)

- Each worker will be fit-tested if a respirator is required. See table and respiratory protection program.
- If a worker is required to wear a respirator that requires an effective seal with the face for proper functioning, the worker must be clean-shaven where the respirator seals with the face.
- When the worker notices a notable resistance to breathing, the respirator filters must be replaced.
- Respirators will be used, cleaned, and stored in accordance with the manufacturer's specifications and the respiratory protection program.

Other Protective Clothing

Workers will wear protective clothing as specified in our task-specific safe work procedures to prevent contamination of worker clothing such as coveralls or Tyvek™ suits.

Housekeeping Procedures

Dry sweeping and the use of compressed air are **prohibited** for removing dust and debris containing silica. Work areas and equipment covered by dust will be cleaned at the end of every shift using a HEPA filter vacuum.

- Wet cleanup may also be used to remove dust, if possible
- Waste material will be placed in a dumpster and will be removed at least weekly. The location and method used to store waste will not allow silica-containing dust to re-enter the workplace.
- Any slurry generated by wet control methods should be leaned up when the work is completed to avoid secondary dust exposure hazard.
- Supervisors are responsible for ensuring that work areas are free from dust at the end of each shift.
- Workers are to be provided with washing facilities with soap, water and paper towers or rags.
- Use a Hepa vacuum or wet cloth to wipe down clothing and body parts.

Hygiene Safety

On-the-job hygiene practices are vital for protecting workers from inhaling silica dust, which can be released into the air from contaminated surfaces, clothing, and equipment. Silica particles can settle on hands, clothing, and hair, and when disturbed, can be re-suspended in the air, and inhaled. Therefore, it is essential to follow appropriate hygiene and work practices whenever silica is present.

All workers must be informed that lunch and rest areas are off-limits to anyone involved in activities that generate silica dust, whether directly or indirectly. Personal cleaning procedures, as specified by company policy and Safe Work Practices (SWPs), must be completed before entering common areas. This requirement also applies to public areas not directly connected to the work site.

Medical Surveillance

Employees with regular exposure to silica dust should participate in a medical monitoring program, which may include physical exams, chest x-rays, and lung function tests. Workers should promptly report any symptoms related to silica exposure to the employer for documentation and further investigation.

Training Requirements

A competent person will train all workers potentially exposed to airborne silica dust in the following:

- Hazards associated with exposure to silica dust
- The risks of exposure to silica
- Signs and symptoms of silica disease
- Safe work procedures to be followed (e.g., setup of enclosures, disposal of silica waste, personal decontamination)
- Use of respirators and other personal protective equipment (e.g., donning and doffing of personal protective equipment, and cleaning and maintenance of respirators)
- Use of control systems (e.g., LEV and wet methods)
- How to seek first aid (for example, the location and use of eyewash stations)
- How to report an exposure to silica dust

Training will be conducted during basic and/or new and young worker orientations, in the field when needed or during toolbox meetings.

Record Keeping

Documentation must be maintained for the following:

- All workers exposed to respirable silica dust on the job.
- Worker education and training sessions.
- Respirator fit testing.
- Equipment maintenance and repairs.
- Worksite inspections.

The exposure control plan must be reviewed at least annually and updated as needed by the employer, in collaboration with the workplace health and safety committee or the worker health and safety representative.

Work Activity	Dust Suppression	Other Controls	Respirator Type
Drilling a few (12 or fewer) holes in a wall or ceiling	Water/misting or Dust cap, HEPA attachment on drill, or HEPA vacuum extraction	Barriers (for example, a tape barrier) to restrict access to the work area	Half face respirator with 100 series (P or R) filters
Drilling a few (12 or fewer) holes in a floor	Water/misting or HEPA attachment on drill or HEPA vacuum extraction or continuous water spray	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters (N95 respirator with water spray)
Drilling a more than 12 holes in a wall or ceiling	Water/misting or Drill connected to a HEPA vacuum extraction or continuous water spray	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters
Chipping small areas of walls or ceilings	Water/misting or LEV (could include a negative air unit or HEPA vacuum positioned near the work surface or continuous water spray	Barriers (for example, a tape barrier) to restrict access to the work area	Half face respirator with 100 series (P or R) filters
Chipping small areas of walls or ceilings	Water/misting or LEV (could include a negative air unit or HEPA vacuum positioned near the work surface or continuous water spray	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters
Using a chipper in a small unventilated area	Water/misting or LEV (could include a negative air unit or HEPA vacuum positioned near the work surface or continuous water spray	Full enclosure systems (with negative air) are required to restrict access and to contain work area. Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters
Jackhammering in a small area	Continuous water spray, vacuum or LEV	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters
Using a jackhammer in a small unventilated area	Continuous water spray	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters

Brick and block masonry cutting	Water/misting or LEV (could include a negative air unit or HEPA vacuum positioned near the work surface or continuous water spray	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters
Mixing grout or mortar	Water/misting or LEV (could include a negative air unit or HEPA vacuum positioned near the work surface or continuous water spray	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with N100 series (P or R) filters

Purpose

We have a duty to protect all workers and the goal of this Dropped Object Prevention Sample Plan is to establish standardized guidelines across our organization for the prevention of dropped objects during work at elevated heights. By implementing this prevention plan, our goal is to significantly minimize the hazards and potential for serious injuries associated with dropped objects. This plan is designed to mitigate the risk of dropped objects by ensuring that all workers receive adequate training in securing tools at height and fully understand the correct procedures to follow."

Worker Safety

Protecting the safety and well-being of employees is paramount. Implementing measures to prevent objects from falling helps reduce the risk of injuries or fatalities that may occur if workers are struck by falling tools, equipment, or materials.

Public Safety

In many work environments, there may be areas where members of the public or visitors are present. A Dropped Objects Prevention Program helps ensure their safety by minimizing the risk of objects falling from height and causing harm.

Property Protection

Falling objects can also damage property, including equipment, vehicles, buildings, and infrastructure. Implementing preventive measures helps safeguard these assets and reduces the potential for costly damage.

Regulatory Compliance

We have regulations and standards in place to provide a safe working environment for their employees. A Dropped Objects Prevention Program helps organizations comply with these legal requirements.

Risk Reduction

By identifying and addressing potential hazards related to falling objects, organizations can reduce the overall risk of incidents occurring in the workplace. This proactive approach helps create a safer and more secure work environment for everyone involved.

Productivity and Efficiency

Injuries and accidents resulting from falling objects can lead to downtime, delays, and disruptions in operations. By preventing such incidents, we can maintain productivity levels that operate more efficiently and most of all protect our workers.

Reputation

Workplace accidents can have negative repercussions on an organization's reputation and may result in legal liabilities. Implementing a comprehensive Dropped Objects Prevention Program demonstrates a commitment to safety, which can enhance the organization's reputation and reduce the risk of legal consequences.

Overall, a Dropped Objects Prevention Program plays a vital role in promoting safety, protecting individuals and property, ensuring regulatory compliance, reducing risk, maintaining productivity, and safeguarding the organization's reputation and financial well-being.

Application

- All locations where personnel are employed to perform work at height or where they may be exposed to a dropped object by working below other personnel, tools, equipment and platforms.
- The requirements of this plan must be observed by all personnel involved in working at height or below at height activities.
- This Dropped Object Prevention Sample Plan must be reviewed in any job safety analysis or pre-task planning for activities that require working at height with tools, and in those activities that require working below such activities.
- This plan establishes minimum expectations in order to mitigate the risk of damage to property or personnel done by dropped or falling objects. It is the expectation that any tools and materials that could be considered drop hazards are secured with secondary drop systems.

Definitions

Primary Drop System

Primary Drop Systems are systems which serve as the tool's primary form of drop prevention and typically include the worker's hand placement or grip on the tool. Other forms of primary protection may include main support systems for the tool (such as holstering a tool on the body or the platform a tool may be resting while not in use).

Secondary Drop System

Secondary Drop Systems serve as a backup in the event the primary system fails, and are utilized to prevent damage from a dropped or falling object after it has fallen. Secondary systems may include passive systems such as guardrails with toe-board and mesh netting, screens, floor/hole coverings, and tool canopies that have side protection. They may also include tool restraint systems which are utilized to secure a tool or object to an employee or stationary structure to prevent it from falling (these include pouches and transport buckets with closure systems). Tool arrest systems include tool tethers, which will arrest the fall of the tool and prevent it from striking a lower level and others below.

Drop Hazard

Any tool, material or object that has an opportunity to fall from elevation to a lower level causing potential for damage to property, injury or death.

Mitigation

The elimination or reduction of the frequency, magnitude, or severity of exposure to risks by the minimization of the potential impact of a threat or warning.

Anchorage

A secure point of attachment for tethers, tools and transport buckets with closure systems which is independent of an anchorage used for fall protection for personnel.

Attachment Point

A device designed and utilized to create a connection point on a tool to which the user can connect a tether or lanyard.

Tool Lanyard/Tether

An extension made of durable materials that is designed to prevent an object from being dropped. These will typically utilize a connection point on either end of the tether for securing an object to a worker or stationary item.

Tool Bucket

A bucket designed for the purpose of carrying tools and materials. These tool buckets must be capable of being closed and secured to prevent the contents of the tool bucket from spilling. All tool buckets being used must utilize a closure system.

Tool Pouch

A bag or pouch that is designed to secure its contents (nuts, bolts, nails, screws, small hand tools, etc.) from being spilled or dropped. Many tool pouches allow the user to remove a tool for use while preventing it from becoming a drop hazard through use of tethers, retractors, etc.

Tool Holster

A bag or pouch designed to secure single tools or items (hammers, wrenches, levels, radios, bottles, etc.) in order to keep them easily accessible while, in use with other necessary components, helps prevent them from becoming drop hazards.

Tool Belt

A device that is designed to ergonomically support and manage other dropped prevention items such as, lanyards/tethers, pouches, and holsters on the person of the worker.

Dropped Object Zone

An area with potential to be impacted by drop hazards currently present in a work-in-progress above. These Dropped Object Zones are to be secured with barricades to prevent unauthorized entry. Signage stating the hazard and who to contact for information will be posted at the DOZ as well.

Safety Net

A device installed beneath work-in-progress to catch falling objects or personnel.

Responsibilities

Management/Supervision is responsible for:

Communicating the expectation that dropped objects will be eliminated and ensuring that this plan and associated procedures are implemented.

- Coordinating assessments to ensure implementation and effectiveness of the procedure.
- Ensuring employees have appropriate equipment and materials to implement the procedure effectively.
- Ensuring workers have necessary opportunity for required training.

Health and Safety is responsible for:

- Communicating this procedure and supporting information to applicable employees.
- Conducting assessments to evaluate the procedure's effectiveness.
- Conducting necessary training with applicable employees.

All Employees are responsible for:

- Notifying his or her supervisor of any drop hazards within their scope of work.
- Conducting work only after all drop hazards have been eliminated or property mitigated.
- Stopping work if hazardous conditions prevent the job from being done safely.
- Immediately reporting any dropped or fallen objects.
- Including potential drop hazards in Job Hazard Analyses and Pre-job Planning

Training

In many circumstances additional training related specifically to dropped and falling objects will be necessary for employees. Training will be provided to each employee who may create or be exposed to drop hazards. This training shall include:

- The nature of drop hazards and dropped objects in the workplace
- Correct procedures and equipment use for drop prevention
- Purpose and application of applicable Primary and Secondary Drop Systems
- Proper storage and handling of equipment and materials at height
- Reporting requirements for incidents and near misses

When there is reason to believe that an employee who has undergone training does not have adequate understanding or comprehension of standards regarding drop prevention, it will be required that said employee is re-trained. Other circumstances which could necessitate re-training are changes in procedure, changes in drop prevention equipment, etc. Training should be documented.

Potential Hazards and Controls for Working at Heights

Working at Heights with Workers Located Below:

- Install barricades in the drop zone below to prevent any unrelated workers to the task from entering the zone.
- In high traffic areas, a spotter is required to coordinate work with crews and the public.
- Communicate with all nearby trades of the overhead activity taking place.
- Schedule / coordinate the overhead work to mitigate any need for workers to be below.
- If appropriate, provide overhead protection in line with local legislation / building code.

Materials at Heights:

- Store materials at least 6.5 feet back from guardrails or a greater distance depending on weather conditions and scope of work.
- Material stored at heights should be secured from a sudden weather event.
- Utilize red flagging below & netting or equal protection which lets the wind travel through the rail. (If scaffold is involved, ensure engineering approval is received).
- Relocate materials to alternate locations.
- Additional measures may need to be implemented such as safety netting to prevent material from leaving its intended position.

- Ensure that ongoing cleanup occurs to minimize the risk of any debris from dropping.
- At any time when leaving the area, all material must be secured

Tool Use at Heights:

- Use tool retention devices and follow manufacturer requirements ensuring the weight limit of the tool is compliant.
- Install tool anchors as per manufacturers installation requirements.
- Ensure the appropriate amount of tool lanyards are available, eliminating the requirement to continuously transition one lanyard for multiple tools.
- Prepare for the task by ensuring only the required tools at the task location.
- Do not hang tools from guardrails

Drop Prevention Systems Criteria

Prior to selecting a tool lanyard, a proper attachment point must be established on the tool. If a tool has a built-in connection point placed by the manufacturer for the purpose of drop prevention, this step is not required. Load rating of the attachment point should be appropriate for the tool's weight.

Examples of **CORRECT** tool attachment:



Examples of **INCORRECT** tool attachment:



Tool Lanyard/Tethers

After establishing an adequate attachment point on a tool, a proper tool tether will then need to be selected which has an appropriate load rating for the tool to be tethered.

Examples of **CORRECT** tether/lanyard selections for different sized tools




BOSCH
squids




squids





Tool Holsters, Pouches and Wristbands

For some tools and objects, a tool holster or tool pouch may be appropriate. Tools used in these holsters should weigh less than or equal to the manufacturer stated load-rating.

Examples of holstered tools and wristbands:



Tool Belts

When choosing a proper method for tethering, it becomes necessary to select an appropriate anchor point for the remaining end of the tethering device. For many small tools, connecting to the worker can be the best option. This is only acceptable for tools weighing less than 5 lbs. D-Rings on fall protection harnesses which have been designated by the manufacturer for use as a tool connection point are a good option. Tool Belts designed with tether points are also a good option.

Examples of tethered tools utilizing tool belts:



Tool Buckets

For the safe transportation of tools and materials, buckets may be utilized only if they are manufactured with a closure system which allows the user to secure the contents of the bucket from potential spills.

Examples of tool buckets with closure systems:



Secondary Drop Prevention Systems

In applications where the utilization of safety nets is necessary, nets should be designed with specific sized webbing approved by the manufacturer for use based on the specific task, location and type of tools/materials being used. Forged steel safety hooks or shackles will be used to fasten the net to its supports.

Nets should be installed as closely below the work in progress as is deemed practicable, but never more than 30 feet below. Safety nets shall be hung, maintained and tested in accordance with the manufacturer's instructions as well as the requirements set forth by the Occupational Safety and Health Regulations.

Nets designed for use to prevent falling objects shall not be used as fall protection for human beings. These nets may be deployed below fall protection nets in these cases. When falling object nets are used alone, signs will be posted informing employees that "Fall Protection is still required in work areas above placed netting." Inspections of safety netting should occur weekly and defective netting will not be deployed.

Toe Boards

When being used as a secondary drop system, toe boards will be erected along the edge of overhead work in order to protect employees below. Toe boards will be capable of withstanding a forces imposed. Toe boards will be at least 4 inches tall with no greater than ¼ inch clearance over the working surface.

Dropped Object Zones

Dropped Object Zones are to be clearly marked with barricades or caution/danger tape to restrict access. Only employees directly engaged in the activity conducted overhead will be admitted into a Dropped Object Zone.

Guardrail Systems

If guardrail systems are to be engaged as a secondary drop system, they will need to be inspected to ensure any openings are not large enough for tools or materials to pass through. It is recommended they be enclosed with a small mesh netting or screen to prevent materials from passing through.

Human Performance

Housekeeping

Trash and waste should be kept in appropriate bins which are to be located in convenient locations across the workplace. When at height, these are to be stored in transport buckets with closure systems, pouches, etc. with an ability to be closed and prevent spillage until the material can be properly stored in a waste bin. Employees should "clean as you go" and maintain an orderly work area, resulting in a lower chance for dropped material. Tools and other materials should also be kept in an organized, orderly fashion.

Tool and Material Storage

Where tools or materials are stacked higher than the edge of the toe boards, screening or paneling will be constructed from the working surface to the top of the guardrail or mid-rail. This will be done for a sufficient distance to ensure these objects will not have an opportunity to become drop hazards. Unless guardrails with screening or paneling has been erected, materials should not be stored within four feet of the leading edge. All stacked materials should be stable and self-supporting.

Tool and Material Handling

Positive tool transfer should be utilized by employees. When transferring a tethered tool from one employee to another, "100% tie off" should be engaged. The tool should be tethered to the passing employee. Prior to handing off, the receiving employee should connect their tether to the tool as well. After positive connection has been completed, the passing employee may disconnect their tether from the tool. By utilizing this passing method, the tool never has an opportunity to become a drop hazard.

Equipment Inspection

All drop prevention systems shall be inspected prior to use. Excessively worn or damaged tools or materials must be immediately removed from service and replaced.

Supporting Information

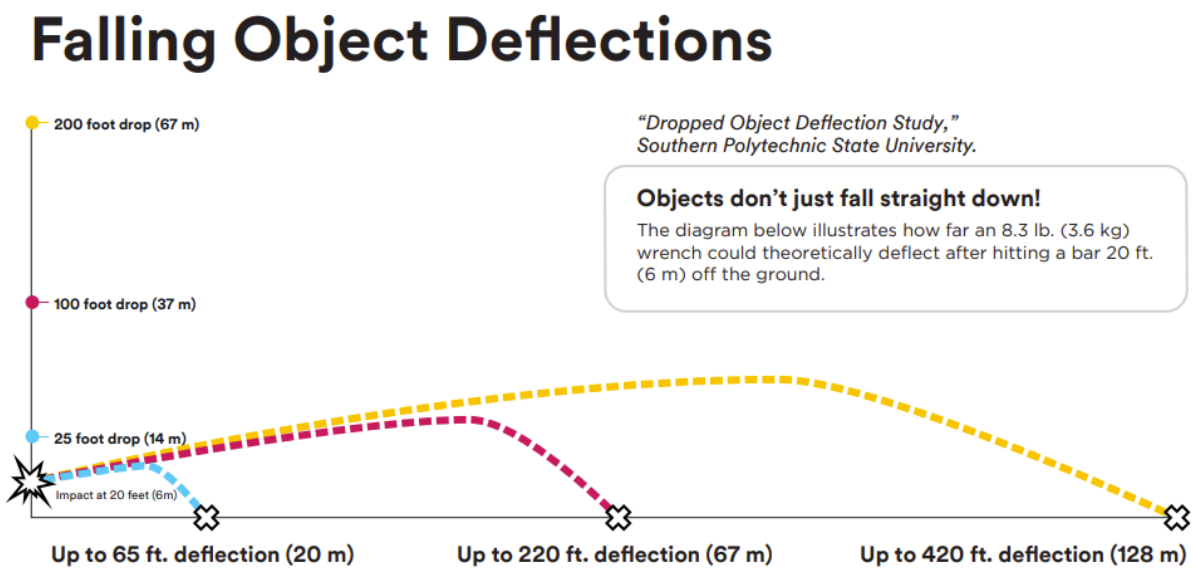
Impact Force Chart

Impact of an 8.3 lb. (3.6 kg) dropped wrench*

Drop Height		Speed		Impact Force	
Feet	Meters	MPH	KPH	Lbs.	Newtons
5	1.5	12	19	166	738
10	3	17	27	332	1477
25	7.6	27	43	830	3692
50	15.2	39	63	1660	7384
100	30.5	55	88	3320	14768
200	61	77	124	5540	29536
300	91	95	152	9960	44304
400	122	109	175	13280	59072
500	152	122	196	16600	73840

*Assumes a 3 in. (7.6 cm) deceleration distance for purposes of this calculation of impact force.

Tool Deflection Diagram



Appendix G – Fall Protection Program

Policy Statement

Our company requires the use of fall protection under the following conditions:

1. **Height Threshold:** Fall protection must be utilized when work is conducted at any location where a fall of 3 meters (10 feet) or more may occur.

2. **Enhanced Risk of Injury:** Fall protection is also required when the fall height is less than 3 meters (10 feet) but involves a higher risk of injury than a fall onto a flat surface. This includes, but is not limited to, situations where a fall could result in:
    - Landing on hazardous objects, such as rebar, machinery, or construction materials.
    - Falling into confined spaces, pits, or openings.
    - Impacting with sharp or protruding objects.
    - Falling into water or other substances that could pose a drowning or inhalation hazard.
    - Falling onto uneven or unstable surfaces that increase the likelihood of injury.

3. **Additional Scenarios Requiring Fall Protection:** Fall protection measures must also be in place under the following circumstances:
    - When working near unprotected edges, openings, or skylights.
    - During the assembly, maintenance, or disassembly of scaffolding where the risk of fall exists.
    - When accessing or egressing elevated work platforms or structures without safe guardrails or handrails.
    - On ladders where the risk of fall cannot be mitigated through proper positioning or use.

4. **Training and Competency:** All employees must receive adequate training in fall protection measures, including the correct use of personal protective equipment (PPE), recognition of fall hazards, and emergency response procedures. Training topics will be:

    - Review of current Regulatory requirements pertaining to fall protection.
    - Understanding of fall protection plan.
    - Fall protection methods and the Hierarchy of Controls.
    - Identification of fall hazards.
    - Assessment and selection of anchors.
    - Instruction in the correct use of connecting hardware.
    - Information on effects of a fall on the human body (arrest force, energy absorbers, swing fall, freefall).
    - Calculating Fall Clearance.
    - Pre-use inspections.
    - Emergency response procedures.
    - Inspecting, fitting, adjusting, and connecting fall protection systems and components.
    - Falling objects.
    - Safe use of ladders.

5. **Equipment and Maintenance:** Fall protection equipment must be regularly inspected, maintained, and replaced as necessary to ensure it remains in proper working condition. This includes harnesses, lanyards, anchor points, and other relevant safety gear.

6. **Work Planning and Risk Assessment:** Before commencing work at heights, a thorough risk assessment must be conducted to identify potential fall hazards and determine appropriate fall protection measures. A fall protection plan should be developed and communicated to all relevant personnel.

By adhering to these requirements, our company aims to ensure the safety and well-being of all employees when working at heights.

Responsibilities

Owners/Managers:

- Ensuring that workers receive instruction and training in the identification and control of fall hazards.
- Providing the necessary resources (equipment, training, PPE, etc.) to implement this program effectively.
- Making sure that written fall protection plans are readily available at the work site before work begins, as required by regulations.
- Ensuring that fall protection plans and controls are comprehensive and applicable to all different scopes of work performed within our operation.

Supervisors:

Supervisors are responsible for:

- Conducting pre-job planning meetings to discuss the required fall protection measures.
- Identifying workplace fall hazards and preparing site-specific fall protection plans for the relevant scope of work.
- Ensuring that employees and sub-contractors comply with fall protection instructions.
- Providing procedures for tasks involving work at height.
- Ensuring that fall protection training is up to date for any worker required to work at height.
- Making sure that fall protection equipment is available at the workplace.

Workers:

Workers are responsible for:

- Following site-specific fall protection plans and procedures when working at height.
- Understanding the requirements and proper use of Fall Protection Systems and the Hierarchy of Controls.
- Using only the equipment provided or approved by the employer.
- Avoiding exposure to fall hazards without appropriate training and controls.

Fall Protection Hierarchy of Controls

1. Elimination or Substitution
2. Guardrails
3. Fall Restraint Systems
4. Fall Arrest Systems
5. Control Zones

Elimination

Wherever practical, site supervisors will make efforts to eliminate the need to work at height. Jobs may be modified or redesigned to avoid exposure to fall hazards entirely.

Guardrails

When it is not feasible to eliminate the need to work at height, guardrails are the preferred method of fall protection. Guardrails must be installed in compliance with the requirements of OHSR 4.58.

If a section of the guardrail needs to be removed to facilitate work:

- Only the portion necessary for the work may be removed.
- Workers in the area must use Personal Fall Arrest Systems.
- Guardrails must be reinstalled immediately after the work is completed or if the area is left unattended.
- Efforts should be made to divert guardrails to accommodate the work rather than removing them, to ensure the protection of other workers.

Fall Restraint Systems

- When using guardrails is not feasible or poses a higher risk, a fall restraint system is the preferred method.
- A fall restraint system prevents a worker from reaching an unguarded edge or falling from a work position.
- The system should allow free movement within the work area but prevent reaching the fall hazard when connected.
- To set up a fall restraint system, the worker must:
  - Don and adjust an approved and inspected full-body harness.
  - Use an anchor point with a minimum breaking strength of 800 lbs (check the label).
  - Select a connecting device of adequate length to reach the work area without reaching the fall hazard.
  - Attach the connecting device between the harness back D-ring and the anchor.
  - Consider compatible and incompatible connections when setting up the system.
  - Ensure no slack in the system that would allow reaching the fall hazard.
  - Regularly check and ensure the system is properly set up if using rope grabs or other adjustable systems.
  - Prefer manual rope grabs in fall restraint applications.

Fall Arrest Systems

A fall arrest system is designed to allow workers to move freely within their work area while ensuring their safety by preventing falls from causing serious injury. Here are details to setting up and using a fall arrest system:

1. **Worker Mobility and Safety:** The system should allow the worker to reach necessary work areas safely. In the event of a fall, the fall arrest system will prevent the worker from hitting the ground or any obstacles.

2. **Steps to Set up a Fall Arrest System**

   - **Harness**
     - Ensure the worker properly dons and adjusts an approved, inspected full-body harness.
     - Confirm the harness meets safety standards and is inspected.

   - **Anchor Point**
     - Use an anchor point with a minimum breaking strength of 5,000 lbs. Verify this by checking the label.

- **Connecting Device**
  - Choose a connecting device of appropriate length that allows the worker to reach their work area while minimizing free fall distance.
  - Secure the connecting device between the harness's back D-ring and the anchor point. Use only energy-absorbing lanyards for fall arrest.
  - Ensure all connections are compatible to maintain system integrity.

- **Slack Management**
  - Ensure there is no slack in the system that could increase the free fall distance or create a swing fall risk.

- **Energy Absorbing Lanyard**
  - Limit the free fall distance to 6 feet when using an energy-absorbing lanyard.
  - Use a higher anchor point to reduce fall distance.
  - Opt for a shorter lanyard to further minimize free fall.
  - Consider using SRDs to automatically limit fall distance.

- **Rescue Procedures**
  - Integrate rescue procedures into the planning stage of any fall arrest system setup. Ensure that workers are trained to rescue a fallen colleague safely and efficiently.
  - Calculate the necessary fall clearance for any worker in a fall arrest situation to ensure they will not hit the ground or any obstacles.

By adhering to these guidelines, workers can safely perform tasks at heights while minimizing the risk of injury from falls. Proper setup and compliance with these protocols are crucial for the effective use of a fall arrest system.

Control Zones

Control zones are a specific fall protection strategy used when other methods are impractical or pose higher risks to workers. Here are the detailed guidelines for setting up and using control zones:

- Control zones should only be implemented when other fall protection options are not feasible or introduce greater risks.
- This is the area between the unguarded edge of a building or structure and a safe distance of at least 2 meters (6.5 feet) from that edge.
- Control zones are appropriate only for flat surfaces or those with a slope of 4:12 or less.
- A warning line must be established at least 6.5 feet from the leading edge to alert workers to the presence of the control zone. This line should include:
- Material that is highly visible, flagged, or clearly marked at intervals no greater than 2 meters (6.5 feet).
- The line should be rigged and maintained at a height of 34 to 45 inches above the working surface.
- A site-specific fall protection plan must be created whenever control zones are used, regardless of the height at which the work is being performed.
- A fall protection plan is mandatory when using control zones as a fall protection method, irrespective of the height.

Fall Protection Plan

Prior to commencing any job or task, an evaluation of the fall protection requirements specific to that job or task must be conducted. A site-specific Fall Protection Plan must be developed and put into action, with continuous training and review throughout the project.

A Site-Specific Fall Protection Plan is mandatory when workers face a fall hazard of 7.5 meters (25 feet) or more unless permanent guardrails are in place. Additionally, Fall Protection Plans are necessary when utilizing work procedures approved by the Board, such as control zones or first-person up procedures, to mitigate worker fall risks.

The written plan must be signed by all workers and their supervisor involved in the task, and it must be tailored to the site and task, with updates made as needed due to changes in work scope, conditions, hazards, or controls.

The plan should cover fall hazard identification, decisions on fall protection methods, equipment inspection and setup procedures, rescue protocols, fall clearance guidelines, and signatures of both workers and supervisors.

Equipment Standards

Equipment used for fall protection systems on our sites must:

- Ensure all components of the fall protection system are compatible and suitable for use together.
- Include compatibility of fall protection systems and connections as part of the Fall Protection training for our workers.
- Ensure equipment is capable of supporting the forces generated by fall restraint or fall arrest.
- Equipment must meet and be used in accordance with the applicable CSA or ANSI standards in effect at the time of manufacture, subject to any modifications or upgrades deemed necessary by the Board.
- Only CSA or ANSI approved equipment will be used by our workers and subcontractors, strictly according to the manufacturer's instructions and for their intended purposes.
- By adhering to these requirements, we ensure that all fall protection equipment used on our sites is safe, effective, and compliant with relevant standards.

Anchors

1. Anchors used in a temporary fall restraint system must have an ultimate load capacity in any direction in which a load may be applied of at least:
   (a) 3.5 kN (800 lbs.), or
   (b) Four times the weight of the worker to be connected to the system.
2. Each personal fall protection system that is connected to an anchor must be secured to an independent point of anchorage.
3. Anchors used in a temporary fall arrest system must have an ultimate load capacity in any direction in which a load may be applied of at least:
   (a) 22 kN (5,000 lbs.), or
   (b) Two times the maximum arrest force.
4. A permanent anchor for a personal fall protection system must have an ultimate load capacity in any direction required to resist a fall of at least 22 kN (5,000 lbs.).

Temporary Horizontal Lifelines

A temporary horizontal lifeline system may be used if the system is:

1. Manufactured for commercial distribution and installed and used in accordance with the written instructions from the manufacturer or authorized agent, and the instructions are readily available in the workplace.
2. Installed and used in accordance with written instructions certified by a professional engineer, and the instructions are readily available in the workplace, or
3. Designed, installed and used in a manner acceptable to the Board, as set in Part 11 – Fall Protection guidelines; G11.7 Temporary horizontal lifelines.

Engineering
The following types of equipment and system, and their installation, must be certified by a professional engineer:

1. Permanent anchors;
2. Anchors with multiple attachment points;
3. Permanent horizontal lifeline systems;
4. Support structures for safety nets.

Inspection, Maintenance and Removal from Service Requirements

Equipment used in a fall protection system must be:

- The user must inspect the equipment before each work shift.
- Conduct periodic inspections as specified by the manufacturer. This includes annual inspections by a competent or qualified person, and factory inspections for equipment like Self-Retracting Lifelines.
- Keep the equipment free from substances and conditions that could cause deterioration.
- Ensure the equipment is kept in good working condition.
- Inspect all components of the fall arrest system before each use for signs of wear, damage, or deterioration.
- Remove any defective components from service if their function or strength is compromised. Follow the manufacturer's instructions for specific inspection requirements and removal criteria.
- If a fall protection system has arrested a fall or failed an inspection, it must be clearly tagged and removed from service.
- Do not return the equipment to service until it has been inspected and certified as safe by the manufacturer or a professional engineer.
- Ensure that any defective equipment to be disposed of is made unusable before disposal. The method for doing this can be decided on a case-by-case basis.
- By following these reworded guidelines, the safety and reliability of fall protection equipment can be maintained, ensuring effective protection for workers.