DGS CONSTRUCTION COMPANY LTD.

COMPANY SAFETY MANUAL
2014

DGS CONSTRUCTION COMPANY LTD SAFETY MANUAL TABLE OF CONTENTS

DGS CONSTRUCTION COMPANY LTD SAFETY MANUAL INTRODUCTION

This company safety manual is part of the DGS Construction Health and Safety Program. The manual provides documented assessments, policies, rules, guidelines, and permits that give clear direction on identified hazards and their control measures.

This company safety manual is supplemented by other elements that make up the entire DGS Construction Health & Safety Program. Other elements include:

- Proactive participation in providing a safe workplace from all employees and management.
- Conducting on site hazard assessments and control measures for each project.
- Conducting random safety inspections of jobsites to determine the effectiveness of the program.
- Holding general safety meetings to allow for worker input into the health & safety program.
- Having toolbox meetings to identify hazards and educate workers on the control measures.
- Investigating incidents and following up with corrective measures.
- Disciplining employees that do not follow the health & safety program.
- Assessing each jobsite for emergencies including emergency evacuation and first aid services.
- Providing the training & education to employees to work in a safe environment.
- Reviewing the company policies, rules & guidelines to ensure their effectiveness.

This safety manual was created with every effort to:

- identify hazards that employees may encounter
- develop control measures
- document the controls and educate workers on the measures.

The safety program is a system of constantly evaluating the industry and work environment changes. The changing hazards are assessed in many different ways and control measures developed with the input from experienced employees.

It is the entire safety program that can prevent incidents and reach the safety objective of employees doing their work without incident.

A copy of this manual will be made available on site at all times for reference by any DGS Construction employee.

Some of the graphics and images in this manual were copied with permission from Worksafe BC and DBI Sala Equipment.

DGS CONSTRUCTION HEALTH & SAFETY POLICY

The objective of the DGS Construction Safety Program is to identify, evaluate and determine preventative measures that will prevent employee safety incidents.

There are many hazards present in the construction industry.
I believe that through education, training and planning in the policies, rules, and guidelines outlined in the company safety manual incidents can be minimized.

I believe that all employees have the right to work in a safe environment and manner to provide for their quality of life.
Employees are expected to refuse work if they feel a work task is unsafe, or if the work contradicts the policies, rules and guidelines outlined in the company safety manual. If work must be performed that contradicts the information in the company safety manual, management must be informed to assess the situation and make any necessary changes.

Working in a safe manner and following the policies, rules and guidelines in the company safety manual is mandatory and a condition of employment for these reasons:

- *preventing personal injuries*
- *preventing incidents to other workers or the public*
- *avoiding unfavorable Worksafe inspection reports or violation fines*
- *avoiding Worksafe prosecution of employers, supervisors, or workers*
- *avoiding federal government prosecutions of employers, supervisors, or workers*

DGS Construction management will make every effort to keep policies and rules; current, reasonable, and practicable. Management welcomes safety input and recommendations from all levels of employees.

By working together as a team, DGS Construction can reach and maintain the safety objective.

_____

George Rossi July 10, 2014
President
DGS Construction Company Ltd.

POTENTIAL HAZARDS WHILE WORKING FOR DGS CONSTRUCTION LTD.

The following is a list of hazards that employees may encounter while working for DGS Construction. This company safety manual addresses each hazard and provides policies, rules & guidelines to minimize the potential for incidents when exposed these hazards.
This assessment was performed in accordance with the requirements of section 115 (General Duties of Employers Worksafe Act :

- Burns by concrete
- Crush by excavated materials
- Cuts from knives, circular, chain or reciprocating saw
- Electrocutions from low voltage power lines
- Electrocutions from low voltage power tools
- Electrocutions from high voltage power lines
- Exposure to toxic controlled products – release oils & caulking
- Exposure to carbon monoxide
- Exposure to violence in the workplace
- Exposure to non-ionizing radiation
- Exposure to silica
- Exposure to heat stresses
- Exposure to cold stresses
- Exposure to communicable diseases
- Exposure to West Nile disease
- Exposure to noise levels > 85 dBA
- Exposure to tobacco smoke
- Exposure to sunlight
- Exposure to laser light
- Falls from ladders
- Falls from elevations
- Falls from work platforms (scaffolding)
- Falls from lifts
- Falls through openings or skylights
- Falls down stairs
- Injuries to the back
- Injuries by knives & other hand tools
- Injuries from electric hand tools
- Struck / crush by mobile equipment
- Struck by overhead object(s)
- Struck by falling object(s)
- Splashes from toxic liquids
- Struck by materials or equipment
- Slipping on surfaces.
- Tripping on uneven surfaces

RESPONSIBILITIES FOR SAFETY

DGS Construction has assigned the following responsibilities to all levels of employees. By assigning clear responsibilities to employees; there is clear direction and understanding of who is responsible for which elements of the company health and safety program.

To ensure proper direction and minimize confusion, the following lists outline the responsibilities for safety of each employee:

OWNER / EMPOYER RESPONSIBILITIES FOR SAFETY
The employer's responsibilities are to:

- Develop and maintain a current health & safety program and manual.
- Provide any specialized personal protective equipment that minimize hazards that workers are exposed to, ie/ eye protection, hearing protection, respirators, face shields, etc… (see list under ppe section)
- Provide the required first-aid equipment and training to first aid attendants.
- Provide any required safety training that will aid in minimizing employee incidents.
- Make time available for employees to be part of safety training, meetings, & investigations.
- Encourage employees and management to make recommendations to the company safety program and follow-up on recommendations made.
- Provide the correct tools and equipment required to do work safely.
- Reward good employee participation in the company safety program and discipline employees according to the company disciplinary policy when violations are observed.
- Correct unsafe conditions or practices if observed or brought to your attention.
- Set a good safety example by following and encouraging the policies, rules & guidelines in the company safety manual.
- Educate and monitor sub-contractors to ensure Worksafe Regulations are complied with.
- Know and comply with the general duties of employers under section 118 of the Worksafe Act.

WCB Act Section 115 General duties of Employers

(1) Every employer must
(a) ensure the health and safety of
(i) all workers working for that employer, and
(ii) any other workers present at a workplace at which that employer's work is being carried out, and
(b) comply with this Part, the regulations and any applicable orders.
(2) Without limiting subsection (1), an employer must
(a) remedy any workplace conditions that are hazardous to the health or safety of the employer's workers,
(b) ensure that the employer's workers
(i) are made aware of all known or reasonably foreseeable health or safety hazards to which they are likely to be exposed by their work,
(ii) comply with this Part, the regulations and any applicable orders, and
(iii) are made aware of their rights and duties under this Part and the regulations,
(c) establish occupational health and safety policies and programs in accordance with the regulations,

WCB Act Section 115 General duties of Employers Continued…

(d) provide and maintain in good condition protective equipment, devices and clothing as required by regulation and ensure that these are used by the employer's workers,
(e) provide to the employer's workers the information, instruction, training and supervision necessary to ensure the health and safety of those workers in carrying out their work and to ensure the health and safety of other workers at the workplace,
(f) make a copy of this Act and the regulations readily available for review by the employer's workers and, at each workplace where workers of the employer are regularly employed, post and keep posted a notice advising where the copy is available for review,
(g) consult and cooperate with the joint committees and worker health and safety representatives for workplaces of the employer, and
(h) cooperate with the Board, officers of the Board and any other person carrying out a duty under this Part or the regulations.

MANAGERS / SUPERINTEDENTS RESPONSIBILITIES FOR SAFETY

Managers and superintendents have responsibilities for safety. Managers and / or superintendents view upcoming projects, either directly or through blue prints before the site supervisor. This gives managers and / or superintendents the ability to assess the project and help plan ways of controlling hazards.

Managers and / or superintendents are defined as supervisors, specifically when giving instructions or directions to supervisors or workers, therefore, they are required to know and comply with the general duties of supervisors under **section 117 of the Worksafe act and the supervisor responsibilities for safety**.

A manager and / or superintendent’s responsibilities are to:

- Assess jobsites for safety hazards and ensure control measures are pre-planned and in place before work begins.
- Arrange for training sessions for supervisors and workers.
- Stop work and correct issues if unsafe conditions are observed or brought to their attention.
- Ensure the correct tools and equipment are available on the jobsite.
- Work with the site supervisor to properly assess and document the emergency procedures on each jobsite as outlined in the “emergency assessment policy and rules” section of the company safety manual.
- Attend and participate in supervisor training & other training courses that will aid in minimizing employee incidents.
- Work with the site supervisor to ensure a correct first aid assessment is conducted and documented as outlined in the first aid section of the company safety manual.
- Assist the site supervisor to set-up and maintain the jobsite in accordance with the company safety manual policies, rules & guidelines.
- Set a good safety example by following and encouraging the policies, rules & guidelines in the company safety manual.
- Educate and monitor sub-contractors to ensure Worksafe Regulations are complied with.

SUPERVISORS RESPONSIBILITIES FOR SAFETY

Supervisors have the most important position on the jobsite. They represent the DGS Construction employer, and thus the manner they handle production and safety issues. The goal of a supervisor is to balance both production and safety so that jobs are completed as planned and employees work in a safe environment and manner.

The Worksafe definition of a supervisor is “a person that instructs and directs a worker in his / her safe work procedures”. Depending on the circumstance, a manager, superintendent, or foreman can be defined as the “supervisor”. The supervisor responsibilities can change depending on who is giving instructions and directions to workers at the time.

A supervisor’s responsibilities are to:

- Assess jobsites for safety hazards and ensuring control measures are pre-planned and in place before work begins.
- Educate workers on what personal protective equipment (ppe) is required for each hazard and monitoring the workers to ensure the ppe is being used and worn properly.
- Train workers on the correct and safe manner of operating tools and equipment when unsafe work practices are observed or brought to their attention. The training techniques are outlined in the company safety manual.
- Attend and participate in supervisor training & other training courses and lecturers that will aid in minimizing employee incidents.
- Stop work and correct issues if unsafe conditions are observed or brought to their attention.
- Inform management if workers are not following the policies, rules and guidelines in the company safety manual and following direction from management on how the situation is to be rectified.
- Ensure the correct tools and equipment are available and being used on the jobsite. If the correct tools or equipment are not available, then inform management.
- Ensure that defective equipment is tagged and taken out of service in accordance with the “defective equipment policy and rules” section of the company safety manual.
- Assess and document the emergency procedures on each jobsite as outlined in the “emergency assessment policy and rules” section of the company safety manual.
- Conduct daily fall hazard assessments and document the system(s) that will be used in the daily log section of the jobsite work permit.
- Conduct and document first aid assessments as outlined in the first aid section of the company safety manual.
- Complete incident investigations as required in the incident reporting section of the company safety manual.
- Inform management of workers that are not trained or require additional training, to comply with the company safety program.
- Set-up and maintain the jobsite in accordance with the company safety manual policies, rules & guidelines.
- Know and comply with the general duties of supervisors under section 117 of the Worksafe Act.
- Set a good safety example by following and encouraging the policies, rules & guidelines in the company safety manual.

WCB Act Section 117 General duties of Supervisors

(1) Every supervisor must
(a) ensure the health and safety of all workers under the direct supervision of the supervisor,
(b) be knowledgeable about this Part and those regulations applicable to the work being supervised, and
(c) comply with this Part, the regulations and any applicable orders.
(2) Without limiting subsection (1), a supervisor must
(a) ensure that the workers under his or her direct supervision (i) are made aware of all known or reasonably foreseeable health or safety hazards in the area where they work, and (ii) comply with this Part, the regulations and any applicable orders,
(b) consult and cooperate with the joint committee or worker health and safety representative for the workplace, and
(c) cooperate with the Board, officers of the Board and any other person carrying out a duty under this Part or the regulations.

WORKER RESPONSIBILITIES FOR SAFETY

Workers are required to know and follow their responsibilities for safety. Following the responsibilities for safety is a condition of employment with DGS Construction.

A worker's responsibilities are to:

- Attend and participate in the safety orientation & other training courses and lecturers that will aid in minimizing employee incidents.
- Provide and wear appropriate footwear, clothing, work gloves and a hardhat as outlined in the personal protective equipment policy.
- Wear the appropriate personal protective equipment (ppe) as required for each hazard as outlined in the ppe section of the company safety manual.
- Inform the site supervisor, manager, or superintendent, if you are not trained or qualified to perform specific work tasks. **Ask questions if not sure.**
- Follow the instructions and directions given to you by your supervisor.
- Stop work and inform your supervisor if you can not perform the work in accordance with policies, rules and guidelines in the company safety manual.
- Refuse unsafe work and follow the guidelines outlined in the refusal of unsafe work section of the company safety manual.
- Inform your supervisor if you damage, or observe damaged equipment so it can be tagged and taken out of service.
- Participate in incident investigations.
- Inform your supervisor within 24 hours if you get injured on the job, and complete the required forms relating to your injury.
- Follow the protocol for reporting injuries as outlined in the incident section of the company safety manual.
- Know and comply with the **general duties of workers under section 116 of the Worksafe Act**.
- Set a good safety example by following and encouraging the policies, rules & guidelines in the company safety manual.

WCB Act Section 116 General Duties of Workers

The following are specific Worksafe safety rules that were copied directly from the Worksafe Act. The law requires management to ensure that you know and understand these "General Duties of a Worker" rules. These rules are very important as they apply ***directly to you****.*
DGS Construction's management encourages you to read these rules very carefully, if these rules are not followed, you are breaking the law. Worksafe BC and federal laws can hold you accountable for your actions under the Canada Criminal Code.

Every worker must

(1) take reasonable care to protect the worker's health and safety and the health and safety of other persons who may be affected by the worker's acts or omissions at work, and (b) comply with this part, the regulations and any applicable orders.

(2a) Without limiting subsection (1), a worker must (a) carry out his work in accordance with established safe work procedures as required by this part and the regulations.

(b) use or wear protective equipment, devices and clothing as required by the regulations,

(c) not engage in horseplay or similar conduct that may endanger the worker or any other person,

(d) ensure that the worker's ability to work without risk to his or her health or safety, or to the health or safety of any other person, is not impaired by alcohol, drugs, or other causes,

(e) report to the supervisor or employer (i) any contravention of this part, the regulations or an applicable order of which the worker is aware, and (ii) the absence of or defect in any protective equipment, device or clothing, or the existence of any other hazard, that the worker considers is likely to endanger the worker or any other person,

(f) cooperate with the joint committee or worker health and safety representative for the workplace, and

(g) cooperate with the board, officers of the board and any other persons carrying out a duty under this Part or the regulations.

FIRST AID ATTENDANT RESPONSIBILITIES & COVERAGE

The following are the responsibilities of a DGS Construction first aid attendant. Some of the responsibilities are WorkSafe requirements that have been adopted as DGS Construction. Any deviation, inability, questions or concerns are to be addressed with the DGS Construction management.

The DGS Construction **first aid attendant is classified as a "worker" and as a "first aid attendant"** under the WorkSafe Act and the DGS Construction policy.
A DGS Construction first aid attendant bears the responsibilities of both a worker and first aid attendant.

FIRST AID ATTENDANT RESPONSIBILITIES FOR SAFETY

- Promptly provide injured workers with a level of care within the scope of the attendant's training and this Part,
  (b) objectively record observed or reported signs and symptoms of injuries and exposures to contaminates covered by this Regulation, and
  (c) refer for medical treatment workers with injuries considered by the first aid attendant as being serious or beyond the scope of the attendant's training.
- Be physically and mentally capable of safely and effectively performing the required duties, and the board may at any time require the attendant to provide a medical certificate.

- Be responsible, and have full authority, for all first aid treatment of an injured worker until responsibility for treatment is accepted
  (a) at a place of medical treatment,
  (b) by an ambulance service acceptable to the board, or
  (c) by a person with higher or equivalent first aid certification.
- The first aid attendant does not have authority to overrule a worker's decision to seek medical treatment or the worker's choice of medical treatment.
- Call or direct someone to call an ambulance based on your first aid assessment.
- Ensure the first aid facility is kept clean and stocked with the required equipment specified in the first aid equipment list.
- Ensure the first aid crash kit is clean, dry, well stocked and stored where required to obtain effective first aid services throughout the site.
- Report to your supervisor any first aid or communication equipment that is needed for effective first aid services.
- Conduct continuous first aid communication and equipment assessments to determine the effectiveness of the first aid services
- Inform your supervisor if your certification is expired or near expiry.
- Provide any DGS Construction injured employee with a Worksafe BC form 6A that they are required to complete and provide to the DGS Construction's office.
- Inform your supervisor if you need to leave the jobsite or will not be available for duty.
- Post your certificate in the first aid room or have it available on site at all times when on duty. Photo-copies are not accepted by WorkSafe BC.
- First aid attendants can not accept activities that will interfere with your ability to receive and respond to a request for first aid service.
  - You must be able to:
    (a) quickly wash hands with soap and water;
    (b) either take off a pair of coveralls or don a pair of clean coveralls; and
    (c) be ready to depart to where you are required with the appropriate level of first aid kit within 3 to 5 minutes.
- Be physically and mentally capable of safely and effectively performing your required duties.

<u>HEPATITIS B SHOTS:</u> DGS Construction will pay and arrange for Hepatitis B vaccination shots for first aid attendants if they choose to obtain the shots. It is the first aid attendant's responsibility to inform their supervisor if wanting to arrange for the shots. The shots are a voluntary method of minimizing exposure to the Hepatitis B virus which can be transmitted through bodily fluids, particularly blood.

FIRST AID ATTENDANT RESPONSIBILITY FOR CONTROL OF TREATMENT:

- The attendant is in complete charge of all first aid treatment of an injured worker until responsibility for treatment is accepted at a place of medical treatment or by a person with higher or equivalent certification in first aid.
- The first aid attendant must not send the injured or ill worker back to work prematurely. The attendant must do the assessments and apply the treatments, such as wound cleansing and bandaging for protection, necessary to adequately prepare the worker for return to work. In determining whether treatment is complete, the first aid attendant must follow first aid assessment and treatment techniques consistent with his or her training. The treatment for an injury or illness may involve follow-up care by the attendant after the worker has returned to work.
- If the attendant may have to provide ongoing treatment he/she should accompany an injured worker to a hospital or place of medical treatment unless the worker is being transported by the B.C. Ambulance Service or other ambulance service acceptable to the Board.

FIRST AID ATTENDANT LIABILITY COVERAGE:

First aid attendants are workers assigned the specific duty of providing first aid services to other workers.

The WorkSafe Act section 10(1) provides liability coverage for first aid attendants when providing first aid services to workers, unless the service is grossly negligent.

The WorkSafe Act does not provide liability coverage if the first aid attendant provides first aid services to anyone other than a worker, ie/ the public.

The BC Good Samaritans Act does not provide liability coverage to first aid attendants that provide grossly negligent first aid services to the public.

DGS Construction's first aid attendant responsibilities does not include providing first aid services to anyone other than a worker, ie/ the public.

See specific section below.

WORKSAFE ACT SECTION 10(1):LIMITATION OF ACTIONS, ELECTION AND SUBROGATION

The provisions of this Part are in lieu of any right and rights of action, statutory or otherwise, founded on a breach of duty of care or any other cause of action, whether that duty or cause of action is imposed by or arises by reason of law or contract, express or implied, to which a worker, dependant or member of the family of the worker is or may be entitled against the employer of the worker, or against any employer within the scope of this Part, or against any worker, in respect of any personal injury, disablement or death arising out of and in the course of employment and no action in respect of it lies. This provision applies only when the action or conduct of the employer, the employer's servant or agent, or the worker, which caused the breach of duty arose out of and in the course of employment within the scope of this Part.

GOOD SAMARITANS ACT

No liability for emergency aid unless gross negligence

1 A person who renders emergency medical services or aid to an ill, injured or unconscious person, at the immediate scene of an accident or emergency that has caused the illness, injury or unconsciousness, is not liable for damages for injury to or death of that person caused by the person's act or omission in rendering the medical services or aid unless that person is grossly negligent.

Exceptions

2 Section 1 does not apply if the person rendering the medical services or aid

(a) is employed expressly for that purpose, or (b) does so with a view to gain.

The first aid attendant's responsibilities for safety are outlined in the first aid section of the company safety manual.

DGS CONSTRUCTION GENERAL SAFETY RULES

The following are the general safety rules that will be adhered to by all employees of DGS Construction. Specific policies, rules, and guidelines are located in the applicable sections of the company safety manual:

- All employees will actively participate and adhere to the policies, rules and guidelines written in the DGS Construction company safety manual.
- Incidents will be reported to the acting DGS Construction supervisor, and the incident will be investigated.
- Employees will not perform work procedures if they are not qualified and inform their supervisor, or manager if they have not been trained in work tasks or equipment operation.
- Alcohol or drugs will not be used or present on any DGS Construction job site or workplace. Working under the influence of drugs or alcohol is prohibited.
- Employees will wear personal protective equipment as specified in the ppe section in the company safety manual.
- Toolbox meetings will be conducted on any jobsite where work will be performed for greater than 1 day.
- Defective tools or equipment will be tagged and taken out of service as outlined in the defective equipment policy.
- Each jobsite will be assessed for safety hazards and documented in the work permits before work begins.
- Fall hazards will be controlled on each jobsite and the control measures will be documented on the work permit.
- Employees will not partake in unsafe work practices or horseplay.
- Employees will refuse unsafe work if they feel the work is unsafe or if the DGS Construction safety policies, rules or guidelines are not being followed.
- All employees will attend and participate in the company safety orientation.
- Electrical hazards will be assessed on each jobsite and controlled.
- Exposure to controlled, biological, combustible and flammable products will be minimized with engineering, administrative and personal protective equipment.
- Employees will receive the applicable training to conduct their work safely.
- Jobsites will be inspected for deficient and proactive elements of safety.
- First aid services and equipment will be available on each jobsite as dictated by the first aid assessment.
- Workers will not work alone, unless following the policy outlined in the working alone policy.

_____

George Rossi July 10, 2014
President
DGS Construction Company Ltd.

PERSONAL PROTECTIVE EQUIPMENT POLICY

The DGS Construction Personal Protective Policy is that **all** employees will wear the applicable personal protective equipment (ppe) as outlined in the company safety manual.

DGS Construction will first consider the use of engineering and administrative controls before depending on ppe to control a hazard.

DGS Construction management will actively review ppe requirements and keep current in ppe advancements to minimize discomfort to employees wearing ppe.

Employees visiting or working on any DGS Construction jobsite are responsible for providing and wearing the following ppe:

- Footwear that meets CSA standard CAN/CSA-Z195-M92, or, ANSI standard Z41-1991 or other standards acceptable under WCB Regulation 8.22(3). Footwear must cover and provide protection above the ankle when on uneven terrain.
- General construction work gloves that protect the entire hand and wrist area. Typically leather gloves provide adequate protection from the most hazards in the construction industry. Special gloves that are required to perform a specific work procedure will be supplied by DGS Construction.
- Clothing that protects the worker from the general hazards in the construction industry. The minimum clothing requirements are a t-shirt with 4" sleeves, pants or coveralls without tears or loose enough to cause snagging, that cover the ankle. The preferred fabric for clothing is cotton. Polyester, nylon or rayon fabrics are not permitted to be worn if working near flames due to high flammability and lack of protection.
- Hardhats that meet the requirements of CSA standard CAN/CSA-Z94.1-92, or ANSI standard Z89.1-1986. The hardhat must have the ability to be equipped with a chin strap.

- Dangling neckwear, bracelets, rings or similar articles are not to be worn if they could become tangled.
- Hazard specific personal protective equipment will be provided by DGS Construction.
- The type of ppe, and when it is required to be worn is outlined in the ppe section of the company safety manual.

_____

George Rossi July 10, 2014
President
DGS Construction Company Ltd.

PERSONAL PROTECTIVE EQUIPMENT RULES

The following are the rules & guidelines for wearing personal protective equipment:

HARDHATS Must meet the requirements of CSA standard CAN/CSA-Z94.1-92, or ANSI standard Z89.1-1986. The hardhat must have the ability to be equipped with a chin strap.
Hardhats will be worn when:

- Travelling up or down a ladder.
- Walking, working, or taking a work break, below upper roofs, decks, or work platforms.
- When any overhead hazard is present, i.e. / crane or hoisting operations.
- When there is a danger if side impacts to or from materials, or equipment.

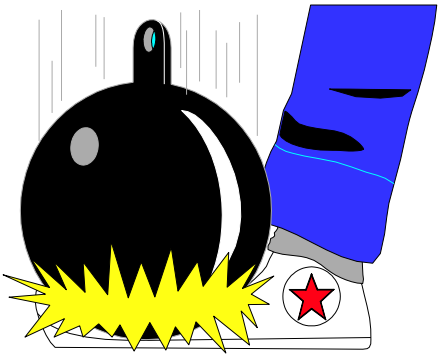
CHINSTRAPS Chinstraps are used to keep a hardhat on an employees head. By using chinstraps when required, employees are protected by wearing the hardhat and ensuring the hardhat doesn't fall into unsafe conditions. DGS Construction will provide chinstraps to employees and they will be fixed to hardhats at all times.

Chinstraps will be used when:

- Working in windy conditions where hardhat rules apply.
- Working at elevations where hardhats could fall onto workers below or fall and create unsafe conditions for other workers.

FOOTWEAR Must meet CSA standard CAN/CSA-Z195-M92, or, ANSI standard Z41-1991 or other standards acceptable under Worksafe BC Regulation 8.22(3).

Footwear must cover and provide protection above the ankle when on uneven terrain. If working in freshly poured concrete, rubber boots with steel shank and toe protection is required.



Footwear meeting the above safety standard will be worn when:

- Walking to and from, or working on any residential, commercial, or industrial construction site.
- loading & unloading materials or equipment on a jobsite or workplace.

WORK GLOVES

General construction work gloves typically made of cowhide are acceptable work gloves for performing most general construction tasks.

CLOTHING Employees will provide and wear clothing that protects the worker from the general hazards in the construction industry. The minimum clothing requirements are a t-shirt with 4" sleeves, pants or coveralls without tears or loose enough to cause snagging and that cover the ankle. The preferred fabric for clothing is cotton.

- Polyester, nylon or rayon fabrics are not permitted to be worn if working near flames due to high flammability and lack of protection.

EYE & FACE PROTECTION Eye protection must meet CSA standard CAN/CSA-Z94.3-92, or ANSI standard Z87.1-1989. Employees are not required to wear eye or face protection at all times, however, it is mandatory to wear eye and / or face protection when there is a hazard to the eyes.

Conditions where **eye protection** is mandatory are:

- Exposure to liquids, when priming, painting, rolling, brushing, or spraying.
- Exposure to flying objects or materials,
- when operating cut-off saws, chain saws, skill saws, reciprocating saws, powder actuated tools, nail guns,
- When drilling into materials overhead or when drilling tasks create flying materials.

HEARING PROTECTION Employees exposed to sound levels of 85dBA or greater are required to wear hearing protection. The hearing protection may be disposable or fitted ear plugs (decidamps), or ear muffs. DGS Construction will provide disposable hearing protection at all times for employees.
A good rule of thumb is if you are exposed to an area where the noise is as loud as or louder than a gas-powered lawnmower, the level is approximately 85dBA and hearing protection is required.

Conditions where wearing hearing protection is mandatory are:

- operating a nail gun, powder actuated gun, grinder, cutoff saw, gas powered chain saw, skill saw, nail gun.

DUST MASKS Dust masks are not required to be worn at all times, however, DGS Construction will have dust masks available for employees at all times, for when an employee wants to wear one. The protection factor of a dust mask is 5, compared to 10 if wearing a half mask respirator or 50 if wearing a full face respirator. Additional information is available in the respiratory protection section of the company safety manual
Dust masks are to be fitted according to the manufacturer's instructions, and the nose bracket must be form fitted to the employee.

Conditions where wearing dust masks is mandatory are:
- When cutting, tearing or disposing of fiberglass insulation.
- When there are nuisance dusts in the air.

RESPIRATORS Respirators are worn to protect employees from hazardous solids, liquids or gases. Half mask respirators provide a protection factor of 10 and full face respirators provide protection factors of 50. Respirators being used will meet the CSA standard CAN/CSA-Z94.4-93. Any employee using a respirator must first be fit tested and trained in respirator use according to the respirator use section of the safety manual.

Conditions where wearing respirators is mandatory are:

- When cutting, grinding or drilling concrete and concrete dust is visible in the employee breathing area.
- When removing or cutting any asbestos containing material
- When using primers, adhesives or other chemicals in confined or enclosed areas. The use of primers, adhesives and cleaners create a hazardous condition, especially when you are in a confined area. Most of the time you are not required to wear a respirator because you are working outside and there is plenty of fresh air, however, this depends on the amount, and type of chemicals you are using.

For more respirator information and fit test requirements see the respiratory protection section of the company safety manual. There are many different types of respirators, cartridges and filters for different conditions and applications.
Supervisors will consult with management if respirators are required to ensure the correct respirator is worn with the correct filter or cartridge and that a proper fit test is conducted.

HIGH VISIBILITY SAFETY VESTS DGS Construction employees are not required to wear high visibility vests at all times on a construction site, however, prime contractors may have site policies that require vests be worn at all times when on their site.

Conditions where employees are required to wear a high visibility vest are:

- When rigging or signaling mobile or stationary cranes.
- When signaling or directing trucks or other mobile equipment.
- When acting as a spotter when debris or material is being thrown off a low level roof, deck, slab or floor level.
- When working at a location where mobile equipment is nearby, such as forklifts, bobcats, vehicles, scissor or boom lifts.
- When it is the prime contractor's site policy.

JEWELRY Employees are not permitted to wear dangling neckwear, bracelets, watches, or similar jewelry that can become snagged or entangled while working. Medical alert bracelets must be worn while working and be secured close to the body.

LEG CHAPS Leg chaps are required to be worn when operating chain saws.

EMPLOYEE CONDUCT POLICIES

EMPLOYEE BEHAVIOR Employees are expected to respect and conduct themselves in a professional manner to fellow employees, other contractors and the public. There may be incidents that trigger hostile language or use physical force. Employees are not permitted to engage in any form of physical or psychological behavior that threatens or demeans another employee, worker or the public.

VIOLENCE IN THE WORKPLACE There are two types of violence that employees may encounter at a workplace, violence between two workers and violence between a worker and the public. Usually the violent behavior either physical or verbal is caused by a misunderstanding, a lack of respect, a lack of pre-planning, or in professionalism.
Employees are prohibited from provoking any form of violent physical or psychological behavior with other workers or the public.
Employees are to take every action available to prevent violence in the workplace, this includes:

- Acting in a professional and respectful manner to diffuse the situation.
- Abstaining from using abusive language, threats or physical force.
- Leaving the area where there is or has potential to be violence.
- Informing the supervisor, superintendent or manager.
- Calling the police.

DISCRIMINATION / HARASSMENT Discrimination or harassment of any form based on race, skin color, gender, religious beliefs, country of origin or other factors is prohibited. Employees are encouraged to report any discriminatory or harassment incidents to management who will keep the information in strict confidence and investigate the issue.

REFUSAL OF UNSAFE WORK The Worksafe act ensures that all employees have the right to refuse unsafe work. If an employee is asked, or told to do work that they have reasonable cause to believe would create an undue hazard to the health & safety of any person, is obligated to refuse doing that work.
DGS Construction expects employees to **refuse unsafe work** if they feel they should.
If an employee wants to refuse unsafe work, the employee will:

- Report the issue to the supervisor, superintendent, or manager, or

The issue will be investigated by management.
If the issue is not resolved after the investigation & corrective action, the employee may contact Worksafe BC by calling 604-276-3100, or be assigned to another task or jobsite.

DISCRIMINATION FOR REFUSAL Employees that refuse unsafe work will not be demoted, nor be dismissed from employment, nor be deducted wages or given any disciplinary action. All refusal of unsafe work incidents will be investigated and kept as confidential as possible.

_____

George Rossi July 10, 2014
President
DGS Construction Company Ltd.

EMPLOYEE WORK ENVIRONMENT

HOUSEKEEPING All employees are responsible for helping keep the jobsite and workplace free of slipping & tripping hazards. Having to work in a messy workplace is aggravating and causes or contributes to incidents. Regular housekeeping duties are part of a regular work day

If you notice materials or scraps in your way, do your co-workers and yourself a favor and clean it up, **don't just complain about it !!**

STORAGE OF MATERIALS / TOOLS / EQUIPMENT Materials, tools or equipment are not permitted to be stored within 6.5' of an unguarded roof or deck edge.
Materials, tools and equipment are to be stored so they do not create tripping, slipping or blocking hazards.
Materials are to be secured from movement due to high winds during and especially after the workday and before leaving the jobsite.
Materials, tools or equipment will not be stored at elevations or locations where they could be easily knocked over.

ARRANGEMENT OF WORK AREAS Work areas will be arranged and planned to ensure:

- Hazards to employees, other workers and the public are minimized.
- There are clear access / egress paths to work areas

WORKING ALONE Employees are not permitted to work alone, unless there is a system of communicating with "another person" in case an employee gets injured or needs rescue assistance.

"Another person" could be a security guard, a building owner, another worker, your supervisor, or public nearby and would hear any calls for assistance.
Employees are permitted to work alone provided:

- They are equipped with a cellular phone and call their supervisor every 2 hours maximum, and when leaving the jobsite, and before ending their work shift.
- The work is within cellular phone range.
- The work is not in a confined space, excavation, over water, or involve working in a high hazard condition.

If the supervisor is not called every 2 hours, the supervisor will call the employee.
If the supervisor is not able to communicate with the employee after 2 hours, it is assumed that the employee is injured and the supervisor is required to travel to the last jobsite they were on.

DRUGS / ALCOHOL An employee that is under the influence of drugs or alcohol is not only a hazard to him/herself, but also to fellow employees, other workers and the public. Each employee has the right to work in a drug & alcohol free environment.

The use of drugs or alcohol on a jobsite or at the workplace is **strictly prohibited.**

A worker with a hang-over from alcohol consumption is still under the influence of alcohol and is prohibited from working.

A worker who comes to work under the influence of drugs or who consumes any drugs or alcohol on the worksite will not be permitted to continue working.

DGS Construction reserves the right to, at its discretion, randomly or because of suspicion, test its employees for the use of drugs through urinalysis. Those known to be in active addiction or in a period of detoxification will be prohibited from working.

SMOKING Smoking at the workplace or jobsite is permitted in **designated areas only**.

RESCUE OF EMPLOYEES

RESCUE OF EMPLOYEE POLICY

Project managers, superintendents, and site supervisors are required to assess each jobsite for rescuing an employee in the event of an accident.
Usually the fire department, ambulance, and first aid services can be obtained with little complications, however, there are projects that compromise the ability to rescue an employee.

The following is a list of projects that require rescue assessments with input from the company safety officer. The assessment and system for rescue will be documented on the site work permit:

- Working in confined spaces.
- Working in excavations.
- Working in fall hazard areas with a fall arrest system (see suspended rescue procedures in the company safety manual)

CONFINED SPACES A confined space is not normally designated or intended for human occupancy. Special precautions are required to protect workers who must enter from flammable or harmful atmospheres, oxygen depletion or enrichment, or situations of possible entrapment. Employees may encounter confined spaces in tankers, silos, storage bins, vessels, sewers, underground utility vaults, boilers, pits, vats, and parkades.

Confined spaces **have the following characteristics**:

- not designated or intended for human occupancy.
- provide limited means of entry and exit.
- have poor natural ventilation with the presence of or the potential for a dangerous atmosphere.
- pose the danger of entrapment.
- require special precautions prior to and during entry, including the means for immediate rescue.

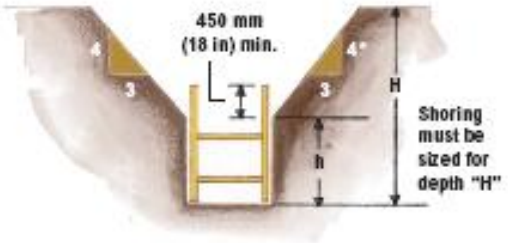
Any DGS Construction employee encountering a confined space **will not enter the area** without informing their supervisor.
DGS Construction supervisors will contact management who will have the area assessed by a **qualified person** before any entrance into the space.
The assessment will determine if the space needs to be ventilated, tested to determine if flammable materials; harmful vapours, gases, mists; and oxygen content are present.

Site specific written confined space entry procedures and permits, will be created and workers will be trained in the procedures, required ppe, ventilation, and rescue procedures **before entering any confined space.**

NO SUPERVISOR OR WORKER IS TO ENTER A WORK AREA IF THEY FEEL IT MAY BE A CONFINED SPACE !!!

EXCAVATIONS Excavations in the construction industry are usually found when concrete forming, or installing drainage materials.
The hazards involved in excavations below grade are:

- Entrapment by sluffing or enclosing excavation walls.
- Exposure to toxic waterproofing primers, adhesives, or liquid membranes.
- Fire hazards from propane build-up or ignition of flammable materials in the excavation.
- Overhead hazards from workers above including falling tools, sparks, cigarettes, materials.



DGS Construction employees are not permitted to enter an excavation that is 4’ or greater below grade unless there is proof that the excavation:

- Is sloped to a 3 horizontal to 4 vertical slope, or shored according to the Worksafe regulations, or
  an engineer has certified that the excavation is safe to enter and there is documentation on site to that fact.
- Has been assessed for other hazards by a DGS Construction supervisor.

FALLING & STRUCK BY OBJECT RULES

Employees working above other workers or the public must always pay special attention to ensuring tools or materials being used or stored do not fall or strike workers or the public:

Always:

- Remove tools and materials from areas that can be accidentally kicked, bumped or pushed off platforms, lift buckets, walls, lifted loads and floors.
- Keep tools or buckets inside boom or scissor lift platforms. Do not wire or hang anything over the outside of the guardrails.
- Ensure toeboards are on floors, slabs, or roofs where materials or tools are stored and can pose a hazard of falling below.

- Secure materials before leaving the jobsite and / or during the day depending on wind conditions.
- Ensure material loads are secured when lifting with rigging or transporting on a vehicle.
- Ensure rigging is done by a qualified rigger that has been trained.
- Ensure rigging is not removed unless the load is level, safe and on a platform.
- Use tool holding devices if the tool could fall onto workers or the public below.
- Ensure nothing is thrown or dropped to areas below unless a spotter is below and has given a clear signal that no person is nearby or will enter the area.
- Lower materials and tools by using a hoist, crane, chute, or pull rope if the freefall distance is greater than 20 feet.

DGS Construction employees will make every effort to minimize the potential for tools, materials, or equipment falling onto fellow employees, other workers, the public or property.

The following methods will be used to minimize the potential of an injury from falling objects:

- Schedule high risk situations for when exposure to the overhead hazard is minimal.
- Employees using hammers, screw drivers, scratch-alls & similar hand tools on the outside face of roof or decks will keep tools dry, in pouches when not being used and take extra caution.

FALL PREVENTION POLICY

DGS Construction employees will use engineering, administrative, and personal protective equipment to protect themselves, fellow employees, and other workers from falls.

Falls are not limited to high elevations, they include:

- Falls through deck, platform or roof openings.
- Falls over deck, platform, or roof edges.
- Falls from ladders, or work platforms.
- Falls over tools, or materials.
- Fall from uneven ground.
- Falls on slippery surfaces.

DGS Construction employees are required to use a guardrails, personal restraint or personal fall arrest systems that meet Worksafe BC regulations when exposed to:

- elevations 10', or more above grade, including scaffolding.
- excavations 10' or greater deep.
- heights less than 10' when there is a risk of injury greater than the risk of injury from the impact on a flat surface.
- working in a scissor lift platform.
- working in a boom lift platform.

DGS Construction management will conduct hazard assessments to determine if the project will involve employees working at elevations 10' or greater above grade and if employees will be working over protrusions.

The assessments will include how employees will be protected from injury when working at elevations 10' or greater above grade and if a fall arrest system is used, how an employee will be rescued after a fall.
The fall hazard assessment will be documented on the fall protection plan. Work is not permitted unless the assessment is completed and documented on the plan, and the plan is on site and available for review.

DGS Construction will provide the education, training, and equipment required to minimize injuries from falling.
It is mandatory that employees follow the Fall Prevention Rules & Guidelines outlined in the company safety manual and report incidents to management.
DGS Construction management will stay current with improved safety procedures, techniques, and equipment to minimize the potential for an employee to fall.
Management welcomes input and ideas from all employees to help minimize the potential for an employee to fall.

_____

George Rossi July 10, 2014
President
DGS Construction Company Ltd.

FALL PREVENTION RULES & GUIDELINES

FALLS FROM NON – ELEVATED SURFACES Fall prevention begins with falls from non-elevated surfaces on floors, decks, platforms, and roofs. Employees will adhere to the following safety rules that will minimize incidents from non-elevated surfaces.

- Employees will wear footwear that is in good condition with laces tied, and free of material build-up that may provide uneven walking surfaces.

- Materials and tools on the ground, slabs, floors and platforms will be stored in designated areas and placed in an orderly manner.
- Clear access and egress areas to ladders and stairs will be maintained.
- Tools and materials will not be stored within 6.5’ of the edge of slabs, floors, or unguarded elevations 10’ or greater above grade.
- Employees will not ride in the back of a truck tailgate area while the of truck is being moved.
- Spills or leaks from primers, adhesives, and / or other liquids will be cleaned up as soon as possible.
- Protrusions through floors, roofs, or decks that create tripping hazards will be removed if possible. If the protrusion can not be removed, it will be painted, or flagged to visually identify the protrusion. This is especially important with protrusions in fall hazard areas.

FALLS THROUGH OPENINGS Employees will adhere to the following safety rules that will minimize incidents from falling or tripping into openings.

- The jobsite will be assessed for opening hazards before the work crew is permitted on the roof or deck. The assessment can be conducted by the estimator, manager, superintendent or site supervisor. It is preferred that the manager, or superintendent assess the hazards of each jobsite with the jobsite supervisor, days prior to bringing the work crew to the site. Roof or deck openings may need to be covered by the prime contractor, therefore, it is best to inform the prime contractor safety personnel or superintendent as soon as possible that the openings need to be adequately covered before the work crew is permitted on the roof or deck.

  - Opening covers will not be removed unless a fall protection system is in place and the supervisor has given the employee permission.
  - Supervisors removing opening covers must first check with the site safety coordinator or prime contractor before doing so.
  - Opening covers if made of plywood will be a minimum of 5/8” plywood.
  - Opening covers if not made of plywood must be capable of holding a minimum of 40lbs/sqft.
  - Insulation will not be used for covering openings.
  - Opening covers will be secured with nails or screws or weight.
  - Skylight glass is not considered to be adequate coverage and must be covered with other materials or warning lines placed at least 6.5’ back from the skylight.

SAFE ACCESS / EGRESS TO ELEVATIONS

The following are rules & guidelines for accessing & egressing elevated work areas:

- Ladders, stairs or ramps are required if an employee needs to access a work area that is ≥ 4' above floors, decks, other roofs, or work platforms.
- Ladders will be a grade 1 ladder with a minimum capacity of 300 lbs.
- Employees will wear hardhats when climbing ladders.
- Ramps or stairs must be stable and equipped with handrails if ≥ 4' in height.
- Ramps will be equipped with cleats to minimize slipping down the ramp.
- Employees will not use scaffold or stairways that are not equipped with handrails.
- Scaffold frames will not be used for access or egress. Climbing scaffolding will only be permitted if a scaffold frame ladder is used.
- Employees waiting to climb down ladders from an unguarded elevation 10' or greater above grade, will wait at least 6.5' back from the ladder in the safe area.
- Fixed permanent ladders will not be used if any part of the ladder has been disconnected, or the ladder is defective.

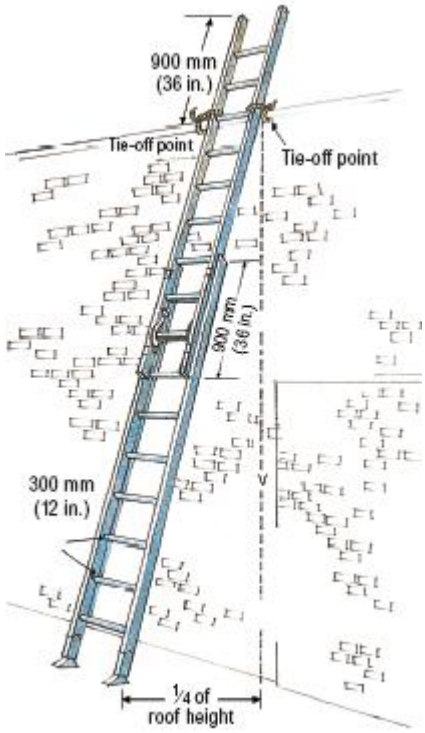
LADDER INSPECTIONS All employees will inspect any ladder before climbing it. Ladder deficiencies are to be brought to the supervisor's attention for further inspection. Ladder inspections include:

- Cracks or bent side rails or rungs
- Turning rungs
- Worn aluminum at the sides of rungs or side rails from incorrect transport
- Missing slip feet
- Extension locking mechanisms are working and locked.
- Cross braces and locking braces are not damaged and working properly.

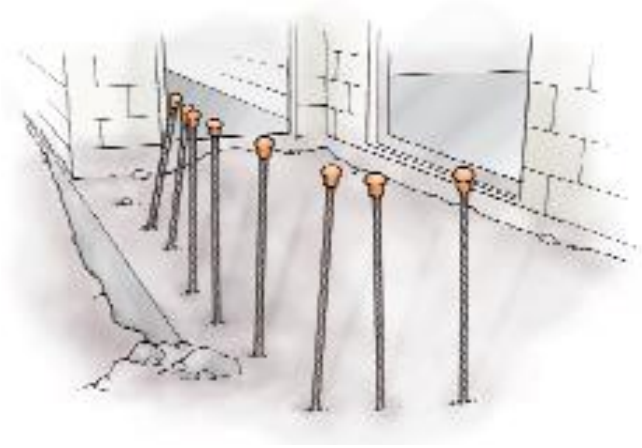
LADDER LOCATION The supervisor will conduct a hazard assessment to determine the safest location for the ladder set up. The assessment will include the following considerations:

- Will a ladder provide safe access, should the site have stairs.
- Can a ladder be set-up with the proper height and 4:1 ratio.
- Can the top and bottom of the ladder be secured.
- Is there something to secured the top of the ladder.
- Will the bottom and top of the ladder be free of obstructions.
- Will the ladder be on a tarp or other slippery surface.
- Is there a safe landing when getting off the ladder.
- Is the ladder within 13’ of a perpendicular edge.
- Is the ladder near high or low voltage lines.

EXTENSION LADDER SET-UP Ladders will be erected:



- With the side rails extending a minimum of 36” above the roof or deck parapet wall, floor, slab, or platform.
- At a 4:1 ratio or 72°, or according to the manufacturer instructions.
- There will be no ropes or other obstructions between the siderails.
- With the lower ends of ladder side rails resting on a firm and level base, i.e./ no resting on bricks, short 2 x 4’s, pallets. The upper part of the side rails will rest on a bearing surface of ample strength to support the loads.
- A maximum length of 20’ for stepladders
  - 30’ for single ladders
  - 48’ for extension ladders (two sections)
  - 66’ for extension ladders (more than two sections)
- With a minimum extension overlap of 3’ for ladders ≤ 36’
  - 4’ for ladders 36’ – 48’
  - 5’ for ladders 48’ – 66’



DO NOT ERECT LADDERS OVER EXPOSED REBAR ENDS UNLESS THE ENDS ARE COVERED WITH LUMBER OR TIRES,
NOT WITH PLASTIC CAPS
THEY ARE NOT ADEQUATE PROTECTION FOR ELEVATED WORKERS

SECURING LADDERS: Ladders are required to be secured in a manner that does not permitted the ladder to move laterally or pull away from the building. The procedure of an employee holding a ladder when another employee climbs the ladder, is limited to the initial ladder set up.

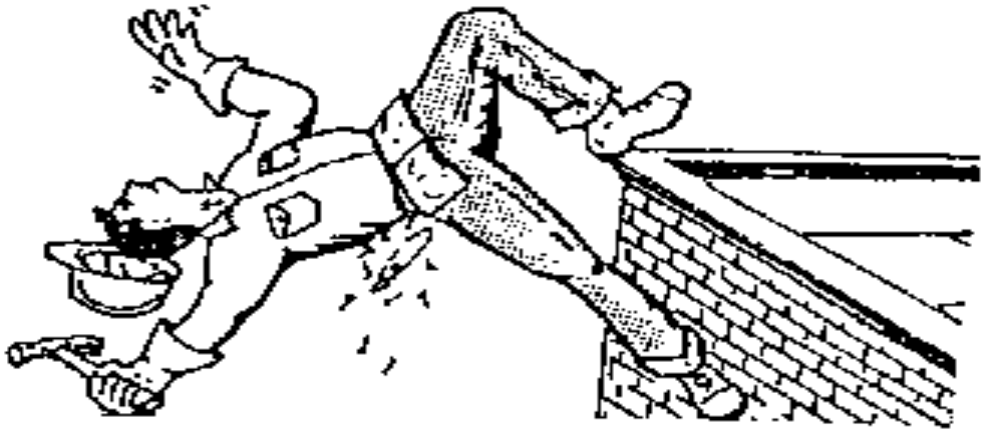
LADDER USE: When employees climb ladders the following rules & guidelines will be adhered to:

- Employees will climb ladders using at minimum 3 point contact.
- Employees are not permitted to carry heavy or bulky tools or materials on ladders if they interfere with safe ladder climbing.
- Only one person is permitted to use a ladder at one time.
- Step ladders will not be used as work platform bearers, unless specified by the manufacturer.
- Employees will not work off the top 2 rungs or paint shelves of step ladders.
- Employees can work at elevations ≥ 10’ above grade off a ladder without using a personal fall arrest system provided that:
    - The employee has 3 point contact with the ladder at all times.
    - The type of work is short duration.
    - The ladder is secured.
    - The employee is able to keep his / her body between the ladder side rails.
- Metal ladders or wire rope reinforced wooden ladders, will not be used in proximity to energized electrical equipment.

FALL PREVENTION FROM ELEVATIONS

FALL PROTECTION SYSTEM REQUIREMENT: DGS Construction employees are required to use a fall protection system that meets Worksafe BC regulations when exposed to:

- elevations 10', or more above grade, including scaffolding.
- excavations 10' or greater deep.
- heights less than 10' when there is a risk of injury greater than the risk of injury from the impact on a flat surface.
- working in a scissor lift platform.
- working in a boom lift platform.



FALL PROTECTION CHOICES The type of fall protection system used must be based on determining the safest system to the least safe system, not the "easiest", or "fastest" system. Projects may incorporate a number of different systems throughout the changing phases of the job.

Worksafe BC regulations specify that guardrail systems be considered first.
If it is not practicable to use guardrails, then a personal restraint system should be used, if a personal restraint system is not practicable, then fall arrest system should be used, and if it is not practicable to use a fall arrest system, then work procedures that are acceptable to the Worksafe BC can be used.

The following are the fall protection system choices:

- **Guardrails** – Can be used on any flat or sloped platform, slab, or floor provided the slope is not 8 vertical to 18 horizontal slope or greater.
- **Personal Fall Restraint** – Can be used on any project with any slope.
- **Personal Fall Arrest -** Can be used on any project with any slope.
- **Work procedures acceptable to Worksafe BC** - Can only be used with prior permission from Worksafe BC.

FALL HAZARD ASSESSMENT The DGS Construction supervisor will conduct a fall hazard assessment for each project where employees will be exposed to fall hazards of 10' or greater, or at heights less than 10' when there is a risk of injury greater than the risk of injury from the impact on a flat surface.

The assessment will include the fall protection system that the supervisor has determined will provide effective fall protection for the employee.
In determining which fall protection system will be used, the following factors will be considered:

- **The height of the working level** – Will employees be working where a fall of 10' or more could occur. Are there hazards in respect to a risk of injury greater than the risk of injury from the impact on a flat surface.
- **Slope of the deck** – Is it flat, slope, or steep. Different slopes require different systems.
- **Type of building** – is it a tilt-up, wood frame, steel skeleton, concrete.
- **Edge detail** – Is there a high or low parapet or cantstrip edge.
- **Deck type**- What type of deck is it? Can anchors or guardrails be installed?
- **Administration** - number of employees required to work at the edge.
- **Anchorage** – are there previously installed or temporary anchors available, how many.
- **Type of anchorage** – fall arrest or fall restraint capabilities.

HAZARD ASSESSMENTS & DOCUMENTATION DGS Construction fall hazard assessments will be documented on the **Pre-crew Hazard Assessment form or the Fall protection plan** located in appendix A of the company safety manual.

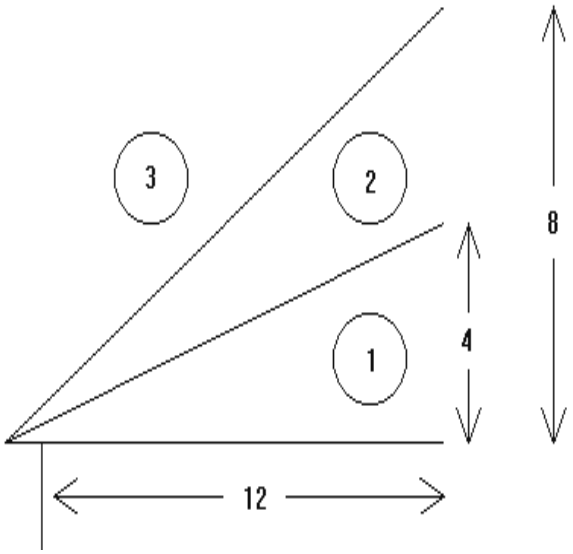
DGS Construction management and supervisor are responsible for working together to coordinate, plan and assess the jobsite for hazards. It is the supervisor's responsibility to ensure a site specific hazard assessment was conducted, documented on the fall protection plan and available on site before beginning production work.
The fall protection plan is a written document that proves a hazard assessment was done, and is a legal requirement of Worksafe BC.
The plans and must be kept in good condition, legible, up to date, on site, provided to the prime contractor and kept on file after the project is completed.

The intent of the permit is to ensure the following:
- Supervisors and management have recognized the site hazards and made arrangements to control them.
- Supervisors delegating responsibilities to employees are documented and workers are aware of their responsibilities.
- Employees are aware of fall hazard locations and know which system(s) will be used .
- Employees know what personal protective equipment, and other safety devices need to be worn.
- Fall protection equipment will be inspected and documented daily during pre-shift inspections.
- Hazards other than fall protection (electrical, burns, exposures, etc) have been recognized and controlled.
- A first aid assessment has been conducted and the equipment, facility, and services are available.
- Meet compliance with Worksafe BC requirements.

FALL PROTECTION USING LIFTS: Employees will use personal fall restraint and arrest systems when in the platform of a boom type lift platform. This includes being on the platform at any height. Shock absorbing lanyards will be used, connected to the correct anchor location of the lift. Connecting lanyards to the guardrail is prohibited.

Employees using scissor lifts will be protected from falls by using the guardrails provided on the scissor lifts. The guardrails will be inspected prior to use and the rear chains or safety bar on the lift must be connected before raising the lift.
If an employee need to work above the scissor lift guardrail protection, a fall arrest system will be used.

TYPES OF FALL PROTECTION SYSTEMS AVAILABLE ACCORDING TO SLOPE:



1) Roof Sloped ≤ 4:12 (≤ 18.4°)
- Guardrails (G)
- Personal Fall Restraint (FR)
- Fall Arrest (FA)
- Control zones with or without warning lines (CZ)
- Safety monitor system (SM)

2) Roof Sloped > 4:12 < 8:12 (> 18.4° < 33.7°)
- Guardrails (G)
- Personal Fall Restraint (FR)
- Fall Arrest (FA)

3) Roof Sloped > 8:12 (> 33.7°)
- Personal Fall Restraint with Toe-Holds (FR/TH)
- Personal Fall Restraint with Hook Ladders (FR/HL)
- Fall Arrest (FA)

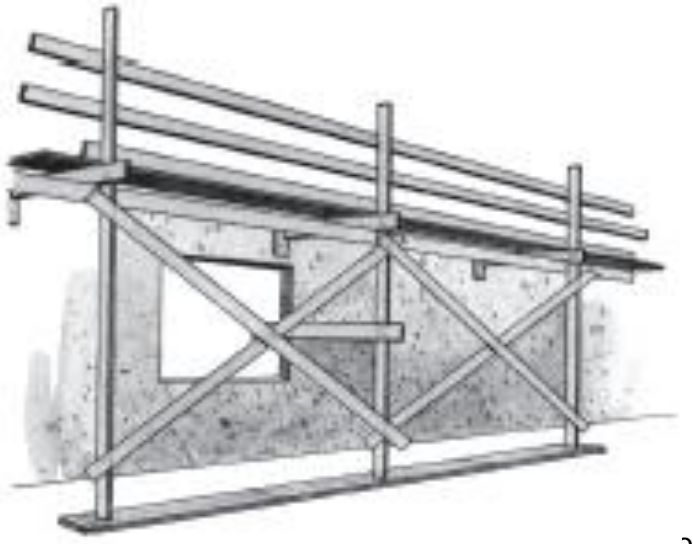
When a DGS Construction employee is required to work on elevations 10’ or more above grade that has a slope of 4 vertical to 12 horizontal or less one or more of the following fall protection systems will be used:

1. Guardrail systems (restraint system)
2. Personal restraint systems
3. Fall arrest systems
4. Work procedures including the safety monitor system, use of control zone systems and the warning line system.

WHEN FALL PROTECTION IS REQUIRED ON FLAT SURFACES Employees that need to work within 13' of any unguarded fall hazard area will use personal restraint or arrest systems. If the site supervisor has determined the fall hazard assessment that personal restraint or arrest systems are not practicable, then at least a warning line is required to be erected to define the control zone which is a minimum of 6.5' wide.

FALL PROTECTION SYSTEM DEFINITIONS & GUIDELINES

GUARD: *"guard"* means a protective barrier around an opening in a floor or along the open sides of stairs or a ramp, landing, balcony, mezzanine, raised walkway or any other area to prevent a fall to a lower level, or inadvertent entry into a dangerous area;



GUARDRAIL: means a guard consisting of a top rail 102 cm to 112 cm (40 in to 44 in) above the work surface, and an intermediate rail located approximately midway between the underside of the top rail and the top of the toeboard, if one is provided, or the work surface if no toeboard is provided. Guardrails are a type of a fall restraint system.

G employees feet with no splicing of 2x4's together.
T top rail, midrails are installed at approx 22" and a toeboard is not necessary if parapet wall is present or tools and materials can not be pushed over the edge.
The maximum span between uprights is 8' unless it is an engineered system. The guardrails will be inspected daily for deficiencies, strength, knots, and splits. There is no requirement for a suspended employee rescue plan when guardrails are used.

FALL RESTRAINT : means a work positioning system to prevent a worker from falling from a work position, or a travel restriction system such as guardrails or a personal fall restraint system (FR) to prevent a worker from traveling to an edge from which the worker could fall.

PERSONAL FALL RESTRAINT SYSTEMS: consists of a worker wearing a safety belt, or full body harness with a lanyard connected to the D-ring, then to an anchor point, or the lanyard can be connected to a ropegrab device, which connects to a lifeline, then to an anchor point.

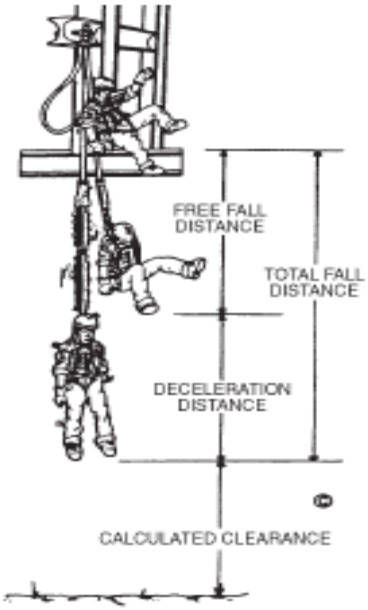
- The system must be arranged so that a worker can get to the fall hazard area edge, **but not be able to go off the edge**.
- Use a CSA or ANSI certified safety belt or full body harness and lanyard.
- Harness or belt must fit snug, comfortable, and according to the manufacturer instructions.
- Minimum anchor ultimate strength is 800 lbs applied in lifeline direction.
- Lifeline breaking strength is minimum 6000lbs and protected from chaffing & abrasion at sharp corners and edges.
- Inspect all equipment including anchorage before each work shift, and store equipment correctly.
- Arrange system so a worker vertical drop is minimized and in no case greater than 1' (30 cm).
- Swing fall must be minimized from the anchor point.
- There is no requirement for a suspended employee rescue plan when restraint systems are used.

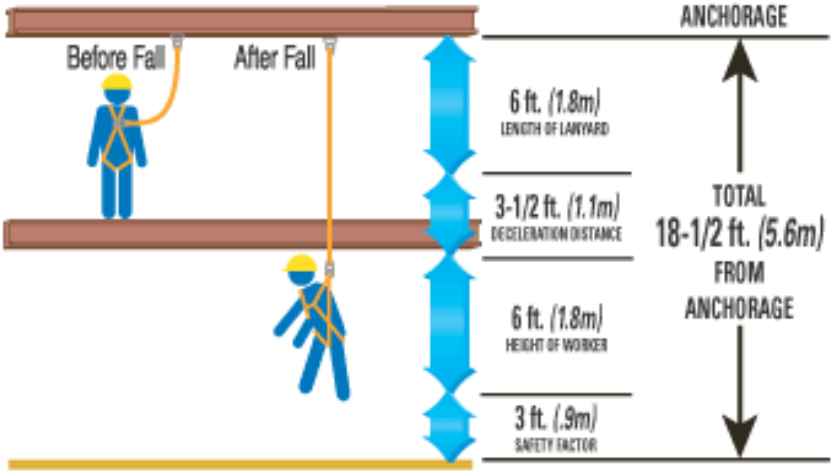
FALL ARREST: protects the worker after a fall has occurred by **stopping the worker before hitting the surface below**. The fall arrest (FA) system consists of a worker wearing a full body harness with a lanyard connected to the D-ring, then to an anchor point, or the lanyard can be connected to a ropegrab device, which connects to a lifeline, then to an anchor point.

- The system must be arranged to limit free fall of the worker according to the equipment manufacturer's instructions.
- Use a CSA or ANSI certified full body harness and lanyard.
- The Harness must fit snug, comfortable, and according to the manufacturer's instructions.
- Minimum anchor ultimate strength is 5000 lbs applied in the lifeline direction, or two times the maximum arrest force (see anchor requirements)
- Lifeline breaking strength is minimum 6000lbs and protected from chaffing & abrasion at sharp corners and edges.
- Inspect all equipment including anchorage before each work shift, and store equipment correctly.
- Shock absorbing are recommended but not mandatory unless wire cable lanyards or lifelines are used, or when the anchor strength is less than 5000 lbs (see anchor requirements)
- A suspended worker rescue plan is needed as a worker can fall and be suspended for long periods of time before being rescued.

MAXIMUM ARREST FORCE The maximum force exerted on a fall arrest system from a 310lb 6' free fall. Equipment standards require energy absorbing devices such as retractable lines and shock absorbers to have a maximum arrest force of 900 lbs.

TOTAL FALL DISTANCE: the distance from the point where the employee would start a fall to the point where the fall would be arrested or stopped. The total fall distance is important to consider, especially if shock absorbing lanyards are used, as, the employee could hit the surface below before the fall arrest system stops the fall. Site supervisors will determine the total fall distance with consideration to all equipment before permitting an employee to use an arrest system.





FALL ARREST FREE-FALL Fall arrest free-fall is the distance the employee has dropped, before the arrest system starts to decelerate the fall.
Free-fall limits are to be minimized at all times, by taking off any slack in the arrest system. The manufacturer of fall arrest systems designates the maximum free-fall limits, most of the time the maximum free fall is 6'.

SWING-FALL HAZARD Swing fall hazards are the hazards of swinging and colliding with an obstruction or the ground following a fall by a worker that was using a fall arrest system.

Swing fall hazards can be avoided by proper placement and connection to anchorage. Employees attaching to anchors will limit the amount of swing fall hazards by connecting to anchors situated behind or above the employee, not to anchorage positioned to the far left or right of the work area.

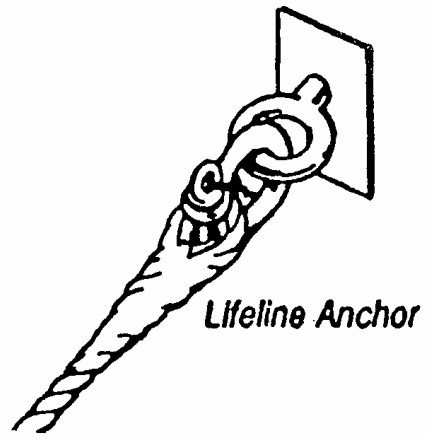
WARNING LINE FALL PROTECTION Employees may erect or work near warning lines. The lines may have been erected by the prime contractor, or other contractor to warn workers of potential fall hazards. Warning lines are required to be erected at least 6.5' (2 meteres) back from fall hazard areas.

Employees that cross a warning line are required to use a fall protection system including guardrails, personal restraint of fall arrest systems. The DGS Construction supervisor is required to determine the fall protection system to be used and complete a fall protection plan before employees are permitted to cross a warning line.

FALL PREVENTION EQUIPMENT

ANCHORAGE: Is a secure point of attachment for lifelines or lanyards that are required to withstand personal fall restraint and arrest forces.

FALL ARREST ANCHORAGE Fall arrest anchorage will be designed and capable of an ultimate strength of at least 5000 lbs, or two times the maximum arrest force, applied in any direction required to resist a fall.



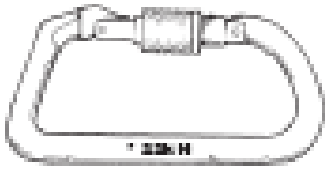
If anchorage can provide two times the max arrest force (2 x 900 lbs) or 1800 lbs, a fall arrest system can be used, provided the fall arrest system incorporates a retractable lifeline, or shock absorber.

Fall arrest anchorage can be temporally installed or a permanent system, and where permanent, must be certified by a professional engineer.

STRENGTH OF ANCHORAGE In determining if onsite anchorage is adequate for supporting the required anchorage strength, the supervisor will:

- Ask the prime contractor site superintendent for anchor instructions, plans, or drawings.
- Ask the prime contractors site safety officer.
- Insert an anchor that has instructions and strength information.
- Use experience, judgement and qualifications to determine the strength.

CARABINER: Is a metal snap link used to connect various components of a personal fall protection or horizontal life line system. D-clips are a type of carabiner. Carabiners must have an ultimate strength of at least 5000 lbs, this must be marked on the carabiner. A self locking gate must be on the carabiner to prevent accidental opening. Aluminium carabiners are not permitted.



HORIZONTAL LIFELINE: A rail, wire rope or synthetic cable that is installed in a horizontal plane between two anchors and used for attachment of a worker's lanyard or life line while permitting the worker to move horizontally. Any horizontal lifeline system **must be an engineered system** and inspected by the supervisor before use.

LANYARD: A flexible line of webbing, rope or cable used to secure a safety belt or full body harness to an anchor or to connect your harness or belt to a rope grab device which is then connected to a lifeline. Ensure the lanyard has locking snap links and is in good working condition.

LANYARDS WITH SHOCK ABSORBERS: A device whose function is to dissipate energy and limit deceleration forces which are put on the body during fall arrest. i.e./ shock absorbers work like a bungee cord. Shock absorbing lanyards are not mandatory unless you are connected to a wire cable choker, when specified in a horizontal lifeline application, or if a fall arrest system is required and the anchorage will not provide an ultimate strength of 5000 lbs. Shock absorbing lanyards have a maximum arrest force of 900 lbs.

ROPE GRAB DEVICE: Rope grab devices are designed to lock onto the lifeline when force is applied to the lanyard connection point. Ensure your rope grab arrow is pointing upwards towards the anchor or it will not work properly. Ensure all the locks on the ropegrab device can be locked.

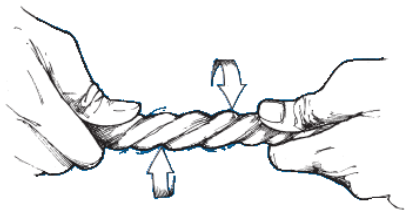
SAFETY BELT: a body support component comprised of a strap with a means for securing it about the waist and for attaching it to other components. **USED FOR TRAVEL RESTRAINT ONLY.**

FULL BODY HARNESS: A configuration of connected straps to distribute a fall arresting force over at the thigh, shoulders and pelvis, with provisions for attaching a lanyard lifeline or the components.

Full body harnesses will be worn when you are using a personal fall arrest system. You must ensure you know how to properly put on and adjust a harness.
The lanyard must always be connected to the back D-ring if you are using a fall arrest system. You are permitted to connect your lanyard to the side or front D-rings in a restraint system.
Daily inspections are required on full body harnesses and defective harness components will be taken out of service.

WEARING A FULL BODY HARNESS Employees using fall arrest systems will wear a full body harness that fits them properly. There are many sizes of harnesses and to have a harness that does not fit properly does not do any good, as the harness will not operate properly when arresting a fall.
Workers are to ensure all leg, shoulder and chest straps are adjusted properly.
The harness donning instructions come with every harness and are available from your safety officer.
If additional training is required on how to properly wear a harness, advise your supervisor or safety officer.

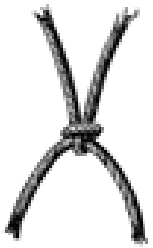
LIFELINE A line or rope connected to an anchor with a locking snap hook, or double figure 8 loop knot used for attachment of an employees lanyard, safety belt, full body harness, or other device.



Lifelines will:

- have a minimum breaking strength of 6000lbs and inspected on a daily basis for defects.
- be independently secured to anchorage with the required strength.
- be suitably padded at points of attachment and elsewhere to protect against chafing or abrasion caused by contact with sharp edges, i.e./ sharp metal corners.
- free of knots or splices except at the termination of the line or a limiter knot at the dead end.
- Have thimbles in lifeline termination snap links to protect lifelines from chafing at points of connection to eyes, rings and snaps.
- Be used by one employee unless the line is part of a horizontal lifeline system.

KNOTS The following are 3 ways employees are permitted to connect vertical lifelines to anchorage.



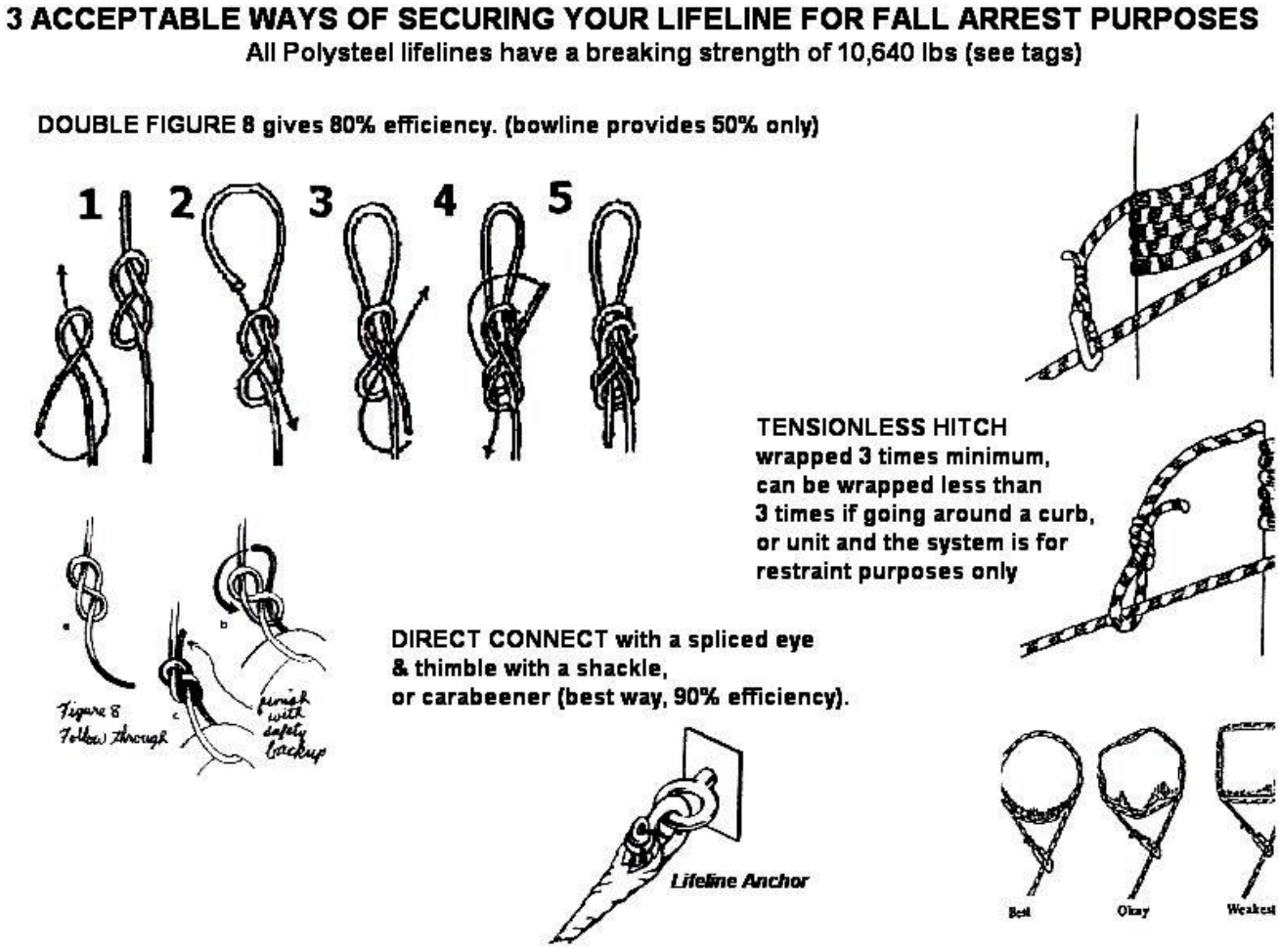
- A direct connect to the anchorage with a locking snap hook is preferred.
- The double figure 8 loop is used if a locking snap hook is not available on the lifeline.
- A tensionless hitch if connecting to a column or similar anchorage.

KNOT TESTING AND LIFELINES Knots weaken the breaking strengths of lifelines sometimes by as much as 50%, this is why the only knot that should be on a lifeline will be at the anchor. The objective of tying a knot in a fall arrest system is to tie the knot without weakening your fall arrest system below 5000lbs.

Tests have proven that a bowline knot can reduce the breaking strength of a life line by 50%, the double figure 8 knot can reduce the breaking strength of a lifeline by only 25%, this is why the figure 8 knot will be used.
Tests have shown that a spliced eye lifeline with a D-clip can reduce a lifeline by 10%, this would be the best system to use, however, not all lifelines will have a spliced eye.

Another acceptable method of tying off a lifeline is to wrap the lifeline around a column minimum of 3 times and tying a regular knot to prevent the hitch from coming undone. This is known as a tensionless hitch (see following diagram). It is the wraps that put tension on the column and create a good tie.

ACCEPTABLE LIFELINE KNOTS



A limiter knot is permitted on the dead end of the lifeline. The dead end is considered to be the part of the lifeline that is not being used, usually past the rope grab device.

INSPECTION & STORAGE OF FALL PROTECTION EQUIPMENT

INSPECTION OF FALL PROTECTION EQUIPMENT

DGS Construction employees using fall protection equipment are required to:

- Conduct pre-shift personal fall protection equipment inspections on a daily basis before use. This includes harnesses, lanyards, rope grab devices, lifelines and anchorage.
- Inform the supervisor if defective parts or materials are observed during the pre-shift equipment inspection.
- Not use fall protection equipment that has been subjected to fall arrest forces.
- Remove defective or suspected defective fall protection equipment out of service and inform the supervisor.

HOW TO INSPECT WEBBING ON A BELT, HARNESS OR LANYARD

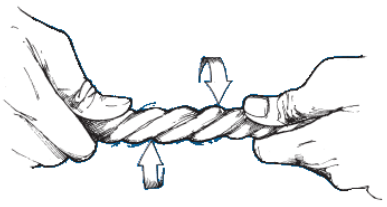
Inspect the entire surface of webbing for damage. Beginning at one end, bend the webbing in an inverted "U." Holding the body side of the belt toward you, grasp the belt with your hands six to eight inches apart.
Watch for frayed edges, broken fibers, pulled stitches, cuts or chemical damage. Broken webbing strands generally appear as tufts on the webbing surface.
Replace according to manufacturers' guidelines.
Inspect for cut fibers or damaged stitches inch by inch by flexing the strap in an inverted "U." Note cuts, frayed areas or corrosion damage.
Check friction buckle for slippage and sharp buckle edges.
Replace when tongue buckle holes are excessively worn or elongated.

HOW TO INSPECT A BUCKLE

Inspect for loose, distorted or broken grommets. Do not cut or punch additional holes in waist strap or strength members.
Check belt without grommets for torn or elongated holes that could cause the buckle tongue to slip.
Inspect the buckle for distortion and sharp edges. The outer and center bars must be straight. Carefully check corners and attachment points of the center bar. They should overlap the buckle frame and move freely back and forth in their sockets. The roller should turn freely on the frame.
Check that rivets are tight and cannot be moved. The body side of the rivet base and outside rivet burr should be flat against the material. Make sure the rivets are not bent.
Inspect for pitted or cracked rivets that show signs of chemical corrosion.

HOW TO INSPECT A LIFELINE

Rotate the rope lanyard and inspect from end to end for fuzzy, worn, broken, burnt or cut fibers. Weakened areas have noticeable changes in the original rope diameter.



Replace when the rope diameter is not uniform throughout, following a short break-in period.
The older a rope is and the more use it gets, the more important testing and inspection become.

HOW TO INSPECT HARDWARE Inspect hardware for cracks or other defects. Replace the belt if the "D" ring does not move vertically independent of the body pad or "D" saddle.
Inspect tool loops and belt sewing for broken or stretched loops.
Check bag rings and knife snaps to see that they are secure and working properly.
Check tool loop rivets. Check for thread separation or rotting, both inside and outside the body pad belt.
Inspect snaps for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should be seated into the snap nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to close the keeper firmly.

HOW TO CLEAN AND STORE EQUIPMENT Basic care prolongs the life of the unit and contributes to its performance.
Wipe off all surface dirt with a sponge dampened in plain water. Rinse the sponge and squeeze it dry.
Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back and forth motion.
Rinse the webbing in clean water.
Wipe the belt dry with a clean cloth. Hang freely to dry.
Dry the belt and other equipment away from direct heat, and out of long periods of sunlight. Store in a clean, dry area, free of fumes, sunlight or corrosive materials and in such a way that it does not warp or distort the belt.

ANNUAL FALL PROTECTION EQUIPMENT INSPECTION RECORD

The annual inspection will be conducted by a qualified person in reference to equipment manufacturer instructions.

DATE OF INSPECTION:_____ INSPECTED BY:_____

Legend: √ = Device is good X = Defective equipment

Name	Lifeline	Lanyard	Harness	Ropegrab	Carabineer

NOTES:_____

SUSPENDED EMPLOYEE RESCUE PLAN

A suspended worker rescue plan is required anytime a fall arrest system is used.

The objective is to have a plan to rescue an employee that has fallen and is suspended from a lifeline, and can not perform a self rescue as soon as possible.

Employees suspended by harnesses can loose blood circulation due to constricting harness webbing and become unconscious if rescue is not performed in a timely manner.

Employees using fall arrest systems will be equipped with suspension trauma straps.

Pre-planning the possibility of a rescue is required and the system to be used will be documented on the site work permit.

If the crew is working on a construction site, the prime contractor's "qualified safety person" should have a system and procedure for rescuing suspended workers. The system may include using evacuation boxes if cranes are on site.

The supervisor will check with the prime contractors "qualified safety person" to determine if the site has a rescue of suspended worker plan.

Other systems that may be available for rescue are using:

- Ladders that could be erected below the suspended worker.
- Scissor or boom lifts operated by qualified workers.
- Pulling the suspended worker up or laterally into or onto the building. Site supervisors must consider the hazards and practicability of cutting through walls or exposing other workers to fall hazards to rescues a suspended worker.
- The local fire department high angle rescue team for rescue, however, the fire department must be contacted previously. Fire department rescue teams are required to perform a rescue assessment and provide a contract of agreement that ensures the fire department can and will be able to provide rescue.

APPLICABLE WORKSAFE BC REGULATIONS

Work Area Guards and Handrails

4.54 Definitions

"guard" means a protective barrier around an opening in a floor or along the open sides of stairs or a ramp, landing, balcony, mezzanine, raised walkway or any other area to prevent a fall to a lower level, or inadvertent entry into a dangerous area;

"guardrail" means a guard consisting of a top rail 102 cm to 112 cm (40 in to 44 in) above the work surface, and an intermediate rail located approximately midway between the underside of the top rail and the top of the toeboard, if one is provided, or the work surface if no toeboard is provided.

4.58 Specifications for guards and guardrails

(1) Guards in a building must be appropriate for the use and occupancy of the area.
(2) Guards in areas not part of a building must meet the applicable criteria of subsections (3) to (5), or other standard acceptable to the Board.
(3) Unless otherwise permitted by subsection (4), guardrails must be installed to withstand a load applied horizontally and normal to the span of the rail, of 550 N (125 lbs) applied at any point along the rail, and a vertical, downward load of 1.5 kN per m (100 lbs per ft) along the top rail, but the horizontal and vertical loads need not be considered to act simultaneously.
(4) Guardrails temporarily installed during the construction, demolition or renovation of a work area must
(a) be able to withstand a load of 550 N (125 lbs) applied perpendicular to the span in a horizontal or vertically downward direction at any point on the top rail, or be built to the criteria of subsection (5), and
(b) not be made of fibre or wire rope without the prior approval of the Board.
(5) Unless designed by a professional engineer, temporary wooden guardrails on floors and platforms must meet the following criteria:
(a) posts must be spaced not more than 2.4 m (8 ft) apart, except a scaffold may have posts spaced not more than 3 m (10 ft) apart;
(b) wooden top rails must be at least 38 mm x 89 mm (2 in x 4 in nominal) lumber for a span of up to 2.4 m between supports, and at least 38 mm x 140 mm (2 in x 6 in nominal) lumber for a span of 2.4 m to 3 m between supports;
(c) wooden midrails must be 19 mm x 140 mm (1 in x 6 in nominal) or 38 mm x 89 mm (2 in x 4 in nominal) lumber;
(d) wooden rails must be secured to the tops or inner sides of their vertical supports;
(e) wooden guardrail posts must be at least 38 mm x 89 mm (2 in x 4 in nominal) lumber, and must be installed with the narrow dimension facing the open edge;
(f) plastic or wire mesh fencing of adequate strength may be used in place of the midrail, but posts and top rails must comply with the requirements of this section and such fencing must be secured in place

11.1 Definitions

"anchor" means a secure point of attachment for a lifeline or lanyard;
"fall arrest system" means a system that will stop a worker's fall before the worker hits the surface below;
"fall protection system" means
(a) a fall restraint system,
(b) a fall arrest system, or
(c) work procedures that are acceptable to the Board and minimize the risk of injury to a worker from a fall;
"fall restraint system" means a system to prevent a worker from falling from a work position, or from traveling to an unguarded edge from which the worker could fall;
"full body harness" means a body support device consisting of connected straps designed to distribute the force resulting from a fall over at least the thigh, shoulders and pelvis, with provision for attaching a lanyard, lifeline or other components;
"horizontal lifeline system" means a system composed of a synthetic or wire rope, installed horizontally between 2 anchors, to which a worker attaches a personal fall protection system;
"lanyard" means a flexible line of webbing, or synthetic or wire rope, that is used to secure a safety belt or full body harness to a lifeline or anchor;
"lifeline" means a synthetic or wire rope, rigged from one or more anchors, to which a worker's lanyard or other part of a personal fall protection system is attached;
"personal fall protection system" means a worker’s fall restraint system or fall arrest system composed of
(a) a safety belt or full body harness, and
(b) a lanyard, lifeline and any other connecting equipment individual to the worker
that is used to secure the worker to an individual point of anchorage or to a horizontal lifeline system;
"safety belt" means a body support device consisting of a strap with a means for securing it about the waist and attaching it to other components;

11.2 Obligation to use fall protection

(1) Unless elsewhere provided for in this Regulation, an employer must ensure that a fall protection system is used when work is being done at a place
(a) from which a fall of 3 m (10 ft) or more may occur, or
(b) where a fall from a height of less than 3 m involves a risk of injury greater than the risk of injury from the impact on a flat surface.
(2) The employer must ensure that guardrails meeting the requirements of Part 4 (General Conditions) or other similar means of fall restraint are used when practicable.
(3) If subsection (2) is not practicable, the employer must ensure that another fall restraint system is used.
(4) If subsection (3) is not practicable, the employer must ensure that a fall arrest system is used.
(5) If the use of a fall arrest system is not practicable, or will result in a hazard greater than if the system was not used, the employer must ensure that work procedures are followed that are acceptable to the Board and minimize the risk of injury to a worker from a fall.
(6) Before a worker is allowed into an area where a risk of falling exists, the employer must ensure that the worker is instructed in the fall protection system for the area and the procedures to be followed.
(7) A worker must use the fall protection system provided by the employer.

11.3 Fall protection plan
(1) The employer must have a written fall protection plan for a workplace if
(a) work is being done at a location where workers are not protected by permanent guardrails, and from which a fall of 7.5 m (25 ft) or more may occur, or
(b) section 11.2(5) applies.
(2) The fall protection plan must be available at the workplace before work with a risk of falling begins.

11.4 Selection of harness or belt
(1) A worker must wear a full body harness or other harness acceptable to the Board when using a personal fall protection system for fall arrest.
(2) A worker must wear a safety belt, a full body harness or other harness acceptable to the Board when using a personal fall protection system for fall restraint.

11.5 Equipment standards
Equipment used for a fall protection system must
(a) consist of compatible and suitable components,
(b) be sufficient to support the fall restraint or arrest forces, and
(c) meet, and be used in accordance with, an applicable CSA or ANSI standard in effect when the equipment was manufactured, subject to any modification or upgrading considered necessary by the Board.

11.6 Anchors
(1) In a temporary fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, 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 vertical lifeline used for fall arrest must be secured to an independent point of anchorage.
(3) In a fall arrest system or permanent fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, must have an ultimate load capacity in any direction required to resist a fall of at least
(a) 22 kN (5 000 lbs), or
(b) two times the maximum arrest force.

11.7 Temporary horizontal lifelines
A temporary horizontal lifeline system may be used if the system is
(a) manufactured for commercial distribution and installed and used in accordance with the written instructions and drawings from the manufacturer or authorized agent, and the instructions and drawings are readily available in the workplace,
(b) installed and used in accordance with written instructions and drawings certified by a professional engineer, and the instructions and drawings are readily available in the workplace, or
(c) designed, installed and used in a manner acceptable to the Board.

11.8 Certification by engineer

The following types of equipment and systems, and their installation, must be certified by a professional engineer:
(a) permanent anchors,
(b) anchors with multiple attachment points,
(c) permanent horizontal lifeline systems, and
(d) support structures for safety nets.

11.9 Inspection and maintenance

Equipment used in a fall protection system must be:
(a) inspected by a qualified person before use on each work shift,
(b) kept free from substances and conditions that could contribute to its deterioration, and
(c) maintained in good working order.

11.10 Removal from service

After a fall protection system has arrested the fall of a worker, it must:
(a) be removed from service, and
(b) not be returned to service until it has been inspected and recertified as safe for use by the manufacturer or its authorized agent, or by a professional engineer.

APPLICABLE WCB FALL PROTECTION GUIDELINES

G11.2-2 Selecting a method of fall protection

Sections 11.2(2) to (5) of the *OHS Regulation* state:

(2) The employer must ensure that guardrails meeting the requirements of Part 4 (General Conditions) or other similar means of fall restraint are used when practicable.

(3) If subsection (2) is not practicable, the employer must ensure that another fall restraint system is used.

(4) If subsection (3) is not practicable, the employer must ensure that a fall arrest system is used.

(5) If the use of a fall arrest system is not practicable, or will result in a hazard greater than if the system was not used, the employer must ensure that work procedures are followed that are acceptable to the Board and minimize the risk of injury to a worker from a fall.

Section 11.2 of the *OHS Regulation* prescribes a hierarchy of choices in subsections (2) to (5). This guideline explains the hierarchy of choices and gives examples of how the circumstances of the workplace affect the selection of fall protection.

The employer must use "guardrails . . . or other similar means of fall restraint" under subsection (2) if it is practicable for the work process. If it is not practicable, the employer can use another fall restraint system under subsection (3). However, the employer cannot use a fall arrest system under subsection (4) unless it is impracticable to use any fall restraint system under subsections (2) and (3). Only if it is impracticable to use a fall restraint or arrest system under subsections (2) to (4) or if the use of a fall arrest system will result in greater hazards is the employer permitted under subsection (5) to use work procedures alone to minimize the risk of injury to a worker from a fall.

The selection of a method for fall protection under section 11.2 depends on what is practicable. Employers are expected to make reasonable assessments and use good judgment in making this decision. What is practicable depends on the circumstances of each workplace and is a matter of assessment and judgment.

The following examples cover some typical situations:

- Guardrails will generally be considered practicable in work areas where numerous workers are working at or near the edges of elevated floors and roofs on buildings or structures under construction.
- Where a roof is under repair, it may not be practicable to install guardrails because of such factors as the small number of workers involved and the short duration of the job. In this situation, it will generally be practicable to use a fall restraint system that consists of a belt or harness and a lifeline connected to a suitable anchor and rigged to prevent the worker from going beyond the unguarded edge(s).
- When a worker needs to be on or near the top plate of a wood frame structure to facilitate part of the erection process, such as to position and fasten joists or trusses to the plate, fall protection is required if the fall distance will be 3 meters (10 feet) or more. Generally this condition will exist along the outer side of the perimeter walls. It will normally be practicable to erect guardrails along the outer side of the wall, or to work from a single pole scaffold (with guardrails if necessary) from either side of the wall, or to use another method of fall restraint or arrest.
- It may be necessary to remove a guardrail to accommodate work. If so, under s. 4.58(1) of the *OHS Regulation*, only that portion of the guardrail necessary to allow the work to be done may be removed. Workers exposed to a fall hazard must be protected by another fall protection system when the guardrail is absent. The guardrail should be replaced when the unguarded area is left unattended, and after the work is completed if the circumstances still require guardrails.

 If guardrails currently exist, an employer cannot tear them down and substitute another form of fall protection, such as a safety monitor and control zone system, simply because it will make the work easier. The fact that guardrails currently exist suggests that it is practicable to use that form of fall protection (see s. 4.58(1) of the *OHS Regulation*).
 A fall arrest system will likely be practicable where there is no sizable work platform (for example, on a bridge girder) or where it would not be cost-effective to build platforms on which guardrails or other fall restraint systems could be used because the work is of short duration and uses relatively few workers.

Some provisions outside of Part 11 of the *OHS Regulation* that require fall protection in particular areas limit the range of choices that might otherwise exist. Notably section 13.33 of Part 13, (Ladders, Scaffolds and Temporary Work Platforms) contains specific requirements for fall protection.

G11.2-3 Defining a fall restraint versus fall arrest system

Sections 11.2(3) to (4) of the *OHS Regulation* state:

(3) If subsection (2) is not practicable, the employer must ensure that another fall restraint system is used.

(4) If subsection (3) is not practicable, the employer must ensure that a fall arrest system is used.

When assessing the requirement for personal fall protection where there is a relatively short potential fall distance, it is sometimes unclear if situation should be treated as fall restraint or fall arrest. This guideline clarifies the difference between a fall restraint and a fall arrest system.

Fall restraint

Fall restraint normally means a fall protection system arranged such that a worker cannot fall lower than the surface on which the worker was supported before the fall started. For example, a personal fall restraint system for a worker on an elevated flat surface would be arranged so the worker could go up to the edge of the work surface, but not beyond the edge in the event of a slip or fall. The system, in the event of a slip or fall, would result in the worker landing on the work surface, and perhaps very close to going over the edge. Other work positioning arrangements, such as a firefighter secured to an aerial ladder, or a tree trimmer or power line technician using a climbing belt and pole strap, will normally result in the worker going through some vertical drop in the event of a slip. To allow their fall protection to be considered as fall restraint, their equipment should be arranged to limit the vertical drop as much as possible, and in no case, should the total fall distance be more than 30 centimeters (1 foot).

A fall restraint system should only be used where a worker likely can regain footing or otherwise self-rescue immediately after a slip or fall. Fall protection equipment and components that are intended only for fall restraint applications should be clearly and permanently marked to indicate such a limitation.

Fall arrest

If the equipment cannot be arranged to limit the vertical drop to 30 cm, then the personal fall protection system should be a fall arrest type, and the system will need to address the additional requirements for fall arrest. For example, section 11.4(1) of the *OHS Regulation* requires workers to wear a full body harness or other harness acceptable to the Board when using a personal fall protection system for fall arrest. Further, the anchor the worker is connected to must meet the requirements of section 11.6(3) of the *OHS Regulation*.

G11.2-4 Tilt-up construction

Sections 11.2(2) to (4) of the *OHS Regulation* state:

(2) The employer must ensure that guardrails meeting the requirements of Part 4 (General Conditions) or other similar means of fall restraint are used when practicable.

(3) If subsection (2) is not practicable, the employer must ensure that another fall restraint system is used.

(4) If subsection (3) is not practicable, the employer must ensure that a fall arrest system is used.

Section 4.58(4)(b) of the *OHS Regulation* states:

(4) Guardrails temporarily installed during the construction, demolition or renovation of a work area must

(b) not be made of fibre or wire rope without the prior approval of the Board.

This guideline describes acceptable solutions for fall protection at tilt-up construction sites. It provides alternatives for obtaining prior approval under section 4.58 for converting a perimeter horizontal lifeline into a rope guardrail system.

Once the roof deck is in place, a perimeter horizontal lifeline may be converted into a rope guardrail system by adding a suitable rope at mid rail level. A Board officer may grant prior approval, required by section 4.58(4)(b) of the *OHS Regulation*, without a formal written application being submitted, if the employer meets all of the following requirements:

- The horizontal lifeline meets the requirements of sections 11.7 (see OHS Guidelines G11.7 and G11.8), or a variance request must be submitted to the Board.
- Wire ropes for the top and mid rail are no less than 10 millimeters (3/8 inch) diameter, and synthetic fibre ropes are no less than 16 millimeters (5/8 inch) diameter.
- Posts supporting the top and mid ropes are spaced so that the rope deflection is no more than 30 centimeters (12 inches) under a load of 900 N (200 pounds), and posts are rigged back from an open edge so that the rope will not deflect beyond the edge of the building.
- The top rope is taut so that under its own weight, it is at a height of 102 to 112 centimeters (40 to 44 inches) above the work surface. (Where a wall or parapet is in place along the open edge, the height may be measured with reference to a point anywhere between the work surface and the top of the wall, to the top of the top rope.)
- Flagging is provided in the form of high-visibility coloured markers, attached to the top rail at intervals of 3 meters (10 feet). (If the top wire rope serves as a horizontal lifeline as well as the top rail of a guardrail, and flagging would interfere with the travel of snap hooks along the line, then flagging may be attached to the mid rail instead of the top rail.)

The officer will record granting the approval in the "inspection text" part of the inspection report. If the above conditions are not met but the employer still wishes to seek Board approval, the *Workers Compensation Act* and/or the *Occupational Health and Safety Regulation* require the employer to submit a formal application for a "prior approval" or variance, as appropriate, to the Board.

If used, horizontal lifelines along the top edge of tilt up walls should be positioned so they do not impede walking along the top edge of the wall. Hence, posts that result in a line location offset to one side of the wall are best suited. If the lifeline will subsequently be used as part of a guardrail system, the offset should be to the inside of the building, so that a 30 centimeter (12 inch) setback from the open edge is achieved.

Note: While it may be permissible to use a horizontal lifeline system as the basis for a wire or fibre rope guardrail system, if modified according to the criteria in this guideline, it is not the case that a system designed as a rope guardrail can readily be converted and used for the purposes of a horizontal lifeline. The strength requirements for rope guardrail systems are far lower than those of horizontal lifelines.

G11.2(5)-3 Other acceptable work procedures

If the use of a fall arrest system is not practicable, or will result in a hazard greater than if the system was not used, the employer must ensure that work procedures are followed that are acceptable to the Board and minimize the risk of injury to a worker from a fall

This guideline provides examples of typical situations where work procedures (other than control zones and safety monitors) may be used and defines some acceptable work procedures under section 11.2(5) to minimize the risk of injury to a worker from a fall.

- Installation or removal of fall protection equipment (first person up/last person down rule).
- Light duty work for short duration. For example:

- Working off of a portable ladder doing a "light duty task," such as inspection or painting, where the ladder will be at any one spot for sporadic, short-term work. Here are some examples of sporadic short-term work: inspection of exterior vents, gutters, and window seals; caulking; touch-up painting; and maintenance-type work (such as changing light bulbs). While doing the task, the worker should keep his/her centre of gravity (worker's waist) between the side rails of the ladder, and should generally have one hand available to hold on to the ladder or other support to maintain three points of contact. The ladder is not to be positioned near an edge or floor opening that would significantly increase the potential fall distance. (Note that if the work on a ladder is likely to exceed 15 minutes at one spot, some form of fall restraint or fall arrest protection should be used.)
- Roof inspection or estimating, provided the worker minimizes exposure to any unguarded edge as much as possible and provided other factors such as environmental conditions (e.g., wind or ice), roof slope, and surface finish do not present an undue hazard.
- Brief transfers between fall protection systems where the worker is protected by having a three-point stance (two feet placed firmly on a suitable supporting surface along with one hand supporting the worker, while the other hand is used to transfer a connection from one fall protection system to another).

- Work requiring constant re-positioning. For example, during the primary connection of skeletal structures, workers employed in the initial placement of skeletal members requiring climbing and walking on the bare structure may, depending on the particulars of the work to be done, be covered by section 11.2(5). Trades with activities of this nature typically include scaffold erectors, tower erectors, blowpipe ventilation erectors, structural steel erectors, and tower crane erectors. Workers on the structure engaged in welding, bolt installation, other fitting out work, and climbing or walking on skeletal members should be able to use the fall protection methods referred to in sections 11.2(2), (3), and (4).
- Workers on roofs engaged in a process that may damage lifelines. For example, workers doing roofing tar work (such as hot bitumen application on flat roofs), may have to work under the protection of work procedures under section 11.2(5), such as control zones and the safety monitor system.
- Use of the normal fall protection methods results in greater hazard. For example, in emergencies such as the correction of an unsafe condition or in firefighting -- see section 31.17(4).

If work procedures are used under section 11.2(5), section 11.3 requires there be a written fall protection plan for the work site.

G11.3 Fall protection plan

Section 11.3 of the *OHS Regulation* states:

(1) The employer must have a written fall protection plan for a workplace if

(a) work is being done at a location where workers are not protected by permanent guardrails, and from which a fall of 7.5 m (25 ft) or more may occur, or

(b) section 11.2(5) applies.

(2) The fall protection plan must be available at the workplace before work with a risk of falling begins.

This guideline outlines what is expected in a written fall protection plan. The plan should specify:

- The fall hazards expected in each work area
- The fall protection system or systems to be used in each area
- The procedures to assemble, maintain, inspect, use, and disassemble the fall protection system or systems
- The procedures for rescue of a worker who has fallen and is suspended by a personal fall protection system or safety net, but is unable to self-rescue

In certain locations and situations, the employer may meet the need for rescue procedures by participating in the Industrial High Angle Rope Rescue Program discussed in OHS Guideline G4.13(3).

Where a fall protection plan may not be required by the *OHS Regulation*, the employer must still consider the need for rescue or evacuation under section 4.13.

G11.4 Belts and harnesses

Issued January 1, 2005

Section 11.4(1) of the *OHS Regulation* states:

(1) A worker must wear a full body harness or other harness acceptable to the Board when using a personal fall protection system for fall arrest.

Belts should not be used as body support in a fall arrest system due to the possibility of death or injury from the following causes:

(a) slipping out of a belt;

(b) abdominal injuries;

(c) back injuries; or

(d) effects on the body of extended static suspension in a belt

For additional reference see *An Introduction to Personal Fall Protection Equipment Safety Belts, Harnesses, Lanyards, and Lifelines*, located at www.WorkSafebc.com.

G11.5-1 Equipment standards

Issued January 1, 2005

Section 11.5 of the *OHS Regulation* states:

Equipment used for the fall protection system must

(a) consist of compatible and suitable components

(b) be sufficient to support the fall restraint or arrest forces, and

(c) meet, and be used in accordance with, an applicable CSA or ANSI standard in effect when the equipment was manufactured, subject to any modification or upgrading considered necessary by the Board.

The following is a table of some standards that apply for fall protection equipment now commonly in use.

Fall Protection Equipment Standards

Standard Agency	Standard Number	Standard Title
ANSI	*A10.11*	*Construction and Demolition Operations - Personnel and Debris Nets*
ANSI	*A14.3*	*American National Standard for Ladders - Fixed - Safety Requirements*
ANSI	*Z359.1*	*Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components*
CSA	*CAN/CSA Z259.10*	*Full Body Harnesses*
CSA	*CAN/CSA Z259.11*	*Shock Absorbers for Personal Fall Arrest Systems*
CSA	*CAN/CSA-Z259.1*	*Safety Belts and Lanyards*
CSA	*Z259.2.1*	*Fall Arresters, Vertical Lifelines, and Rails*
CSA	*Z259.2.2*	*Self-Retracting Devices for Personal Fall-Arrest Systems*
CSA	*Z259.2.3*	*Descent Control Devices*
CSA	*Z259.12*	*Connecting Components for Personal Fall Arrest Systems (PFAS)*

Under section 4.4 of the *OHS Regulation*, the Board can also recognize standards other than *CSA* or *ANSI*.

Types of equipment that do not have applicable standards still must meet the requirements of sections 11.5(a) and (b).

G11.5-2 Equipment standards - Vertical lifelines

Section 11.5 of the *OHS Regulation* states in part:

Equipment used for the fall protection system must

(a) consist of compatible and suitable components,

(b) be sufficient to support the fall restraint or arrest forces . . .

This guideline sets out some factors to be considered in determining whether vertical lifelines consist of suitable and compatible components and are sufficient to support fall arrest forces that may be imposed.

- Only one worker is to be attached to the lifeline, unless the vertical lifeline is part of a ladder safety device.
- The lifeline is to have a breaking strength specified by the manufacturer of at least 27 kN (6,000 pounds).
- The lifeline is to be free of knots or splices except at its termination. A termination knot or splice should not reduce the breaking strength of the lifeline to less than 22 kN (5,000 pounds).
- The lifeline is to be installed and used in a manner that minimizes the swing-fall hazard.
- A vertical lifeline is to extend to within 1.2 meters (4 feet) of ground level or other safe lower surface to which the worker might descend or fall. The intent is to ensure that a worker on a suspended stage, such as a swing stage or boatswain's chair, can be secured to a lifeline through the full range of travel of the staging unit.

Note: In some circumstances it is not practicable or safe for the lifeline to extend to within 1.2 meters of the lower landing spot. For example, if a stage is rigged over an underground parking entrance and the lower end of the rope were to come within 1.2 meters of the roadway, there would be a danger of the rope being caught by a vehicle, unless the use of the access was blocked. Blocking the access may not be practicable, in which case some means to terminate the lifeline rope at a safe distance above the danger area should be used. The stage should also be rigged to prevent it from being lowered into a zone where traffic could be a danger to the stage. A means to rescue workers also needs to be preplanned; and

- The suspended length of a vertical lifeline should not to exceed 91 meters (300 feet).

G11.5-3 Equipment standards - Lanyards

Section 11.5 of the *OHS Regulation* states in part:

Equipment used for the fall protection system must

(a) consist of compatible and suitable components,

(b) be sufficient to support the fall restraint or arrest forces . . .

This guideline describes use of shock absorbers as a component of a fall protection system and management of fall arrest where shock absorbers are not used.

A shock absorber is to be used with:

- A lanyard made of wire rope or other inelastic material in a fall arrest system
- A wire rope vertical lifeline unless the lifeline is part of a ladder safety device

When a shock absorber is used in a fall arrest system, allowance should be made for the potential increase in the total fall distance. If a shock absorber is used, a free fall of up to 2 meters (6.5 feet) is allowed, or the limit specified in the manufacturer's instructions, whichever is less.

If a synthetic fibre lanyard is used without a shock absorber, the fall arrest system should be arranged to limit the free fall of a worker to 1.2 meters (4 feet).

G11.5-6 Equipment standards - Connecting equipment

Section 11.5 of the *OHS Regulation* states in part:

Equipment used for the fall protection system must

(a) consist of compatible and suitable components,

(b) be sufficient to support the fall restraint or arrest forces . . .

The following factors are to be considered when assessing the suitability of connecting equipment under sections 11.5(a) and (b):

- A snap hook on a lanyard or lifeline is to be self-locking.
- When in use, a carabiner or similar connecting hardware is to be secured to prevent inadvertent opening.
- Carabiners, links, and rings are to have an ultimate load capacity of at least 22 kN (5,000 pounds) and are to be clearly marked with their load capacity and with a means of identifying the manufacturer.

G11.5-7 Protection against abrasion or burning

Section 11.5 of the *OHS Regulation* states in part:

Equipment used for the fall protection system must

(a) consist of compatible and suitable components,

(b) be sufficient to support the fall restraint or arrest forces . . .

This guideline explains the need to prevent components of fall protection systems from abrasion or burning in order for them to remain capable of supporting fall restraint or fall arrest forces.

A vertical lifeline, lanyard, or safety strap should be effectively protected at points of attachment and elsewhere, as necessary, to prevent chafing or abrasion caused by contact with sharp or rough edges.

When a tool is used that could sever, abrade, or burn a lifeline, lanyard, or safety strap, the lifeline, lanyard, or safety strap should be made of wire rope.

A worker working near an energized conductor or in another work area where a conductive lifeline, lanyard, or safety strap cannot be used safely need not use equipment of this type provided that two nonconductive lanyards or safety straps are used, or another effective means of fall protection is used.

G11.6-1 Anchors

Section 11.6 of the *OHS Regulation* states:

(1) In a temporary fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, must have an ultimate load capacity in any direction in which a load may be applied of at least

(a) 3.5kN (800 lbs), or

(b) four times the weight of the worker to be connected to the system.

(2) Each vertical lifeline used for fall arrest must be secured to an independent point of anchorage.

(3) In a fall arrest system or permanent fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, must have an ultimate load capacity in any direction required to resist a fall of at least

(a) 22 kN (5 000 lbs), or

(b) two times the maximum arrest force.

This guideline provides additional information for selecting anchors that are acceptable under section 11.6.

The *OHS Regulation* defines an anchor as "a secure point of attachment for a lifeline or lanyard".

Types of anchors under this definition include:

1. a device that has been purposefully manufactured and installed as an anchor to support a personal fall protection system and

2. a substantial structure, such as a beam, column or similar substantial portion of the structure, selected as a point of anchorage where no dedicated anchor device is available. These *points of anchorage* generally require some supplemental rigging, such as a sling, to allow the anchorage connector of a personal fall protection system to connect to the anchorage.

Natural anchors, such as large well-rooted trees or rock outcroppings can be acceptable points of anchorage as well if deemed by a qualified person to be able to withstand the forces that may be imposed by the fall protection system.

The actual strength of an anchor is dependent on:

- The design of the anchor
- The orientation of the anchor relative to the direction of loading
- The condition of the anchor
- The connection of the anchor to the supporting structure
- The adequacy of the structure to resist the imposed loading

If an employer proposes to use an anchor with an ultimate load capacity of less than 22 kN (5,000 pounds), the employer will need to be able to demonstrate that the anchor has an ultimate load capacity of two times the maximum arrest force (MAF) at the particular location.
In some cases, and especially on complex fall protection systems, a professional engineer will design the system and calculate the expected MAF. The Board considers the upper limit of acceptable MAF to be 8kN (1800 lbs).

By using other methods to reduce the arrest forces in conjunction with the anchor, the employer may not need to obtain engineering advice. At work locations where that expertise is not readily available, the employer may choose to use a manufactured product that indicates on the label and within the product instructions what the MAF will be in the circumstances in which it is used. Shock absorbers are an effective way to reduce and control the MAF that can occur in the event of a fall. In the absence of advice from a professional engineer, a shock absorber should be included in a fall arrest system when connecting to an anchor that has a load capacity of less than 22 kN but is designed to resist two times the maximum arrest force.

Standard *CAN/CSA-Z259.11-M92, Shock Absorbers for Personal Fall Arrest Systems*, requires that that a shock absorber must limit the maximum arrest force to 4.0 kN (900 pounds) when at room temperature and dry.

As the calculation of the MAF in any situation can be complex and dependent to some degree on the particular circumstances of the place where the equipment is used, simply using such a product may not suffice. A person selecting an energy absorber is to consider his or her weight, atmospheric conditions, and fall distance in order to make the correct choice. Additional detail is available in the new *CSA Standard Z259.16-04 Design of Active Fall-protection Systems*.
A temporary anchor should be removed upon completion of the work for which it was intended.

G11.6-2 Anchor selection and use
Section 11.6 of the *OHS Regulation* states:
(1) In a temporary fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, 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 vertical lifeline used for fall arrest must be secured to an independent point of anchorage.
(3) In a fall arrest system or permanent fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, must have an ultimate load capacity in any direction required to resist a fall of at least
(a) 22 kN (5 000 lbs), or
(b) two times the maximum arrest force.
The following are guidelines for good practice with respect to anchor design, layout selection, and use:
 A permanent anchor should be made of stainless steel, hot dipped galvanized steel, or other corrosion-resistant material having similar structural properties.
 An anchor should be located so a lifeline attached to it is not deflected over a guardrail or other part of the structure which has insufficient strength to support the maximum potential load from a fall arrest. Note also OHS Guideline G11.5-7 on protecting the line from abrasion.
 An anchor in concrete should be cast in place or through-bolted with a backing plate for adequate load distribution.

 An anchor mounted on concrete with drilled in fasteners (expansion or adhesive type) should use a group of at least three fasteners supporting an anchor plate, sized and arranged so that if any one fastener in the group is assumed to be carrying no load, the remaining fasteners will have a design capacity to carry the full design load of the anchor.

 An anchor should be located on a line perpendicular to the building edge at the drop location to eliminate the swing fall hazard. Where this is not practicable, an anchor may be offset so the angle between the line perpendicular to the building edge at the drop location and the suspension line or lifeline is no greater than 22 degrees. The distance from the perpendicular line to the anchor should be less than 3 meters (10 feet), as shown in Figure 1 below. As an alternative, the line may be deflected using a Prusik sling, provided the sling is made and used as outlined in OHS Guideline G11.5-4.

 A temporary anchor for fall arrest may be established by wrapping a wire or synthetic fibre rope around the base of a rooftop penthouse. If the rope is installed so the sling angle at the point of attachment is not in excess of 120 degrees, rope with a rated breaking strength at least equal to that of the lifeline may be used. This is illustrated in Figure 2 below. If the sling angle is in excess of 120 degrees, wire rope of sufficient strength to provide an anchor capability, for the installed sling angle, of at least 22 kN (5,000 pounds), should be used. Only one fall arrest lifeline may be attached to each such independent rope wrap.

 If a lifeline is anchored to a parapet clamp on the parapet on the far side of the roof from the drop location, it may not be practicable to tie back the parapet clamp as required by section 13.10. In such cases, the lifeline may be secured to a second anchor using a Prusik sling.

A fall protection anchor that is acceptable is designed, installed, and maintained in accordance with the applicable requirements of *CAN/CSA Z271-98, Safety Code for Suspended Elevating Platforms* and *CSA Z91-02, Health and Safety Code for Suspended Equipment Operations*. Please refer to *WCB Standard WPL2, Design, Construction and Use of Crane Supported Work Platforms, 2004*, for standards on design of lifeline anchors for personal fall protection systems for workers on platforms suspended from a crane or attached to a crane boom.

Figure 1 (Plan View)

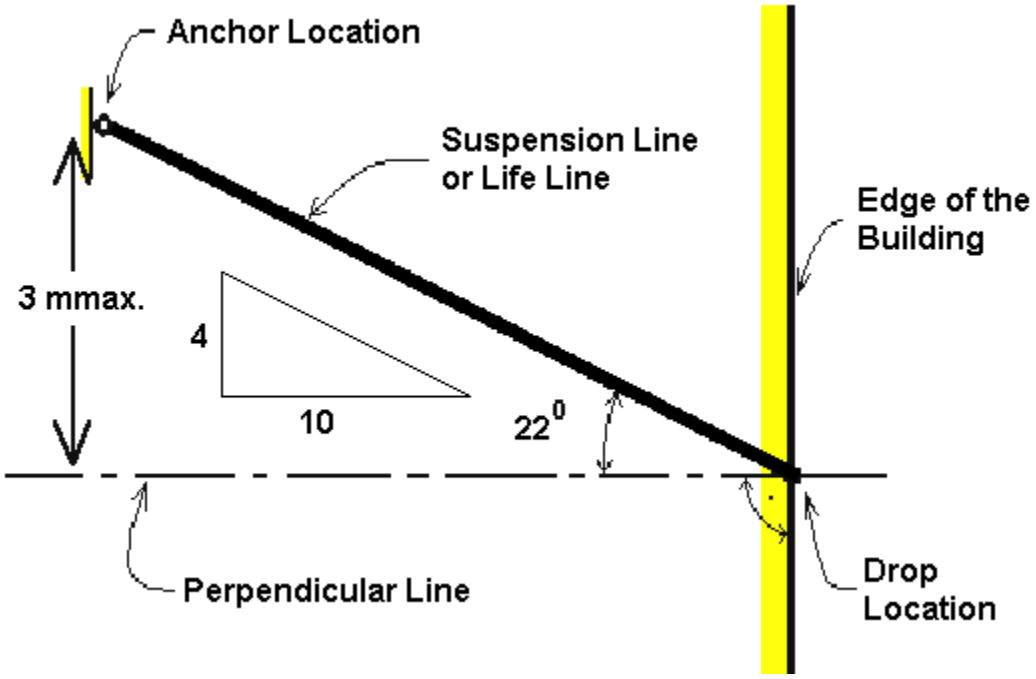
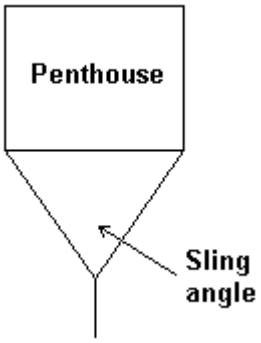


Figure 2 (Plan View)



G11.6-3 Anchors - Cornice hook and parapet clamp use

Section 11.6 of the *OHS Regulation* states:

(1) In a temporary fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, 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 vertical lifeline used for fall arrest must be secured to an independent point of anchorage.

(3) In a fall arrest system or permanent fall restraint system, an anchor for a vertical lifeline, or for a lanyard used without a lifeline, must have an ultimate load capacity in any direction required to resist a fall of at least

(a) 22 kN (5 000 lbs), or

(b) two times the maximum arrest force.

A cornice hook is a device that functions as a portable or temporary anchor for a suspension line. A parapet clamp is a device that functions as a portable or temporary anchor for a suspension line, lifeline or tieback line. As such, each hook or clamp should be designed for a minimum ultimate load of 5000 pounds. Generally the suspension rigging for each end of a swing stage or portable powered platform has a safe working load of no less than 1000 pounds. A factor of safety of 4 for ductile materials and 5 for brittle materials should be used, based on the breaking strength of the material.

A cornice hook should be installed so that the load from the suspended equipment acts in a vertically downward direction. A cornice hook should not be used as a lifeline or equipment tieback anchor.

A parapet clamp may be used where the load of the suspended equipment acts either vertically down (such as the suspension line for a swing stage), or horizontally (such as for a suspension rope deflected over the edge of a roof and anchored to a clamp on the opposite edge of the roof). If a parapet clamp is used to anchor a lifeline, or an equipment tieback line, a minimum ultimate strength of 5000 pounds is required for the parapet clamp and parapet as a system, in the direction which the lifeline or tieback will apply load. The design of a parapet clamp should anticipate usage for loads acting either downward or horizontally, and the instructions for its use should be clear on the allowable load configurations for the unit.

A cornice hook or parapet clamp can only function effectively as an anchor if it is positioned on a part of the building or structure that is structurally able to support the loads the clamp or hook will apply. If the parapet supporting a parapet clamp or cornice hook is made from cast-in-place concrete or from substantial precast elements, generally structural adequacy is no problem. If the parapet supporting parapet clamps or cornice hooks is made from masonry wall or brick, or light wood framing finished with stucco, the load from the clamp or hook should be distributed through the use of adequate blocking. A 2x8 plank at least 4 feet long should be secured horizontally to the inside face of the parapet so the load from the hook or clamp is distributed over a length of the parapet. If a parapet is deteriorated, cracked, or shows other evidence of structural weakness, it should not be used for supporting parapet clamps or cornice hooks.

G11.7 Temporary horizontal lifelines

Section 11.7 of the *OHS Regulation* states:

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

(a) manufactured for commercial distribution and installed and used in accordance with the written instructions and drawings from the manufacturer or authorized agent, and the instructions and drawings are readily available in the workplace,

(b) installed and used in accordance with written instructions and drawings certified by a professional engineer, and the instructions and drawings are readily available in the workplace, or

(c) designed, installed and used in a manner acceptable to the Board.

This guideline describes an acceptable temporary horizontal lifeline system.

Under section 11.7(a) if there are any written instructions and drawings from the manufacturer or authorized agent, the written instructions and drawings need to be readily available. Likewise, under 11.7(b), if there are any written instructions and drawings certified by a professional engineer, the drawings must be readily available. For the purpose of section 11.7(c), a temporary horizontal lifeline system for fall restraint is acceptable if it provides an ultimate load capacity of at least 3.5 kN (800 pounds) for each worker connected to it. "Ultimate load capacity" is determined with the design loads applied perpendicular to the span of the line and at critical locations for sizing the components.

A temporary horizontal lifeline system used for fall arrest is acceptable under section 11.7(c) if it meets the following requirements:

- The horizontal lifeline is a minimum 12 millimeters (1/2 inch) diameter wire rope having a breaking strength specified by the manufacturer of at least 89 kN (20,000 pounds).
- The horizontal lifeline is free of splices except at the terminations.
- Connecting hardware such as shackles and turnbuckles has an ultimate load capacity of at least 71 kN (16,000 pounds).
- The span is at least 6 meters (20 feet) and not more than 18 meters (60 feet).
- End anchors have an ultimate load capacity of at least 71 kN (16,000 pounds).
- The horizontal lifeline has an unloaded sag of approximately the span length divided by 60.
- The elevation of the line at any point is at least 1 meter (39 inches) above the working surface.
- The free fall distance is limited to 1.2 meters (4 feet).
- A minimum of 3.5 meters (12 feet) of unobstructed clearance is available below the working surface.
- No more than 3 workers are secured to the horizontal lifeline.
- The horizontal lifeline is positioned so it does not impede the safe movement of workers.

G11.8 Requirements for engineering - Permanent horizontal lifelines

Section 11.8 of the *OHS Regulation* states:

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

(a) permanent anchors,

(b) anchors with multiple attachment points,

(c) permanent horizontal lifeline systems, and

(d) support structures for safety nets.

Section 11.8(c) provides that a permanent horizontal lifeline system, and its installation, must be certified by a professional engineer. The drawings and instructions required should show:

- The layout in plan and elevation, including anchor locations, installation specifications, anchor design, and detailing
- Horizontal lifeline system specifications, including permissible free fall distance, clearance to obstructions below, and rope size, breaking strength, termination details, initial sag or tension
- The number of workers permitted to connect to the lifeline, and maximum arrest force to each worker

G20.75 Fall protection

Sections 11.2(2) to 11.2(5) of the *OHS Regulation* state:

(2) The employer must ensure that guardrails meeting the requirements of Part 4 (General Conditions) or other similar means of fall restraint are used when practicable.

(3) If subsection (2) is not practicable, the employer must ensure that another fall restraint system is used.

(4) If subsection (3) is not practicable, the employer must ensure that a fall arrest system is used.

(5) If the use of a fall arrest system is not practicable, or will result in a hazard greater than if the system was not used, the employer must ensure that work procedures are followed that are acceptable to the Board and minimize the risk of injury to a worker from a fall.

Sections 20.75 of the *OHS Regulation* states:

If a worker is employed on a roof having a slope ratio of 8 vertical to 12 horizontal or greater, the worker must use a personal fall protection system or personnel safety nets must be used, and 38 mm x 140 mm (2 in x 6 in nominal) toe-holds must be used if the roofing material allows for it.

This guideline describes different fall protection systems for work on roofs, according to the amount of slope, using the hierarchy in section 11.2 of the *OHS Regulation*. Sections 20.74 to 20.77 also need to be considered for roof work.

The general effect of sections 20.74 to 20.77 and Part 11 of the *OHS Regulation* is to create 3 categories of roofs as illustrated in FIGURE 1 and to provide for different fall protection systems available to be used for each category.

SAFE USE OF WORK PLATFORMS

RESPONSIBILITIES FOR USING WORK PLATFORMS: Work platforms are defined by WorkSafe BC as “An elevated or suspended temporary work base for workers”. Work platforms are a common device used in the construction industry for providing access, egress and supporting a worker while doing work.

Work platforms include:

- Scissor and boom lifts
- Wooden and tubular scaffolding systems
- Ramps

DGS Construction employees continuously use work platforms that are built and erected on construction sites. The work platforms may have been built by DGS Construction employees or other contractors. Regardless of who built and erected any work platform, it is the responsibility of the employees that use the platforms that need to ensure the work platform is safe to use and meets Worksafe BC requirements.

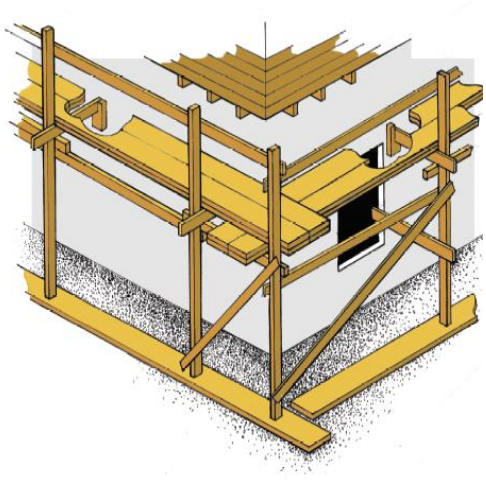
DGS Construction employees that observe improperly built or erected work platforms are required to assembled ramps, will bring the issue to their supervisors attention.
The supervisor will correct the issue or bring it to the site superintendents’ attention.

RAMPS & WALKWAYS: All ramps, and walkways must be a minimum of 20” wide. Single plank ramps are prohibited. If a ramp is sloped, it must be fitted with cleats to provide protection from slipping.

MOBILE WORK PLATFORMS Before a DGS Construction employee is permitted to use mobile work platforms, they are required to

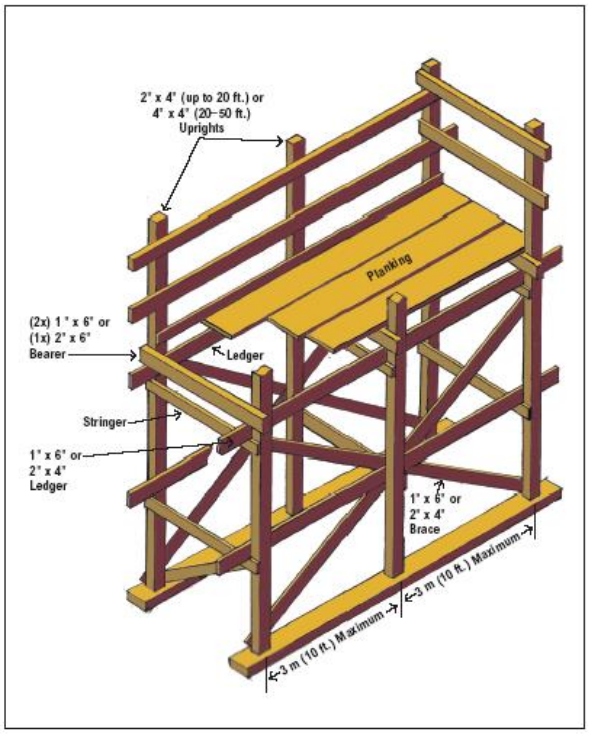
- be trained to the standard of CSA standard B354.4, Self-propelled boom-supported elevating work platforms if using boom type platforms.
- be trained to the standard of CSA standard B354.2, Self-propelled elevating work platforms if using scissor lifts.
- Use a fall restraint or arrest system while in a boom type work platform.
- Use the provided guardrails and chains equipped on scissor lift platforms.
- Inspect and document pre-shift inspections of lifts before shift use.

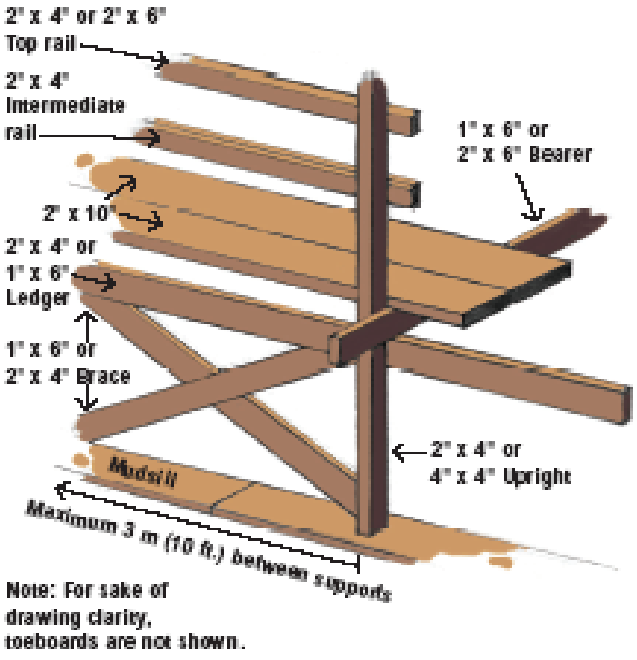
WOODEN SCAFFOLD COMPONENTS AND REQUIREMENTS The following are Worksafe requirements for wooden scaffold erection and use. DGS Construction has adopted these requirements as part of the company safety program and manual.



Scaffold Component	Dimensions (Inches)*
Uprights – Up to 6 m (20 ft.)	2 x 4
– 6 m to 15 m (20 ft. to 50 ft.)	4 x 4
Bearers – 900 mm (3 ft.) maximum span	1 x 6
– 1.5 m (5 ft.) maximum span	2 x 6
Ledgers (ribbons)	1 x 6 or 2 x 4
Braces	1 x 6 or 2 x 4
Wall scabs and bearer blocks	2 x 6
Minimum work platform width	(2x) 2 x 10
Guardrails – Top, up to 2.4 m (8 ft.) span	2 x 4
– Top, 2.4 m to 3 m (8 ft. to 10 ft.) span	2 x 6
– Intermediate	2 x 4
Toeboards	1 x 4
Scaffold planks	See section 13.24 of WCB Regulation

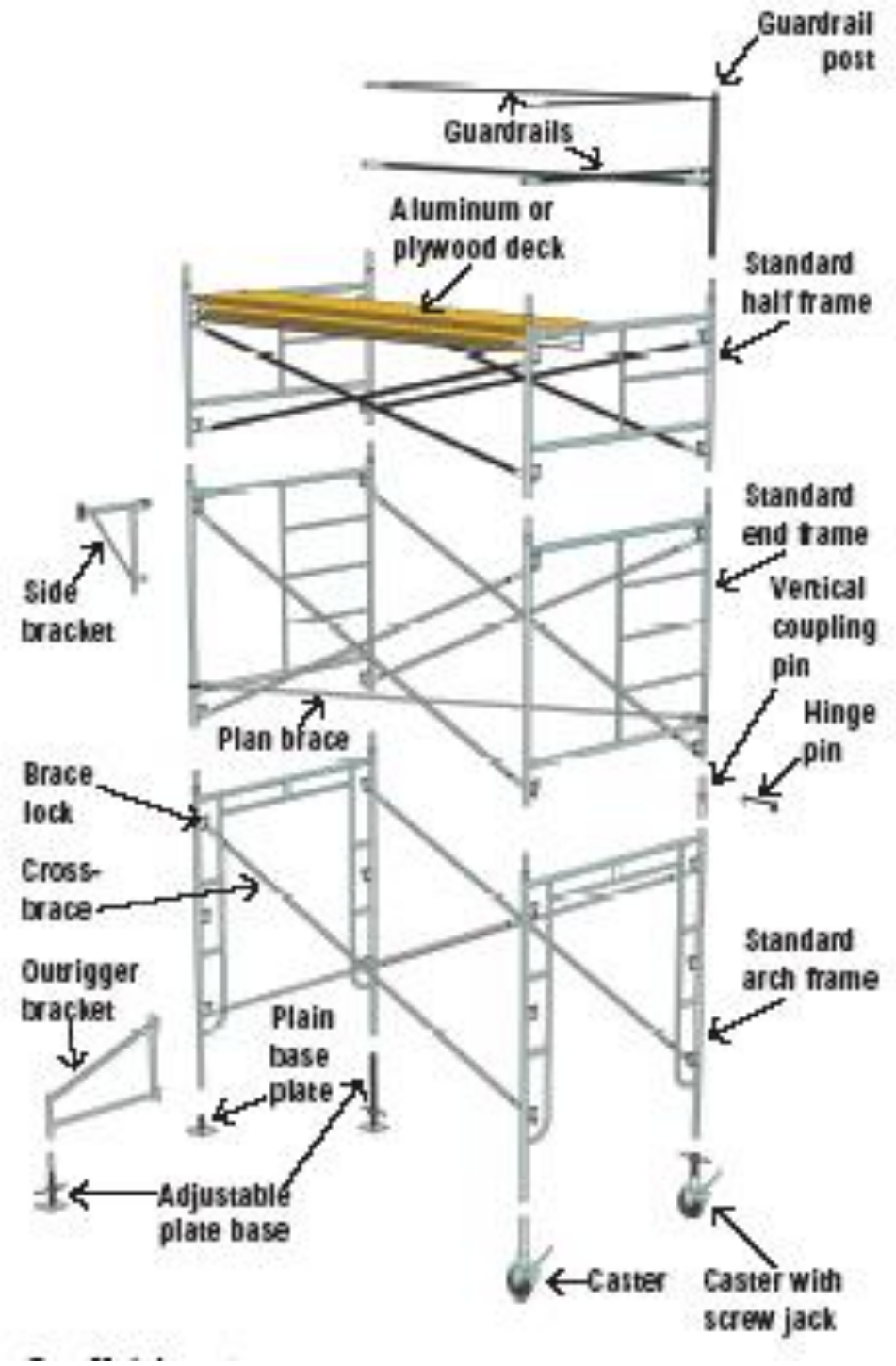
** These are "nominal" dimensions. They refer to the name of the dressed lumber, not the actual measurement.*



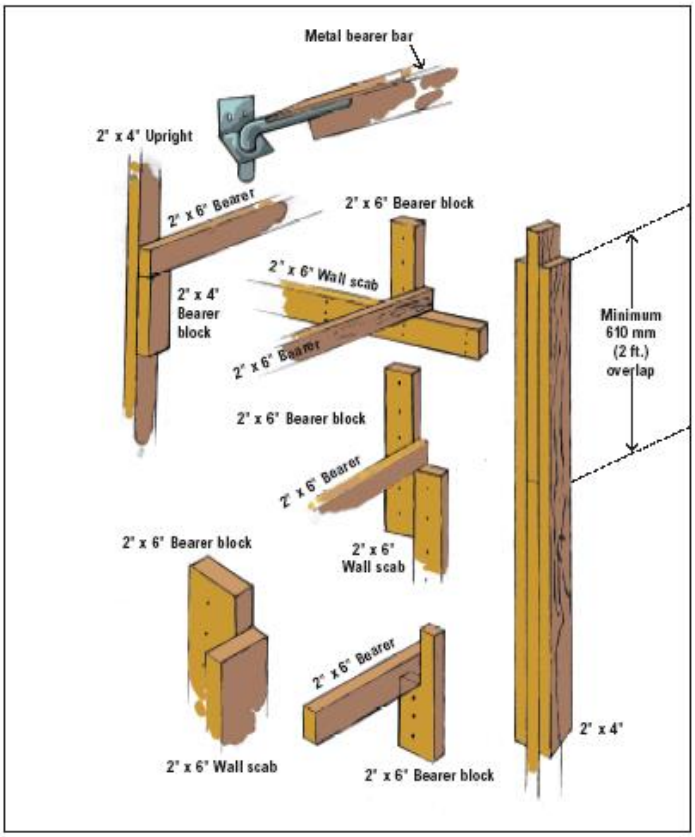


Note: For sake of drawing clarity, toeboards are not shown.

SCAFFOLD COMPONENTS

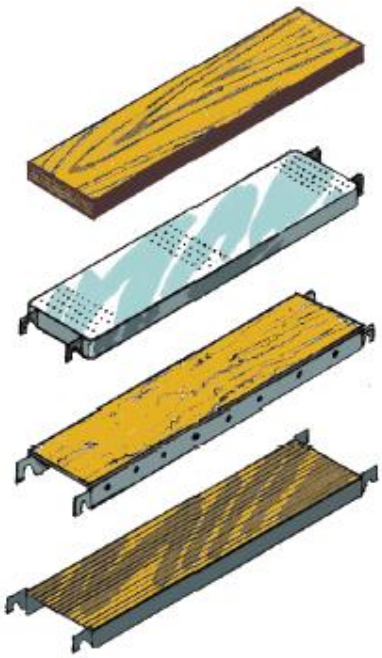


SUPPORTING BEARER LUMBER REQUIREMENTS



WORK PLATFORM / PLANK REQUIREMENTS

Grade	Minimum Width	
	(mm)	(Inches)
Select Structural — Scaffold Planks	38 x 235	2 x 10 (nominal)
Select Structural — Joists & Planks	38 x 235	2 x 10 (nominal)
No. 2 and Better — Joists & Planks	48 x 251	2 x 10 (rough sawn)
No. 2 and Better — Joists & Planks*	38 x 235	2 x 10 (dressed/nominal)
** Important: These planks must be doubled, one on top of the other.*		

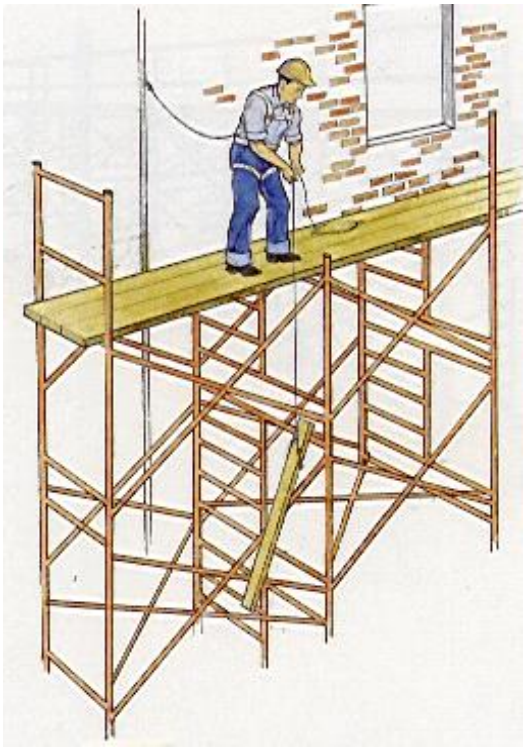


SCAFFOLD AND WORK PLATFORM ERECTION The following are rules & guidelines that workers will follow when erecting or using scaffold or work platform systems:

- All vertical scaffold supports will be placed on a firm, level base or sills. Pallets, boxes, building blocks, bricks, or other unstable materials will not be used to support vertical uprights.
- Access and egress to scaffold work platforms will be with ladders, or ladder like structures with a minimum of 12” rungs. Climbing scaffold end frames is not permitted unless it is a scaffold ladder frame.
- Guardrails will be erected on scaffolds or other work platforms when the scaffold planks or work platform planks are 10 feet or greater above grade.
- Guardrails will be placed at 40” above the scaffold platform with a mid-rail placed between the top 40” rails and the scaffold work platform.

- Toeboards will be placed on the scaffold if there are workers below the work platform that could be struck by any materials or tools falling off the work platform.

- To prevent overturning, the height of any free standing tower or rolling scaffold will be not exceed 3 times the minimum base dimension, unless the scaffold is adequately tied to the structure or outriggers have been used to increase the base dimension.
- On scaffolding or other work platforms 10ft or more above grade, workers will erect guardrails for use as a fall protection system.
- If guardrails are clearly impracticable, then the worker will use fall arrest devices as a means of fall protection.



SCAFFOLD & WORK PLATFORM INSPECTION POLICY

The following are scaffold and other work platform use and erection rules and guidelines. Employees using scaffolding or other work platforms will inspect the system on a daily basis.

If the scaffold or work platform system is erected by DGS Construction employees, a scaffold inspection will be conducted and documented in the daily scaffold inspection sheet by the site supervisor.

If the scaffold or work platform system is erected by other contractors, the scaffold will be inspected by the site supervisor for safe use and any defects or unsafe conditions will be brought to the prime contractors site safety personnel or the site superintendent.

Regardless who erected the scaffold or work platform, a daily inspection will be conducted and unsafe conditions found will be corrected before use.

Key inspection points include:

- Are guardrails in place at elevations 10’ and greater ?
- Is there an access ladder, does it extend 36” above any landings?
- Is the area around the access / egress clear of materials and obstructions ?
- Are the scaffold planks secure, so they can’t be kicked out of place?
- Does the scaffold have adjustable bases and are they resting on good sills?
- Are all the cross braces in place, and locked?
- Are there gaps in the scaffold > 10” wide?
- Are there any visibly damaged components of the scaffold?
- Are locking pins required, if so, are they secured in each frame?
- Are the engineering instructions being followed, or has the scaffold been altered?

DATE:	SCAFFOLD HAZARD:	CORRECTIVE ACTION:	INSPECTED BY:

DGS CONSTRUCTION LTD. SCAFFOLD INSPECTION

DGS Construction & the WCB (Regulation 13.16(3)) requires that a scaffold be inspected daily before use. The site supervisor will conduct & document a daily scaffold safety inspection in the table below if scaffolding was erected by DGS Construction. This document will be kept as part of the project file.

Date . .	Date . .	Date . .	Date . .	Date . .	Jobsite:_____ Person Inspection Scaffold: _____ √ Applicable Issues Inspected On Each Scaffold Before Use Place an X where attention is needed & make notes in the repair section.
					Scaffold is erected plumb & level using adjustable bases
					Scaffold is on a firm foundation with min 2x10" sills
					Scaffold is erected on a solid floor (sills & adjustable bases not needed)
					Scaffold has been secured vertically, 3 x min base dimension
					Scaffold secured max every 20' vertical above the 3 x min base dimension
					Scaffold secured longitudinal max 21', & at the scaffold ends
					Scaffold building ties do not move (900lb working loads)
					Scaffold is tarped & engineering on site.
					Work platforms are guarded with toprails (40"– 44") & midrails
					Work platforms are guarded on open sides & ends
					Work platform gap between building is ≤ 12"
					Work platform is min 20" wide (exception for ladder jacks)
					Work platform covers the area inside the frames & openings ≤ 10"
					Work platforms that are sloped are fitted with cleats, max 16" intervals
					Work platform slopes do not exceed 1 vertical to 5 horizontal
					Scaffold is erected > 10' away from high voltage lines.
					Scaffold planks do not have cracks longer than the width of the plank.
					Scaffold planks are supported max 10' for light duty, 7' for heavy duty
					Scaffold plank ends are min 6" & not greater than 12" beyond supports
					Scaffold planks are secured (wired, screwed, nailed)
					Access to platforms ≤ 30' have min 12" ladder end frames, portable ladder, or stairway.
					Access to platforms > 30' have stairway, ladder with rest platforms every 30', or ladder end frames with rest platforms every 30'
					Access ladders are 36" above the required level & secured.
					Scaffold frames & uprights joined with couplings & pins.
					Scaffold cross braces installed or fabricated end hook planks used.
					Rolling scaffold is not supported on pneumatic tires.
					LADDER - JACK SCAFFOLDING
					Heavy duty ladders (grade 1) used & secured
					Supported max 10' if solid lumber plank, max 24' if manufactured plank
					Plank secured to ladder jack.
					Plank ends are min 6" & not greater than 12" beyond end of jacks

Issue	**Corrective Action**

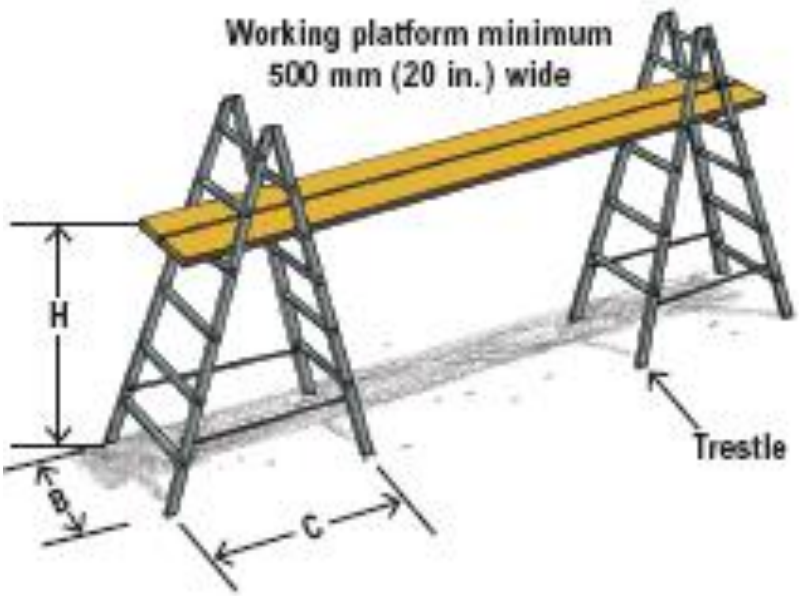
USE OF LADDER - JACK WORK PLATFORMS

Ladder - Jack work platforms will:

- be used only on heavy duty class 1 ladders.
- be used only for light duty operations such as painting and siding installation.
- not be used by more than two workers on a single platform at one time.
- have supporting ladders firmly secured against displacement.
- not be less than 2 inches * 12 inches, supported at intervals not exceeding 10 ft.
- not be less than 12 inches wide, and supported at intervals not exceeding 24 ft if manufactured stagings are used.
- ladder - jack outriggers will not be used above the 2nd highest rung of an extension ladder.
- Workers on ladder - jack work platforms will use a fall arrest system when working at elevations 10 ft or greater above grade.

TRESTLE SCAFFOLD RULES

Trestle scaffolds will:

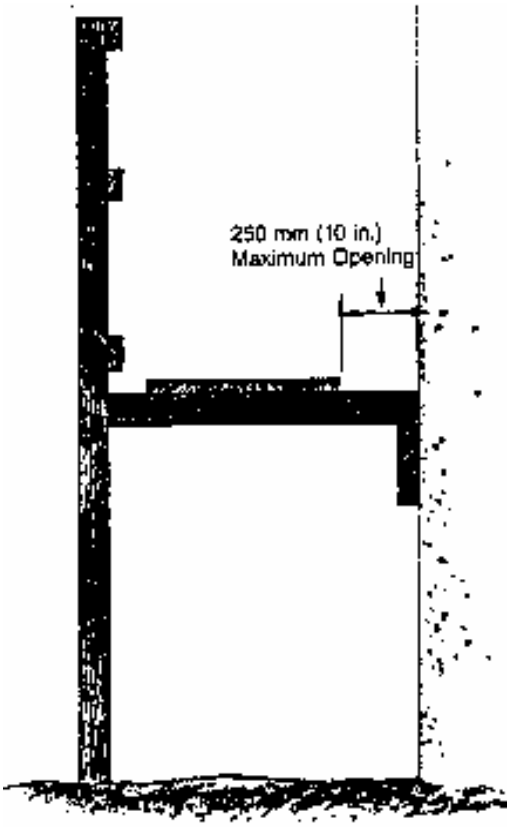


- be used for light duty work only.
- not use extensions added to trestle legs.
- have the height (H) not exceed 3 times the base dimension (B) of the trestle.
- have the spread of trestle legs (C) equal to ½ the height of the trestle.
- not use stepladders for trestle scaffolds.

- Shore & lean - to work platforms will not be used without permission from the company safety officer and specific engineering.

- No employee will work on a work platform with openings 10 inches or greater between the work platform vertical uprights and / or between work platform vertical uprights and a structure wall.

- Additional planks will be placed on the work platform so that there is no opening 10 inches or greater. Guardrails may also be used to close off openings.

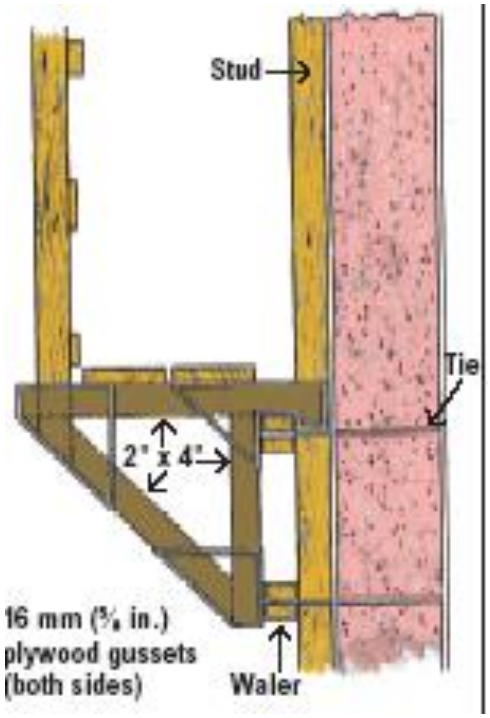


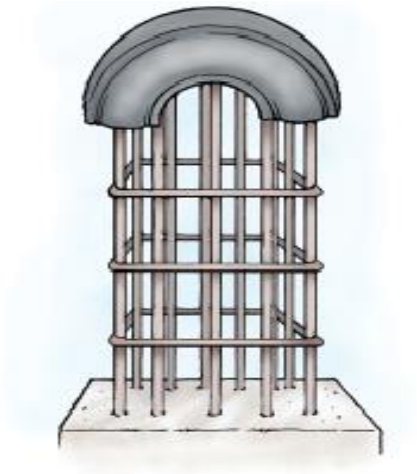
FORMWORK SAFETY

Formwork involves the process of building walls and pouring concrete.
Hazards associated with formwork include:

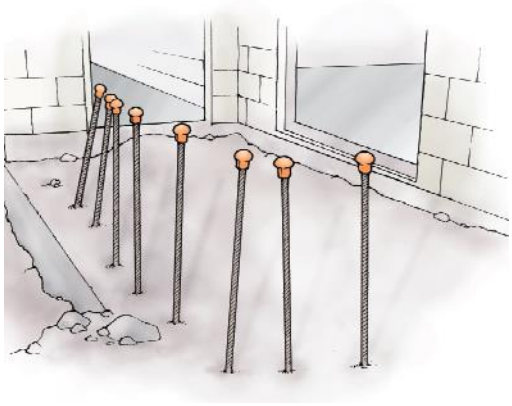
- Walls or forms falling or collapsing and injuring an employee.
- Employees falling from workplatforms, ladders or the top of walls or forms.
- Exposure to silica dust if grinding, sanding, cutting or drilling into dried concrete.
- Chemical burns from wet concrete.
- Struck by materials or tools that are overhead or rigged for hoisting.
- Punctures from protruding rebar.
- Electrocution from powerline contact.
- Concrete falls from the pump truck.

The following are Worksafe requirements and guidelines for formwork. DGS Construction has adopted these requirements as part of the company safety program and manual.





- Grade or ground beams are usually the first part of wall forming, and the rebar dowels will protrude above the beam, so that the rebar can be attached to the wall. Protection must be provided to prevent workers from being injured by or impaled on the dowels.
- After the wall forms have been installed, ladders and work platforms must be used to provide safe access to and around the formwork.
- Stripping of the formwork should be done in an organized way that eliminates hazards such as tripping and nail punctures. For example, nails need to be removed or bent as the stripping takes place.
- Platforms can be constructed using either single or double waler systems. Stud Waler Tie 16 mm (5⁄8 in.) plywood gussets (both sides) 2" x 4"
- Fall protection systems are required to be used by employees working at elevations 10’ or greater above grade. Typically, the fall protection system used for formwork will include a guardrail system in conjunction with a minimum 20” wide workplatform.
- Rebar protruding from lower levels are required to be bent over, covered with lumber, or covered with used tires.
- Plastic caps on rebar do not provide the required impalement protection. Plastic caps on rebar are visual hazard indicators providing minimal protection from non-elevated areas.



- This type of rebar protection is permitted, provided no workers are working above the rebar.

CONCRETE POURING AND PUMPING

- Employees exposing skin to wet concrete can develop rashes, burns or irritated skin. Employees are required to wear rubber boots if standing in wet concrete for pouring floors or horizontal wall forms.
- Employees are required to wear clothing and gloves to protect from wet concrete skin exposure.

- Unless working on the ground, pouring and pumping of concrete into wall forms must be done from platforms that are a minimum of 510 mm (20 in.) wide and at the correct height, approximately 1 metre (3 ft.) below the top of the form.

CONCRETE FORM RELEASE OILS Employees using formwork release oils are exposed to the following hazards:

- Release oil splashing or sprayed onto an employee or near the eyes.
- Inhalation of large quantities of form oil vapours.
- Injection of form oil.

Although the majority of form oils are mostly petroleum and pose little health risks to employees, the following preventative controls will be used by employees when using form oils:

- Have the oil material safety data sheet on site for review of contents and correct preventative measures.
- Wear safety glasses when spraying or rolling release oils on forms.
- Use good hygiene practices and clean-up before eating, or if oils penetrate clothing or work gloves.
- Wear clothing and work gloves that are impervious to oil absorbtion.

APPLICABLE WORKSAFE REGULATIONS FOR CONCRETE WORK

The following are the current Worksafe BC requirements for concrete formwork and falsework. DGS Construction has adopted these requirements as part of the company safety program and manual:

CONCRETE FORMWORK AND FALSEWORK

20.17 Specifications and plans

(1) The employer must ensure that a set of plans and specifications meeting the requirements of *CSA Standard S269.1-1975, Falsework for Construction Purposes* and *CSA Standard CAN/CSA-S269.3-M92, Concrete Formwork* is prepared for the formwork for each job and for all items of concrete work, the failure of which could cause injury.

(2) Erection drawings and supplementary instructions for concrete formwork, falsework and reshoring must be certified by a professional engineer and available at the site during erection, use and removal of the concrete formwork, falsework and reshoring.

(3) The following types of concrete formwork require erection drawings and supplementary information certified by a professional engineer:

(a) flyforms;
(b) gang forms;
(c) jump forms;
(d) vertical slip forms;
(e) formwork more than 4 m (13 ft) in height;
(f) suspended forms for slabs, stairs and landings;
(g) beam forms;
(h) single sided forms over 2 m (6.5 ft) in height;
(i) cantilever forms;
(j) bridge deck forms;
(k) shaft lining forms;
(l) tunnel lining forms;
(m) forms so designated by the designer of the structure.

20.18 Supervision

(1) A qualified supervisor experienced in the construction of temporary support structures must supervise the erection and use of formwork and falsework.

(2) Workers must be properly instructed on the hazards that they may be exposed to and on the precautions to be taken while around or on formwork and falsework.

20.19 Erection drawing information

(1) Erection drawings and supplementary instructions must clearly show all information necessary to accurately and safely assemble the concrete formwork, falsework and reshoring to the design requirements.

(2) The documents required by subsection (1) must include at least

(a) erection drawings showing sufficient plan and section views and connection details, enlarged where necessary, to clearly describe the formwork and permit accurate assembly,
(b) the quality and grade of materials to be used for the components and their connection,
(c) an accurate description of proprietary items, including fittings, to permit field identification,
(d) the load bearing capacity required of the material upon which the sills are to be placed and, where necessary, details of procedures to be used to develop and maintain the required capacity,
(e) the minimum dimensions of sills or other foundation members,
(f) construction, erection and dismantling procedures which require special attention including, where applicable, handling multi-use formwork panels,

(g) details of supports necessary to maintain lateral stability and resist sidesway and racking, specifying the materials, dimensions and locations of external braces, ties, and other support devices,
(h) where structural components connect together, the connections detailed to prevent accidental displacement or rotation of the components,
(i) the reshore plan where applicable,
(j) details of the form or mould into which concrete will be placed,
(k) sufficient load and deflection information to permit a professional engineer to understand the design of the concrete formwork and falsework,
(l) the requirement for outstanding field design and detailing where applicable, and
(m) the sequence, method and rate of load placement to prevent overloading of any part of the formwork.

20.20 Responsibility for design
(1) A professional engineer must be responsible for all field designs, details and changes including the effect they may have on the original design.
(2) Field designs and changes must be documented as required by section 20.19 and must be available at the site before and during placement of concrete or other significant loading of the formwork or falsework.

20.21 Continuity of engineering
The employer, or if the formwork affects workers of more than one employer, the owner or principal contractor, must ensure continuity of design, construction and inspection in the event of a change of professional engineers, or if the separate work of 2 or more professional engineers is involved.

20.22 Equipment requirements
(1) Equipment, materials and hardware which cannot be identified as meeting the standards specified in the professional engineer's drawings and specifications must not be used.
(

20.23 Concrete placing hazards
(1) Protruding ends of reinforcing steel which are hazardous to workers must be removed or effectively guarded.
(2) If a worker is required to be underneath the formwork during a concrete pour or placement of another significant load, the worker must be restricted from the areas where the loads are placed.
(3) If loads such as bundles of reinforcing steel are being placed on the formwork, or if concrete has just been placed on the formwork, workers must be restricted from the area under those portions of the formwork until it can be assured that the formwork will withstand the load.
(4) Placement of concrete or other loads must stop if any weakness, undue settlement or excess distortion of formwork of a type listed in section 20.17(3) occurs, and may only restart after the formwork has been repaired or strengthened as specified by a professional engineer.
(5) Loads must not be applied to uncured concrete structures except as permitted by the erection drawings and supplementary instructions.
Note: For the purposes of compliance with subsection (1) reinforcing steel may be bent back so as not to be a hazard to workers unless it presents a tripping hazard on a surface where workers would walk.

20.24 Flyform drawings

(1) Erection drawings must be detailed to show

(a) a plan view, a longitudinal section, and a cross section for each type of flyform panel, and

(b) the weight, the calculated position of the centre of gravity and the position of the pickup points for each type of flyform panel.

(2) The design on the erection drawings and supplementary instructions for a flyform panel must provide that as soon as a flyform panel is landed on a supporting surface, before anyone climbs or walks on the panel, and before reinforcing steel or concrete is placed on the panel, the panel must

(a) be able to resist a minimum horizontal load of 3.6 kN (800 lbs) applied in any direction on the top edge,

(b) have a minimum safety factor against overturning about any possible axis of

(i) 1.6 when dead load plus most severe live load configuration plus horizontal loads are considered, and

(ii) 2.0 when dead load plus most severe live load configuration or dead load plus horizontal loads are considered,

(c) have a minimum safety factor of 1.5 against the panel sliding along the supporting surface, and

(d) have flyform legs placed as necessary to attain the required safety factor against overturning.

(3) If any of the requirements of subsection (2) cannot be obtained for a panel, the panel must, before being unhooked from the crane or hoist, be secured to the permanent structure or an adjacent panel in a manner specified by the formwork designer.

(4) When all flyform panels have been assembled to form a continuous piece of concrete formwork, the concrete formwork and falsework must meet the requirements of section 20.17(1).

20.25 Flyform handling

(1) The erection drawings and supplementary instructions for flyforms must show a step by step procedure for all phases of each cycle of assembly, flying, use, dismantling, and reuse of each flyform panel, including special procedures for non-typical floors.

(2) If any flyform panel is not inherently stable for all possible conditions of load, special notation on the flyform design documents must draw attention to the procedure for obtaining stability.

(3) The erection drawings and supplementary instructions required by subsections (1) and (2), including special procedures required for non-typical floors, must be made available to workers involved in any part of the assembly, flying, use, dismantling and reuse of each flyform panel.

20.26 Inspections

(1) Immediately before placement of concrete or other intended loading, the employer must ensure that the concrete formwork and falsework is inspected and an engineering certificate is issued by a professional engineer, which

(a) indicates the specific areas inspected,

(b) certifies that the concrete formwork and falsework has been erected in accordance with the latest approved erection drawings and supplementary instructions, and

(c) certifies that specified reshoring is in place.

(2) The certificate required by subsection (1) must be available at the site for inspection by an officer.

(3) If a gangform is being reused on the same jobsite without modification, an inspection by a qualified person must be performed before each pour, in which case a new professional engineer's inspection certificate under subsection (1) is not required.

CONCRETE HEALTH HAZARDS

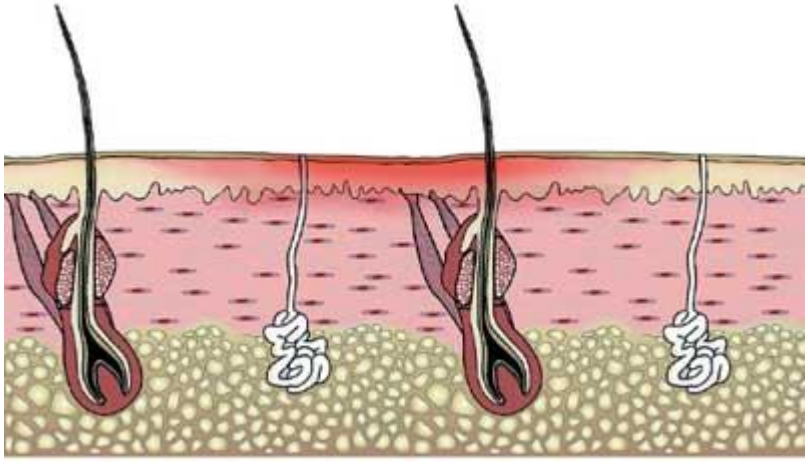
Concrete is defined as a construction material that consists, in its most common form, of Portland cement, construction aggregate (generally gravel and sand) and water.
DGS Construction uses concrete in the majority of the work employees perform.
Employees exposed to concrete can have several negative health effects if the employee is not protected or the exposure to the concrete is not minimized.

Employees need to understand the possible health effects of concrete exposure and follow the methods of protection to prevent concrete exposure injuries.

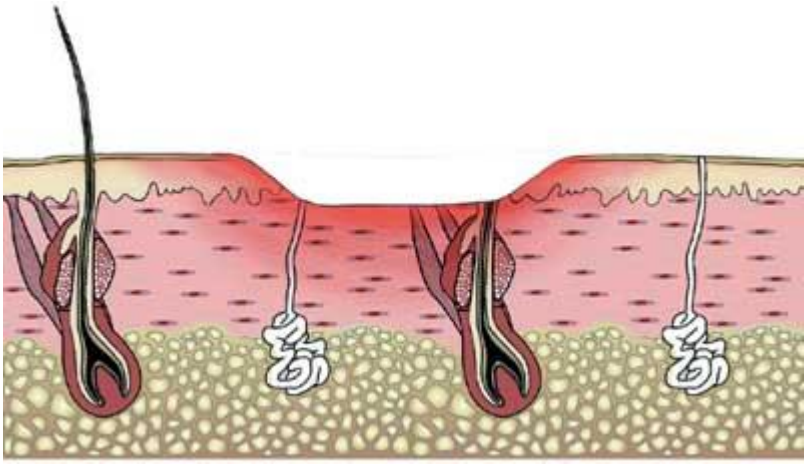
CONCRETE HEALTH EFFECTS Concrete can cause ill health by skin contact, eye contact, or inhalation. Risk of injury depends on duration, level of exposure and individual sensitivity. Hazardous materials in wet concrete and mortar include:

- alkaline compounds such as lime (calcium oxide) that are corrosive to human tissue.
- trace amounts of crystalline silica which is abrasive to the skin and can damage lungs.
- trace amounts of chromium that can cause allergic reactions.

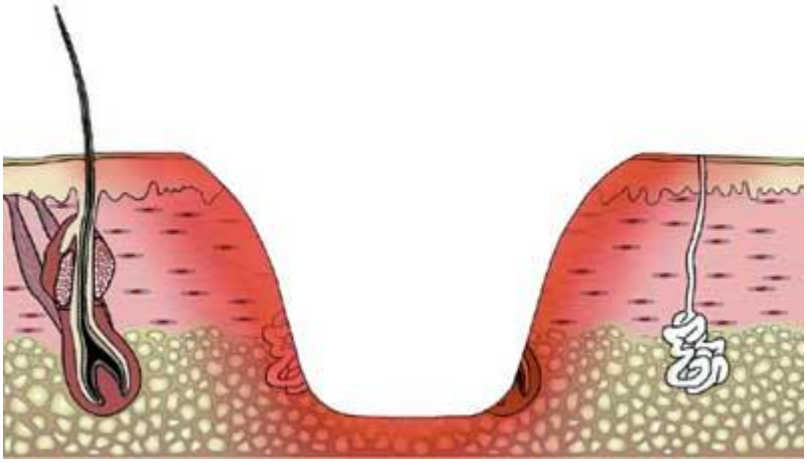
CONCRETE SKIN CONTACT HAZARDS The hazards of wet concrete are due to its caustic, abrasive, and drying properties.
Wet concrete contacting the skin for a short period and then thoroughly washed off causes little irritation. But continuous contact between skin and wet concrete allows alkaline compounds to penetrate and burn the skin.
When wet concrete or mortar is trapped against the skin, perhaps by falling inside a worker's boots or gloves or by soaking through protective clothing.
This may result in first, second, or third degree burns or skin ulcers. These injuries can take several months to heal and may involve hospitalization and skin grafts.



First degree burn - outer skin layer

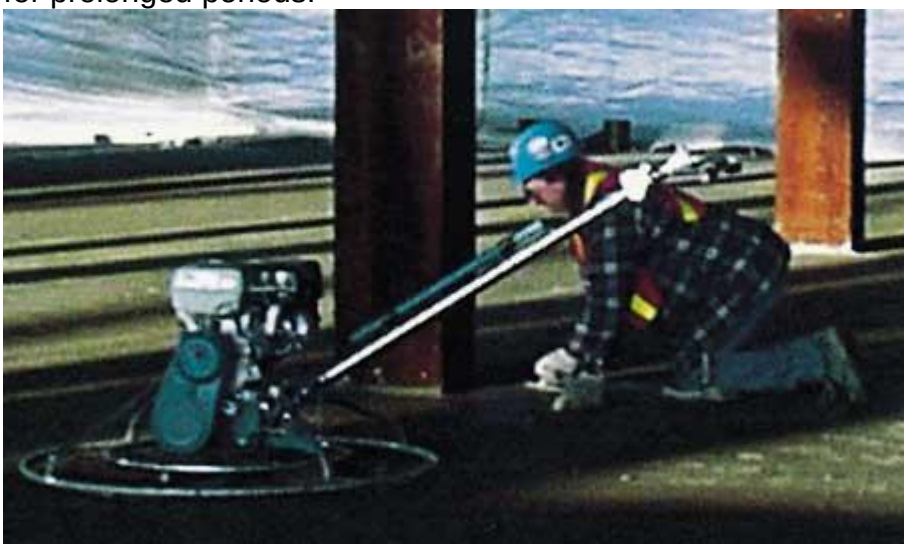


Second degree burn - middle skin layer



Third degree burn - deep skin layer

Wet concrete may get trapped inside rubber boots or gloves or gradually soak through coveralls. Concrete finishers kneeling on fresh concrete have had their knees severely burned. Corrosive bleed water from the concrete is absorbed by the worker's pants and held against the skin for prolonged periods.



Without waterproof knee pads, kneeling on wet concrete can irritate or burn the skin

Cement dust released during bag dumping or concrete cutting can also irritate the skin. Moisture from sweat or wet clothing reacts with the cement dust to form a caustic solution.

CONCRETE ALLERGIC SKIN REACTIONS Some workers become allergic to the hexavalent chromium in cement. A small yet significant percentage of all workers using cement will develop an allergy to chromium, with symptoms ranging from a mild rash to severe skin ulcers.
In addition to skin reactions, hexavalent chromium can cause a respiratory allergy called occupational asthma. Symptoms include wheezing and difficulty breathing. Workers may develop both skin *and* respiratory allergies to hexavalent chromium.
It's possible to work with cement for years without any allergic skin reaction and then to suddenly develop such a reaction. The condition gets worse until exposure to even minute quantities triggers a severe reaction. The allergy usually lasts a lifetime and prevents any future work with wet concrete or powder cement.

CONCRETE EYE CONTACT Exposure to airborne dust may cause immediate or delayed irritation of the eyes. Depending on the level of exposure, effects may range from redness to chemical burns and blindness.

CONCRETE INHALATION Inhaling high levels of dust may occur when workers empty bags of cement. In the short term, such exposure irritates the nose and throat and causes choking and difficult breathing.
Sanding, grinding, or cutting concrete will release large amounts of dust containing high levels of crystalline silica. Prolonged or repeated exposure can lead to a disabling and often fatal lung disease called **silicosis**.

Dry cutting generates high levels of dust

SILICOSIS Silicosis is a disabling, nonreversible and sometimes fatal lung disease caused by overexposure to respirable crystalline silica. Silica is found in concrete dust generated when sand, grinding or drilling into dry concrete.
Exposure to concrete dust that contains microscopic particles of crystalline silica can cause scar tissue to form in the lungs, which reduces the lungs' ability to extract oxygen from the air we breathe.
DGS Construction employees are required to use the methods of protection to prevent concrete burns and exposure to silica.

METHODS OF EMPLOYEE PROTECTION FROM CONCRETE HAZARDS

Safe Work Practices: DGS Construction employees will use the following safe work practices to minimize concrete hazard exposure:

- When laying concrete block, have different sizes on hand to avoid cutting or hammering to make them fit.
- Recognize when silica dust may be generated and plan ahead to eliminate or control the dust at the source.
- Post signs or barricade areas to let other workers know of the concrete hazard if creating concrete dust.
- Work in ways that minimize the amount of cement dust released by using vacuums, wet cutting or drilling.
- Minimize concrete dust when sweeping by using aborbing cleaning compounds.
- Do not use compressed air to clean or move concrete dust.
- Where possible, wet-cut rather than dry-cut masonry products.
- Mix dry cement in well-ventilated areas.
- Make sure to work upwind from dust sources.
- Where possible, use ready-mixed concrete instead of mixing on site.
- When kneeling on fresh concrete, use a dry board or waterproof kneepads to protect knees from water that can soak through fabric.
- Plan the work correctly to avoid needing to chip, cut or remove concrete where not needed.
- Use concrete grinders equipped with shrouds and vacuum to avoid concrete dust exposure.
- Remove jewelry such as rings and watches because wet cement can collect under them.

Personal Protection Equipment: DGS Construction employees will protect themselves from concrete and concrete mixtures by wearing:

- Alkali-resistant gloves
- Coveralls or shirts with long sleeves and full-length trousers pants. Sleeves should be pulled down over gloves and pant or coverall legs tucked inside boots to keep wet concrete out.
- Rubber boots high enough to prevent concrete from flowing in when employees are required to stand in fresh concrete
- A half mask respirator with a high efficiency particulate aerosol (hepa) filter when exposure to concrete dust can not be avoided. Employees are required to be “fit tested” and educated on respirator use and checks before being provided a respirator.
- Eye protection where mixing, pouring, or other activities may endanger eyes. Don’t wear contact lenses when handling cement or cement products.

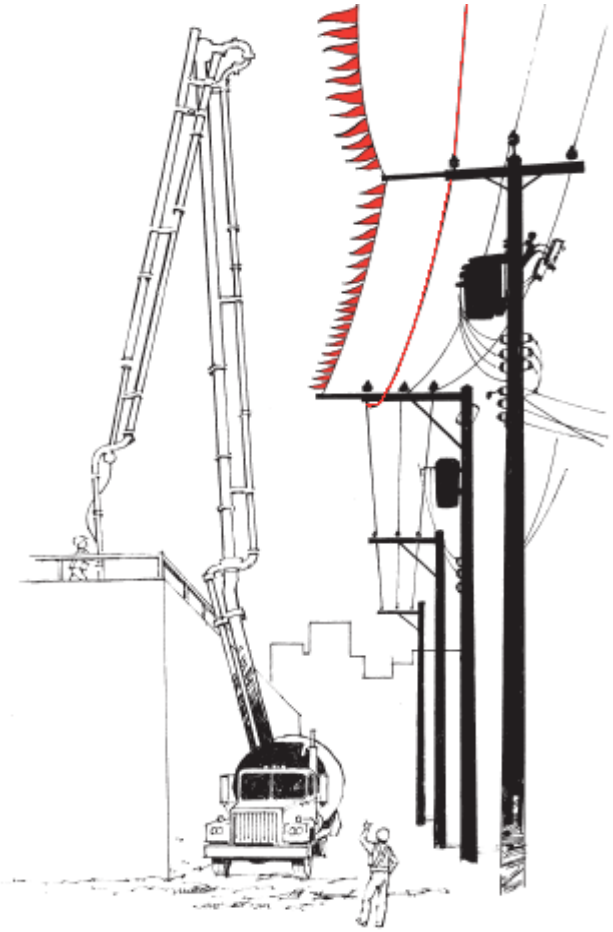
Hygiene Practices: DGS Construction employees will follow these safe hygiene practices:

- Remove clothing contaminated by wet cement.
- Wash skin that has contacted wet concrete with large amounts of cool clean water.
- Don’t wash hands with water from buckets used for cleaning tools.
- Have water and cleaning facilities on site to wash hands and face at the end of a job and before eating, drinking, smoking, or using the toilet.
- Facilities for cleaning boots and changing clothes should also be available.

RIGGING & HOISTING TOOLS OR MATERIALS

The following are requirements DGS Construction employees are required to follow when rigging or hoisting materials or tools:

- Rigging of tools or materials that will be hoisted by a mobile or tower crane will be performed by qualified riggers provided by the crane or hoist operator or designated by the supervisor.
- The removal of strapping or rigging components will not be performed until the load is on a level, stable platform.
- Materials or tools on vehicles will be secured before moving the vehicle.
- Correct hand signals for directing a crane or hoist will be used.
- Cranes, hoists or pump trucks will not enter within 10’ of any overhead high voltage lines.
- Ensure minimum distances from overhead high voltage lines and low voltage lines are kept.



No part of a crane or load can come within 10’ of high voltage lines.

- In higher voltage locations, minimum distances are increased to 15’ & 20’.
- Low voltage lines that are missing insulation need to be re-guarded by BC Hydro if working within 3’.

Ensure the ground is stable for vehicles and cranes.

- Check with the site superintendent to determine if all loads will be stable at the planned rigging areas.
- Are the crane outriggers deployed and float pads positioned.

Ensure the crane and operator is safe to work.

- Does the crane have a yearly non destructive testing decal.
- Is the operator attentive and physically ready for work.
- Is the operator wearing a hardhat, safety boots.
- Does the hook have a safety latch, slings are in good condition

Ensure materials or equipment do not fall and cause injury or property damage.

- Are the riggers competent to perform rigging connections.
- Are there loose pieces /parts of equipment or materials (dunage, pins, bolts) that can fall when lifted.
- Are lifts planned in areas where workers or public will not enter, place barricades, signs, or “do not enter” tape where it is possible for public or property to enter.
- Are tag lines needed because of wind or awkwardness.
- Is it too windy to load.
- Is the load going on a sloped roof, how will it be secured from moving, sliding.
- Is the platform capable of supporting the intended load.

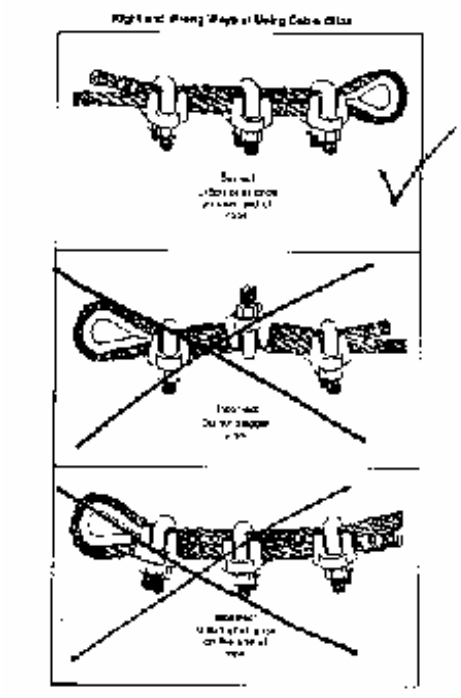
Ensure good communication between the signal person and operator.

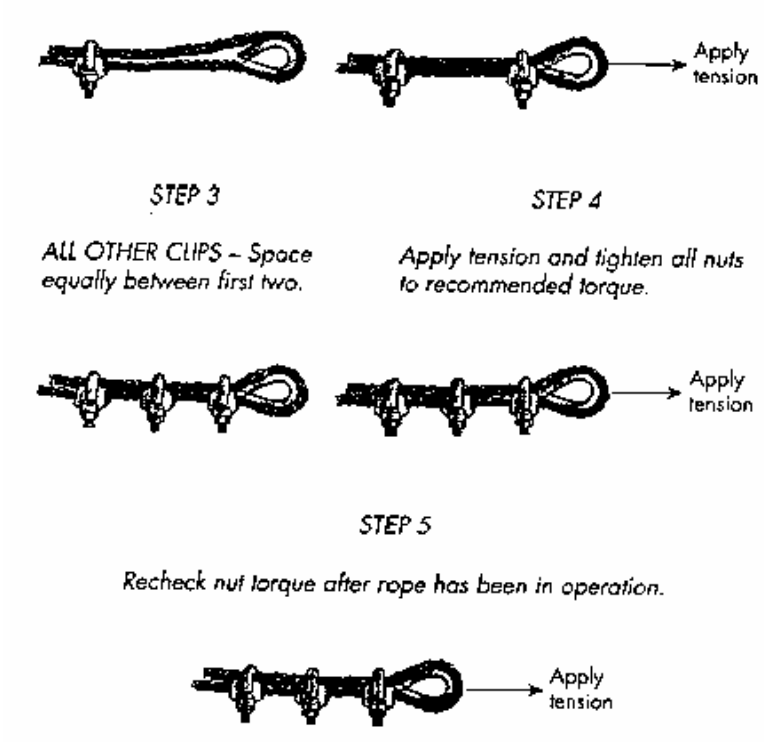
- Does the signal person knows the proper hand signals. (see below)
- Are the hand signals made away from the body.
- Does the signal person have a clear view with the operator.
- Does the operator have a clear view of the signal person and riggers.
- Is the signal person and ground riggers wearing a safety vests and other ppe.
- Is there one (only one) designated signal person.
- Are radios or another signal person needed.
- Is the operator using a cell phone, or not responding to signals.

Ensure the correct number and installation direction of cable clips.
CABLE CLAMP REQUIREMENTS the following are the minimum number of cable clips and torque required when installing cable clips:

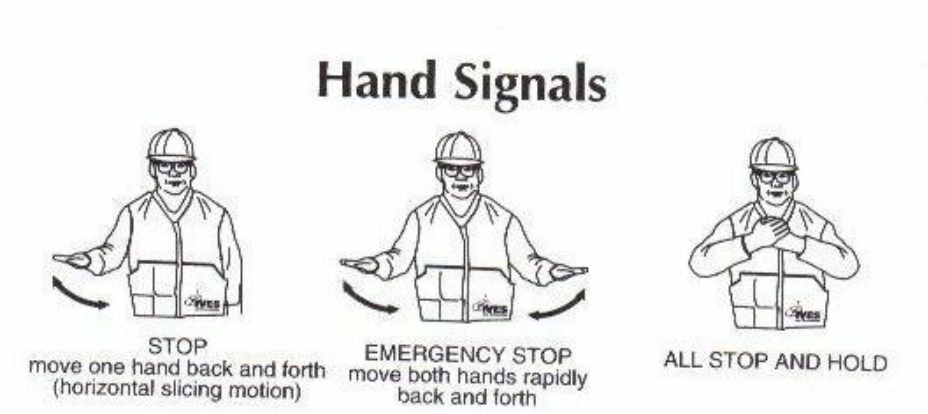
Diameter of cable	# of clips	Space between clips	Torque (ft/lbs)
1/4”	2	1 ½”	15
5/16”	2	2”	30
3/8”	2	2 ¼”	45
7/16”	2	2 ½”	65
1/2”	3	3”	65
5/8”	3	4”	95

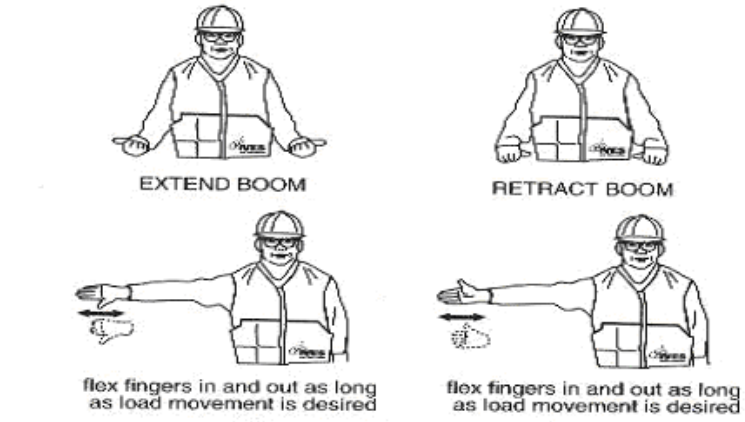
CABLE CLAMP INSTALLATION Cable clamps will be installed in the correct manner.

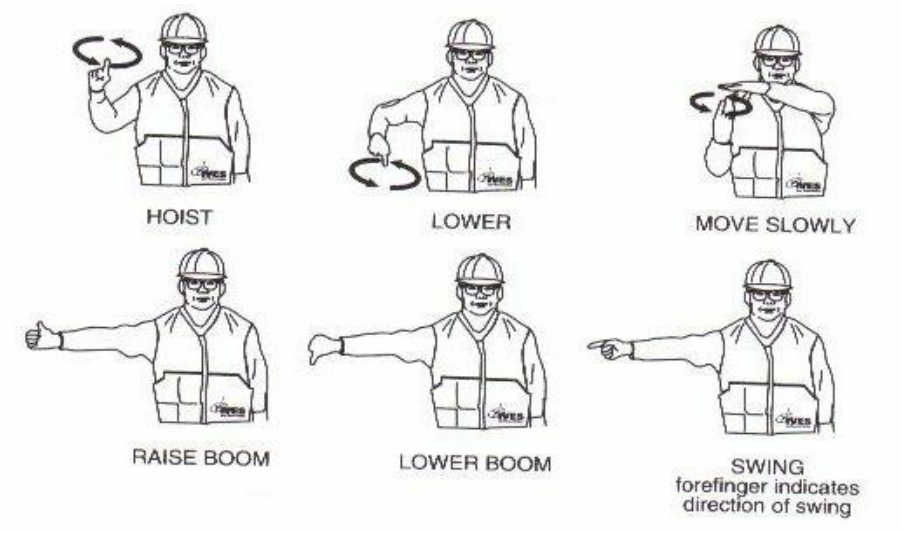




STANDARD CRANE HAND SIGNALS:







RIGGING WITH ROPE

USE OF ROPES: Employees using rope for securing or lifting tools or equipment are required to use correct knots that will safely lift or secure loads without undoing.
The following is rope use information and knots for employee reference:

ROPEWORK TERMINOLOGY The following are rope terms and types of knots that are commonly used in the construction industry:

Knot: When a rope is tied back to itself, the attachment is called a knot.

Bend: When two ropes are tied together, the attachment is called a bend.

Hitch: When a rope is tied to a fixture or post, the attachment is called a hitch.

Running end: When tying a knot, bend or hitch, the part of a rope not attached to the load is called the running end. A running end is a loose end.

Standing part: Any standing part of a knot, bend or hitch attaches to the load.

Overhand loop: An overhand loop is made when the running end passes over the standing part.

Underhand loop: An underhand loop is made when the running end passes under the standing part.

Bight: A "U" shaped bend in a rope is referred to as a bight. The phrase "don't get caught in the bight" means do not stand inside the "U" shape formed by the rope passing through a pulley, because if it tightens you may be caught. Also if the rope breaks, the broken end will whip back and hit you.

Splice: A splice is formed by interweaving the strands of two sections of rope.

Eye splice: An eye splice is a splice that forms a loop at the end of a rope.

Short splice: A splice joining the ends of two ropes, is a short splice if the spliced section is thicker than the individual ropes used to make the splice.

Long splice: If a spliced section of rope is the same thickness as the ropes used to make the splice, it is called a long splice. The long splice is weaker than a short splice, but it allows the rope to pass through a sheave.

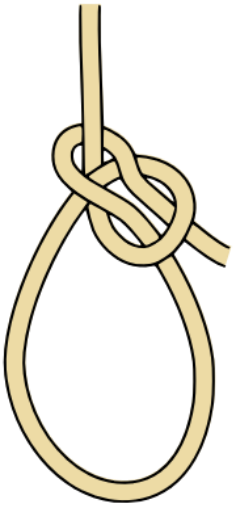
Back splice: A back splice is used to secure the strands at the end of a rope.

Thimble: A thimble is a metal reinforcement used to protect an eye loop in the end of a rope.

GENERAL RULES FOR TYING KNOTS, BENDS AND HITCHES To be secure, knots, and hitches must resist the tendency to slip. This is particularly important for slippery synthetic fibre ropes. It is good practice to double the knots in polypropylene ropes.
Whenever a rope is fastened there is a reduction on strength up to 50%. The loss is not cumulative: a rope with two knots will retain 50% of its strength, like a rope with a single knot does.

COMMON KNOTS The following are common knots used to hoist materials and tools:

BOWLINE KNOT The bowline is one of the most useful of all knots, bends or hitches, however, it can decrease the efficiency of the rope by as much as 50%.



The bowline is used to hitch a rope to a ring or post, and also to make a loop in the end of the rope. The knot does not slip or jam.

- Make an overhand loop in the end of the rope.
- Pass the running end up through the loop.
- Pass the running end around the standing part.
- Pass the running end back down through the loop.
- Pull tight.

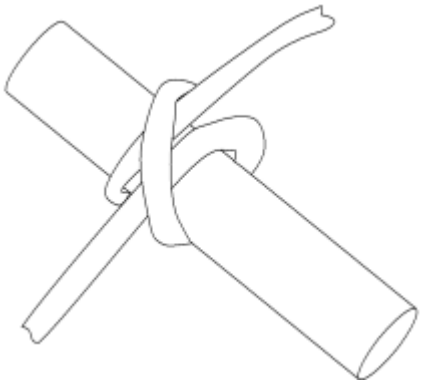
ROLLING HITCH The rolling hitch is used to attach a rope to a rounded object without slipping when it is under load.

- Wrap the running end of the rope twice around the pipe in a complete loop.
- Pass the running end down over these wraps.
- Wrap the running end once around the pipe again.
- Pass the running end under this last wrap, so that it tightens itself.
- Pull the rolling hitch tight.

ROUND TURN AND TWO HALF-HITCHES This hitch is easy to tie and will not jam.

- A round turn and two half-hitches is used to attach a rope to a post, pipe or ring.
- Wrap the running end of the rope around the post twice. The loop completely encloses the post.
- Use the running end to tie two half-hitches around the standing part of the rope. (A half-hitch is made by passing the running end of the rope around the standing part, and then under itself. A single half-hitch around an object is unreliable when pull on the rope is not steady.)
- Pull the half-hitches tight.

CLOVE HITCH normally used for securing objects, such as tying a load on a trailer or truck as a means of reliably securing one end of the rope, especially when used in combination with a sheepshank to ensure tension is maintained.



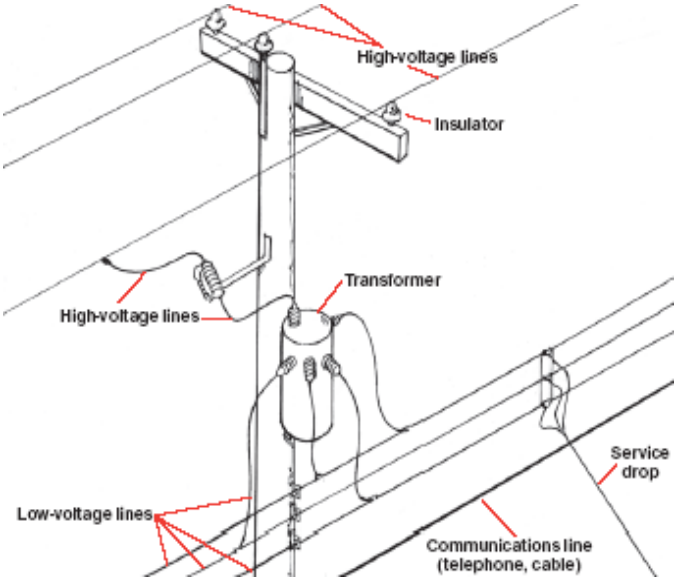
- The clove hitch is a quick, simple method of fastening a rope around a post or pipe. It can be tied in the middle, or at the end of a rope, but has a tendency to slip when used at the end.
- Form an underhand loop around the post.
- Form another underhand loop around the post.
- Pull the clove hitch tight.
- If the hitch is near the end of the rope, half-hitch the running end of the rope to the standing part.

TIMBER HITCH The timber hitch is used to attach a rope to a piece of lumber.

- Pass the running end of the rope around the timber.
- Pass the running end around the standing part.
- Wrap the running end around itself at least three times.
- Pull the timber hitch tight, so that the end is trapped against the lumber.
- Pull two half-hitches around the end of the timber with the standing part of the rope.

ELECTRICAL SAFETY

HIGH VOLTAGE HAZARD RECOGNITION High voltage lines are defined as power lines that distribute power greater than 750 volts. They are mostly located on the upper portions of power poles above the transformers and suspended on porcelain mushroom type insulators. The top of the transformers also contain high voltage lines.

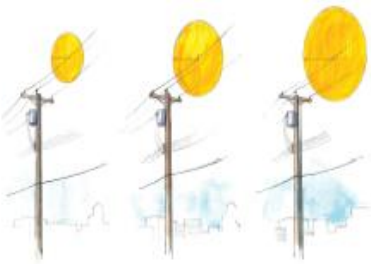


High voltage lines are mostly located on power poles in back alleys, and in parking lots around buildings. Due to location restrictions, the lines may be within 10' of building edges.
The most common power lines, employees will see on projects are the standard distribution lines on a single power pole which run between 751 to 75000 volts, however, there are other distribution lines that run voltages over 75000 volts that require employees to stay away greater than 10', these lines are usually on metal towers, not single poles.

IF THERE IS ANY DOUBT IF A POWER LINE IS HIGH VOLTAGE, CALL THE SUPERVISOR FOR CLARIFICATION

HIGH VOLTAGE LIMITS OF APPROACH

DGS Construction employees will ensure that no material is piled, stored or otherwise handled, no Scaffolding, hoists, erected or dismantled, nor any tools, machinery



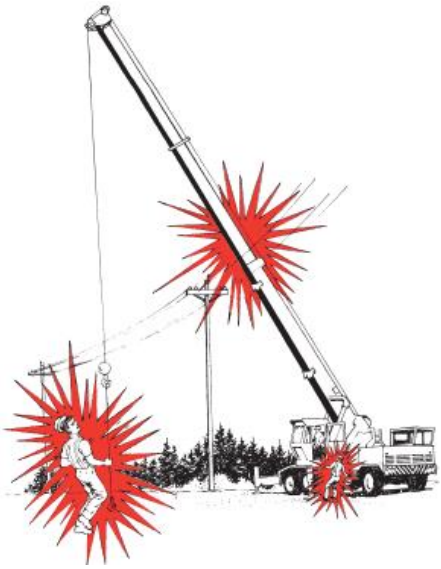
VOLTAGE	MINIMUM DISTANCE	
751V to 75KV	10'	3 meters
Over 75KV to 250KV	15'	4.6 meters
Over 250KV to 550KV	20'	6.1 meters

ent operated within the following distances:

Where overhead electric conductors are encountered in proximity to a work area, DGS Construction is responsible for:

- determining the voltage and distance to the power line by contacting the power authority, and
- ensuring employees are maintaining the minimum clearance distance.

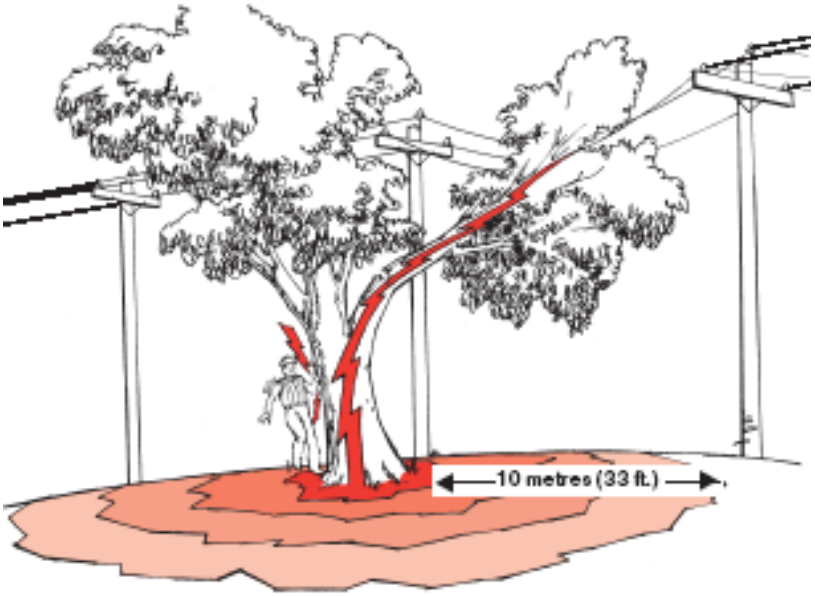
CRANE OPERATIONS NEAR POWERLINES Mobile cranes operated on any DGS Construction project **regardless of who is operating the crane** will:



- Plan the lifting away from high & low voltage lines.
- Ensure the minimum distances from high voltage lines are maintained.
- Retract the crane boom if the boom is long enough to contact a high voltage line within the radius of the boom. If this is not possible a power line spotter is required on the ground within visual distance of the operator.
- Designate a power line spotter if the crane boom is long enough to reach a high voltage line.
- Ensure the power line spotter is able to alert the crane operator if the crane boom turns in the direction where high voltage lines are located.

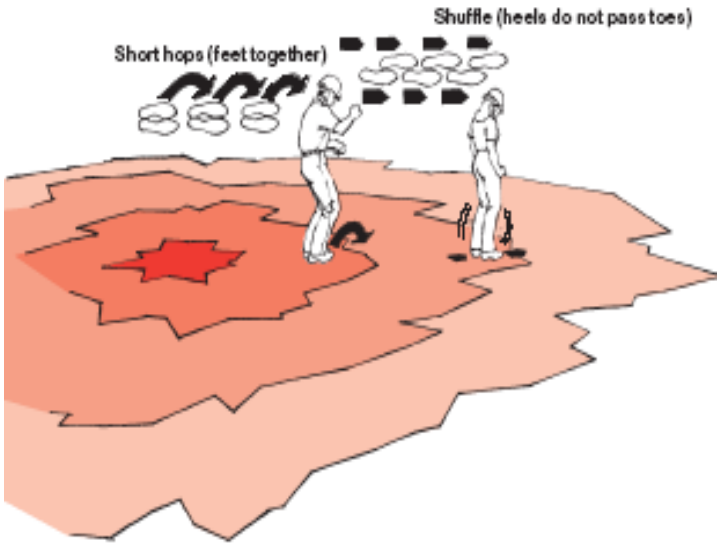
NOTE: IF A CRANE BOOM CONTACTS THE POWERLINE, POWER WILL FLOW TO THE SURROUNDING GROUND APPROXIMATELY 30'

DOWNED POWER LINES If an employee notices a power line fallen from a pole, the employee will:



- Assume the line is high voltage.
- Not go towards the line.
- Walk with their feet not separated and shuffle along the ground until they are at least 30 feet away from the area. If the employee's feet separate, there will be a potential difference between the two feet and electrocution could result.
- If in a vehicle, stay in the vehicle, and do not touch any instruments, or handles. Only leave if there is a fire, by shuffling.
- Call 911.

DO NOT ENTER AN AREA WITH A DOWN HIGH VOLTAGE POWERLINE!
STAY BACK AT LEAST 30 FEET



SHUFFLE AWAY FROM DOWNED POWERLINES

POWER TOOL AND CORD ELECTRICAL HAZARDS Power tools and cords can be the cause of low voltage electrocutions, especially in wet weather. The most common reason for low voltage electrocutions is from not having or having an inadequate grounding system. Many minor electrocutions accidents cause more serious injuries like falls or dropping materials or tools.

PREVENTING POWER TOOL ELECTRICAL INCIDENTS To ensure a power tool always has a proper ground, all power cords will be

- connected to properly working ground fault circuit interrupters (gfci's) **or**
- be tested, inspected and labeled according to the assured grounding program .

GROUND FAULT CIRCUIT INTERUPTERS (GFCI's) A properly working gfci will detect any fluctuation of current 5milliamps (ma) or greater and shut down the circuit. If the gfci detects current fluctuations it will trip and need to be re-set. If the gfci continues to trip, it is because of fault in the system, poor power cords, or moisture in the gfci.
Gfcis are required if generators are used, unless the generator is equipped with a gfci, not a fuse.

ASSURED GROUNDING PROGRAM (AGP) An assured grounding program will ensure that all site power cords and equipment have good insulated wires and proper ground plugs. The program will also ensure that the black wires (hot), white wires (neutral), and green wires (ground) of extension cords and power tool cords are properly protected.

The Assured Grounding Program consists of the following 4 elements:

1. Employee training
2. Daily visual inspection
3. Continuity and Polarity testing
4. Colour coding

ASSURED GROUNDING TRAINING: Each DGS Construction employee will be educated in the assured grounding program. If a worker notices conditions that do not conform to this assured grounding program, he/she will notify their supervisor.

Each worker must know:

1. What the purpose of using an assured grounding program is.
2. What a gfci is, and what it is used for.
3. When gfci's can be used.
4. Who will conduct power cord inspections.
5. Which cords may be repaired, and which cords must be discarded.
6. What a continuity and polarity test is.
7. How to conduct a continuity test.
8. What the color codes on power cords mean and where they are located.
9. Who do workers turn to when they observe violations of the assured grounding program.

ASSURED GROUNDING DAILY VISUAL INSPECTION**:** Employees that use power cords will inspect the tool cord and extension cord daily. Any outside insulation that is cut can be repaired with electrical tape, providing that the internal black, white, or green wires have not been cut.

If any of the internal wires have been cut or you can see the actual wire inside the insulation, that cord can not be repaired. The cord must be replaced or the section can be cut and the cord will be shortened. No extension cord may be spliced.

All extension cords must also have a ground plug. If a ground plug is missing; the cord cannot be used and the cord will need to be repaired before use.

POWER CORD CONTINUITY & POLARITY TEST: A qualified worker must test each extension cord for continuity and polarity by using a portable circuit tester. The tester is plugged into the female end of the cord while the cord is plugged into the power source. Coded lights on the tester will tell the qualified worker if any of the black, white, or green wires are crossed or not connected properly, this is a continuity and polarity test. If the test results are good, this means, all the wires are connected properly.

This test must be conducted on all cords, including new ones and must be repeated every 3 months, or after any servicing of the cord, i.e./changing male or female ends.

COLOUR- CODING POWER CORDS AND TOOLS: Power cords that have been inspected and tested in the above manner must now be tagged. Tagging consists of applying a coloured electrical tape approximately 4 inches below the male cord end.
The standard colours used in British Columbia are:

- Red - Jan, Feb, March,
- White - April, May, June
- Blue - July, August, September
- Green - Oct, Nov, December

OPERATING MOBILE EQUIPMENT

OPERATION OF MOBILE EQUIPMENT Employees operating mobile equipment including company vehicles, fork lifts, mobile cranes, boom lifts or scissor lifts will comply with the following Worksafe requirements:

16.4 Competency of operators

(1) A person must not operate mobile equipment unless the person

(a) Has received adequate instruction in the safe use of the equipment,
(b) Has demonstrated to a qualified supervisor or instructor competency in operating the equipment,
(c) if operating equipment with air brakes, has a valid air brake certificate or a driver's license with an air brake endorsement, or evidence of successful completion of a course of instruction on air brake systems by an organization acceptable to the Board, and
(d) is familiar with the operating instructions for the equipment.
(2) Subsection (1)(a) and (c) does not apply if a trainee operates the equipment under the supervision of a qualified instructor, or a supervisor.

16.5 Operator's responsibility

The operator of mobile equipment must operate the equipment safely, maintain full control of the equipment, and comply with the laws governing the operation of the equipment.

16.6 Supervisor's responsibility

A supervisor must not knowingly operate or permit a worker to operate mobile equipment which is, or could create, an undue hazard to the health or safety of any person, or is in violation of this Regulation.

MOBILE EQUIPMENT MAINTENANCE Maintenance work done on any DGS Construction mobile equipment will be done in accordance with the following Worksafe requirements:

16.3 Operation and maintenance

(3) Maintenance records for any service, repair or modification which affects the safe performance of the equipment must be maintained and be reasonably available to the operator and maintenance personnel during work hours.

(5) Servicing, maintenance and repair of mobile equipment must not be done when the equipment is operating, unless continued operation is essential to the process and a safe means is provided.

MOBILE EQUIPMENT TRAINING DGS Construction employees using fork lifts will be trained to the standard of Lift Truck Operator training: CSA Standard B335-94, Industrial Lift Truck Operator Training.

DGS Construction employees using boom lifts will be trained to the standard of CSA standard B354.4, Self-propelled boom-supported elevating work platforms.
DGS Construction employees using scissor lifts will be trained to the standard of CSA standard B354.2, Self-propelled elevating work platforms.
DGS Construction employees operating a company vehicle are required to hold a **valid drivers license with the appropriate class**.

PRE-SHIFT MOBILE EQUIPMENT INSPECTIONS Employees operating boom or scissor lifts will conduct pre-shift safety equipment inspections on a daily basis before use.
The inspection sheets are available on the mobile equipment and will be kept legible for reference and inspection.

SAFE USE OF HANDTOOLS

The following safe work practices will be followed when operating hand tools:

CLAW HAMMERS These are available in many shapes, weights, and sizes for various purposes. Handles can be wood or steel (solid or rubber). Metal handles are usually covered with shock absorbing material.

- Start with a good quality hammer of medium weight (16 ounces) with a grip suited to the size of your hand.
- Rest your arm occasionally to avoid tendonitis. Avoid overexertion in pulling out nails. Use a crow bar or nail puller when necessary.
- When nailing, start with one “soft” hit, that is, with fingers holding the nail. Then let go and drive the nail in the rest of the way.
- Strike with the hammer face at right angles to the nail head. Glancing blows can lead to flying nails. Clean the face on sandpaper to remove glue and gum.
- Don’t use nail hammers on concrete, steel chisels, hardened steel-cut nails, or masonry nails.
- Discard any hammer with a dented, chipped, or mushroomed striking face or with claws broken, deformed, or nicked inside the nail slot.

UTILITY KNIVES: Utility knives cause more cuts than any other sharp-edged cutting tool in construction.

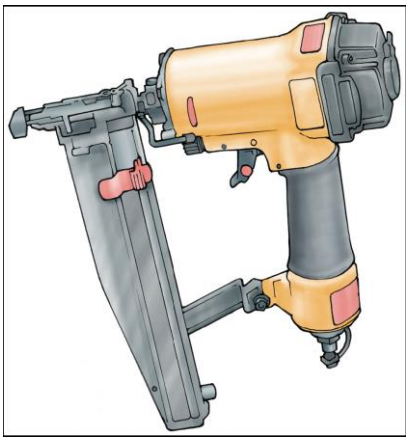
- Use knives with retractable blades when possible.
- Always cut away from your body, especially away from your free hand. When you’re done with the knife, retract the blade at once. A blade left exposed is dangerous, particularly in a toolbox.

- Where possible, set up a cutting area that has a solid backing and is at a good working height.
- Position yourself before cutting; most cuts happen because the worker was cutting from an awkward position.

HANDHELD SAW SAFETY When using hand-held saws:

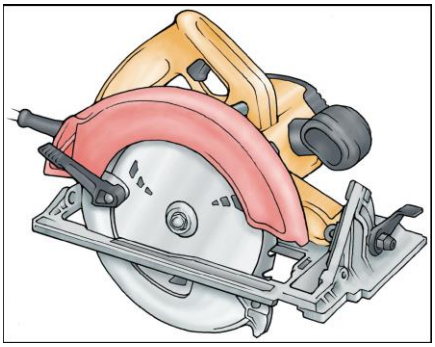
- Keep hands away from the rotating blade; wet lumber, plywood, or wood with a twisting grain can cause binding and kick back of the blade.
- Rest or clamp wood to a bench or sawhorse on a stable footing; make sure you have a firm grip on the wood being cut.
- Always use the right blade for the material you are cutting; ensure that it is sharp and installed correctly.
- When using a sabre saw (reciprocating), caution should be exercised when cutting near electrical
- wiring, copper or plastic piping.

PNEUMATIC NAILING AND STAPLING EQUIPMENT



- Permit only trained and experienced workers to operate pneumatic nailing and stapling tools.
- Wear proper eye and hearing protection.
- Make sure the tool is maintained in safe operating condition.
- Inspect the tool before connecting to the air supply:
  - Check safety mechanisms if applicable.
  - Ensure that screws and cylinder caps are securely tightened.
  - Make sure the air pressure is as specified by the manufacturer of the tool.
- Before using, check that the tool is properly connected to the air supply and is in working order, with the safety mechanism operable.
- Follow manufacturer's instructions.
- Do not operate the tool at air pressures above the manufacturer's specifications.
- Always handle the tool as if it contains fasteners.
- Always use a work-contacting element that limits the contact area to one as small as practicable.
- Make sure the mechanical linkage between the work-contacting element and trigger is enclosed.
- Disconnect the tool from the air supply and exhaust all air from the tool by squeezing the trigger when:
  - Not in use
  - Cleaning or adjusting
  - Clearing a blockage
- Only use fasteners recommended by the manufacturer of the tool.
- Do not point the tool at yourself or any other person.
- Do not squeeze the trigger unless the nosepiece of the tool is directed at a safe work surface.
- Do not transport or load the tool with your finger on the trigger.
- Do not secure the trigger in the ON position.
- Do not overreach when using the tool.
- Ensure you have the right amount of air pressure for the size and type of nail you are using

CIRCULAR SAWS



- Permit only trained and experienced workers to operate a saw.
- Wear proper eye and hearing protection, and when required, respiratory protection.
- Use sharp blades designed for your work and recommended by the tool manufacturer.
- Check the retractable lower blade guard before use, to make certain that it works correctly.
- Allow the saw to reach full power before cutting.
- Make sure the lower blade guard is fully returned before laying down the saw.
- Disconnect the power supply before adjusting or changing the blade.
- Keep all electrical cords clear of the cutting path.
- Use both hands to operate the saw.
- Keep the saw blade guards and motor clean and free of sawdust.
- Secure the work while cutting.
- Do not fix or hold the retractable lower blade guard in the open position.
- Do not place your hand under the shoe or guard of the saw while the saw is connected to the power supply.
- Do not over tighten the saw blade locking nut.
- Do not twist the saw while cutting to change direction or saw alignment unless the blade is designed for that purpose.
- Do not use a saw that vibrates or is defective.
- Do not force the saw during cutting.
- Do not cut materials without first checking for obstructions or foreign objects such as nails and screws in the cutting path of the saw.
- Do not carry portable circular saws with hands or fingers on the trigger switch.

POWERED HAND DRILLS

- Wear proper eye and hearing protection.
- Keep drill vents clear to maintain adequate drill ventilation.

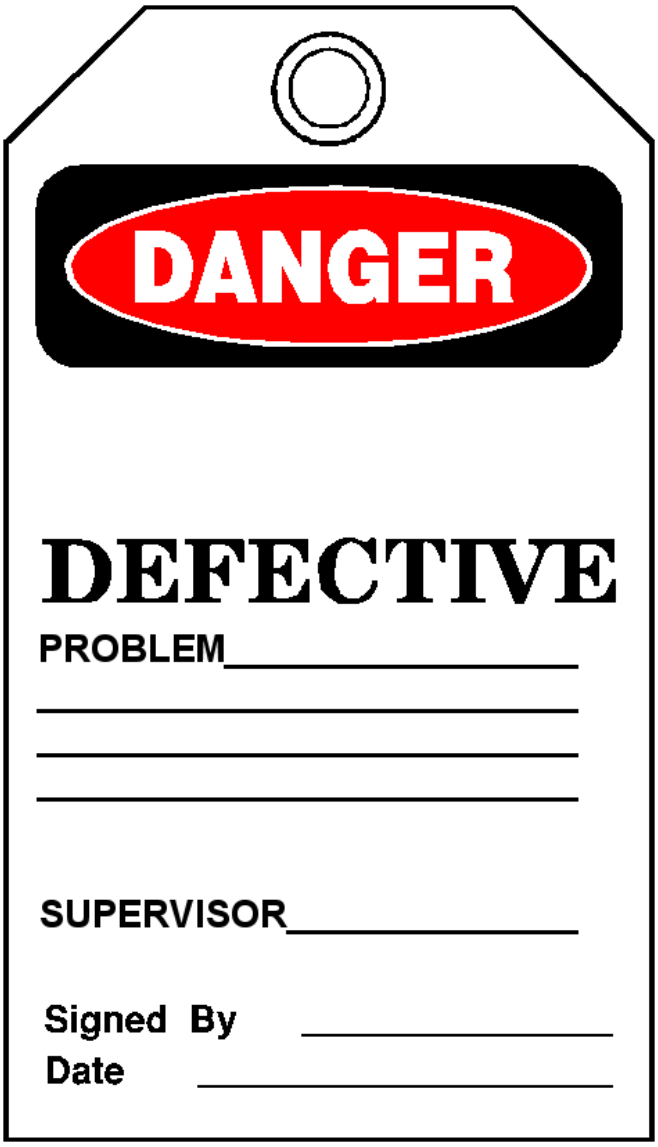
- Keep drill bits sharp at all times.
- Keep electrical cords clear of the drilling area.
- Secure the material being drilled to prevent movement.
- Slow the rate of feed before breaking through the surface.
- Do not use a bent or damaged drill bit.
- Do not exceed the manufacturer's recommended maximum drilling capacities.
- Do not use high speed steel bits without cooling or lubrication.
- Do not reach under or around material being drilled.
- Do not overreach. Keep proper footing and balance at all times.
- Do not drill with one hand while holding the material with the other.
- Drill a small pilot hole before drilling large holes.
- Disconnect the power supply before changing or adjusting the drill bit or other attachments.
- Remove the chuck key before connecting the drill to the power supply.

POWDER ACTUATED TOOLS:

- Only employees specifically trained by Hilti to use powder-actuated tools are permitted to use them.
- Powder-actuated tools operate like loaded guns. Handle powder-actuated tools with the same respect and safety precautions as guns.
- Wear safety glasses or a face shield a hard hat and hearing protection.
- Brace yourself at all times when working on ladders or scaffolds to maintain good balance.
- Keep tools pointed in a safe direction. Never point powder-actuated tools at anyone.
- Load powder-actuated tools just before use. Do not carry loaded tools from job to job.
- Do not leave loaded powder-actuated tools unattended.
- Do not permit bystanders near the work.
- Clean and maintain tools according to the manufacturers' instructions.
- Check tools before use to ensure that they are in good working order.
- Tag defective tools "Out of service" and remove from service until properly repaired.
- Store tools and cartridges in a container when they are not in use.
- Ensure that the tool is unloaded before storing it.
- Use the tool at right angles to the work surface.
- Check the chamber to see that the barrel is clean and free from any obstruction, before using the tool.
- Do not use the tool where flammable or explosive vapours, dust or similar substances are present.
- Do not place your hand over the front (muzzle) end of a loaded tool.
- Use only the projectiles (fasteners, nails, studs, etc.) recommended by the tool manufacturer.
- Ensure that the base material has no holes or openings and is of sufficient consistency to prevent a projectile from passing right through.
- Do not load a tool until immediately before use.
- Do not force a projectile into a working surface that is harder than the projectile being used. If the base material is unknown, use a hand hammer to drive the projectile, using it as a centre punch
- Check that the colour of the cartridge is appropriate for work being done. Charge cartridges are colour-coded to show their strength.
- Conduct a first trial by using the weakest or lowest strength charge cartridge.
- Hold the tool in the fixing position for no less than 5 to 15 seconds when a tool misfires. Keep the tool pointed in a direction that will not cause injury to you or others and unload a cartridge with extreme caution.
- Use caution when using tools near live electrical circuits. Make sure that the nails (etc.) do not enter live circuits buried or hidden in the base material.
- Do not attempt to force a cartridge into a tool.
- Do not discard unfired cartridges carelessly.
- Do not carry cartridges loose or in a pocket. Carry them in the manufacturer's package.

DEFECTIVE EQUIPMENT & TOOLS

DEFECTIVE EQUIPMENT AND TOOLS POLICY Using defective tools or equipment will lead to incidents and poor workmanship.
Supervisors will inspect tools and equipment before leaving the shop area to prevent defective tools or equipment from getting on site and being used by employees.
Bringing defective tools or equipment to the jobsite not only creates unsafe conditions, but also wastes time, as the defective device will need to be removed from site and replaced.



DGS Construction employees noticing defective tools or equipment will bring the device to the site supervisor's attention.
The site supervisor will inspect the tool or equipment and fix the following defective tag onto the device before sending it back to the shop for repair or replacement.

SAFE WORK PROCEDURES FOR LIFTING

LIFTING POLICY Lifting heavy materials and equipment is part of the construction industry, and as such, not all employees are able to perform the duties of a construction worker.

Employees are expected to show up for work in good physical condition and be able to perform typical construction tasks

DGS Construction is dedicated to minimize the injuries sustained by workers lifting overly heavy tools or equipment and working in awkward positions.

LIFTING WITH OTHER WORKERS In order to lift and transport the above materials or equipment, two workers must work together. Before lifting heavy objects with another worker, ensure that you and your lifting partner:

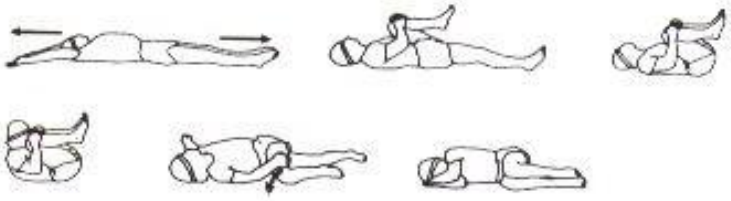
- are familiar with the weight of the object.
- know the location where the object is being transported to.
- know the proper lifting techniques.
- plan to lift the object simultaneously.
- know the best location to grab the object (pick points).
- plan to lower and release the object simultaneously.

SAFE LIFTING PRACTICES Employees will follow these guidelines to minimize the potential for back injuries:

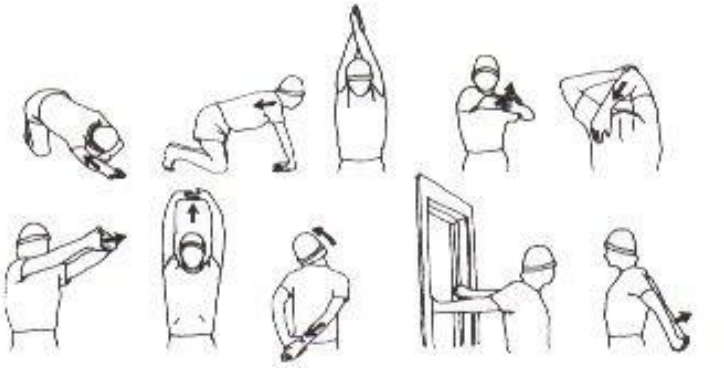
- **Do not over exert yourself, ask a fellow worker to help you when a load is to heavy or bulky for one person to transport alone. A back injury is not worth it!**
- Stretch and do a short warm-up before your workday (see stretching exercises).
- Determine if the object can be moved with a wheelbarrow, trailer, or other lifting device.
- Lift with your legs, not with your back. Lift, then turn or pivot, do not lift and turn at the same time.
- Carry objects as close as possible to your body.
- Keep your feet shoulder width apart for balance with one foot staggered in front of the other when beginning a lift.
- Keep your back as straight as possible when carrying objects, and when standing or sitting.
- Face the direction in which the load is to be placed; this will reduce twisting of the body.
- Try to lessen the load within reason..
- Never try to catch a heavy object when dropped.
- Change body positions when positioned for a long period of time.

RECOMMENDED PRE-LIFT STRETCHES Prior to heavy lifting cycles, you are permitted a few minutes of time during the workday (within reason) to conduct stretching exercises. DGS Construction recommends the following pre-work stretches:

Back exercises



Back, shoulder & arm exercises



Lower back, hips, groin & hamstring exercises

EXPOSURE TO HEAT STRESS

HEAT STRESS RECOGNITION

In the construction industry, employees are expected to work in very hot conditions. Management will make every effort to minimize exposure to hot sunny days by starting the workday earlier in the morning; however, not being exposed to heat is not always possible.
The following information is in relation to heat stress.
Employees need to understand heat stress problems and be able to identify heat stress symptoms so that you can avoid sickness or injury.

HEAT CRAMPS Occurs in the muscles that have performed the most work (usually in arms or legs), It results from a salt imbalance in muscles. Onset is often delayed and cramping may occur during a rest period. Treatment focuses on fluid and salt replacement. Fruit juices are useful, or a solution of one teaspoon of salt per 500ml of water is recommended for treatment.

HEAT EXHAUSTION Occurs during prolonged periods of exertion, often to workers that are not used to the heat or heavy workload in the heat. It is caused by both water and salt depletion. Onset may develop during extreme exertion with no fluid intake, or it may take a few days of less severe exertion in a hot environment. Common features are general weakness, fatigue, dizziness, headache, and nausea. Skin is usually pale, cool and clammy, there is a weak rapid pulse and rapid shallow breathing. Treatment is moving to a cooler area and cooling down with sponging or fanning. If you do not feel well after taking a break and cooling down, go to a doctor.

HEAT STROKE Occurs as a result of extreme exertion, often in workers not used to the heat. The body process for heat loss are overwhelmed and fail. Onset is during extreme exertion in a hot humid environment. The body temperature approaches or exceeds 41 C. Common features are headache, nausea, vomiting, there is hot, dry, flushed skin, with no sweating. You may be agitated or confused, **this is a medical emergency!!!** Cool down now! Move to the nearest cool area !!! and call 911 for emergency help.

In short, if you need a break because of the heat, tell the supervisor that you need a break.

CONTROLLING WORKER HEAT STRESSES The following are ways to help control heat stresses to employees. Although working in warm and hot heat environments is part of the construction industry, some of the following preventative measures can be used to minimize heat stresses:

- When possible, work in the shade
- Cover skin with clothing and apply skin lotions with a sun protection factor of at least 15. Avoid direct sunlight
- Reduce activity levels and/or heat exposure by scheduling strenuous jobs to cooler times of the day.
- Drink cool drinking water or other liquids a cup every 20 minutes approximately.
- Check on employees to help spot the symptoms that often precede heat stroke
- Increase the frequency and length of rest breaks.
- Progressively acclimatize yourself.
- Recognize the signs and symptoms of heat stress and start a "buddy system" since people are not likely to notice their own symptoms.
- Wear light summer clothing to allow free air movement and sweat evaporation.
- Use handkerchiefs soaked in cool water to wear under your hardhat.
- Ask your supervisor if hardhats can be removed.
- Purchase a hardhat equipped with cooling fins. These hardhats provide better air circulation.
- Inform your supervisor if not feeling well.
- Avoid alcohol and caffeinated beverages after and during working hours.

POTENTIAL EMPLOYEE HARMFUL EXPOSURES

EXPOSURE TO NOISE Employees will be exposed to many loud noises in the construction industry. Employees exposed to sound levels of 85dBA or greater are required to wear hearing protection. The hearing protection may be disposable or fitted ear plugs (decidamps), or ear muffs. DGS Construction will provide disposable hearing protection at all times for employees.
A good rule of thumb is if you are exposed to an area where the noise is as loud as or louder than a gas-powered lawnmower, the level is approximately 85dBA and hearing protection is required.

Conditions where wearing hearing protection is mandatory are:

- operating a nail gun, powder actuated gun, grinder, cutoff saw, gas powered chain saw, skill saw, nail gun,

HEARING TESTING Employees will have their hearing tested on an annual basis. The hearing tests are given to detect if there is a trend of hearing loss. The hearing test records will be kept for reference and records.

EXPOSURE TO VAPORS Some products employees use while at work will give off vapors that are hazardous to employees. Some vapors can be inhaled, or absorbed into the body which should not be inhaled at all. This is why a product msds is so important in determining how hazardous the product is, and what protective equipment must be worn.
Common work processes that involve use of hazardous products are priming, using adhesives, applying formwork release oils.
Employees will be informed of any high hazard products before you use them, however, everyone is different. If an employees is exposed to a product that gives rashes, or makes them feel dizzy or if feel ill when using the product, stop the work process and inform your supervisor.

EXPOSURE TO SILICA An employee that cuts, drills, or grinds concrete may be exposed to silica which is in the concrete dust. Silica can be as hazardous to an employee as asbestos. Anytime concrete dust is created that employees could inhale, the employee must wear a half mask respirator with a hepa (high efficiency particulate air filter) cartridge.

The employee will need to be instructed on how to use and store your respirator, you will also need to be fit tested and instructed on how to test and wear your respirator.

EXPOSURE TO ASBESTOS: From time to time there may be a project that involves working near asbestos materials. Asbestos is a material that can cause serious negative health effects if an employee is not properly protected.
Management will inform employees of any asbestos projects, and special assessments. Training, procedures, and safety equipment will be provided. The training will include information on what asbestos is, what the hazards of asbestos, are and the procedures for working on the specific project.

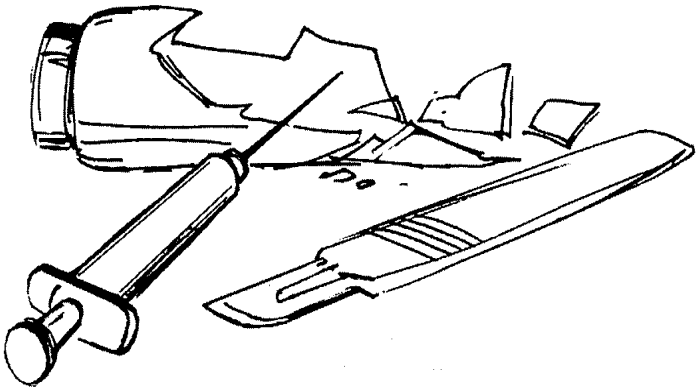
EXPOSURE TO BIOHAZARDS

COMMUNICABLE DISEASES Communicable diseases have become more of an important issue over the last few years. Diseases that can be spread in the construction industry may be HIV/AIDS, Hepatitis B and Hepatitis C. All these diseases can be spread by exposure to certain body fluids or infected blood in body fluids. Employees may encounter communicable diseases from needles left on site, exposure to blood from typical worker cuts, blood from patients if the employee is a first aid attendant, or sharing food or fluids.

SITE WATER JUG

Drinking water will be provided to employees on the jobsite at all times during hot weather as part of a heat stress control.
Employees are asked to not drink directly from a water jug or share drinking cups as the Hepatitis B virus can be spread by saliva.

EXPOSURE TO NEEDLES



In the past decade there have been more and more incidents on construction sites where workers have come in accidental contact with blood and/or needles.
These blood containing materials or needles may contain viruses that can enter the body and infect an employee with diseases that at present, there is no cure for.

Employees must ensure the following information is understood and followed, not only for their own safety, but for the safety of co-workers

HOW CAN I BE EXPOSED TO INFECTED BLOOD AND BODY FLUIDS AT WORK?

HIV, Hepatitis B and Hepatitis C viruses must have the opportunity to enter your body for contact with blood and certain body fluids to pose a risk of infection. Whether an infection occurs depends on your ability to fight infection. You can be exposed to infected blood and body fluids at work by:

Puncturing the skin with sharp objects contaminated with infected blood and body fluids. “sharps” include needles, knives, razors, scissors, broken glass, or anything that can puncture or cut your skin.
Splashing infected blood and body fluids into the tissues lining the eyes, nose, or mouth. (these tissues are called mucous membranes)
Splashing infected blood and body fluids on fresh open cuts, nicks, wounds, skin abrasions, or chapped and damaged skin.

YOU MUST TREAT ALL BLOOD AND BODY FLUIDS OF EVERY PERSON AS IF THEY’RE INFECTIOUS.

COMMUNICABLE DISEASE EXPOSURE POLICY DGS Construction does not permit employees to partake in the physical removal and disposal of sharps, or materials containing blood or body fluids.

If any employee of DGS Construction observes “sharps” or infected materials containing blood, that employee will report the observation directly to his / her immediate site supervisor.

The site supervisor will inform management immediately.
Management will contact the company safety officer and DEYAS (Downtown Eastside Youth Activities Society) phone # 604 – 685 – 6561.

The “sharp” or infected material can be moved away from the work area by using a shovel, broom, long stick, etc…. No worker will come in direct contact with the “sharp” or infected material.
If the “sharp or infected material is moved, the supervisor must delineate the area where the “sharp” or infected material is being temporarily stored and inform management of the location.

NOTE: SHARPS OR WILL NEVER BE DISPOSED OF IN GARBAGE BINS OR OTHER GARBAGE CONTAINERS.

WHAT DO I DO IF AN INCIDENT OCCURS? The following exposure incidents are potentially harmful:

- Skin is punctured with a contaminated sharp.
- A mucous membrane is splashed with blood and certain body fluids.
- Non-intact skin is splashed with blood and certain body fluids.

PUNCTURE INCIDENTS If any of the above incidents occur, follow these steps:

- Get first aid treatment immediately.
- If the mucous membranes of the eyes, nose or mouth are affected, flush with lots of clean water at a sink or eyewash station.
- If there is a sharp injury, allow the wound to bleed freely. Then wash the area thoroughly with non-abrasive soap and water. Management will obtain the sharp from the scene as soon as possible, in order that it can be tested.
- If an area of non-intact skin is affected, wash the area thoroughly with non-abrasive soap and water.
- Report the incident to your immediate supervisor. The supervisor will immediately contact management.
- Seek medical attention immediately, at least within 2 hours.
- Go to the nearest hospital emergency room, or at a health care facility if there is no hospital.
- Immunizations or medications may be necessary. These may prevent infection or alter the course of the disease if you do become infected.
- Blood tests should also be done at that time. You may need to see your family doctor within the next five days for follow-up, such as counseling and medications.

COMMUNICABLE DISEASE "**DON'TS**" For your safety, do not:

- Reach into areas that you cannot see (especially re-roofing). ie/ sharps can be hiding anywhere.
- Leave a contaminated area without informing your supervisor.
- Attempt to pick up any sharps. **Call management.**
- Try to suck out any contaminants if you get stuck or cut with a sharp.
- Throw sharps into the garbage bins or cans.
- Carry garbage bags against your body, or with one hand on the bottom for support.
- Throw the sharp away if you get stuck or cut, the sharp can be tested for viruses.
- Share drinking fluids, or fluid containers (water bottles).
- Assume that a sharp is not contaminated.
- Take this issue lightly.

EXPOSURE TO WEST NILE DISEASE West Nile Virus infection is an illness transmitted to humans primarily by mosquitoes and known to infect birds and other animals as well as humans. In most cases, persons infected with West Nile Virus either show no symptoms or have very mild flu-like symptoms, called West Nile fever. These mild cases of West Nile fever normally last only a few days and are not believed to cause any long-term effects.

SIGNS & SYMPTOMS OF WEST NILE DISEASE The typical time from infection to the onset of signs and symptoms is 3 to 14 days. Signs and symptoms of the milder illness, West Nile fever, include:

- Headache
- Fever
- Body aches
- Sometimes, swollen lymph nodes
- Sometimes, a skin rash on the body

More severe infection (West Nile encephalitis or meningitis), the signs and symptoms include:

- Headache
- High fever
- Stiffness in the neck
- Disorientation (in very severe cases, coma)
- Tremors and convulsions
- Muscle weakness (in very severe cases, paralysis)

WEST NILE DIEASE CONTROLS The risk of getting infected can be reduced by minimizing or eliminating mosquito bites. To minimize mosquito bites employees should:

- Reduce or eliminate mosquito populations by disrupting their breeding grounds. Ie/ get rid of stagnant or standing water, mosquitos can breed in 4 days.
- Cover as much of the skin as possible by wearing shirts with long sleeves, long pants and socks.
- Use insect repellents containing DEET. According to the CDC, the most effective repellents contain DEET (N, N-diethyl-m-toluamide or N, N-diethyl-3-methylbenzamide).

Note: In order to avoid reaction to DEET or other ingredients of insect repellents, it is important that employees read and follow the directions on all insect repellent before use. Repellents should not be applied to skin that is already irritated, or to cuts/lacerations.

EXPOSURE TO BEE STINGS Bee stings effect employees in different ways. Some employees can be stung with no adverse allergic reactions, however, some employees can have severe reactions that could result in death if treatment is not available in a timely manner.

Employees that are aware of bee sting allergic reactions are required to inform the supervisor and have their medical treatment with them at all times.

FIRST AID REQUIREMENTS

FIRST AID INFORMATION

On any project, the site supervisor is responsible for ensuring first aid services are available. They will determine and inform each crew employee the following first aid information:
Who the crew first aid attendant is.
Where the site first aid station is located.
How to obtain first aid service ie/ are there first aid horns, how many times are they to be blown.

FIRST AID EQUIPMENT

The DGS Construction first aid attendant is the only person qualified to give first aid services and use first aid equipment from the first aid kits.
DGS Construction will supply a level 1 first aid kit to projects when required. If a level 2 first aid attendant is required, the company safety officer will determine the equipment required and transportation of injured employees.
The level 1 first aid kit will be available in good condition and contain the following supplies:

LEVEL 1 FIRST AID KIT CONTENTS	
24	14 cm x 19 cm wound cleaning towelettes individually packaged
60	hand cleansing towellettes, individually packaged
100	Sterile adhesive dressings, assorted sizes, individually packaged
12	10 cm x 10 cm sterile gauze dressings, individually packaged
4	10 cm x 16.5 cm sterile pressure dressings with crepe ties
2	7.5 cm x 4.5 m crepe roller bandages
1	2.5 cm x 4.5 m adhesive tape
4	20 cm x 25 cm sterile abdominal dressings, individually packaged
6	Cotton triangular bandages, minimum length of base 1.25 m
4	Safety pins
1	14 cm stainless steel bandage scissors or universal scissors
1	11.5 cm stainless steel silver forceps
12	Cotton tip applicators
1	Pocket mask with a one-way valve and oxygen inlet
6	Pairs of medical gloves (preferably non-latex)
1	Eyewash station
	First aid record sheets and a pen

FIRST AID RECORDS & DOCUMENTS The DGS Construction first aid attendant is required to document any treatment given to an injured employee and give the site supervisor the first aid record document. The site supervisor will turn in the first aid record to the office.
First aid records are required for any treatment, whether additional medical attention is given or not.

The first aid attendant is required to provide the injured employee a WCB form 6A if the employee requires additional medical attention. The injured employee is required to complete the form 6A and provide it to management (see injury reporting policy).

WORKPLACE FIRST AID ASSESSMENT

Effective March 30, 2004 the BC Workers' Compensation Board (regulation 3.16(2)) requires a first aid assessment of the circumstances at each workplace. The circumstances will determine the level of first aid coverage.

DGS Construction requires the project superintendent to conduct a first aid assessment and document the assessment on the work permit first aid information section before workers are dispatched to the workplace.

FIRST AID ASSESMENT: The following system will be used by the project superintendent to determine the level of first aid services, equipment and transportation required.

Step # 1, Identify the Workplace:

- Each workplace will have its own first aid assessment documented on the work permit.
- The work permit must be on site for reference and inspection by a WCB or DGS Construction Safety Officer.
- If workers of two or more employers are working at the same workplace at the same time, the prime contractor is responsible for conducting a first aid assessment and providing the first aid services as identified in the assessment. Ie/ if there are DGS Construction workers and subcontractors on the same site, DGS Construction is the prime contractor.

Step # 2, Identify the Hazard Rating:

- DGS Construction has identified that workers in the field are exposed to high-risk job functions, this was based on worker exposure to the following hazards:
    - Working in the presence of a biohazardous material, toxic substance, or chemical which if released, would result in workers needing immediate medical treatment as a result of inhalation or eye or skin contact.
    - Using tools, equipment, or machinery for high-speed grinding, cutting, chipping or drilling.
    - Working near mobile equipment where there is a possibility of a worker being struck.
    - Working at elevations.
- Workers employed in the shop areas are assigned a **Moderate Hazard rating** (M).
- Workers employed at workplaces other than the shop areas are assigned a **High Hazard rating** (H).

Potential Types of Injuries:

Falls from elevations, chemical exposure, electrocution by low voltage, punctures, severe cuts, stuck by (falling materials, mobile equipment) burns, heat related disorders.

Step # 3, Determine Surface Travel Time to Hospital:

- The designated hospital or medical facility must be documented on the work permit.

  Hospital is a "hospital or diagnostic and treatment centre that has an emergency department or resuscitation area and a physician on duty, or immediately available on call, during the hours when workers might need these services".
  Designated Hospitals or treatment facilities must have an emergency department or resuscitation area, a physician on duty or immediately available on call, and open during working hours.
- The superintendent must determine is the surface travel time from the workplace to the designated hospital would be greater than or less than 20 minutes.

Step # 4, Determine Number Of Workers & First Aid Services:

- The supplies, first aid attendant, and first aid transportation will be determined according to table # 1 below:

NOTE: When determining the response time of ambulances & time it takes to get to a hospital, consider the following factors:

- Distance from the workplace to the ambulance centre
- Availability of full-time or part-time crews on call
- Obstructions or barriers on the access route to the workplace, eg/ regularly recurring blocking of roads by railway trains.

- If Emergency Transport Vehicles (EMT) are required, they will meet the following:
  - Capable of traversing the area it is intended to serve.
  - Have a min of 1 meter of clear headroom.
  - Provide protection from the natural elements & dust.

TABLE # 1 REQUIRED FIRST AID SERVICES

# of workers	Time to hospital	Kit required	Level of attendant	Transportation required
≤ 15	< 20 min	Level 1	Level 1	Company vehicle, ambulance
16 - 30	< 20 min	Level 2 & station	Level 2	Company vehicle, ambulance
≤ 5	> 20 min	Level 1 with blankets	Level 1	Company vehicle, ambulance
6 -10	> 20 min	Level 1 with blankets & ETV equipment	Level 1 & transportation endorsement	Emergency Transport Vehicle (ETV)
11 - 30	> 20 min	Level 3 & dressing station	Level 3 Unrestricted if > 2 hrs away	Emergency Transport Vehicle (ETV)

  - Provide adequate warmth to maintain a normal body temperature when the injured worker is covered with 3 blankets.
  - Have effective voice communication between the operator and the attendant in the vehicle.
  - Have a communication system with the district office and the hospital

EMPLOYEE INJURY REPORTING POLICY

If An Employee Gets Injured On The Job:

1. The injury will be reported to the supervisor as soon as possible, he / she will obtain the following information:

- What, when, where, and to whom the accident happened.
- Why the accident occurred.
- Was personal protective equipment used.
- Are there witnesses. (names & phone numbers)
- Were any safety rules not followed.
- What treatment was given, (sent to hospital, first aid, medical clinic)
- Who the first aid attendant was, if applicable

2. The supervisor will report the injury to management. Management will make arrangements with the injured employee to obtain the required Worksafe "Report of Injury" form, (form 6A) and the doctor medical status report form.

3. The employee must fully complete the Worksafe form 6A as required by law (Worksafe Act) and inform management after the form is completed. The Management will schedule an investigation meeting where the WCB form 7 will be completed. The employee will bring his / her form 6A to the meeting.

4. The employee will attend the investigation meeting, and provide the form 6A and any other information to management.

5. DGS Construction has a WCB accepted "Return to Work Program". The goal of this program is to help in employee recovery by providing light duty work and keeping employees active until they can return to full work duties.
   Employees are required to fully participate in the return to work program and follow the directives given by the claims manager, failure to follow the return to work directives will result in Worksafe claim suspensions or terminations.

6. Depending on the injury, the claims manager may provide a "Medical Status Report" form to the employee. The form must be completed by the employee's doctor and given to management to obtain a better indication of any physical limitations.

7. Employees are required to cooperate with the management and inform management if there are changes in the employees condition.

INJURY CLAIM FRAUD Employees that provide false information to management or supervisor regarding an injury claim is considered to be a very serious offense. If this occurs, the employees employment will be terminated and the claim case will be turned over to the Worksafe Fraud, and Legal Division. Worksafe BC will initiate a criminal investigation into the matter. Further civil suits may be initiated.

ACCIDENT & INCIDENT INVESTIGATIONS

The purpose of an accident or incident investigation is so that the cause and corrective actions can be implemented to prevent recurrences.

An accident or incident investigation will be conducted if an accident happens that requires medical attention, incident investigations will take place when an incident takes place where no employee was injured, however, the potential for an accident was present (near misses).

WHEN AN ACCIDENT OCCURS In the event of an accident, the supervisor and workers will:

- Assist in first aid and obtaining medical attention.
- Call the WCB at 604-276-3100 if the accident meets the “When to Call WCB “criteria.
- Call the office and notify management.
- Not disturb the scene of the accident unless necessary for first aid purposes.
- Give written statements as to what was seen to management.
- Cooperate with management, police and Worksafe BC Officers.

WHEN TO CALL WORKSAFE BC Worksafe BC will be called at 604-276-3100 by the DGS Construction site supervisor if the accident:

- Resulted in worker death or critical condition with a serious risk of death.
- Involved a major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system or excavation.
- Involve the major release of a toxic or hazardous substance.
- Was a blasting accident.

ACCIDENT / INCIDENT RESPONSIBILITIES

- All employees will report all accidents and incidents to the immediate supervisor.
- Management will conduct accident and incident investigations.
- Supervisors will assist the DGS Construction management in conducting accident & incident investigations.

INCIDENT INVESTIGATION REPORT FORM

Incident: **Includes an accident or other occurrence which resulted in or had potential for causing an injury or occupational disease.**
This form shall be completed & given to management, by the site supervisor when an incident resulted in an injury requiring medical or first aid treatment , **OR** no worker was injured, but, the incident had the potential for causing serious injury.

Management is to be called if a worker is injured & required medical treatment.

Nature of reportable event:
- ☐ incident (no injury, but potential for causing serious injury)
- ☐ accident with first aid treatment only
- ☐ accident medical treatment only (no time loss)
- ☐ accident with time loss

Jobsite Location:_____Date & Time of Incident:_____

Specific location incident occurred:_____

Worker's name & position involved in incident:_____

Worker's injuries or potential loss:_____

Description of incident:_____

_____

_____

_____

Root Cause of Incident:_____

Contributing factors causing incident:_____

_____

Corrective action taken:_____

_____

Additional corrective action recommended:_____

_____

Supervisor name & phone #:_____ Witness name & phone #:_____

Witness name & phone #:_____ Witness name & phone #:_____

Investigator name & phone # _____

EMERGENCY PREPAREDNESS POLICY

DGS Construction site supervisors will obtain emergency preparedness information and inform the work crew at the site safety orientation meeting. The information will include:

- Employees are aware of site emergency evacuation procedures including signals, and marshalling areas.
- Employees are aware of the nearest hospital location.
- Employees are not working alone, unless following the working alone policy.
- Employees are aware of the nearest first-aid facility, and attendants.
- First-aid equipment is present on all job sites.
- All first-aid equipment is complete and meets or exceeds Worksafe BC First - Aid Regulations. If there is not adequate first aid equipment, the site supervisor will notify DGS Construction management.
- Fire extinguishers will be present on every job site for use in emergency fire situations.
- A means for calling the fire department, ambulance or an emergency response team will be available on every job site. Radios or cellular phones are acceptable means of communication.

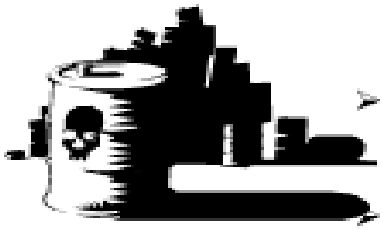
EMERGENCY PHONE NUMBERS

Office:	604 – 584 – 2214
Safety Officer (Rob Zygmunski):	604 – 818 - 3991
Ambulance, Fire, Police:	911
Gas Leaks & Odors:	1- 800 – 663 - 9911
Dangerous Goods Spill, Earthquake, Flood, Tsunami:	1 – 800 – 663 - 3456
Poison Control Centre:	(604) 682-5050 (604) 682-2344
Worksafe BC:	604 – 276 - 3100
BC Hydro:	1 - 888 - POWERON
Gas Emergencies (Terason):	1- 800 – 663 - 9911

HOSPITALS / POLICE / FIRE DEPARTMENT NON-EMERGENCY NUMBERS

ABBOTSFORD	MSA Hospital	2179 McCallum Rd, Abbotsford	604-853-2201
	Fire Department non-emergency		604-853-3566
	Police non-emergency		604-859-5225
BURNABY	Burnaby Hospital	3935 Kincaid St. Burnaby, BC	604-434-4211
	Fire Department non-emergency		604-294-7190
	RCMP non-emergency		604-294-7922
CHILLIWACK	Chilliwack General Hospital	45600 Menholm, Chilliwack	604-795-4141
	Fire Department non-emergency		604-792-8713
	Police non-emergency		604-792-4611
LANGLEY	Langley Memorial Hospital	22051 Fraser Hwy, Langley	604-534-4121
	Fire Department non-emergency		604-514-2880
	RCMP non-emergency		604-532-3200
MAPLE RIDGE	Ridge Meadows Hospital	11666 Laity St, Maple Ridge	604-463-4111
	Fire Department non-emergency		604-463-5880
	RCMP non-emergency		604-463-6251
MISSION	Mission Memorial Hospital	7324 Hurd St, Mission	604-826-6261
	Fire Department non-emergency		604-820-3793
	RCMP non-emergency		604-820-2722
NEW WESTMINSTER	Royal Columbian Hospital	330 E. Columbia St. New West	604-520-4253
	Fire Department non-emergency		604-519-1000
	RCMP non-emergency		604-525-5411
NORTH VANCOUVER	Lion's Gate Hospital	231 E. 15, North Vancouver	604-988-3131
	Fire Department non-emergency		604-980-5021
	Police non-emergency		604-985-1311
PORT MOODY	Eagle Ridge Hospital	475 Guildford Way, Port Moody	604-461-2022
	Fire Department non-emergency		604-469-7795
	RCMP non-emergency		604-461-3456
RICHMOND	Richmond General Hospital	7000 Westminster Hwy, Richmond	604-278-9711
	Fire Department non-emergency		604-278-5131
	RCMP non-emergency		604-278-1212
SURREY	Surrey Memorial Hospital	13750 96 Ave, Surrey	604-586-2772
	Delta Hospital	5800 Mountain View Blvd., Delta	604-946-1121
	Fire Department non-emergency		604-543-6700
	RCMP non-emergency		604-599-7619
VANCOUVER	Children's Hospital	4480 Oak St., Vancouver	604-875-2345
	St. Paul's Hospital	1081 Burrard St., Vancouver	604-682-2344
	University Hospital	2211 Wesbrook Mall, Vancouver	604-822-7121
	Vancouver Hospital	855 W. 12th Avenue, Vancouver	604-875-4111
	Fire Department non-emergency		604-665-6000
	Police non-emergency		604-717-3321
WHITE ROCK	Peace Arch Hospital	15521 Russell Ave, White Rock	604-531-5512
	Fire Department non-emergency		604-541-2121
	RCMP non-emergency		604-531-5527

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)



- **WORKPLACE**
  - deals only with products used in the workplace
- **HAZARDOUS MATERIALS**
  - dangerous products that may cause fires, explosions, or health problems
- **INFORMATION SYSTEM**
  - provides information about hazardous materials

WHMIS ELEMENTS

The WHMIS is based on the following three key elements:

- material safety data sheets (MSDS)
- labelling (from the supplier & workplace labels)
- training

WHMIS TRAINING

All DGS Construction employees will be trained in the WHMIS.

- All DGS Construction employees that come in contact or work in the vicinity will be trained in how to identify the hazards of the controlled product they are using, how to protect themselves against the hazards of the product and where to obtain further safety information about the product.

IF YOU ARE NOT AWARE OF THE HAZARDS OF THE PRODUCTS YOU ARE USING, INFORM YOUR SUPERVISOR !

MATERIAL SAFETY DATA SHEETS (MSDS) Material safety data sheets (msds) give all the information about the product. Material safety data sheets are available for review in the job file which the site superintendent has on the job.

Msds's are periodically reviewed to ensure they are up to date and are a maximum 3 years old.

WHMIS LABELS Controlled products are labelled in two ways:

- supplier labels
- workplace labels

SUPPLIER LABEL EXAMPLE

Controlled products used by DGS Construction will be labelled with supplier or workplace labels. Workplace labels will be used if small quantities of a controlled product are being transferred from a large supplier labelled container to a smaller unlabelled container.

IF WHMIS LABELS ARE MISSING FROM PAILS OR CONTAINERS, INFORM THE SUPERVISOR, WHO WILL INFORM MANAGEMENT TO OBTAIN EITHER A SUPPLIER OR WORKPLACE LABEL.

WHMIS SYMBOLS The following symbols must be known by all employees as they are very important when identifying the hazards of a controlled product.

Materials Causing Immediate & Serious Toxic Effects
This Division covers materials which can cause the death of a person exposed to small amounts.
Eg/ sodium cyanide, hydrogen sulphide

Oxidizing Material
Materials which provide oxygen or similar substance and which increase the risk of fire if they come in contact with flammable or combustible materials

Biohazard Infectious Material
This division applies to materials which contain harmful micro organisms.
Eg/ cultures, hepatitis B virus, salmonella bacteria

Compressed Gas
This class includes compressed gases dissolved gases and gases liquefied by compression or refrigeration. Eg/ fire extinguishers, propane tanks.

Corrosive Material
Caustic or acid materials which can destroy the skin or eat through metals.
Eg/ lye, muriatic acid

Materials Causing Other Toxic Effects
This division covers materials which cause immediate skin or eye irritation as well as those which can cause long –term effects in a person repeatedly exposed to small amounts
Eg/ toluene, diisocyanate, asphalt, silica, asbestos, fibreglass insulation

Dangerously Reactive Material
Products which can undergo dangerous reactions if subjected to heat, pressure, shock or allowed to contact water.

Flammable & Combustible Material
Solids, liquids and gases capable of catching fire or exploding in the presence of an ignition source. Eq/ white phosphorus, acetone, butane, kerosene, gasoline

RESPIRATOR USE PROGRAM

The purpose of a respirator program is to ensure that respirators used by DGS Construction employees provide effective protection against airborne contaminants to which they may be exposed.

Before considering respirators as a way to control exposure, DGS Construction management will first consider other ways of eliminating the exposure hazard, such as engineering or administrative controls.

RESPIRATOR SELECTION The selection of a respirator must be appropriate to the contaminants. IE/ High Efficiency Particulate Aerosol cartridges will not be used when working with organic vapours.
Employees not sure of the type of respirator and contaminant cartridge to use will ask the company safety officer.

RESPIRATOR FITTING To fit properly and provide protection, respirators that are designed to fit the face (such as rubber half-masks) must have an effective seal.
Employees using this type of respirator must be clean-shaven in the area where the respirator seals with the face (ie. No visible stubble).

TRAINING Every employee who may have to wear a respirator will be trained in the proper use of the respirator. Both the employee and site supervisor receive this training. This training includes:

- Description of the type and amount of exposure.
- Description of the respirators.
- The intended use and limitations of the respirators.
- Proper wearing, adjustment, and testing for fit.
- Cleaning and storage methods.
- Inspection and maintenance procedures.

RESPIRATOR USE Employees using respirators will ensure the following, if there are concerns they will contact the company safety officer:

- Only respirators bearing NIOSH / MSHA approval or other respirators acceptable to the Worksafe BC will be provided to employees.
- Always read cartridge or filter labels and instruction manual prior to use and be certain the correct cartridge and / or filter is selected. Ie/ Only fume rated particle filters provide protection against welding fumes.
- Corrective eye wear or other equipment must not interfere with the seal of the respirator.
- No covering can be used which passes between the respirator face-piece and the wearer's face.
- Respirators will be inspected before and after every use, checking straps, valves, cartridges, etc., as well as general cleanliness. See the respirator instructional manual.
- A positive / negative pressure fit-test will be performed, where applicable, by the respirator user each time they put on respirators.
- High contaminant levels and other factors such as high humidity can effect the filter or cartridge. Employees noting a resistance to breathing or the smell or taste of chemicals within the respirator; or irritation, will leave the immediate work area and report to his / her supervisor. After an investigation rules out other reasons (such as failure of ventilation systems) the respirator shall be checked and new filters or cartridges installed.

When wearing a respirator, employees experiencing any of the following will leave the contaminated area:

- Nausea.
- Dizziness.
- Eye irritation.
- Unusual odour or taste.
- Excessive fatigue.
- Difficult breathing.

If an employee has any concerns about wearing a respirator due to medical conditions, the employee has the right to refuse the work that requires the use of the respirator. Certain medical conditions may affect the employee's ability to wear a respirator, such as lung (asthma, emphysema), or heart disease.

CLEANING, MAINTENANCE AND STORAGE OF RESPIRATORS Employees using respirators will ensure the following:

- Respirators will be maintained and cleaned as described by the Manufacturer's instructions.
- Where respirators are shared, they will be cleaned and sanitised after each use. Follow the Manufacturer's recommendations for sanitising.
- Defective respirators shall not be used.
- After inspection, cleaning and necessary repairs, respirators will be properly stored, ie. In plastic bags, storage cabinets or lockers.

RESPIRATOR FIT-TESTS

NEGATIVE AND POSITIVE FIT CHECKS Fit-checking and testing is done to find both a style and a size of respirator that fits the individual best and most comfortable. Before an irritant smoke or banana oil test is carried out, a positive and negative pressure fit-check is required. These checks will give the individual a general indication that the respirator provides a seal. Once a seal is obtained, then a smoke or banana oil test must be done.
The fit-checks are also done each time the individual puts on a respirator to make sure there is a proper seal this includes work breaks.

FIT CHECK PROCEDURE Employees will conduct the following procedure for fit checking every time a respirator is donned for use:

1. Close off the inlet to the filter or cartridge by lightly pressing the palms against it, or by squeezing or covering the breathing tube (on an air line respirator or full-face respirator gas mask).
2. Inhale gently to build a slight negative pressure in the respirator. Hold for ten (10) seconds. If the face piece remains slightly collapsed and no inward leakage is detected, the respirator is sealed properly.
3. If leakage does occur adjust straps or adjust the face piece and try again.
4. For a positive pressure fit check cover the exhalation valve, or the end the breathing tube on an airline respirator or full face respirator. Gently blow out and hold for ten (10) seconds. (See figure 2.)
5. The fit-check is satisfactory if there is no outward leakage.

Figure 1
Negative Pressure Check

Figure 2
Positive Pressure Check

During both tests, care should be taken that the respirator is not distorted by too much pressure.

ISOAMYL ACETATE (Banana oil) FIT TEST

For banana oil fit-testing the respirator will have an organic vapour cartridge in place. For filters irritant smoke will be used.

After the user has completed step “A” above, break a capsule or ampoule and pass it near the respirator along the face seal while the wearer”

- Performs side to side and nodding head movements.
- Breathes deeply as during heavy exertion.
- Speaks or reads loudly enough to be understood.

If the user reports smelling banana oil, the test must be repeated after adjusting the face-piece or selecting another respirator.

After obtaining a satisfactory fit, the fit testing record will be completed.

IRRITANT SMOKE FIT TEST

Irritant smoke tests are done on respirators fitted with particle filter (dust, mist, fume or HEPA type). Irritant smoke is also used on full face respirators including air line respirators and self-contained Breathing Apparatus (SCBA).

NOTE: IT IS ACCEPTABLE TO USE BANANA OIL FOR FIT-TESTING IF THE PARTICLE FILTERS ARE REMOVED AND REPLACED WITH ORGANIC VAPOUR CARTRIDGES.

After the user has completed step “A” above, break the ends off the irritant smoke tube and attach the small bulb at the other end.

Squeeze the smoke along the face seal while the user:

- Performs side to side and nodding head movements.
- Breathes deeply as during heavy exertion.
- Speaks or reads loudly enough to be understood.

NOTE: THE USER MUST CLOSE HIS OR HER EYES DURING THIS TEST. KEEP THE SMOKE TUBE ABOUT 15 CM (6”) FROM THE FACE. SLOWLY WAVE THE TUBE TO DIRECT THE SMOKE TOWARDS THE RESPIRATOR. IF THE USER REPORTS SMELLING THE IRRITANT SMOKE, THE TEST MUST BE REPEATED AFTER ADJUSTING THE FACE-PIECE OR SELECTING ANOTHER RESPIRATOR.

NOTE: THE SMOKE TUBE CONTAINS STANIC CHLORIDE. NEVER PICK UP A BROKEN TUBE WITH BARE HANDS.

RESPIRATOR USE TRAINING RECORD

Worker:_____ Date:_____

REGULATIONS REVIEWED:

☐ WCB Regulation 5.7 Worker Training:
Training in the safe use, storage, handling, disposal, emergency of controlled product.

☐ WCB Regulation 8.34 Respirator Protection Factor (exposure limit x protection factor)
Air purifying, disposable masks protection factor is 5.
Air purifying, half face piece respirator protection factor is 10.
Air purifying, full face piece respirator protection factor is 50

☐ WCB Regulation 8.38 Corrective Eyewear:
Full face respirators & the need for prescription eye glasses, use of contact lenses.

☐ WCB Regulation 8.39 Face Seal:
Interference between respirator & face including facial hair.

☐ WCB Regulation 8.40 Fit Testing:
Annual fit testing required to determine proper seal to face.

☐ WCB Regulation 8.41 Fit Check:
Positive & negative pressure fit check before use. (including breaks)

☐ WHMIS, CHEMICALS IN CONSTRUCTION VIDEOS VIEWED

TYPE OF RESPIRATOR: _____ CARTRIDGE / FILTER TYPE: _____

TEST RESULTS:

Positive pressure _____

Negative pressure _____

Banana oil _____

Smoke _____

RESPIRATOR SIZE REQUIRED: ☐ Small ☐ Medium ☐ Large

COMMENTS:_____

_____

TESTED BY: _____ SIGN:_____

FIRE PREVENTION

FIRE COMPONENTS The following are the components of a fire, each component needs each other to start and keep a fire going:

- fuel
- oxygen
- heat

If one is eliminated the fire will extinguish.

CONTROLLING FIRES The following are ways a fire may be controlled:

- Cooling- usually by means of water vapour.
- Removing fuel- turning off propane supply to fire
- Limiting oxygen- closing lids on kettle fires, smothering fires with blankets.

CLASSIFICATION OF FIRES The following are the classification of fire extinguishers:

Class A	materials such as wood, paper, rags, rubbish.
Class B	mixtures of chemicals, flammable liquids.
Class C	fires that occur near energised electrical equipment are used, extinguishing agents are non-conductive.
Class D	fires that occur in combustible metals such as magnesium, titanium.

FIRE EXTINGUISHERS Construction fires are mostly class A, B, C fires.

Fully charged Class ABC fire extinguishers are required to be near DGS Construction employees if conducting grinding, welding work, using torches, or work tasks where fire is possible.

Employees using fire extinguishers are required to be specially trained for its use, and limitations.

Employees should know the location of fire extinguishers on each job site in the event of an emergency.

TOOL BOX MEETING FORM

Toolbox Meeting Policy: **DGS Construction supervisors are required to conduct toolbox meetings with the work crew at least once a week.**
The toolbox meetings are short (5-15 minute) safety information training sessions, procedure review sessions, or can also be used as a forum to discuss site safety concerns from workers.
The bottom section of this form provides space for documenting worker site safety concerns that will be turned into the prime contractor's site safety representative.

Date: _____ Jobsite: _____

Time: _____ Person Coordinating the Meeting:_____

Workers Attending The Meeting:_____

_____

_____

_____

Safety Topics Discussed At The Meeting:_____

_____

_____

Some Suggested Topics For Discussion (check off what was discussed)

- □ Personal protective equipment requirements (hardhat, boots, gloves, vests, eye or hearing protection)
- □ Fall protection requirements, inspection of equipment, anchorage requirements
- □ How to tie rigging knots
- □ Accident/Incident reporting procedures
- □ Review of emergency evacuation signal, muster station, first aid service signal and shack
- □ Hazards from other trades (silica, noise, flammables, openings, housekeeping, overhead hazards, other _____)
- □ Lifting procedures and restrictions
- □ Working / walking near mobile equipment (eye contact and vests)
- □ Using power tools, (type of tool_____)
- □ Heat stress symptoms (cramps, exhaustion, stroke)
- □ Ladder inspection/securing
- □ Fire extinguisher use
- □ Power cord inspection/assured grounding / GFCI's, electrical safety

Site Safety Concerns Or Unsafe Conditions:_____

SAFETY TRAINING EMPLOYEES

Supervisors are required to take the time to instruct you on the hazards of work procedures and train you on the best way to perform them. They must then watch you to ensure the procedure is being done effectively and safely, furthermore, if you are not performing your job properly; the supervisor must correct you.

The following are specific safety related training courses that DGS Construction employees are required to attend:

- Level 1 First aid
- Fall protection Training
- Lift truck (forklift training) operation
- Boom lift operation
- Scissor lift operation
- Hilti powder actuated tools
- WHMIS (Workplace Hazardous Information System)

SAFETY RECORDS Copies of employee safety exams, quizzes, orientation forms, and certificates will be kept on file for reference and record keeping.

APPENDIX A

PRE-WORK HAZARD ASSESSMENTS
&
FALL PROTECTION PLANS

APPENDIX B

TOOL BOX MEETING FORMS

APPENDIX C

FIRST AID INJURY FORMS

APPENDIX D

WCB FORM 6A
(WORKER REPORT OF INJURY FORMS)

APPENDIX E

EMPLOYEE SAFETY ORIENTATION INFORMATION