Manitoba Home Builders' Association

CONFINED SPACE AWARENESS

Facilitator Guide

MANITOBA CONSTRUCTION SECTOR COUNCIL

CONSTRUCTION SAFETY ASSOCIATION OF MANITOBA

SAFE SOLUTIONS, LLC

WCB Workers Compensation Board of Manitoba

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NTRODUCTION

The Manitoba Homebuilders Association (MHBA) is digitalizing four safety courses using the latest technology to support the delivery of MHBA's safety training. The safety programs will be delivered at and in partnership with the Construction Safety Association of Manitoba (CSAM). The target group or audience includes general laborers, tradespeople, new supervisors and safety trainers working in homebuilders, commercial and the heavy construction industries and transportation. It is the intention of MHBA to share these resources with the Construction Safety Association of Manitoba, Work Safely with the Manitoba Heavy Construction Association, Risk Professionally Managed, Manitoba Trucking Association, Elite Safety Services, International Brotherhood of Electrical Works, Manitoba Building Trades and other safety associations who would benefit from these interactive resources.

The workplace safety and health issues to be addressed include: confined space, fall protection, scaffolding and safe use of power tools. Currently these courses are not available using this innovative and engaging approach to teaching safety.

The blended/on line virtual reality format will standardize safety training, allow greater access to training in rural and remote locations, increase access for refresher training, improve retention through use of different teaching strategies, provide opportunity for repetition to improve retention and reduce employees time away from work for training. Virtual reality gives safety associations the means to engage our technology savvy youth. In addition, virtual reality allows participants to experience height and confined space sensations in a safe non-threatening environment before getting into a difficult and uncomfortable situation. Students will be able to identify unsafe situations and know when additional training is required. Recent changes to legislation will demand increased training in these areas so digitalization of the courses will ensure larger audiences receive certification. This virtual reality experience will be developed by a team of experts well versed in construction safety, adult learning principles and knowledge transfer planning.

Who needs confined space training?

Any worker/supervisor who is required to work in a confined space that has limited means for entry and exit. Including:

- Construction
- Mining
- Manufacturing
- Oil and Gas
- Painters
- Electrical Workers
- Cities and Townships

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Confined Space App Usage

The application is intended to be used in 2 ways:

1. In Classroom Training
   Deployed to students in the class room using either the student's own smart phone or supplied devices.

2. Offsite Training
   Using loaned devices or the student's own device.

Once launched the smart phone should be placed inside a Google Cardboard capable viewer. The application does not work without a virtual reality display.

Virtual Reality may cause dizziness for approximately 30% of students. It is advised the facilitator takes time to discuss each module to allow for a break between each VR experience. In addition, the discussion time will allow for reflection and application of new learning. Guiding questions are provided for each module.

Confined Space Awareness Applications

- iOS:
  https://itunes.apple.com/us/app/mhba-confied-space-vr/id1322438531
- Android:
  https://play.google.com/store/apps/details?id=com.bsd.confinedspace360
  https://play.google.com/store/apps/details?id=com.bitspacedevelopment.confinedspaceandroidcardboardvr

MHBA

Learning Outcomes

- Define elements of a confined space
- Explain the reasons for entry into a confined space
- Describe the hazards associated with a confined space including atmospheric, safety, work related, and human factor hazards
- Explain when confined space incidents can occur
- Describe the purpose and use of entry permits used in confined space
- Develop a code of practice for a confined space
- Outline the work procedure for a confined space entry
- Explain the responsibilities of a confined space entry
- Describe the general responsibilities of the employer, the supervisor and the worker in regards to confined space entry
- Explain where confined space training can be accessed in your province

Virtual Reality Content

- You should always have appropriate lighting for the task at hand.
- Crawl spaces are common in many residential buildings.
- The access and egress (entry and exit) points should be identified during your assessment of the confined space.
- Make sure you are always aware of your surroundings. The space should be structurally sound, and you should always be aware of overhead hazards.
- Some confined spaces are very restricting and will cause awkward posture and repetitive movements.
- Before entering a confined space, you must identify your access (entry point) and egress (exit point).
- You should always wear appropriate personal protective equipment (PPE). For example, a hard hat or bump cap.
- People often improperly store chemical in their crawl space or attic. Being aware of these chemicals is very important. Improper chemical storage could cause serious health risks.
- A physical hazard to be aware of could include exposed protrusions like nails and screws, water, sprinkler heads, piping, electrical, and more.
- Crawl spaces could include mold, asbestos, and animal feces.
- Some people can get claustrophobic in confined space.
- There is the possibility of off gassing from sewers.
- Protective sheathing on all electrical lines should be inspected while performing work in a confined space. Rodents may have chewed through the sheathing creating an electrical hazard.
- It is important to bring the appropriate lighting.
- Watch for the placement of your task lighting to avoid fire hazards by placing too close to insulation.
- Extension cords although important can cause a trip hazard. Ensure you are not creating additional trip hazards.
- Be aware of access and egress before entry
- Add appropriate lighting to all areas where work is being performed.
- In an attic you must be aware of your footing because if you step wrong you can fall through the roof.
- Physical hazards in an attic can include overhead protrusions.
- Biological hazards in attics can be mold, asbestos, animal droppings.
- Use LED lighting where possible, it is cooler and less of a risk of starting a fire.
- Attic spaces tend to pose environmental hazards to the entrant. Temperatures in the summer can reach 50 degrees C in the summer and minus 50 degrees C in the winter.
- All confined space work requires a rescue plan in the event of an emergency
- Vermiculite insulation may contain asbestos. Testing is required.
- Wasps, bees, and birds may be nesting in attic spaces and can cause injury, disease, and respiratory issues.
- Does the possibility of live electrical wires exist in a confined space like an attic? Yes.

- Head protection is required because of potential overhead hazards like these nails from roofing.
- Temporary guarding is available for hatches or attic entry points.
- Every confined space is unique, and every confined space will have its own hazards
- Workers must be trained to enter a confined space. This is an awareness course and does not replace confined space training.

Confined space means an enclosed or partially closed space that:

1. Except for the purpose of performing work is not primarily designed or intended for human occupancy.
2. Has restricted means of access (entry) or egress (exit).

- Typical reason for entering a confined space: Performing maintenance, installation, access, or repair.
- Each confined space has its own unique hazards associated with it.

Look for the following hazards of a confined space:

1. Chemical: Vapors (gases).
2. Physical: Oxygen level content, body hazards (struck by caught between).
3. Biological: Animal Feces, Mold, Asbestos.
4. Psychosocial: Claustrophobia.
5. Ergonomic: Awkward Posture.

- You need to know where the fire extinguisher is and if it is the correct type.
- Ensure proper hearing protection when working in areas with noise exceeding 80dba
- Air quality should be tested with a properly calibrated air monitor (sniffer) before entry. Continuous air quality testing is required while in a confined space. You should perform a bump test on your air monitor before use.
- In older building piping may be wrapped in asbestos and you may be exposed to mold.
- When working in confined space you should ensure 0 state of energy for electrical, mechanical, pneumatic, and hydraulics. Lockouts should only be performed by appropriately trained personal.
- Mechanical rooms are a common place for inappropriately stored chemicals. Paint, solvents, cleaning products, and more.

There are four basic steps in preparing a safe work procedure for confined space entry:

1. Identify confined space at the work site.
2. Identify hazards in the confined spaces.
3. Develop a safe work procedure.
4. Create your rescue plan.

Work procedure for confined space entry should include:

1. Procedures for recognizing the risks associated with working in a confined space.

2. Procedures for isolating, including blanking, disconnecting, interrupting, and locking out-pipes, lines, and sources of energy from a confined space.
3. Safety and PPE to be used.
4. Procedures for communicating with a standby worker.
5. An emergency response plan and rescue procedures in the event of an emergency.
6. Information about the entry permit.

Employer responsibilities:

1. Develop an implement a safe work procedure for working in a confined space.
2. Train workers in safe work procedures.
3. Ensure that workers comply with safe work procedures.

- Once the worker is trained they are responsible for following and reviewing the safe work procedures.
- For more information on confined space training please contact: Construction Safety Association of Manitoba or Manitoba Heavy Construction Association
- Personal entering spaces like this should have asbestos awareness training so they can identify it to have a sample taken.
- Mechanical rooms can have trip hazards from either boxes and stored materials or built in hazards like piping.
- Knee knockers and shin bangers are present in mechanical rooms.
- Housekeeping should be maintained in all confined spaces.
- People working in a mechanical room need to know where the emergency shut off for electrical and mechanical equipment is.
- Identify your access and egress points.
- Vertical access is an entry or exit that you enter from above or below.

Confined space incidents can occur when:

1. A confined space is being prepared for entry.
2. Workers or others are entering a confined space.
3. Work is happening in a confined space.

- There are acts and regulations governing all workplaces in Manitoba
- An electrical winch or a manual rope is the most common for lowering and retrieving workers from a vertical confined space such as a sewer.
- This type equipment would be operated by an attendant
- The properly trained attendant monitors all aspects of the tripod and it is their responsibility that before anybody enters the space, the air must be tested.
- Mechanical ventilation and exhaust of the confined space may be required.

Facilitator Discussion Questions

- What are the elements of a confined space?
- Explain the reasons for entry into a confined space.
- Describe the hazards associated with a confined space including atmospheric, safety, work related, and human factor hazards
- Explain when confined space incidents can occur
- Describe the purpose and use of entry permits used in confined space
- Develop a code of practice for a confined space
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Teacher Led Activities

Materials Needed:

- Confined space power point
- Confined space entry permit
- Sample confined space procedures form
- Steve's Story YouTube video: https://www.youtube.com/watch?v=eCG_1q6gWF8
- Workplace Safety and Health Regulations MR217/2006 part 15
- CSA standards CSAZ1000-16

A. **Confined Space Power Point:**

Discuss safety while working in a confined space using the power point provided.

B. **Small Group Activity** (after slide on permits):

Ask students to complete a sample permit entry form.

C. **Individual Activity** (after slides on procedures):

Ask students to read a sample confined space procedure form, the confined space WSH MR217/2006 Part 15 and the CSA Standards. Share new learning.

D. **Steve Nicolson's Story** (Safe Work Manitoba)

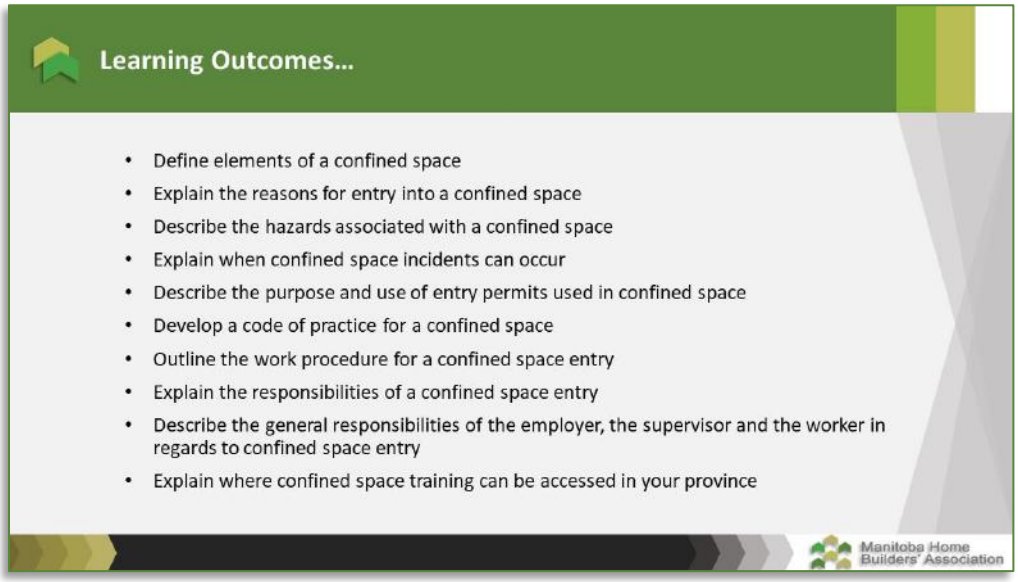
E. **Small Group Activity** (after code of practice slide):

Prepare a code of practice for working in a confined space. Think of a confined space that a worker may be required to enter while on the job. Develop a code of practice for that site with the information you have been provided.

CONFINED SPACE POWERPOINT

An Overview:

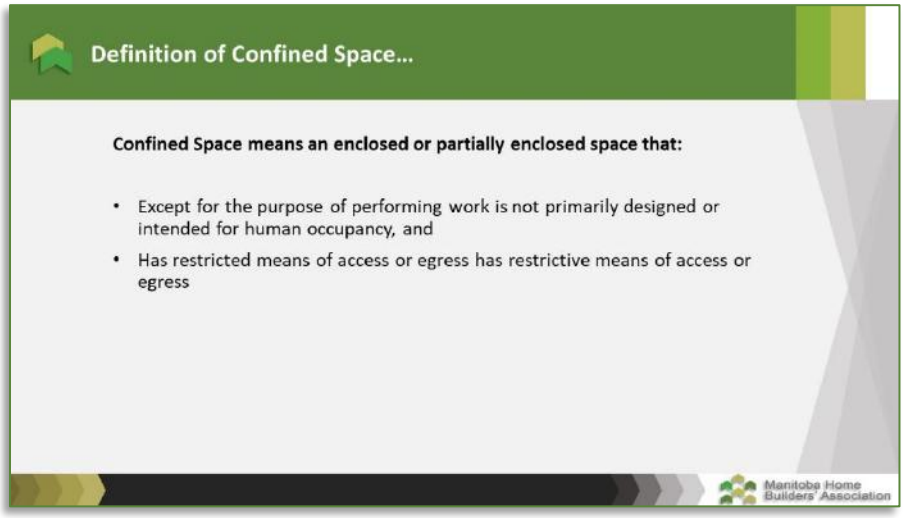
- Definition of Confined Space
- What are the typical reasons for entering a confined space?
- What are some hazards associated with confined space?
- When do confined space incidents occur?
- What information would confined space entry permits include?
- Work procedure for Confined Space Entry
- Responsibilities
- Steve's Story, Safe Work Manitoba
- Prepare a Code of Practice for Working in a Confined Space
- Where can I take confined space training in Manitoba?



Definition of Confined Space

Confined Space means an enclosed or partially enclosed space that:

- Except for the purpose of performing work is not primarily designed or intended for human occupancy, and
- Has restricted means of access or egress has restrictive means of access or egress



Typical Reasons for Entering a Confined Space

Typical reasons for entering a confined space include:

- Cleaning,
- Inspecting process
- Equipment, maintenance,
- Tapping, coating, wrapping and testing underground piping systems,
- Installing, inspecting, repairing, and replacing, valves, piping, pumps, motors, etc. in below ground pits and vaults,
- Checking and reading meters, gauges, dials, charts and other measuring instruments, and
- Rescuing workers who are injured, incapacitated or overcome while inside a confined space.

Each confined space has its own hazard associated with it. Asbestos, natural gas, mouse droppings…

Hazards in Confined Space

Atmospheric Hazards

- Explosive gases or vapours,
- Toxic gases or vapours,
- Oxygen level content,
- Fumes,
- Dusts,
- Mists,
- Smoke, or
- Biological contaminants (e.g. animal droppings or mould).

Safety Hazards

- Entry/exit points (e.g. very small openings, steep ladders, exits at height that could cause falls, exits into traffic or machinery hazard areas)
- Machinery (the worker may be trapped or crushed by drive belts augers, mixers, agitators, conveyor belts, etc.)
- Piping and distribution systems (e.g. steam lines, liquid distribution lines)
- Residual chemicals (e.g. material in a storage tank that is not completely emptied or purged, dry materials that may remain stuck to surfaces)
- Engulfment (workers can be trapped or buried by dry bulk materials such as grain, sand, flour, fertilizer and sawdust)
- Uncontrolled introduction of steam, water or other gas or liquid
- Electricity (e.g. unguarded energized electrical equipment, motor control centres)
- Visibility (the space may be improperly or inadequately lit.)
- Physical obstacles (e.g. cross bracing, baffle plates, piping)
- Walking or working surfaces (e.g. the surfaces may be hot or slippery)
- Traffic around the confined space
- Temperature extremes (e.g. working in freezers or boilers, areas with steam or heat distribution pipes)
- Humidity
- Vibration (e.g. equipment or tools may cause vibration, such as impact hammers, motors, etc.)
- Radiation (e.g. ultraviolet or infrared sources from welding, cutting or brazing, x-ray systems used for inspection and monitoring)

Work-related Hazards

- Examples include hot work, use of chemicals such as paints or cleaners, sandblasting, grinding, noise and cutting.

Human factor Hazards

- Some workers may have phobias (e.g. claustrophobia, fear of heights) that could interfere with their ability to work in a confined space. The use of bulky personal protective equipment (especially respirators) can also cause heat stress and fatigue.

- The physical condition of workers may also be a factor in cases where there are temperature extremes or the work is physically demanding. As a result, some workers may not be suited for work in confined spaces. The employer should consider the physical condition of the workers during the hazard assessment process. Fitness-to-work assessments should be done by a qualified professional to ensure it is safe for workers to perform work in a confined space.

What are some hazards associated with confined space?

Each confined space has its own hazard associated with it including:

- Atmospheric Hazards
- Safety Hazards
- Work-related Hazards
- Human Factor Hazards

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What are some hazards associated with confined space?

- Atmospheric Hazards include:
  - Explosive gases or vapours
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  - Paints or Cleaners
  - Sandblasting
  - Grinding
  - Noise
  - Cutting

What are some hazards associated with confined space?

- Human Factor Hazards include:
  - Some workers may have phobias (e.g. claustrophobia, fear of heights) that could interfere with their ability to work in a confined space.

    The use of bulky personal protective equipment (especially respirators) can also cause heat stress and fatigue.
  - The physical condition of workers may also be a factor in cases where there are temperature extremes or the work is physically demanding. As a result, some workers may not be suited for work in confined spaces.

    The employer should consider the physical condition of the workers during the hazard assessment process. Fitness-to-work assessments should be done by a qualified professional to ensure it is safe for workers to perform work in a confined space.

Confined Space Incidents

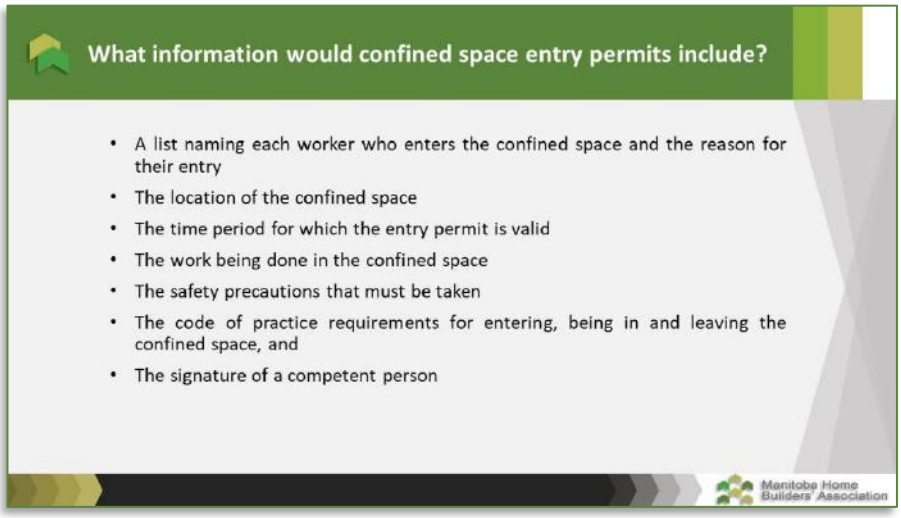
Confined Space incidents can occur when:

- A confined space is being prepared for entry
- Workers or others are entering a confined space
- Work is happening in a confined space

Entry Permits

Entry permits are created for each confined space. It must contain:

- A list naming each worker who enters the confined space and the reason for their entry,
- The location of the confined space,
- The time period for which the entry permit is valid,
- The work being done in the confined space,
- The safety precautions that must be taken,
- The code of practice requirements for entering, being in and leaving the confined space, and
- The signature of a competent person
- Sample Permit Entry Form



Work Procedures

Work procedures for confined space entry should include:

Testing the Atmosphere

- Determine who is qualified to test the atmosphere prior to entry of a confined space
- Provide detailed procedures to be used (substances to be checked for, circumstances when continuous monitoring is required, instruments to be used, calibration of the instruments, how often measurements are to be taken and recordkeeping)

Ventilation, Purging and Inerting

- The code of practice must contain a description of when ventilation, purging or inerting are required and the specific procedures and materials to be used. If ventilation is to be used, the code of practice must describe how workers will be alerted should the system fail.

Isolation

- The confined space should be isolated prior to entry to prevent materials from coming into the space via pipelines or vents and to ensure that equipment inside the space does not start up while the worker is inside e.g. locked out. The code of practice includes a detailed description of the procedures to be followed to isolate the confined space.

Emergency Response

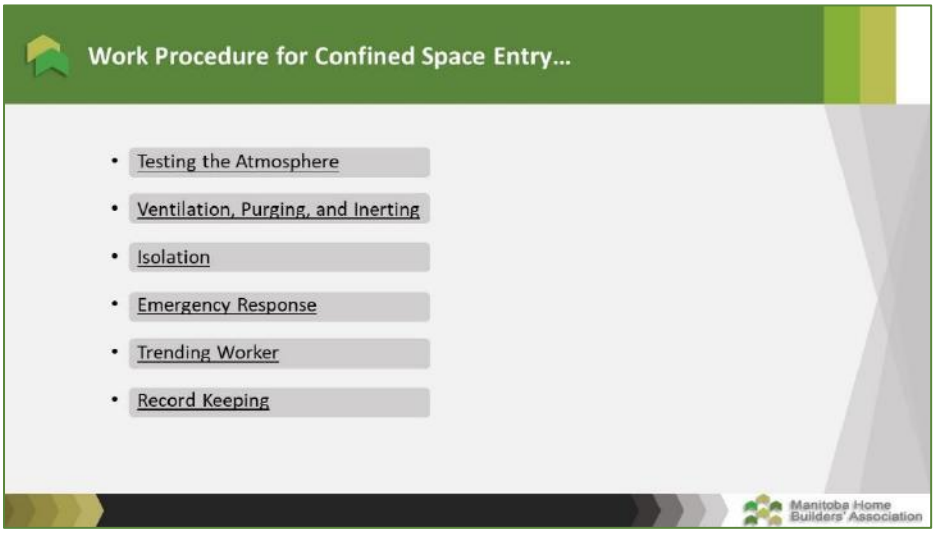
- A worker cannot enter a confined space unless an effective rescue can be carried out. These rescue procedures are specific to what must be done in the event of an emergency in a confined space (e.g. responding to a spill in a confined space, fire or rescue of an injured worker). Using a 9-1-1 service by itself is not enough to meet this requirement. A list of the rescue equipment (including protective equipment) for first aiders and rescue workers are required. Proper training on emergency procedures includes simulation of potential emergencies.

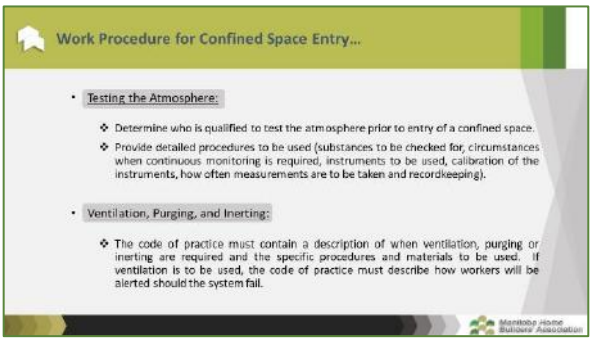
Tending Worker

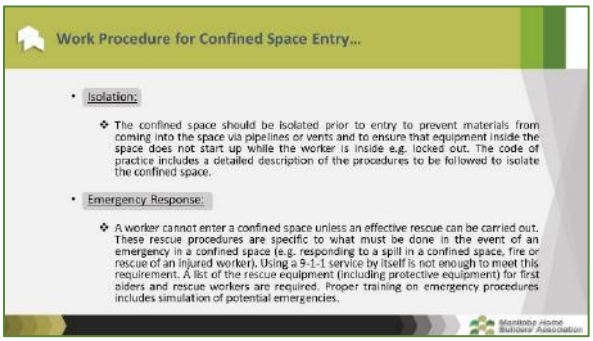
- The role of the tending worker is to monitor the safety of the person(s) working inside the confined space and to take action if an emergency arises. The code of practice must describe when a tending worker is required and the duties of that worker during the confined space entry. The code of practice must also detail the actions the tending worker will take in the event of an emergency.

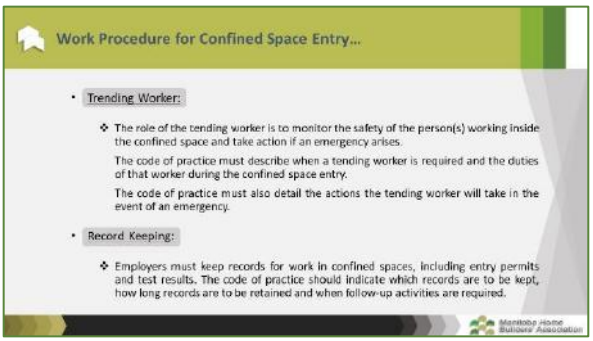
Record Keeping

- Employers must keep records for work in confined spaces, including entry permits and test results. The code of practice should indicate which records are to be kept, how long records are to be retained and when follow-up activities are required.









Responsibilities of Confined Space

- Employers are responsible for the health and safety of their workers. Employers identify confined spaces and their hazards. They send employees to confined space training prior to entry.
- Not all hazards in confined spaces are evident to the untrained person. Trained confined space employees are able to identify possible hazards of each confined space prior to entry and take the appropriate precautions.
- There are penalties for non-compliance.

  - Refer to the W210 Section 55 (penalties) in the Act
  - Workplace Safety and Health regulations MR217/2006 part 15
  - CSA standards CSAZ1000-16

Duty of the Employer

- Provide access to the act
- Provide access to each regulation made under the act that applies to the workplace or the work being done
- Provide access to each code of practice approved and issued by the employer that relates to a regulation under the act
- Ensure regular inspections of the workplace and of work processes and procedures to identify risk to individual's safety and health
- Correct unsafe conditions as soon as possible and take steps to protect the safety and health of individuals at risk

Duty of Supervisor

- Take all precautions necessary to protect the safety and health of a worker under his/her supervision
- Ensure that a worker under his/her supervision works in the manner and in accordance with the procedures and measures required by this act and regulations
- Ensure that a worker under his/her supervision uses all the devices and wears all clothing and PPE designated or provided by the employer or required to be used or worn by this act or the regulations
- Advise a worker under his/her supervision of all known or reasonably foreseeable risks to safety and health in the area where a worker is performing work
- Cooperate with any other person exercising a duty imposed by this act or the regulations
- Comply with this act and the regulations

Duty of Employees

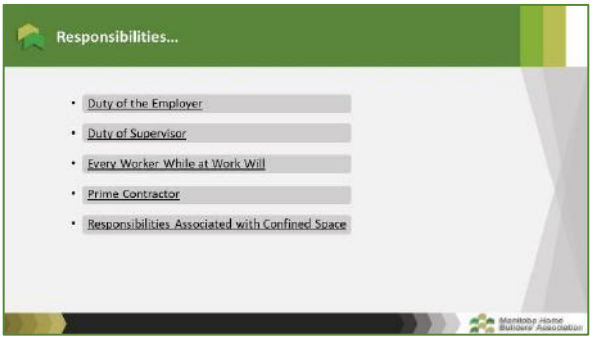
Every worker while at work will:

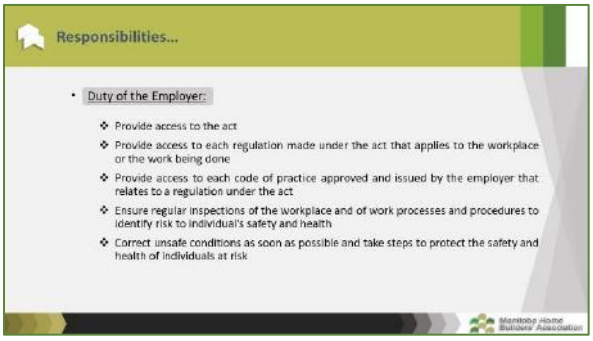
- Take reasonable care to protect his/her safety and health and the safety and health of other persons

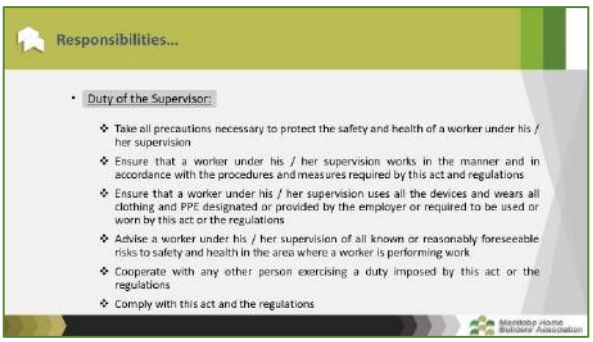
- Use all devices and wear all articles of clothing and PPE designated and provided for his/her protection by the employer or required to be used and worn by him/her in accordance with the regulations
- Consult and cooperate with the Workplace Safety and Health Committee, where such a committee exists, regarding the duties and matters with which that committee is charged under this act
- Consult and cooperate with the Workplace Safety and Health representative, where such a representative has been designated, regarding the duties and matters with which that representative is charged under this act

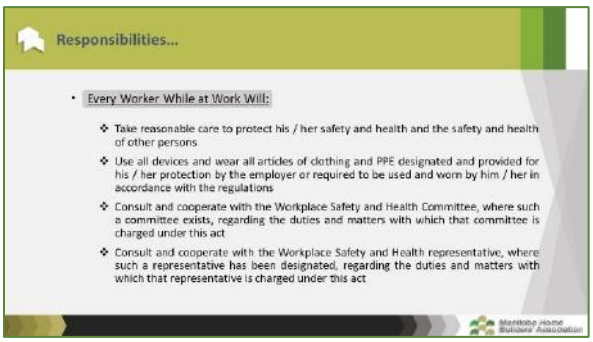
Prime Contractor

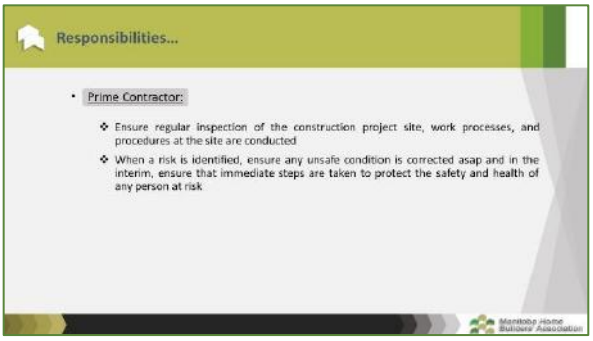
- Ensure regular inspection of the construction project site, work processes, and procedures at the site are conducted
- When a risk is identified, ensure any unsafe condition is corrected asap and in the interim, ensure that immediate steps are taken to protect the safety and health of any person at risk

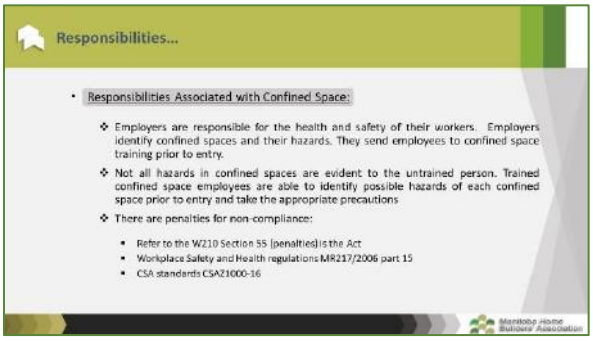












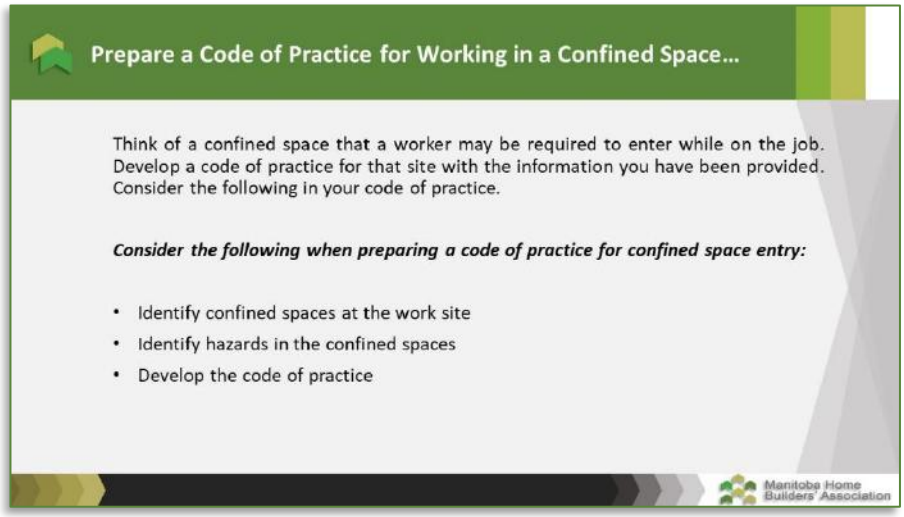
Steve's Story, Safe Work Manitoba

- YouTube Link:
  www.youtube.com/watch?v=eCG_1q6gWF8

Preparing a Code of Practice

There are three basic steps in preparing a code of practice for confined space entry:

- Identify confined spaces at the work site
- Identify hazards in the confined spaces
- Develop the code of practice



Where can I take confined space training in Manitoba?

- **Elite Safety Services**
  Address: 1850-17th Street East, Brandon, MB R7A 7A2
  Phone: 1-877-726-9101 (Toll Free) or 1-204-726-9101
  Fax: 1-204-725-7638
  Website: www.elitesafetyservices.ca

- **Safety Services Manitoba**
  Address: 3-1680 Notre Dame, Winnipeg, MB R3H 1H6
  Phone: 1-800-661-3321 (Toll Free) or 204-949-1085
  Fax: 204-956-2897
  Website: www.safetyservicesmanitoba.ca

- **Construction Safety Association of Manitoba**
  Address: 1447 Waverley Street, Winnipeg, MB R3T 0P7
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