

Excavations and Trenching - Training Program Standard



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comply with the *Manitoba Workplace Safety and Health Act and Regulation*, as may be amended from time to time.

1. Training Standard Topic

Excavations and Trenching

2. Purpose

The purpose of the Excavations and Trenching Training Program Standard is to provide individuals with:

- understanding the applicable legal requirements, including the requirements pertaining to registration and notifications before entering an excavation or trench
- knowledge of identifying the hazards and assessing the risks associated with entering an excavation or trench
- knowledge of various control measures and other requirements including support structures and personal protective equipment to be used when entering an excavation or trench

The training is intended for employers, supervisors and workers or any personnel performing or involved in trenching and excavation activities.

The Excavations & Trenching Training Program Standard outlines the minimum requirements for the development and delivery of Excavations & Trenching training programs in Manitoba. It was developed in consideration of the *Manitoba Workplace Safety & Health Act & Regulation*, *Canada Labour Code Part II*, *Canada Occupational Health and Safety Regulations (SOR/86-*

304) *Part III* for temporary structures & excavations and the *Gas Pipe Line Excavations Regulation*.

NOTE: This training standard does not include details on flag-person and confined spaces.

3. Design

The design of the training program must meet the following criteria:

- Compliance with adult learning principles:
 - a. ensure learners know why they need to learn specific content and its relevance to their workplaces
 - b. relate training to learners' own experiences when simulating workplace scenarios
 - c. challenge and engage learners using a variety of activities that allow opportunities for participation, feedback and interaction
 - d. recognize the limits of attention spans and apply techniques to address the various ways that adults learn
 - e. use realistic activities and tools to support the transfer of learning to the workplace
- Use language that is appropriate for all learners;
- Provide content that is accurate and current;
- Include references to legal and technical information;
- Use a variety of technical teaching aids;
- Provide learner materials that follow the principles of instructional writing and good graphic design;
- Be consistent with provincial and federal legal requirements.

4. Delivery

Regardless of the delivery method, all Endorsed Training programs must meet the requirements of this standard along with ***The Accessibility for Manitobans Act (AMA)***, and the delivery method must be reasonable and practicable to support the learner's ability to attain the applicable learning outcomes.

4.1 Face-to-Face Learning

The following is the maximum ratio of learners to instructor:

- Basic Theory Module: 24:1

The following are the minimum hours for training delivery:

- Basic Theory Module: 3.5 hours

The timing for delivery of this training program may be extended for various reasons such as the amount of equipment available for demonstration of learning outcomes, instructor experience and/or the learning needs of the training participants.

4.2 E-Learning and Blended Learning

The eLearning content should be consistent with Manitoba e-Learning Instructional Design Guidelines ([click here to learn more](#)).

This type of learning is acceptable for:

- Basic Theory Module

4.3 Distance Learning

Distance learning includes training via a live video link; a plan for interactivity with a qualified instructor should be developed and available.

This type of learning is acceptable for:

- Basic Theory Module

5. Learning Outcomes

Employers will need to supplement any training program that meets the requirements of this training program standard with additional information, instruction and training in workplace-specific policies and procedures and workplace-specific hazards and equipment related to Excavations and Trenching.

5.1 Excavations and Trenching Basic Theory Module

5.1.1 Legal Requirement

Content must include:

- an overview of the legal framework including rights, duties and responsibilities and legislative requirements pertaining to performing excavation work or trenching
- an overview of the legislative documents and additional available resources on excavations and trenching, including but not limited to, *Guide for Excavation Work* by Safe Work Manitoba and *Safe Excavation and Safety Watch Guidelines* by Manitoba Hydro, and how to access them

At the end of this module, learners will be able to:

- identify parts in the *Manitoba Workplace Safety & Health Act and Regulation* and/or *Canada Labour Code Part II* and *Canada Occupational Health & Safety Regulations (SOR/86-304) Part III* and the *Gas Pipe Line Excavations Regulation*, as applicable, pertaining to excavations and trenching
- distinguish between an excavation and a trench
- reference the duties and responsibilities of the employer, supervisor and workers as they relate to excavations and trenching
- describe the workers' rights as they relate to excavations and trenching
- recognize the requirements for registration to perform excavations
- recognize the requirements pertaining to notification of excavation work
- recognize the need of a competent person for supervision
- reference and access various resource documents related to excavations and trenching

5.1.2 Identification and Assessment of Excavations and Trenching Hazards

Content to include:

- a description of common hazards related to excavations and trenching, including but not limited to, cave-ins, collapse, hazardous objects near an excavation, flooding, water accumulation, powered mobile equipment, hazardous atmospheres, slips, trips and falls, material handling and other musculoskeletal hazards
- a description of hazards related to underground or buried as well as overhead facilities
- an overview of different soil categories in Manitoba and various causes for cave-ins or collapses including the impact of weather conditions
- an overview of the risk assessment process for identifying and assessing hazards

At the end of this module, learners will be able to:

- identify the common hazards associated with excavations and trenching
- identify the common underground or buried and overhead facilities and the hazards associated with them
- recognize different types of incidents due to hazardous conditions when performing excavation and trenching work
- recognize the different soil categories in Manitoba
- describe the various causes of cave-ins
- describe the importance of and steps for conducting a risk assessment

5.1.3 Control of Excavations and Trenching Hazards

Content must include:

- an overview of the control measures for damage prevention of underground and overhead facilities, including notification to owner and request for locates
- an overview of the hierarchy of controls and different types of control measures to eliminate or reduce the risk associated with common hazards identified during excavation and trenching work, including but not limited to, support structures (shoring, sloping, trench cages), safe access to and egress from excavation, guarding, walkways, hazardous atmospheric testing, safe material handling, safe work procedures, emergency procedures and personal protective equipment (PPE)
- a description of the requirements for support structures for excavations and trenches, including but not limited to, installation, use, inspection and removal of shoring
- a description of different methods of shoring and different types of shoring material, including but not limited to, wood shoring
- an overview of the requirements for deep foundation excavations

At the end of this module, learners will be able to:

- describe various control measures to eliminate or reduce the risk associated with hazards identified during excavation and trenching work
- recognize underground and overhead facility owners and the process to request locates before doing an excavation
- describe the control measures to eliminate or reduce underground or overhead facilities contacts or hits
- describe the steps to be taken in the event of damage to underground or overhead facilities
- explain the importance and the requirements of support structures against cave-ins, including but not limited to, shoring, sloping and trench cages
- describe the requirements for design, installation, use, inspection and removal of shoring
- recognize the requirement for engineering approvals
- restate the requirements pertaining to deep foundation excavations
- recognize the need for safe work procedures for performing excavations and trenching
- describe the steps to be taken in the event of an emergency or serious incident when working on excavations or trenching sites
- identify the basic and/or specialized PPE requirements when working on trenching or excavation sites
- recognize the importance of using, maintaining and inspecting PPE

5.1.4 Shafts and tunnels**Content must include:**

- an overview of identification and control of hazards related to shafts and tunnel excavations
- an overview of the requirements for shafts and tunnel excavations with reference to legislation

At the end of the module, learners will be able to:

- identify the hazards related to shafts and tunnels
- explain different control measures to reduce the risk associated with shafts and tunnel excavations
- recognize the requirements for shafts and tunnel excavations

6. Resource Material

The Excavations and Trenching Training Standard has material requirements for both learners and instructors.

The date and version number should be indicated on all resource materials, which include:

- terms and definitions
- job aids, evaluation tools and templates
- copies of the applicable provincial or federal safety legislation
- manufacturers' instructions for equipment
- participant and instructor manuals with copies of activities
- instructor manual and lesson plan

Learner materials will include:

- learning objectives, agenda, training content and evaluation/testing

Instructor materials will include:

- instructional methods, learning activities, and lesson plan timing
- detailed instructor manual and lesson plans, including all learning activities and audio-visual resources

7. Learner Evaluation

The training program must include a plan for learner evaluation that meets the requirements below. There must be a variety of evaluation methods available to the instructor and/or evaluator that are appropriate to the learning outcomes.

7.1 Evaluation Methods

The training program will include methods to evaluate whether key concepts have been understood by the learner using a variety of evaluation methods that are appropriate to the learning outcomes, including:

- open discussion
- group discussion
- questions and answers
- written and/or oral test, where applicable

Evaluation methods must be clearly outlined in the evaluation plan, and the corresponding results must be documented by the evaluator.

7.2 Evaluation of Demonstration Learning Outcomes

- a. Learning outcomes requiring demonstration must be performed satisfactorily in order to successfully complete the practical module;
- b. For learners with language, literacy or accommodation needs, alternative evaluation methods may be employed to verify satisfactory demonstration of learning outcome by the learner. These evaluation methods must be clearly outlined in the evaluation plan, and the corresponding results must be documented by the evaluator.

8. Validation/Refresher Requirements

Learners who have successfully completed an approved training program must periodically refresh their training in order to maintain its validity. This requirement supports learners in maintaining their foundational knowledge and skills.

8.1 Validation/Refresher Requirements

Learners who successfully complete an approved Excavations and Trenching Training Program must periodically refresh their training in order to maintain its validity. This requirement supports learners in maintaining their foundational knowledge and skills.

Completion of the Basic Theory Module in accordance with the criteria set out in this standard and the training provider standard is required to confirm a successful training program has been completed.

Training remains valid for a period of three years from the date of successful completion of the Excavations and Trenching Basic Theory Module.

8.2 Refresher Training

A worker's training is re-validated for another three-year period after successfully completing the refresher training of the Excavations and Trenching Basic Theory Module.

Glossary

General Terms

Asynchronous instruction (ASTD)

A general term used to describe forms of education, instruction and learning that do not occur in the same place or at the same time. It uses resources that facilitate information sharing outside the constraints of time and place among a network of people.

Blended Learning

Describes the practice of using several training delivery mediums in a single training program and typically refers to the combination of classroom instruction and eLearning.

Distance Learning

An educational situation in which the instructor and students are separated by time, location or both. Education or training courses are delivered to remote locations via synchronous or ASTD.

eLearning (Electronic Learning)

A term covering a wide set of applications and processes that includes web-based learning, computer-based learning, virtual classrooms and digital collaboration.

Face-to-Face Training

Usually refers to traditional classroom training in which an instructor teaches a course to a room of training participants. The term is used synonymously with on-site training, classroom training and instructor-led training (slightly modified from ASTD definition).

Minimum Hours for Training Delivery

The timing for instruction of a training program that excludes breaks and lunch:

- 3.5 hours of instruction is equal to a half-day of delivery;
- 7 hours of instruction is equal to a full-day of delivery.

Module

A unit of instruction that can be measured, evaluated for change, assembled to form complete courses or bypassed as a whole, and that is usually intended to teach one or a group of skills or areas of knowledge (slightly modified from ASTD definition).

Evaluator

A person who evaluates learners.

Instructor

A person who delivers training programs.

Qualification

A skill, quality or attribute that makes somebody suitable for a job, activity or task.

*Excavations and Trenching Terms***Deep Foundation**

A foundation unit that provides support for a building or structure by transferring loads, either by end-bearing to soil or rock at substantial depth below the building or structure, or by adhesion or friction, or both, in the soil or rock in which it is placed, and that includes a pile or caisson.

Excavation

A dug out area of ground that includes a deep foundation excavation, trench, tunnel and shaft.

Open Excavation

An excavation in which the width is greater than the depth, measured at the bottom.

Pile or Caisson

A slender, deep foundation unit made of materials, or a combination of materials, such as wood, steel or concrete, which is either pre-manufactured and placed by driving, jacking, jetting or screwing, or cast in place in a hole formed by driving, excavation or boring.

Professional Engineer

A person who is a member of the Association of Professional Engineers and Geoscientists of the Province of Manitoba, and who holds a valid certificate of registration under *The Engineering and Geoscientific Professions Act*, or who is a non-resident and holds a valid temporary licence granted under *The Engineering and Geoscientific Professions Act*.

Shaft

A vertical or inclined opening that leads to an underground working and is excavated below ground level.

Shoring

An assembly of structural members designed to prevent earth or material from falling, sliding

or rolling into an excavation.

Support Structure

A temporary or permanent structure or device designed to protect workers in an excavation, tunnel or shaft from cave-ins, collapse, sliding or rolling materials and includes shoring, bracing, piles, planks and trench cages.

Trench

An excavation that is deeper than its width measured at the bottom.

Trench Cage

A steel support structure designed to resist pressure from the walls of a trench and capable of being moved as a unit.

Trench Jack

A screw or hydraulic jack used as a brace for a temporary support structure.

Tunnel

A generally horizontal excavation that is more than a metre long and located underground.

Acknowledgements Statement

The Excavations and Trenching committee/working group has developed an Excavations and Trenching Training Program Standard that outlines the minimum requirements for program objectives, training requirements and learning outcomes that are designed to educate Manitoba workers on working in compliance.

Please note that while reasonable efforts have been made to ensure that the criteria of the Training Program Standard is met, responsibility resides with employers to ensure compliance with training requirements under the *Manitoba Workplace Safety and Health Act and Regulation*. In determining what rights or obligations a party may have under the province's legislation, reference should always be made to the official version of the WSH Act and Regulation.

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