

PART 26

EXCAVATIONS AND TUNNELS

GENERAL MATTERS

Application

26.1(1) Subject to subsection (2), this Part applies to every workplace where excavation work takes place.

26.1(2) This Part does not apply to a mine as defined in *The Mines and Minerals Act*.

Safe work procedures

26.2(1) An employer must

(a) develop and implement safe work procedures for the work to be done at an excavation, including the installation, use and removal of shoring;

(b) train workers in the safe work procedures; and

(c) ensure that workers comply with the safe work procedures.

26.2(2) Before any excavation work begins, an employer must ensure that workers are made aware of the potential hazards of the job functions they are to perform.

REGISTRATION

Registration requirement

26.3(1) In order to perform excavation work, an employer must

(a) notify the division that the employer intends to do excavation work; and

(b) receive a registration number from the division.

26.3(2) An employer must not begin any excavation work unless the employer has a valid registration number.

26.3(3) A safety and health officer may revoke an employer's registration number if the officer is of the opinion that the employer is performing excavation work in a manner that creates or may create a risk to the safety or health of a worker.

26.3(4) When a registration number has been revoked, an employer may not be issued a new registration number unless a safety and health officer is satisfied that the

employer will perform excavation work in accordance with the requirements of this Part.

NOTIFICATION

Notice of excavation

26.4(1) An employer who proposes to make an excavation that is more than 1.5 m deep in which a worker is required or permitted to enter must notify the division not more than 48 hours before the day that excavation work is scheduled to begin and provide the following information to the division:

- (a) the name and address of the owner of the land where the excavation is to be made;
- (b) the name and address of the employer;
- (c) the location of the excavation;
- (d) the starting date of the excavation and its proposed completion date;
- (e) the proposed depth, length and width of the excavation;
- (f) a description of the proposed support structure, including the method of shoring and type of shoring materials, if shoring is to be used;
- (g) verification that the owners of underground facilities have been notified and that the location of any pipes, conduits, or previous excavations in or adjacent to the proposed excavation site has been determined;
- (h) the name of the person who will be supervising the work.

26.4(2) An employer required to notify the division under this section must not begin excavation work until the division has assigned a serial number to the excavation project.

26.4(3) This section does not apply to the digging of a burial lot or plot in a cemetery as defined in *The Cemeteries Act*.

SUPERVISION

Employer to appoint supervisor

26.5(1) An employer must supervise or designate a competent person to supervise

work at an excavation site. The supervisor must be present at the site whenever a worker is in the excavation or work on the excavation is being performed.

26.5(2) When a worker is in an excavation that is more than 1.5 m deep, an employer must ensure that a competent person is located at the surface of the excavation to alert the worker of any potentially unsafe condition and provide assistance in an emergency.

UNDERGROUND FACILITIES

Underground facilities

26.6(1) Before any excavation work begins, an employer must

(a) give notice of the proposed excavation to the owners of underground facilities, such as gas, oil, steam, water, sewer, communication and electrical systems, in the area where the work is to be done;

(b) ensure that the owner of the underground facilities has conspicuously marked the location of the facilities; and

(c) obtain from the owner of the underground facilities any relevant information, instructions and documents that the owner may provide respecting the facilities and precautions to be taken when excavating.

26.6(2) An employer must keep the information, instructions and documents received from the owner under clause (1)(c) at the excavation site.

26.6(3) If an underground facility in the area of an excavation is likely to be exposed by excavation work, an employer must ensure that adequate support and protection is provided for the facility in accordance with the instructions of the owner of the facility.

26.6(4) If there is inadvertent exposure of, contact with or damage to an underground pipe, cable or conduit or any other underground facility when excavation work is performed, an employer must

(a) immediately evacuate all workers from the excavation site until any hazard or unsafe condition that arises or may arise has been identified and remedied; and

(b) immediately notify the owner of the pipe, cable, conduit or other underground facility.

HAZARDS

Flooding risks

26.7 When flooding may occur in an excavation, an employer must ensure that no worker enters the excavation unless

- a) the worker is equipped with a full body harness attached to a lifeline that meets the requirements of Part 14 (Fall Protection);
- (b) the worker is in direct communication with the person who is required to be located on the surface of the excavation under subsection 26.5(2); and
- (c) the worker's safety equipment is rigged so that the worker can be immediately removed from the excavation if a hazardous situation occurs.

Hazardous atmosphere risks

26.8(1) When the atmosphere in an excavation is toxic or hazardous or may reasonably be suspected to be toxic or hazardous, an employer must ensure that no worker enters the excavation until after a competent person tests the atmosphere in the excavation to determine whether a breathing or other hazard exists.

26.8(2) If a test under subsection (1) finds that a breathing hazard exists in an excavation, an employer must ensure that no worker enters the excavation unless the requirements of section 26.7 are met and

- (a) suitable ventilation is installed, operated and maintained that will supplement and maintain a satisfactory supply of breathable air to the excavation and to workers in the excavation; or
- (b) any worker entering the excavation is provided with suitable respiratory protective equipment that meets the requirements of Part 6 (Personal Protective Equipment).

26.8(3) If a test under subsection (1) finds that no breathing or other hazard exists in an excavation, an employer must ensure that periodic and frequent tests of the atmosphere in the excavation are carried out by a competent person to determine if the atmosphere in the excavation remains safe.

26.8(4) An employer must ensure that the results of any tests required to be conducted under this section are

- (a) recorded;
- (b) kept at the excavation site; and
- (c) readily accessible to a worker who requests the results of the tests.

Water hazards

26.9 An employer must ensure that an excavation that a worker may be required

or permitted to enter is kept free of an accumulation of water that may create a risk to the safety or health of the worker.

Hazardous objects

26.10(1) An employer must ensure that trees, utility poles, boulders and other objects located near an excavation site that may create a risk to the safety or health of a worker are removed or adequately supported before excavation work begins.

26.10(2) An employer must ensure that excavated material is placed at least one metre away from the edge of an excavation and piled so that it cannot fall into the excavation.

26.10(3) An employer must ensure that no worker places equipment or other material near the edge of an excavation so that the item can fall into the excavation.

26.10(4) When a concrete truck delivers concrete to an excavation site, an employer must ensure that

(a) the distance between the truck and the edge of a vertical excavation is at least equal to the depth of the excavation; or

(b) the excavation is sloped at an angle not greater than 45° measured from the horizontal plane.

Powered mobile equipment and machinery

26.11 An employer must ensure that no worker drives, operates or locates powered mobile equipment or machinery so that it endangers the stability of the walls of an excavation.

Guarding excavations

26.12(1) When excavation work is being carried out adjacent to an area where the public or a worker who is not usually engaged in the work may pass, an employer must ensure that the excavation is adequately guarded by a fence, guardrail or covering sufficient to prevent a person from falling into the excavation.

26.12(2) If there is a danger of a worker falling into an excavation that is more than 3 m deep, an employer must ensure that the excavation is adequately guarded by a fence, guardrail or covering sufficient to prevent a worker from falling into the excavation.

26.12(3) When an excavation poses a hazard to traffic because it is located close to a roadway, an employer must ensure that reflective traffic control devices are installed around the excavation.

Walkways

26.13(1) If a worker is required or permitted to cross over an excavation, an employer

must ensure that the excavation is equipped with an adequate walkway with suitable guardrails that meet the requirements of Part 14 (Fall Protection).

26.13(2) An employer must ensure that the walkway required under subsection (1) is kept clear of obstructions, excavated materials and equipment.

Safe means of entering and leaving an excavation

26.14(1) If a worker is required or permitted to enter an excavation, an employer must provide the worker with a safe means of entering and leaving the excavation.

26.14(2) If a worker is required or permitted to enter an open excavation or trench that is more than 1.5 m deep, an employer must provide a ladder, stairway or ramp as a means of entering and leaving the excavation or trench.

26.14(3) If a ladder is used as the means for entering and leaving an open excavation or trench, an employer must ensure that the ladder

(a) extends 1 m above the top of the excavation or trench; and

(b) is located not more than 3 m from the worker, when a ladder is used in a trench.

SUPPORT STRUCTURES

Support structures

26.15(1) If a worker is required or permitted to enter an excavation that is more than 1.5 m deep, an employer must ensure that a support structure is installed in the excavation, unless

(a) the excavation is cut in solid rock or other equally stable material, excluding frozen ground;

(b) the walls of the excavation are sloped at an angle not greater than 45° measured from the horizontal plane; or

(c) a combination of slope and vertical face is used for stabilizing the walls of the excavation where the vertical face is not more than one metre high and the remaining walls are sloped at an angle not greater than 45° measured from the horizontal plane.

26.15(2) If shoring is used in an open excavation that is more than 1.5 m deep but no more than 4.5 m deep, the employer must ensure that the shoring is constructed of components that meet the minimum requirements for the applicable soil conditions set out in the Schedule to this Part.

26.15(3) An employer must ensure that a support structure is installed in an excavation in which a worker is required or permitted to enter that is 1.5 m deep or less if there is a danger of a cave-in, collapse or material sliding or rolling into the excavation due to

(a) soil conditions where the excavation is to be made; or

(b) work conditions at the construction project site where the excavation is to be made.

26.15(4) If an adjacent building, foundation or other structure may be affected by an excavation, an employer must ensure that, before any work on the excavation begins, the building, foundation or other structure is supported by a support structure that is designed and certified by a professional engineer and constructed, installed, used and dismantled in accordance with the professional engineer's specifications.

Design by professional engineer

26.16(1) If a worker is required or permitted to enter an excavation that is more than 3 m deep, an employer must ensure that a support structure is installed in the excavation that is designed and certified by a professional engineer and constructed, installed, used, maintained and dismantled in accordance with the professional engineer's specifications.

26.16(2) An employer must ensure that the professional engineer's specifications for a support structure address the following matters:

(a) the size and specifications of the structure, including the type and grade of materials used in its construction;

(b) the loads and types of soil conditions for which the structure is designed;

(c) the installation, use and dismantling instructions.

26.16(3) When an employer is required to have a support structure designed by a professional engineer, the employer must ensure that the structure is inspected and certified by a professional engineer immediately after the installation of the structure has been completed.

26.16(4) Despite subsection (1), an employer is not required to retain a professional engineer if a support structure is installed in a trench that is more than 1.5 m deep but not more than 4.5 m deep, if the shoring is constructed of components that comply with the shoring requirements for the applicable soil conditions set out in the Schedule to this Part.

Support structure requirements

26.17(1) An employer must ensure that a support structure is

- (a) structurally sound;
- (b) suitable for the type and condition of the soil to be supported; and
- (c) of sufficient strength to prevent the walls of the excavation from caving in, collapsing or otherwise moving into the excavation.

26.17(2) Subject to subsection (3), an employer must ensure that any support structure extends at least 300 mm above the top of the excavation.

26.17(3) When under clause 26.15(1)(c),

- (a) a combination slope and vertical face is used for wall stability in an excavation; and
- (b) the depth of the excavation below the sloped sides exceeds one metre;

an employer must ensure that a support structure is installed and extends at least 600 mm above the bottom of the sloped sides in a continuous manner to prevent any material from falling into the excavation.

Required inspection

26.18(1) An employer must ensure that a support structure is immediately inspected by a professional engineer if

- (a) a safety and health officer is of the opinion that the support structure may create a risk to the safety or health of a worker; or
- (b) there is a change in ground stability in the excavation in which the support structure has been installed.

26.18(2) If an inspection results in a recommendation that the support structure be redesigned, an employer must ensure that

- (a) the structure is redesigned and certified by a professional engineer; and
- (b) the structure is constructed, installed, used, maintained and dismantled in accordance with the professional engineer's specifications.

Reshoring

26.19 If an employer installs reshoring in an excavation, the employer must ensure that, before a worker enters the excavation, the reshoring or any other support structure in the excavation is

(a) designed and certified by a professional engineer; and

(b) constructed, used, maintained and dismantled in accordance with the professional engineer's specifications.

Support structure when earth exposed

26.20 When 1.5 m of earth is exposed on a side of a vertical excavation in which a worker is required or permitted to enter, an employer must ensure that a support structure is immediately installed in the excavation to support the exposed earth.

Installing shoring

26.21 An employer must ensure that shoring is installed from the top to the bottom of an excavation in descending order and removed in the reverse order from which it was installed.

Scaling walls

26.22 If a worker is required or permitted to enter an excavation with a support structure, an employer must ensure that the walls of the excavation are scaled and trimmed, where necessary, to reduce the danger of falling material.

Support structure in firm contact

26.23(1) An employer must ensure that a support structure in an excavation is installed firmly in contact with the walls of an excavation and any voids between the structure and the walls are back-filled.

26.23(2) Subsection (1) does not apply to a trench cage.

Wood shoring

26.24(1) If wood shoring is used in an excavation, an employer must ensure that

(a) the shoring components are of a size, composition and arrangement to safely support the walls of the excavation; and

(b) the lumber used meets the requirements set out in the Schedule to this Part.

26.24(2) An employer may provide a steel trench jack of equivalent strength to wood shoring to be used as a strut in a trench.

No worker to enter

26.25 An employer must ensure that a worker does not enter any part of a trench beyond the point to which shoring has advanced.

Trench excavation by mechanical equipment

26.26(1) When a trench is being excavated by a trench digger, backhoe or similar equipment, the operator of the equipment must

(a) ensure that the digging portion of the machinery or equipment remains in the excavation while shoring is proceeding; and

(b) maintain a clear view of all workers in and near the trench.

26.26(2) The operator of equipment excavating a trench must ensure that the equipment does not come into contact with the shoring.

Trench cages

26.27(1) An employer must ensure that a trench cage is constructed and used in accordance with design specifications certified by a professional engineer.

26.27(2) An employer must ensure that the sides of a trench cage are continuous and extend at least 300 mm above the vertical wall of an excavation.

26.27(3) If a trench cage is used, an employer must ensure that a worker does not work in the excavation unless the worker works from inside the trench cage.

26.27(4) When trench cages are stacked, an employer must ensure that the trench cages have been

(a) designed for stacking by a professional engineer; and

(b) stacked in accordance with a stacking method specified by the professional engineer.

DEEP FOUNDATION EXCAVATIONS

Support structure for deep foundation excavations

26.28(1) An employer must ensure that the support structure for a deep foundation excavation is designed and certified by a professional engineer and constructed, installed, used, maintained and dismantled in accordance with the professional engineer's specifications.

26.28(2) If a worker is required or permitted to enter a deep foundation excavation, an employer must ensure that the professional engineer's design specifications for the support structure to be used in the excavation for the deep foundation include a method for the worker to enter and leave the excavation.

26.28(3) If a worker is required or permitted to enter a deep foundation excavation, an employer must ensure that the support structure for the excavation

(a) extends from a point 300 mm above ground level to the point where work is being carried out;

(b) has a minimum diameter of 700 mm; and

(c) is secured against movement.

Worker to wear body harness

26.29(1) An employer must ensure that a worker in a deep foundation excavation always wears a full body harness attached to a secured lifeline. The harness and lifeline must both meet the requirements of Part 14 (Fall Protection).

26.29(2) When a worker is in a deep foundation excavation, an employer must ensure that the worker's lifeline

(a) extends to the top of the excavation and is secured in a suitable manner to an anchorage point as required under Part 14 (Fall Protection); and

(b) is attended to continuously by at least one other worker.

Hoisting device

26.30(1) If a worker is required or permitted to enter a deep foundation excavation, an employer must ensure that a tripod-type or similar hoist is used to lower and raise the worker.

26.30(2) An employer must ensure that a hoist used in a deep foundation excavation, and all of the hoist's cables, hooks and components, are

(a) designed and certified by a professional engineer;

(b) installed, used, maintained and dismantled in accordance with the professional engineer's specifications;

(c) inspected regularly to ensure that the hoist and its components are in safe operating condition;

(d) of a sufficient height to safely raise a worker completely above the ground surface; and

(e) equipped with a brake capable of supporting at least four times the maximum load likely to be imposed on it.

Hook to have positive means of securement

26.31 An employer must ensure that a hook used for hoisting a worker or any other object in a deep foundation excavation is fitted with a positive means of securement.

Guarding deep foundation excavation

26.32 An employer must ensure that a deep foundation excavation is adequately guarded or covered whenever work on the excavation is not being performed.

SHAFTS AND TUNNELS

Professional engineer to design support structure

26.33(1) An employer must ensure that, during the excavation of a shaft or a tunnel, the walls of the shaft or tunnel are retained by a support structure that is

(a) designed and certified by a professional engineer as being of sufficient strength to prevent the walls from collapsing or caving in; and

(b) constructed, installed, used, maintained and dismantled in accordance with the professional engineer's specifications.

26.33(2) An employer must ensure that the professional engineer's design specifications are kept at the site of the excavation of the shaft or tunnel and are made readily accessible to a worker, on request.

Work areas to be free of mud and debris

26.34 An employer must ensure that the following areas of a shaft or tunnel excavation are kept free of loose mud and other accumulations of debris:

(a) the access landing;

(b) the bottom of the shaft or tunnel excavation;

(c) other similar work areas.

Ventilation to be provided

26.35 An employer must provide a suitable ventilation system in a shaft or tunnel to ensure that

(a) the ventilation rate is at least 0.25 m^3 per second per square metre of face of the shaft or tunnel; and

(b) the concentrations of toxic vapours, gases, aerosols, dusts or other hazardous substances are reduced to and remain at levels that will not be hazardous to the safety or health of a worker.

Accessway

26.36(1) An employer must ensure that an accessway is provided for the full depth of a shaft that a worker is required or permitted to enter.

26.36(2) An employer must ensure that the accessway

(a) is completely separated from a hoistway so that a load or hoist will not come in contact with a worker; and

(b) has a landing or rest platform provided at vertical intervals not exceeding 5 m or a protective cage or other suitable safety device.

26.36(3) An employer must ensure that the accessway is securely covered when it is not in use.

Guardrail at shaft opening

26.37 An employer must ensure that the opening to a shaft is protected by a guardrail and toe board that meet the requirements of Part 14 (Fall Protection).

Illumination

26.38(1) An employer must ensure that a source of lighting of at least five decalux is provided at the location in a shaft or tunnel where a worker is working.

26.38(2) An employer must provide an adequate emergency lighting system in a tunnel or shaft if the normal lighting system fails.

Internal combustion engines

26.39 An employer must ensure that an internal combustion engine is not used in a shaft or tunnel unless

(a) the engine is equipped with a properly maintained exhaust conditioner;

(b) the engine is shut down immediately if the ventilation system ceases to operate or function effectively and is not restarted until the ventilation system is functioning effectively;

(c) tests are conducted continuously and recorded at least once during each shift to determine the concentration of hazardous gases in the work area; and

(d) an appropriate fire extinguisher is kept near the internal combustion engine.

Haulage locomotives

26.40(1) An employer must ensure that if a haulage locomotive is used in a tunnel it is equipped with the following:

(a) a properly maintained braking system;

(b) interlock power controls that are operational from the driver's station only;

(c) an appropriate fire extinguisher.

26.40(2) An employer must ensure that track for haulage equipment is

(a) constructed in a straight manner and at a uniform height to the established grade; and

(b) securely attached to the foundation ties.

Fire protection

26.41 An employer must ensure that there is an effective means for extinguishing a fire in a shaft or tunnel.

Removal of scrap materials

26.42 An employer must ensure that scrap materials are removed at least daily from, and not allowed to accumulate in, a shaft or tunnel.

Communication system

26.43(1) An employer must ensure that a shaft hoist has a communication system available and working at all times between the hoist operator and workers at landings in the shaft leading to a tunnel or an underground space.

26.43(2) An employer must ensure that the communication system is used during a hoisting operation.

Hoisting operations

26.44(1) An employer must ensure that only a competent person designated by the employer operates hoisting equipment in a shaft or tunnel.

26.44(2) An employer must ensure that, at all times when a hoisting operation is underway in a shaft or tunnel, a worker designated by the employer is present at the top and the bottom of the shaft to supervise the operation.

26.44(3) An employer must ensure that a worker only signals to hoist a conveyance when the worker is on the landing from which the conveyance is to move.

MISCELLANEOUS PROVISIONS

Electrical installations

26.45 An employer must ensure that all electrical circuits and equipment in an excavation are installed in accordance with the requirements of the *Manitoba Electrical Code*.

Haulage buckets

26.46 An employer must ensure that a worker in an excavation does not load a

haulage bucket to the point where material is likely to fall out of the bucket.

Storage and dispensing of flammable liquids

26.47 An employer must ensure that flammable and combustible liquids are not used in an excavation unless they are stored in accordance with the *Manitoba Fire Code* and dispensed from safety containers that meet the requirements of CSA Standard B376-M1980 (R2003), *Portable Containers for Gasoline and Other Petroleum Fuels*.

Schedule

Minimum shoring requirements subsection 26.15(2), 26.16(4) and 26.24(1)

Category	UPRIGHTS (Vertical Members)			STRINGERS / WALES (Horizontal Members)*		CROSS-BRACES, STRUTS (Horizontal)*				
	Depth	Member minimum dimensions	Maximum spacing horizontally	Member minimum dimensions	Maximum spacing horizontally	Member minimum dimensions (mm)		Maximum spacing vertically) (to match Stringers / Wales)	Maximum spacing horizontally along Stringers / Wales	
	(m)	(mm)	(mm)	(mm)	(mm)	Width of Trench (m)		(mm)	(mm)	
Category 1a Stiff clays and stiff to hard clay tills, and stiff fissured clays	1.5 - 3.0 m	38 x 235	384	89 x 140	1200	less than 1.8 m.	1.8 m. to 3.7 m.	1200	1291	
	3.0 - 4.5 m	38 x 235	344	191 x 191	915	89 x 89	140 x 140	915	1475	
	UPRIGHTS (Vertical)			STRINGERS / WALES (Horizontal)		CROSS-BRACES, STRUTS (Horizontal)				
	1.5 - 3.0 m	89 x 140	686	89 x 140	1200	89 x 89	140 x 140	1200	796	
3.0 - 4.5 m	89 x 140	564	191 x 191	915	89 x 89	140 x 140	915	939		
Category 2 Soft cohesive soils, and stiff to wet/loose silt soils	1.5 - 3.0 m	38 x 235	229	89 x 140	1200	89 x 89	140 x 140	1200	918	
	3.0 - 4.5 m	89 x 140	457	191 x 191	915	89 x 89	140 x 140	915	887	
	UPRIGHTS (Vertical)			STRINGERS / WALES (Horizontal)		CROSS-BRACES, STRUTS (Horizontal)				
	1.5 - 3.0 m	38 x 235	326	89 x 140	1200	89 x 89	140 x 140	1200	1193	
3.0 - 4.5 m	38 x 235	293	191 x 191	915	89 x 89	140 x 140	915	1359		
Category 3a Cohesionless: loose to medium dense soils	1.5 - 3.0 m	38 x 235	460	89 x 140	1200	89 x 89	140 x 140	1200	1414	
	3.0 - 4.5 m	38 x 235	415	191 x 191	915	89 x 89	140 x 140	915	1616	
	UPRIGHTS (Vertical)			STRINGERS / WALES (Horizontal)		CROSS-BRACES, STRUTS (Horizontal)				
	1.5 - 3.0 m	38 x 235	460	89 x 140	1200	89 x 89	140 x 140	1200	1414	
3.0 - 4.5 m	38 x 235	415	191 x 191	915	89 x 89	140 x 140	915	1616		
Category 3b Cohesionless: dense to very dense soils	1.5 - 3.0 m	38 x 235	460	89 x 140	1200	89 x 89	140 x 140	1200	1414	
	3.0 - 4.5 m	38 x 235	415	191 x 191	915	89 x 89	140 x 140	915	1616	
	UPRIGHTS (Vertical)			STRINGERS / WALES (Horizontal)		CROSS-BRACES, STRUTS (Horizontal)				
	1.5 - 3.0 m	38 x 235	460	89 x 140	1200	89 x 89	140 x 140	1200	1414	
3.0 - 4.5 m	38 x 235	415	191 x 191	915	89 x 89	140 x 140	915	1616		
* Notes for Table:		1. All spacings shown are centre-to-centre of members.			2. Design based on 086.1-2001 Wood Design Manual; all "uprights" (vertical shoring) to be minimum 2-span continuous (cantilevers not to be included as "spans"). All shoring assumed to have members orientated for weak-axis bending.		3. All members to be graded lumber meeting S.P.F. No. 2 or better.		4. in this Schedule: "strut" means a horizontal cross-member of shoring that directly resists pressure; (* étrésillon +) "upright" means a vertical shoring member that is placed against and directly resists pressure from a wall of an excavation; (* montant +) "wale" means a horizontal shoring member that is placed parallel to the excavation face and whose sides bear against the vertical shoring member or the earth. (* moise +)	