**EXCAVATIONS**

Interpretation and Application

**222.** In this Part,

“engineered support system” means an excavation or trench shoring system, designed for a specific project or location, assembled in place and which cannot be moved as a unit; (“système de soutien calculé”)

“hydraulic support system” means a system capable of being moved as a unit, designed to resist the pressure from the walls of an excavation by applying a hydraulic counterpressure through the struts; (“système de soutien hydraulique”)

“prefabricated support system” means a trench box, trench shield or similar structure, composed of members connected to each other and capable of being moved as a unit, and designed to resist the pressure from the walls of an excavation but does not include a hydraulic support system; (“système de soutien préfabriqué”)

“pressure”, in relation to a wall of an excavation, means the lateral pressure of the earth on the wall calculated in accordance with generally accepted engineering principles and includes hydrostatic pressure and pressure due to surcharge. (“pression”) O. Reg. 213/91, s. 222; O. Reg. 142/17, s. 25.

**223.** This Part applies to all excavating and trenching operations. O. Reg. 213/91, s. 223.

Entry and Working Alone

**224.** No person shall enter or be permitted to enter an excavation that does not comply with this Part. O. Reg. 213/91, s. 224.

**225.** Work shall not be performed in a trench unless another worker is working above ground in close proximity to the trench or to the means of access to it. O. Reg. 213/91, s. 225.

Soil Types

**226.** (1) For the purposes of this Part, soil shall be classified as Type 1, 2, 3 or 4 in accordance with the descriptions set out in this section. O. Reg. 213/91, s. 226 (1).

(2) Type 1 soil,

(a) is hard, very dense and only able to be penetrated with difficulty by a small sharp object;

(b) has a low natural moisture content and a high degree of internal strength;

(c) has no signs of water seepage; and

(d) can be excavated only by mechanical equipment. O. Reg. 213/91, s. 226 (2).

(3) Type 2 soil,

(a) is very stiff, dense and can be penetrated with moderate difficulty by a small sharp object;

(b) has a low to medium natural moisture content and a medium degree of internal strength; and

(c) has a damp appearance after it is excavated. O. Reg. 213/91, s. 226 (3).

(4) Type 3 soil is,

(a) previously excavated soil; or

(b) soil that is stiff to firm or compact to loose in consistency and has one or more of the following characteristics:

(i) It exhibits signs of surface cracking.

(ii) It exhibits signs of water seepage.

(iii) If it is dry, it may run easily into a well-defined conical pile.

(iv) It has a low degree of internal strength. O. Reg. 345/15, s. 24.

(5) Type 4 soil,

(a) is soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength;

(b) runs easily or flows, unless it is completely supported before excavating procedures;

(c) has almost no internal strength;

(d) is wet or muddy; and

(e) exerts substantial fluid pressure on its supporting system. O. Reg. 213/91, s. 226 (5).

**227.** (1) The type of soil in which an excavation is made shall be determined by visual and physical examination of the soil,

(a) at the walls of the excavation; and

(b) within a horizontal distance from each wall equal to the depth of the excavation measured away from the excavation. O. Reg. 213/91, s. 227 (1).

(2) The soil in which an excavation is made shall be classified as the type described in section 226 that the soil most closely resembles. O. Reg. 213/91, s. 227 (2).

(3) If an excavation contains more than one type of soil, the soil shall be classified as the type with the highest number as described in section 226 among the types present. O. Reg. 213/91, s. 227 (3).

Precautions Concerning Services

**228.**(1) Before an excavation is begun,

(a) the employer excavating shall ensure that all gas, electrical and other services in and near the area to be excavated are located and marked;

(b) the employer and worker locating and marking the services described in clause (a) shall ensure that they are accurately located and marked; and

(c) if a service may pose a hazard, the service shall be shut off and disconnected. O. Reg. 443/09, s. 6.

(2) If a service may pose a hazard and it cannot be shut off or disconnected, the owner of the service shall be requested to supervise the uncovering of the service during the excavation. O. Reg. 443/09, s. 6.

(3) Pipes, conduits and cables for gas, electrical and other services in an excavation shall be supported to prevent their failure or breakage. O. Reg. 443/09, s. 6.

Protection of Adjacent Structures

**229.** (1) If an excavation may affect the stability of an adjacent building or structure, the constructor shall take precautions to prevent damage to the adjacent building or structure. O. Reg. 213/91, s. 229 (1).

(2) A professional engineer shall specify in writing the precautions required under subsection (1). O. Reg. 213/91, s. 229 (2).

(3) Such precautions as the professional engineer specifies shall be taken. O. Reg. 213/91, s. 229 (3).

General Requirements

**230.** Every excavation that a worker may be required to enter shall be kept reasonably free of water. O. Reg. 213/91, s. 230.

**231.** An excavation in which a worker may work shall have a clear work space of at least 450 millimetres between the wall of the excavation and any formwork or masonry or similar wall. O. Reg. 213/91, s. 231.

**232.** (1) The walls of an excavation shall be stripped of loose rock or other material that may slide, roll or fall upon a worker. O. Reg. 213/91, s. 232 (1).

(2) The walls of an excavation cut in rock shall be supported by rock anchors or wire mesh if support is necessary to prevent the spalling of loose rock. O. Reg. 213/91, s. 232 (2).

**233.** (1) A level area extending at least one metre from the upper edge of each wall of an excavation shall be kept clear of equipment, excavated soil, rock and construction material. O. Reg. 213/91, s. 233 (1).

(2) The stability of a wall of an excavation shall be maintained where it may be affected by stockpiling excavated soil or rock or construction materials. O. Reg. 213/91, s. 233 (2).

(3) No person shall operate a vehicle or other machine and no vehicle or other machine shall be located in such a way as to affect the stability of a wall of an excavation. O. Reg. 213/91, s. 233 (3).

(4) If a person could fall into an excavation that is more than 2.4 metres deep, a barrier at least 1.1 metres high shall be provided at the top of every wall of the excavation that is not sloped as described in clauses 234 (2) (e), (f) and (g). O. Reg. 213/91, s. 233 (4).

Support Systems

**234.** (1) The walls of an excavation shall be supported by a support system that complies with sections 235, 236, 237, 238, 239 and 241. O. Reg. 213/91, s. 234 (1).

(2) Subsection (1) does not apply with respect to an excavation,

(a) that is less than 1.2 metres deep;

(b) that no worker is required to enter;

(c) that is not a trench and with respect to which no worker is required to be closer to a wall than the height of the wall;

(d) that is cut in sound and stable rock;

(e) made in Type 1 or Type 2 soil and whose walls are sloped to 1.2 metres or less from its bottom with a slope having a minimum gradient of one vertical to one horizontal;

(f) made in Type 3 soil and whose walls are sloped from its bottom with a slope having a minimum gradient of one vertical to one horizontal;

(g) made in Type 4 soil and whose walls are sloped from its bottom with a slope having a minimum gradient of one vertical to three horizontal; or

(h) that is not a trench and is not made in Type 4 soil and with respect to which a professional engineer has given a written opinion that the walls of the excavation are sufficiently stable that no worker will be endangered if no support system is used. O. Reg. 213/91, s. 234 (2); O. Reg. 142/17, s. 26.

(3) The opinion in clause (2) (h) shall include details of,

(a) the specific project and the location thereon;

(b) any specific condition for which the opinion applies; and

(c) the frequency of inspections. O. Reg. 213/91, s. 234 (3).

(4) The constructor shall keep on the project a copy of every opinion given by a professional engineer for the purpose of clause (2) (h) while the project is in progress. O. Reg. 213/91, s. 234 (4).

(5) The professional engineer who gives an opinion described in clause (2) (h), or a competent worker designated by him or her, shall inspect the excavation to which the opinion relates as frequently as the opinion specifies. O. Reg. 213/91, s. 234 (5).

**235.** (1) Subject to subsection (2), a support system shall consist of,

(a) timbering and shoring that meets the requirements of subsection 238 (2), if no hydrostatic pressure is present in the soil, and if the width and depth of the excavation are equal to or less than the width and depth indicated in the Table to section 238;

(b) a prefabricated support system that complies with sections 236 and 237;

(c) a hydraulic support system that complies with sections 236 and 237; or

(d) an engineered support system that complies with section 236. O. Reg. 213/91, s. 235 (1).

(2) Where the excavation is a trench and the depth exceeds six metres or the width exceeds 3.6 metres, the support system shall consist of an engineered support system designed for the specific location and project. O. Reg. 213/91, s. 235 (2); O. Reg. 631/94, s. 7.

**236.** (1) Every prefabricated, hydraulic or engineered support system shall be designed by a professional engineer. O. Reg. 213/91, s. 236 (1).

(2) Every prefabricated, hydraulic or engineered support system shall be constructed, installed, used and maintained in accordance with its design drawings and specifications. O. Reg. 213/91, s. 236 (2).

(3) The design drawings and specifications for a prefabricated, hydraulic or an engineered support system,

(a) shall indicate the size of the system and the type and grade of materials of which it is to be made;

(b) shall indicate the maximum depth and the types of soil for which it is designed;

(c) shall indicate the proper positioning of the system in the excavation, including the maximum allowable clearance between the walls of the support system and the walls of the excavation; and

(d) shall indicate how to install and remove the system.

(e) Revoked:  O. Reg. 85/04, s. 21.

O. Reg. 213/91, s. 236 (3); O. Reg. 85/04, s. 21.

(4) In addition to the requirements of subsection (3), the design drawings and specifications for a hydraulic support system,

(a) shall indicate the minimum working pressure required for the system; and

(b) shall require the use of a device to ensure the protection of workers if a loss of hydraulic pressure occurs in the system. O. Reg. 213/91, s. 236 (4).

(5) Before a variation from the design drawings and specifications for a prefabricated, hydraulic or an engineered support system is permitted, the variation shall be approved in writing by a professional engineer. O. Reg. 213/91, s. 236 (5).

(6) If the soil conditions on a project differ from those assumed by the professional engineer in designing a prefabricated, hydraulic or an engineered support system, a professional engineer shall modify the design drawings and specifications for the actual soil conditions or shall approve the support system for use in the actual soil conditions. O. Reg. 213/91, s. 236 (6).

(7) The constructor shall keep the design drawings and specifications for a prefabricated, hydraulic or an engineered support system at a project while the system is on the project. O. Reg. 213/91, s. 236 (7).

(8) Revoked:  O. Reg. 443/09, s. 7.

**237.** (1) Subject to subsection (2),

(a) no prefabricated or hydraulic support system shall be used in type 4 soil;

(b) the space between the walls of a prefabricated support system and the walls of the excavation shall be restricted to the minimum clearance required for the forward progression of the support system; and

(c) the walls of a hydraulic support system shall touch the walls of the excavation. O. Reg. 631/94, s. 8.

(2) A prefabricated or hydraulic support system may be used for repairing underground pipe breaks if the system,

(a) meets the requirements of section 236;

(b) has four side walls;

(c) is designed for a maximum depth of 3.6 metres;

(d) is not used at a greater depth than 3.6 metres;

(e) is designed to resist all hydrostatic and earth pressures found in type 3 and type 4 soils;

(f) is installed so as to extend to the bottom of the excavation;

(g) is installed so that the walls of the system touch the walls of the excavation; and

(h) is not pulled forward after being installed in the excavation. O. Reg. 631/94, s. 8.

(3) Before a support system is used as described in subsection (2), the constructor shall submit two copies of its design drawings and specifications to the office of the Ministry of Labour nearest to the project. O. Reg. 631/94, s. 8.

**238.** (1) In this section,

“cleat” means a member of shoring that directly resists the downward movement of a wale or strut; (“tasseau”)

“o/c” means the maximum distance measured from the centre of one member of sheathing, wale or strut to the centre of the adjacent member of sheathing, wale or strut; (“c. à c.”)

“post” means a vertical member of shoring that acts as a spacer between the wales; (“montant”)

“10 millimetres gap” means that the space between two adjacent members of sheathing is a maximum of ten millimetres. (“écart de 10 millimètres”) O. Reg. 213/91, s. 238 (1).

(2) Timbering and shoring referred to in clause 235 (1) (a) for the walls of an excavation with a depth described in Column 1 of the Table to this section and located in a soil type described in Column 2 of the Table shall meet the corresponding specifications set out in Columns 3 to 8 of the Table. O. Reg. 345/15, s. 25 (1).

(3) Every piece of sheathing referred to in the Table to this section shall be made of sound Number 1 Grade spruce and,

(a) shall be placed against the side of the excavation so that it is vertical;

(b) shall be secured in place by wales; and

(c) shall be driven into the soil and firmly secured in place if the excavation is made in Type 3 or 4 soil. O. Reg. 213/91, s. 238 (3).

(4) Every strut referred to in the Table to this section shall be made of sound number 1 structural grade spruce and,

(a) shall be placed in the excavation so that it is horizontal and at right angles to the wales;

(b) shall be cut to the proper length and held in place by at least two wedges driven between the strut and the wales; and

(c) shall be cleated with cleats that extend over the top of the strut and rest on the wales or that are attached securely to the wales by spikes or bolts. O. Reg. 213/91, s. 238 (4).

(5) Every wale referred to in the Table to this section shall be made of sound number 1 structural grade spruce and,

(a) shall be placed in the excavation so that it is parallel to the bottom, or proposed bottom, of the excavation; and

(b) shall be supported by either cleats secured to the sheathing or posts set on the wale next below it or, if it is the lowest wale, on the bottom of the excavation. O. Reg. 213/91, s. 238 (5).

TABLE
EXCAVATION SHORING AND TIMBERING

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Excavation Depth | Soil Type | Sheathing | Strut width where width of excavation at strut location is 1.8 to 3.6 metres | Strut width where width of excavation at strut location is up to 1.8 metres | Vertical strut spacing | Horizontal strut spacing | Wales |
| 1. | 3.0 m or less | 1 | 50 mm × 200 mm at 1.2 m o/c | 200 mm × 200 mm | 150 mm × 150 mm | 1.2 m | \* 2.4 m | \*200 mm × 200 mm |
| 2. | 3.0 m or less | 2 | 50 mm × 200 mm at 1.2 m o/c | 200 mm × 200 mm | 150 mm × 150 mm | 1.2 m | \* 2.4 m | \*200 mm × 200 mm |
| 3. | 3.0 m or less | 3 | 50 mm × 200 mm at 10 mm gap | 200 mm × 200 mm | 200 mm × 200 mm | 1.2 m |   2.4 m | 250 mm × 250 mm |
| 4. | 3.0 m or less | 4 | 75 mm × 200 mm at 10 mm gap | 250 mm × 250 mm | 200 mm × 200 mm | 1.2 m |   2.4 m | 300 mm × 300 mm |
| 5. | Over 3.0 m to 4.5 m | 1 | 50 mm × 200 mm with 10 mm gap | 200 mm × 200 mm | 150 mm × 150 mm | 1.2 m | 2.4 m | 200 mm × 200 mm |
| 6. | Over 3.0 m to 4.5 m | 2 | 50 mm × 200 mm with 10 mm gap | 200 mm × 200 mm | 200 mm × 200 mm | 1.2 m | 2.4 m | 250 mm × 250 mm |
| 7. | Over 3.0 m to 4.5 m | 3 | 50 mm × 200 mm with 10 mm gap | 250 mm × 250 mm | 250 mm × 250 mm | 1.2 m | 2.4 m | 250 mm × 250 mm |
| 8. | Over 3.0 m to 4.0 m | 4 | 75 mm × 200 mm with 10 mm gap | 300 mm × 300 mm | 300 mm × 300 mm | 1.2 m | 2.4 m | 300 mm × 300 mm |
| 9. | Over 4.5 m to 6.0 m | 1 | 50 mm × 200 mm with 10 mm gap | 200 mm × 200 mm | 200 mm × 200 mm | 1.2 m | 2.4 m | 200 mm × 200 mm |
| 10. | Over 4.5 m to 6.0 m | 2 | 50 mm × 200 mm with 10 mm gap | 250 mm × 250 mm | 250 mm × 250 mm | 1.2 m | 2.4 m | 250 mm × 250 mm |
| 11. | Over 4.5 m to 6.0 m | 3 | 50 mm × 200 mm with 10 mm gap | 300 mm × 300 mm | 300 mm × 300 mm | 1.2 m | 2.4 m | 300 mm × 300 mm |

\*Note: For excavations to 3 m deep in soil types 1 and 2, the wales can be omitted if the struts are used at 1.2 m horizontal spacings.

O. Reg. 213/91, s. 238, Table; O. Reg. 631/94, s. 9; O. Reg. 345/15, s. 25 (2).

**239.** (1) A support system for the walls of an excavation shall be installed,

(a) progressively in an excavation in Type 1, 2 or 3 soil; and

(b) in advance of an excavation in Type 4 soil, if practicable. O. Reg. 213/91, s. 239 (1).

(2) A support system for the walls of an excavation shall provide continuous support for it. O. Reg. 213/91, s. 239 (2).

(3) No support system for the walls of an excavation shall be removed until immediately before the excavation is backfilled. O. Reg. 213/91, s. 239 (3).

(4) A competent person shall supervise the removal of a support system for the walls of an excavation. O. Reg. 213/91, s. 239 (4).

**240.** If a support system is used for the walls of an excavation, a ladder for access to or egress from the excavation shall be placed within the area protected by the support system. O. Reg. 213/91, s. 240.

**241.** (1) A support system for the walls of an excavation shall extend at least 0.3 metres above the top of the excavation unless otherwise permitted or required by this section. O. Reg. 213/91, s. 241 (1).

(2) If an excavation is located where there is vehicular or pedestrian traffic and if the excavation will be covered when work on or in it is not in progress, the support system for the walls of the excavation shall extend at least to the top of the excavation. O. Reg. 213/91, s. 241 (2).

(3) If the upper portion of the walls of an excavation are sloped for the soil types as described in clauses 234 (2) (e), (f) and (g) and the lower portion of the walls are vertical or near vertical, the walls shall be supported by a support system which extends at least 0.5 metres above the vertical walls. O. Reg. 213/91, s. 241 (3).

**242.** (1) A metal trench-jack or trench-brace may be used in place of a timber strut,

(a) if the allowable working load of the trench-jack or trench-brace is equal to or greater than that of the timber strut; and

(b) if the size of the replaced timber strut is shown on the trench-jack or trench-brace. O. Reg. 213/91, s. 242 (1).

(2) The allowable working load of a metal trench-jack or trench-brace shall be determined by a professional engineer in accordance with good engineering practice and shall be legibly cast or stamped on the trench-jack or trench-brace. O. Reg. 213/91, s. 242 (2).

(3) No metal trench-jack or trench-brace shall be extended beyond the length used to establish its maximum allowable working load. O. Reg. 213/91, s. 242 (3).

(4) Every metal trench-jack or trench-brace, when it is used,

(a) shall be placed against the wales in such a way that the load from the wales is applied axially to the trench-jack or trench-brace; and

(b) shall be adequately supported so that it does not move out of position. O. Reg. 213/91, s. 242 (4).