

# Consultation on New Health and Safety Requirements relating to Foundation Drill Rigs

## Summary of Proposal

The Ministry of Labour (MOL) is proposing to add new requirements to Ontario Regulation 213/91, Construction Projects Regulation (“the Regulation”), to enhance health and safety protection of workers during the operation of rotary foundation drill rigs.

An outline of the MOL’s proposed regulatory requirements and associated commentary, as well as questions to stakeholders related to implementation and training requirements are provided in the “[Details of Proposal](#)” section below. The MOL would appreciate receiving feedback on the proposed regulatory requirements and related questions to stakeholders by December 29, 2014. For more information on how to submit your comments, please see the “[How to participate](#)” section at the end of this document.

## Background

The MOL regularly reviews the Occupational Health and Safety Act and its regulations to ensure accuracy and consistency with current industry practices and standards, to increase clarity for stakeholders and to improve enforcement.

The MOL believes that, although the use of rotary foundation drill rigs is covered generally under existing provisions of the Regulation, certain aspects related to their operation may need to be addressed more specifically.

## Details of Proposal

### ***Section 1. Foundation Drill Rig Definition***

The MOL proposes to introduce a new definition of foundation drill rig to clarify which kinds of drill rigs are to be regulated. The definition would indicate that a rotary foundation drill rig is used for boring holes in soil for the placement of foundations or earth retention structures, but excludes a drill rig that is:

- (a) used for geotechnical sampling;
- (b) used for drilling water, oil or gas wells;
- (c) a rock drill or a diamond drill;
- (d) a digger derrick since they dig holes to install utility poles and not foundations;
- (e) used for digging holes for posts, sonotubes or poles; or,

- (f) a pile driver that is not equipped with an auger.

### ***Section 2. Pre-drilling work site inspection***

The MOL proposes that an inspection of the intended work area is to be conducted before any drilling operation with a foundation drill rig begins. The inspection is intended to identify potential hazards that may affect the various aspects of a drilling operation.

A written report is to be prepared outlining the identified potential hazards. The constructor is to keep a copy of the inspection report at the project and make it available to an inspector on request until the drilling operation is completed.

#### *Commentary*

Proper planning and organization are important to ensure the safety of foundation drilling operations. A pre-drill work site inspection is intended to identify relevant potential hazards such as underground and overhead utilities and electrical conductors, buried tanks, or depressions or voids in the ground that could lead to soil cave-ins or collapses.

### ***Section 3. Pre-drilling engineering reports***

If a foundation drill rig is capable of exerting a ground pressure of 200 kiloPascals (kPa) or more under its tires, crawlers or outrigger pads in any configuration including operational activities, the MOL proposes that, prior to beginning a drilling operation, the employer is to have a professional engineer prepare:

- (a) a written report indicating that the supporting surface on which the drill rig is to operate is adequate for the operation; and,
- (b) a written drilling procedure.

The constructor is to keep at the project a copy of the supporting surface report and drilling procedure prepared by a professional engineer and make them available to an inspector on request until the drilling operation is completed.

#### *Supporting surface report*

The written report is to include details such as:

- (i) description of the project and its location;
- (ii) any operating or travel restrictions imposed according to the manufacturer's instructions including maximum safe ground slope for operation;
- (iii) the safe travel path to be used;
- (iv) the existing soil conditions and environmental concerns or precautions;
- (v) the minimum bearing capacity required for each of the various operations that may be undertaken with the drill rig;

- (vi) surface preparation required to safely support the drill rig on the travel path and during operation, such as topsoil removal, type of fill to be used, degree of compaction to be attained, any surface reinforcement or mats to be used;
- (vii) the frequency of any inspections of the supporting surface, any specific weather or other conditions under which the inspections must be conducted, and who is to conduct these inspections; and
- (viii) what parts of the drill rig and its attachments are permitted on the supporting surface.

The supporting surface for a foundation drill rig is to be prepared or constructed in accordance with the professional engineer's written report.

The supporting surface is to be inspected,

- (a) by the person identified by the engineer in the supporting surface report, as frequently as the report specifies;
- (b) before the drill rig is installed on it to confirm that the supporting surface was prepared or constructed in accordance with the report; and
- (c) as frequently as required by the report while the drill rig is in service to ensure that the supporting surface does not deteriorate and that it continues to function as designed in the report.

#### *Drilling procedure*

The drilling procedure prepared by a professional engineer is to include details, such as:

- (i) the sequence of activities of the drilling operation including, if applicable, the delivery of concrete, rebar and steel piles;
- (ii) methods for removing or storing excavated soil and material, if applicable; and
- (iii) the location and designated travel path for any heavy machinery so that it does not undermine the stability and integrity of the drill rig's supporting surface.

The drilling procedure is to be followed on the project. Any deviation from the drilling procedure must be reviewed and approved by a professional engineer in writing prior to operating the drill rig.

#### *Commentary*

Drill rigs are able to exert tremendous ground bearing pressure on the ground or supporting surface during actual drilling. Certain soils may not be able to withstand these pressures without sinking/settling, deflecting or collapsing, any of which would affect the stability of the drill rig and may cause it to overturn. A supporting surface report by a professional engineer is intended to ensure the supporting surface beneath a drill rig remains stable during a drilling operation.

The professional engineer is to indicate in the supporting surface report whether inspections of the supporting surface are to be conducted by an engineer, a person under the engineer's direction, an employer's competent worker, or another person with specific qualifications, depending on the type of equipment, soil conditions, complexity

of the drilling operation, other hazards in the area, etc. The drilling employer would be able to use one of his or her own workers for the inspections only if the engineer indicates so in the supporting surface report and the employer's worker is a "competent worker" as defined in the Regulation.

The Regulation defines "competent worker" as follows:

"competent worker", in relation to specific work, means a worker who,

- (a) is qualified because of knowledge, training and experience to perform the work,
- (b) is familiar with the Occupational Health and Safety Act and with the provisions of the regulations that apply to the work, and
- (c) has knowledge of all potential or actual danger to health or safety in the work.

#### ***Section 4. Written safety measures and procedures***

The MOL proposes that the drilling employer is to have written measures and procedures prepared and implemented prior to the start of a drilling operation. The written measures and procedures would:

- (a) ensure the safety of all workers engaged in, and in the vicinity of, the drilling operation;
- (b) address all potential hazards identified during the work site inspection under Section 2 above; and,
- (c) for drill rigs that exert a ground pressure of 200 kPa or more on its supporting surface, incorporate the requirements in the written report on the drill rig's supporting surface and the drilling procedure prepared by a professional engineer under Section 3 above.

The written measures and procedures are to include at least the following:

- (d) locating of all utilities, services, hazards, obstructions and structures at the work site that may affect the safe operation of the drill rig and any related equipment;
- (e) clearing the work site of such hazards, obstructions and structures;
- (f) designating safe areas for the drilling operation; for staging, disassembling and altering drilling equipment; and for storing materials, equipment and excavated soil;
- (g) establishing and maintaining a restricted access zone around the drilling operation and materials handling areas to prevent access by persons or equipment not involved with the operation;
- (h) procedures for assembling, disassembling, altering and operating the drilling equipment;
- (i) procedures for removing and storing excavated soil and other excavated materials from the auger or drill tool;
- (j) fall protection measures, not only in accordance with Section 26 of the Regulation, but also to protect workers from falling into an excavated drill hole, and from being engulfed by collapsing soil around the excavated drill hole; and

- (k) a telecommunications system among the rig operator, the drill rig front-end worker and other workers in the restricted access zone, or a system of prearranged visual signals among them if visual signals are clearly visible and understood by the drill rig operator, the drill rig front-end worker and other workers.

### *Commentary*

The written measures and procedures are intended to provide information and instruction to workers who are engaged in the drilling operation, as well as workers in the vicinity of the drilling operation to enable them to work safely.

### **Section 5. Drill rig operator training**

One of the duties of an employer under the Occupational Health and Safety Act (Section 25(2)(a)) is to provide information, instruction and supervision to workers to protect their health and safety. This would generally require an employer responsible for the drilling operation on a project to ensure workers are adequately trained to operate the drill rig(s).

To ensure drill rig operators are properly trained and competent, the MOL proposes to add new requirements to the Regulation that would be consistent with the Foundation Drill Rig Operator Modular Training Standard (please see the [“Resources”](#) section at the end of this document for a copy of the Standard) that was developed by the Ministry of Training, Colleges and Universities (MTCU) in consultation with industry stakeholders. The proposed requirements would include the prerequisites and the training subjects outlined in the MTCU training standard.

Under the MOL’s proposal, an employer is to ensure that a worker who operates a foundation drill rig:

- (a) is adequately trained to operate the drill rig;
- (b) has demonstrated to the employer that the worker has adequate knowledge and proficiency in operating the drill rig;
- (c) is familiar with the drill rig’s operating instructions;
- (d) is authorized by the employer to operate the drill rig;

In addition, as per the MTCU drill rig training standard, the employer is to ensure that the operator of a drill rig:

- (e) has completed six months orientation and work experience on the ground as a front-end person with a qualified, experienced drill rig operator; and,
- (f) depending on the size of the drill rig, has completed:
  - (i) certification as a hoisting engineer-mobile crane operator under the *Ontario College of Trades and Apprenticeship Act, 2009* for those wishing to operate medium to large drill rigs (with 190 kNm torque and greater);
  - (ii) the MTCU Mobile Crane 0-8 Ton Construction Modular Training Program for those wishing to operate smaller drill rigs (with 50 – 190 kNm torque).

The MOL proposes that as per the MTCU drill rig training standard, a drill rig operator's training include at a minimum the following subjects: Safe Work Practices, Communications, Pre-operational Checks, Site Assessment, Drill Rig Setup, Drill Rig Operation, Equipment Maintenance, and Drill Rig Securing. The MOL would appreciate receiving feedback on how much detail should be included (if any) under each of the training subjects to ensure a worker is able to safely operate a drill rig.

As a guide, the MOL has included below the detailed content and learning outcomes for each of these subjects from the MTCU Foundation Drill Rig Operator Modular Training Standard.

1. Safe work practices

Describe regulations relevant to operating a drill rig; demonstrate how to use personal protective equipment (PPE) and how to maintain it; identify hazards in the operation of drill rigs; explain how to handle hazardous materials.

2. Communication

Demonstrate universal hand signals; learn hand signals related to drill rig operation (to be developed for Ontario); understand how to present a professional image; describe how to coach and mentor co-workers (e.g., front-end worker).

3. Pre-operational checks

Understand operating manuals and explain their purpose; review the functions of a drill rig; recall drill rig terminology; interpret load charts; explain how to determine which rigging/hardware and sling arrangement are needed; learn how to inspect the Kelly bar, equipment, and tools; describe the importance of the log book and the need to record inspections and general maintenance.

4. Site assessment

Learn how to read utility locates; understand how to interpret ground conditions; read and interpret the bore hole report; identify the ground condition hazards; explain how to verify that the work platform is certified for safe operation; learn how to choose the requirements for an assembly area.

5. Drill rig set up

Describe how to plan a set-up; explain the importance of traffic control; understand proximity and approach requirements for loading and unloading equipment; learn how to interpret dimensions, swing radii, weight, and blocking requirements for loading and unloading equipment; describe how to assemble equipment.

6. Drill rig operation

Explain Kelly drilling and illustrate other types of drilling; describe how to plan a drilling operation; explain the different types of tools and how to assemble them; plan how to travel with a drill rig; describe the use and importance of fall protection; identify hazards for self and others during the operation of a drill rig; discuss how to define a work area and no-go zones with signage and other barriers; walk through the steps of a drill rig operation, from start to finish; learn how to calculate the weights of reinforcing steel; interpret warning and alarm indicators.

7. Equipment maintenance

Identify different power systems and the components of a drill rig; review an inspection checklist from an operating manual; understand scheduled maintenance for the drill rig; identify the need for unscheduled inspections or servicing after incidents or mechanical failure; discuss the importance of communicating the need for maintenance to the supervisor; identify hazards during inspections, servicing, and refueling; demonstrate how to record inspections and maintenance in a log book.

8. Drill rig securing

Explain why drill rig must be secured; understand shut-down procedures for the drill rig and work site.

*Commentary*

The MOL is addressing two types of rotary foundation drill rigs:

1. Ones that have the auger/drilling equipment suspended from the boom of a mobile crane, i.e., mobile crane drill rigs; and
2. Those that have the auger/drilling equipment mounted directly on the vertical mast of a mobile/crawler chassis, i.e., non-mobile crane drill rigs.

Both types of drill rigs are designed to be operated differently and have different operational requirements and hazards. For instance, a mobile crane drill rig's main hazard of overturning is related to weight of the auger (and drilling material) suspended from its boom; and the extension of the boom and the boom angle during the lifting of the auger. Non-mobile crane drill rigs do not have this same hazard as their vertical masts have minimal lateral movement; their main hazard of overturning is related to the stability and integrity of the ground or surface supporting the drill rig.

The MTCU Foundation Drill Rig Operator Modular Training Standard requires trainees and operators to have two prerequisites that the MOL proposes to adopt into the Regulation:

- (a) Six month's orientation and work experience on the ground as a front-end person with a qualified, experienced drill rig operator; and,
- (b) Depending on the size of the drill rig,

- (i) Certification as a hoisting engineer-mobile crane operator under the Ontario College of Trades and Apprenticeship Act, 2009 for those wishing to operate medium to large drill rigs (with 190 kNm torque and greater);
- (ii) Successful completion of the MTCU Mobile Crane 0-8 Ton Construction Modular Training Program for those wishing to operate smaller drill rigs (with 50 – 190 kNm torque).

The Regulation already requires an operator of a large mobile crane drill rig to be certified as a hoisting engineer – mobile crane operator. Specifically, Section 150 of the Regulation currently requires an operator of a mobile crane capable of moving materials weighing more than 16,000 pounds to be certified as a hoisting engineer – mobile crane operator under the Ontario College of Trades and Apprenticeship Act, 2009. The trade of hoisting engineer – mobile crane operator is a compulsory trade under the Ontario College of Trades and Apprenticeship Act, 2009 with two classes and apprenticeship of a minimum of either 6000 hours or 2000 hours depending on the class.

The MOL would be taking a leading role in mandating these pre-requisites for drill rig operators. Other Canadian jurisdictions and the U.S. Occupational Safety and Health Administration do not consider drill rigs with augers/drilling equipment mounted on their vertical masts to be mobile cranes. They also do not require operators of such drill rigs to have mobile crane operator certification. These jurisdictions currently accept drill rig training programs from jurisdictions other than their own including Europe, e.g., training provided by drill rig manufacturers and suppliers, individual employers, specialized equipment training providers.

The MTCU Foundation Drill Rig Operator Modular Training Standard also includes a certification examination before trainees can receive a completion certificate from the MTCU.

## **Consultation Questions**

The MOL is interested in your responses to the following questions.

1. Are there other specific health and safety issues or hazards related to the use of foundation drill rigs that are not covered under the ministry's drill rig proposal and should be addressed by the Regulation?
2. Do you agree with the list of subjects the MOL proposes should be included in training provided to a drill rig operator? Are there any training subjects that should be added to or deleted from the proposed list? How much detail should be included (if any) under each of the training subjects to ensure a worker is able to operate a drill rig in a safe manner?

3. Do you agree the prerequisites in the MTCU Foundation Drill Rig Operator Modular Training Standard for trainees and operators of mobile crane and non-mobile crane drill rigs should be made mandatory under the Regulation? Why do you agree or not agree with the MTCU prerequisites? What would be the advantages or disadvantages and job implications to drill rig operators of mobile crane and non-mobile crane drill rigs and their employers of this certification with respect to labour availability and mobility across Canada and internationally, business competitiveness, cost to operators and employers, etc.?
4. How should the training requirements be applied to experienced drill rig operators who are currently working in the industry without certification as a hoisting engineer-mobile crane operator under the Ontario College of Trades and Apprenticeship Act, 2009?
  - Should there be some 'grandfathering' mechanism for these experienced operators who do not have this certification and how would such a grandfathering mechanism be applied?
  - How could experienced operators without certification as a hoisting engineer-mobile crane operator or their employers prove an operator's past training was equivalent to the training required under the Regulation?
5. How much time would the industry reasonably need (employers and operators) to comply with new drill rig requirements, e.g., 3 months, 6 months, longer?

### **How to participate**

The consultation period ends on December 29, 2014.

#### ***Send us your comments:***

Email: [WebHSpolicy@ontario.ca](mailto:WebHSpolicy@ontario.ca)

Fax: 416-326-7650

#### ***Write to us:***

Ministry of Labour  
Health and Safety Policy Branch  
Construction Health and Safety Regulatory Proposal Project  
400 University Ave., 12th floor  
Toronto, ON  
M7A 1T7

### **Notice to Consultation Participants**

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amendments to the Construction Projects Regulation. This process may involve the ministry publishing your submissions or summaries of submissions (in hard copy and on the internet). In addition, the ministry may disclose your submissions to third parties as part of the consultation process or where required by law.

If you identify yourself or other individuals in the body of the submission, this identifying information may be published or otherwise disclosed to the public. Any name and contact information provided outside of the body of the submission will not be disclosed by the ministry unless required by law. Any individual who provides a submission and indicates an affiliation with an organization will be considered a representative of that organization and his or her name and other identifying information may be published or otherwise disclosed.

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