



Professional Engineers
Ontario

Temporary Works for Construction Projects

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TEMPORARY WORKS FOR CONSTRUCTION PROJECTS

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Notice: The Professional Standards Committee periodically reviews guidelines to determine if a guideline is still viable and adequate. Practice bulletins may be issued from time to time to clarify statements made herein or to add information useful to those engineers engaged in this area of practice.

1. ABSTRACT

Few construction, renovation or demolition projects are completed without some form of “temporary works” being required. Temporary works provide access, protection or services for workers, equipment, materials, public and/or the environment during construction, renovation, retrofit, maintenance or demolition. Temporary works also provide temporary support for any part of permanent works, until the permanent works have achieved a state of completion allowing temporary works to be removed. Because of the temporary nature of these works, they may not be given sufficient attention. This can lead to partial or complete failure of either temporary or permanent works.

The purpose of this guideline is to bring to the attention of practitioners who specify, design or take part in the construction and/or review of temporary works the basic requirements, procedures and duties necessary to achieve the proper design and installation or construction of temporary works.

Practitioners can perform several different roles with respect to temporary works. The roles of prime responsibility considered by this guideline are practitioners designing temporary works, practitioners designing permanent works and the field review practitioner. It would not be unusual for one practitioner to be responsible for more than one of these roles, but for the purposes of this guideline, each role has been dealt with as though it were performed separately.

2.

PURPOSE OF PEO GUIDELINES

For more information on the purpose of practice guidelines, the guideline development and maintenance processes, including the Professional Engineers Ontario (PEO) standard form for proposing revisions to guidelines, please read [our document](#).

To view a list of the PEO guidelines, please visit the [Knowledge Centre](#) of the PEO website.

3.

PREFACE

According to Professional Standards Committee (PSC) policy, in 2020 the PSC considered whether this guideline required a complete re-write or if an update would be sufficient to keep the document current and reflect best practice in the industry. Following consultations with engineers, co-regulators and other

stakeholders, PSC found that the guideline is still relevant and would continue to provide benefit to PEO members and the public with only an updating of its content. The PSC approved this revised version in March 2022.

Notes:

1. References in this guideline to the word “practitioners” refers to engineers and firms holding a certificate of authorization to offer and provide engineering services to the public as defined in the *Professional Engineers Act*, henceforth referred to as the PEA.
2. References in this guideline to the word “engineers” apply equally to professional engineer licence holders, temporary licence holders, provisional licence holders and limited licence holders issued under the PEA.
3. For the purposes of this guideline, the term “public interest” refers to the safeguarding of life, health, property, economic interests, the public welfare and the environment for the benefit of the public.

4.

PURPOSE AND SCOPE OF THIS GUIDELINE

This guideline applies to the design of temporary works, as defined in this guideline, and sets best practices that are consistent with the professional and ethical obligations of engineers as contained in the PEA. It is not intended to be used as an instruction manual by practitioners who lack related technical knowledge and practical experience. This guideline should be read in conjunction with other PEO guidelines.

As per the Code of Ethics under O. Reg. 941/90, it is the duty of practitioners to always act with “knowledge of developments in the area of professional engineering relevant to any services that are undertaken, and competence in the performance of any professional engineering services that are undertaken.” Consequently, engineers engaged in design, construction, installation or field review of temporary works must be knowledgeable with codes, legislation, standards and technical publications in this area of engineering practice.

Note that some systems, such as demountable structures or tower cranes, may be covered separately under regulations and/or other PEO guidelines.

PROFESSIONAL COMPETENCE

Clause 72(2)(h) of O. Reg. 941/90 under the PEA makes it professional misconduct for practitioners to undertake work that they are not competent to perform by virtue of their training and experience. Furthermore, failure to make responsible provision for complying with applicable statutes, regulations, standards, codes, bylaws and rules in connection with work being undertaken by or under the responsibility of the practitioner is professional misconduct according to Clause 72(2)(d) of O. Reg. 941/90.

PROFESSIONAL REQUIREMENTS

Practitioners' professional requirements are detailed in the *Professional Engineering Practice* guideline.

ROLES AND RESPONSIBILITIES

Construction projects normally involve the services of several practitioners, each with their own area of responsibility. All practitioners, whether retained to design the permanent works, components of the permanent works, or temporary works, should be familiar with the responsibility and oversight recommendations in the *PEO Structural Engineering Design Services for Buildings Guideline* and *Assuming Responsibility and Supervising Engineering Work Guideline*.

7.1 Permanent Works

Practitioners designing permanent works are not usually responsible for the design or field review of temporary works required during the construction of permanent works. However, permanent works practitioners should be available to consult with the temporary works practitioners so that their respective designs are coordinated. Practitioners responsible for temporary works design are usually employed or retained by temporary works contractors. Permanent works practitioners may also be retained to design part of, or all of, the temporary works. Where more than one practitioner is involved in temporary works for a specific construction project, the practitioners' roles should be clearly coordinated amongst themselves to ensure responsibility for all aspects of the temporary works has been assigned.

Specifications for permanent works should list all requirements, including standards and codes, monitoring techniques and methods of reporting for temporary works, that the permanent works practitioners require. These specifications should also state that practitioners designing temporary works that load, unload or cause any other effect on the permanent structure are to consult and coordinate with the permanent works practitioner.

7.2 Temporary Works

Practitioners designing temporary works should become familiar with the design and specifications of the permanent works and should consult and coordinate with the permanent works practitioner when the temporary works load, unload or cause any other effect on the permanent structure. Practitioners should design temporary works so the temporary works will not have an adverse effect on permanent works. Temporary works practitioners should also consult with the client and/or constructor to fully understand their means and methods.

In addition, the Regulations for Construction Projects under the *Ontario Health and Safety Act* (OHSA) identify conditions where a professional engineer may be required to design, inspect or test temporary works and equipment. Temporary works practitioners should be knowledgeable with all relevant acts, standards and codes, including the OHSA and its regulations so that when they design, inspect or test, they can be confident that the requirements of all acts and regulations are met. The OHSA permits a Ministry of Labour, Training and Skills Development (MLTSD) inspector to order a professional engineer's report on the adequacy of a temporary work for which the inspector has a concern with respect to worker safety.

Design parameters for some temporary works are not as specific as design parameters and codes for permanent works. Rather than prescribe specific design criteria, some regulations may specify acceptable factors of safety and allowable stresses. Practitioners responsible for designing temporary works may find it necessary to research particular design problems in detail to determine the design criteria and unique conditions that apply to temporary works.

Temporary works practitioners are also expected to be cognizant of the effects that progress in the construction of permanent works could have on their temporary works design. Temporary works practitioners should communicate with their client, the constructor and permanent works practitioners as needed, to clearly establish the purpose, intended use, method of construction and staging of temporary works. Therefore, practitioners designing temporary works are to assess all impacts or effects of the temporary works for its full life cycle.

Temporary works will, in some instances, require approvals from government departments or agencies, regulatory bodies or other entities with jurisdiction over an activity or location. Temporary works practitioners should know when these approvals are required and advise their clients so that the process for obtaining the approvals is understood and followed.

DRAWINGS AND SPECIFICATIONS

Temporary works practitioners should be thoroughly knowledgeable about the design documents for the proposed permanent works and the existing site conditions before designing the temporary works. Temporary works practitioners should identify portions of the works shown on their drawings that fall outside their scope, noting such as “designed by others.” Practitioners should ensure that design drawings and specifications are complete and capable of standing on their own and should be adequately detailed to allow detailed review of the temporary works for compliance with the permanent works and field review requirements and constructability.

Drawings should be clear and consistent. They should include their dimensioning system, explain key elements in plain language, include a legend for all acronyms and symbols and an index of all drawings and documents that constitute the complete set of temporary works drawings. Temporary works practitioners should not assume that constructors will know all the required details. Guidance on the content of design and erection drawings is available in the PEO guideline, *Structural Engineering Design Services for Buildings*.

Specifications should be consistent with the temporary works drawings so that they include only information that is relevant to the temporary works being described. Specifications together with the temporary works drawings should completely define the scope of the temporary works and provide design criteria and limitations. Practitioners should advise the client that only final versions of the drawings and documents are sealed, and only final versions are to be used for the temporary works. Practitioners should be familiar with the PEO guideline, *Use of Professional Engineer’s Seal*.

In addition to defining the layout, sizes, materials, proprietary equipment and other relevant details, temporary works drawings should clearly show or note:

- All live and dead loads or service conditions for which temporary works were designed;
- Any loads the temporary works may impose on any permanent works;
- Any required staging of the construction, modifications required during construction and special precautions required during erection and dismantling;
- The anticipated duration and seasonal climatic loads for which the temporary works were designed;
- All tolerances and clearances;
- Any necessary inspection, testing or monitoring and related procedures and safeguards;
- Monitoring requirements during construction (e.g. settlement, vibration, environmental, air quality, etc.);
- All limitations for the use of proprietary components; and

- All relevant standards, codes and regulations to which temporary works have been designed, and the requirements with which the constructor of temporary works should comply during construction.

CONSTRUCTION AND FIELD REVIEW

Constructors of temporary works are responsible for constructing those works in conformance with the temporary works drawings and specifications. Practitioners should advise their clients when field review of temporary works is required by regulation or code and, when there is no specific regulatory requirement, when field review should be carried out to confirm the temporary work is in general conformance with the design intent. It is recommended that all such field review work be carried out by the designer of temporary works; however, another practitioner may perform this function. Guidance on field review best practices may be taken from the PEO *Guideline for Professional Engineers Providing General Review of Construction*.

Practitioners conducting field reviews should comply with the following procedures:

- a) Establish terms of reference relating to the temporary works, including the reporting requirements and to whom the reports are to be sent. Maintain clear lines of communication with contractors, temporary works practitioners and, where appropriate, permanent works practitioners and constructors to ensure temporary works have been built as designed.
- b) Determine and list the construction progress points at which field review, independent testing or sampling is required. Consult with the temporary works design practitioner, as needed, to create this list. Provide the list to all those identified in the field review communications plan and establish that those who are responsible for notifying field review practitioners and independent testing firms of upcoming progress points are aware of their responsibility.
- c) Determine what sampling of material or testing of equipment has been specified by the temporary works design practitioner for the work being reviewed and confirm that a testing agency has been hired to carry out this work.
- d) Carry out field review of the work at the progress points identified in the published list. Note any condition found during field review that differs from those inferred from the temporary works design documents. After each field review, issue a written report with copies sent to the contractors and others as identified in the temporary works communications plan.
- e) Field review practitioners should be familiar with any proprietary equipment that is used. As part of the field review, the condition of components in the proprietary system needs

to be considered since they may have been used numerous times before. Confirm that all re-used components have been inspected by qualified people with the authority to reject defective parts.

- f) When the field review practitioner has a concern about the condition of any component, they should request that the component either be replaced with one in serviceable condition or that the component in question be tested to verify its adequacy. The field review practitioner should confirm that appropriate testing is carried out by qualified personnel and that copies of all test reports are made available to the relevant parties promptly. When appropriate, these tests should be performed under a professional engineer's supervision.
- g) The field review is not complete until all variations and deficiencies are corrected or documented and reviewed. Large or complex temporary works may need several field reviews. When a review finds that a corrective action is required, a follow-up review should be done to confirm the correction has been completed.

10.

DEFINITIONS

The definitions of the key words and phrases used in this guideline are those assigned to them in the following statutes, regulations, codes, standards and commentaries in the priority in which they are listed:

1. The *Professional Engineers Act* and its regulations;
2. The *Building Code Act* and Ontario Regulation 332/12;
3. The *Occupational Health and Safety Act, R.S.O. 1990, c. O.1*
4. The National Building Code of Canada;
5. The technical standards referenced in the building code applicable to the design, construction, renovation, occupancy and use of buildings referenced therein;
6. Those listed below to which specific meanings have been assigned in this guideline; and
7. The meanings that are commonly assigned to them by dictionaries, within the context in which they are used by engineers, technicians, builders and the skilled trades that implement structural engineering work.

Specific definitions for key words and phrases likely to appear on design documents or in field review reports, which this guideline recommends for the sake of consistency, are provided below.

- (a) "Temporary works" are installations required to provide access, protection, support or services for workers, equipment and materials during the construction, renovation, retrofit, maintenance or demolition of permanent works. Temporary works are also required to provide temporary

service, repair or support for any part of permanent works until the permanent works have achieved a state of completion, allowing temporary works to be removed.

Some typical examples of works that may be temporary are:

- Formwork and falsework for structures;
- Shoring and temporary bracing for masonry walls and structural frames;
- Support of excavation and shoring for trenches;
- Underpinning and guying;
- Roof and parapet anchors;
- Caissons, cofferdams and tunnels;
- Access scaffolding for construction purposes, swing staging, stirrup supports and bosun's chairs;
- Cranes and crane foundations;
- Re-shores for multi-storey concrete structures;
- Field offices;
- Access roads;
- Hoarding and construction fencing;
- Environmental encapsulation during the removal of hazardous materials;
- Protection of vehicular and pedestrian traffic during construction;
- Provisions for loading testing, and
- Piping, electrical, mechanical and heating services.

- (b) "Constructor" is defined in the *Occupational Health and Safety Act* (OHSA) as "a person who undertakes a project for an owner and includes an owner who undertakes all or part of a project by himself or by more than one employer."
- (c) "Temporary works contractor" means the person or company responsible for erecting, installing, constructing, maintaining or demolishing temporary works.
- (d) "Temporary works design practitioner" means the practitioner responsible for the design of temporary works, including the preparation of the engineering documents the contractor of temporary works will use.
- (e) "Permanent works design practitioner" means the practitioner responsible for the design of permanent works.
- (f) "Temporary works field review practitioner" means the practitioner responsible for reviewing the temporary works.

APPENDIX

PEO Guidelines Referenced

- *Assuming Responsibility and Supervising Engineering Work Guideline*
- *Guideline for Professional Engineers Providing General Review of Construction*
- *Professional Engineering Practice*
- *Structural Engineering Design Services for Buildings Guideline*
- *Use of the Professional Engineer's Seal*



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