

GUIDELINE

**Professional Engineers Providing
Professional Services in Building
Projects using Manufacturer-
Designed Systems and
Components**

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INTRODUCTION

This guideline covers practices and responsibilities in design, construction, and general review of construction for building projects that fall within Part 4 of the *Ontario Building Code* and that utilize manufacturer-designed building components.

The use of manufacturer-designed components and systems has evolved from the traditional approach to building design, in which design professionals' original designs utilize predetermined systems and components and specify materials and methods to be used in construction. In this traditional approach, contractors and subcontractors are responsible for manufacturing, fabricating, supplying and installing components according to design professionals' specified requirements.

Today's trend, however, is toward the use of performance-based design requirements. The use of this approach has made it necessary to modify the traditional roles of the professionals responsible for executing and ensuring adequacy of the work.

Although this guideline does not cover buildings exempted from the requirement for design and general review by an architect or professional engineer, professional services provided on exempted buildings should be of the same professional standard as those provided for buildings covered in this guideline.

This guideline covers professional engineers' roles in specifying requirements for, and designing and reviewing the construction of, this building type.

In buildings, some structural elements are designed by fabricators, and their engineers are responsible for those parts of the work. These services include, but are not limited to, open web steel joists, preengineered steel buildings, precast concrete and deep foundations. Structural engineers are not normally responsible for such other building components as waterproofing, protection systems for floor slabs, stairs, miscellaneous metals, nonloadbearing walls and metal stud back up to veneer walls. However, when negotiated with prime consultants or clients, structural engineers may provide these services for some projects.

1. PROFESSIONAL RESPONSIBILITIES

1.1 Parties Having Responsibility

1.1.1 Chief Building Official

Before issuing Building Permits, *chief building officials* should obtain from owners the names, roles, and agreement of the people or organizations that will provide design and general review services as specified under the *Building Code Act*.

1.1.2 Prime Consultant–Owner's Representative

The *prime consultant* is responsible for establishing the owner's requirements, and for ensuring that plans, sketches, drawings, graphic representations, specifications, quality assurance programs and other necessary documents to obtain Building Permits are prepared by responsible professionals and submitted to the chief building official.

The prime consultant is also responsible for obtaining the chief building official's approval for changes to the documents submitted for Building Permits.

If a prime consultant, through lack of training, experience or professional qualification, must rely on the experience and qualifications of designers of the work, the prime consultant should advise the owner of the nature of his or her limitations with respect to the project's design requirements.

Unless otherwise established by written agreement with the owner or the owner's agents, the person or organization undertaking to provide the design function specified under Article 2.3.1 of the *Building Code Act* should be deemed to be the prime consultant and should assume responsibility for coordinating the activities of the designers of the work.

1.1.3 Designer of the Work (System)

In the case of a design for a building, responsibility for design and performance criteria rests with the professional who has specified these criteria, who is known as the *designer of the work*. The designer of the work is therefore the professional who has set out the performance criteria and applicable codes and standards to be followed in the execution of the work.

Designers of the work are responsible for:

- ◆ ensuring that all necessary components have been specified;
- ◆ specifying the method of certifying a component's design;
- ◆ specifying requirements for submission of shop drawings and fabrication details; and
- ◆ ruling on whether components acceptably meet the requirements of the building system, or advising chief building officials and prime consultants of any approved changes to the requirements.

When a designer of the work specifies a specialized product or process, but does not have the expertise to determine whether the product or process adequately meets specified requirements, the designer of the work should so advise the prime consultant. The designer of the work must also state clearly in the specification that he or she is relying on the manufacturer of the product or process for its design, acceptable tolerances in manufacture and installation, and for providing adequate information to allow successful installation, erection and operation of the component that uses the product or process.

1.1.4 Designer of the Work (Component)

In the case of building components, responsibility for designing and specifying manufacturing and assembly requirements rests with the professional *designer of the work (component)*, who is engaged to provide engineering services to the manufacturer.

By sealing drawings of the components or issuing the prescribed certification, designers of the work (component) assume responsibility for ensuring that the design meets the performance criteria and requirements of the *Ontario Building Code* and the applicable codes and standards specified by the designer of the work. The designer of the work (component) is also responsible for specifying the necessary quality assurance inspection and testing to certify that the work is in accordance with requirements of the design. The designer of the work (component) must receive and review these inspection and testing reports before certifying the work.

1.1.5 General Review Engineer

The people or organizations providing general review should assume the responsibilities outlined in the *Guideline for Professional Engineers Providing General Review of Construction as Required by the Ontario Building Code*, which is published by Professional Engineers Ontario.

1.1.6 Contractor/Constructor

The person or organization acting as the *constructor* should have, or should retain, the necessary professional expertise to successfully execute the work according to the documents prepared by the prime consultant and/or designers of the work. The contractor/constructor is also responsible for observing all construction safety requirements.

2. ROLES AND RELATIONSHIPS

The roles and relationships of the various professionals depend on the method the owner adopts to secure the necessary design and construction services, and on the contractual arrangements among the parties.

This guideline is intended to outline the roles and relationships of the various professionals in protecting people who may occupy or be affected by a building's construction and operation. The guideline is not intended to predefine contractual relationships among the parties.

2.1 Traditional Approach

Under the traditional approach, the *owner/client* retains a design professional (architect/engineer/project manager) as the prime consultant, to act as the owner's agent and accept professional responsibility for design and review of construction. The owner/client retains, directly or indirectly, designers of the work for various engineering disciplines. The owner/client also retains a constructor to construct the work.

When acting as owners' agents, *prime consultants* have the roles and responsibilities of owners with respect to meeting chief building officials' requirements for documentation, notice and general review of construction. Communication between the chief building official and the project team should pass directly through the owner's agent.

The *prime consultant* and *designers of the work* share the responsibility for establishing the scope and requirements for the work to be executed by designers of the work (component) and the contractor/constructor.

In the specification of documents, the *prime consultant* sets out manufacturers' responsibilities for designing the work's systems or components. This specification also establishes the means and methods of interfacing and reporting among the various manufacturers, contractor, and prime consultant, and the necessary documentation for submission to the chief building official and the general review engineer.

In contracting to provide engineering design services for components of the work, *manufacturers of systems and components* undertake that they have the necessary licensing from Professional Engineers Ontario, understand the requirements of the *Building Code Act* of Ontario and the approval and certification processes, and will provide to the chief building official through the prime consultant all necessary information to secure approval of systems.

As manufacturers' consultants, *designers of the work (component)* are responsible for ensuring that supplied systems and components are designed according to the requirements of the *Ontario Building Code* and other specified criteria. When a component's design depends on, or imposes, loads/forces on the work of others, designers of the work (component) should ensure that proper documentation establishing these loads/forces is provided and transmitted to the affected parties. Designers of the work (component) should provide as part of the documentation of the work a signed, sealed and dated Certificate of Design, stating the design criteria used and the loads assumed in the design.

Designers of the work (component) should ensure that assembly or erection drawings that enable the component to be properly installed or erected are provided, including adequate notation as to the installation requirements to be provided by others and any restriction on the components' field modification.

Unless otherwise specified, *designers of the work (component)* are responsible under the *Building Code Act* for general review of construction for the portion of the work prepared under their professional seals. If a designer of the work (component) is unable, or has contractually excluded this responsibility from the scope of his or her work, the project documentation should *clearly exclude* this work from the scope of services, so as to identify to the chief building official and the owner that the work is to be undertaken by others.

Manufacturers should provide quality assurance programs and Certificates of Manufacturing Conformance that verify that products have been manufactured to meet the requirements of the designers of the work (component).

In the traditional approach, the *contractor/constructor* implements and coordinates the work at the workplace. The contractor/constructor reports to and takes direction from the prime consultant on interpretation of the owner's requirements.

2.2 Design/Build Approach

Under the design/build approach, the *owner/client* retains a *design/build organization*, either directly or in response to a proposal call, to provide professional design, review of construction, and construction services. The level of definition of the owner's requirements will depend on how well the owner understands approval and construction processes.

Unless otherwise expressly agreed between an owner/client and a *design/build organization*, the design/build firm assumes the:

- ◆ role of the owner's agent with respect to the chief building official;
- ◆ design responsibilities of the prime consultant and the designers of the work;
- ◆ the general review of construction; and
- ◆ role of the contractor/constructor.

The *design/build organization* may or may not retain outside professionals to assume specific portions of these responsibilities, but must ensure that the required professional certification is provided. If a design/build firm provides these services from internal professional resources, the design/build firm must have a Certificate of Authorization from Professional Engineers Ontario.

A design/build contractor's method of contracting for design, supply and installation services from manufacturers of systems and components, and the amount of information related to the requirements of the design of the system and the components, can vary from contract to contract.

In contracting to provide engineering design services for components of the work, *manufacturers of systems and components* undertake that they:

- ◆ have the necessary licensing from Professional Engineers Ontario;
- ◆ understand the requirements of the *Building Code Act* of Ontario and the approval and certification processes; and
- ◆ will provide all necessary information to secure approval of the system to the chief building official through the design/build organization.

3. PROCEDURAL GUIDELINES

The purpose of this section is to enable all of the professional engineers associated with a project to determine whether the requirements of the *Building Code Act* of Ontario and the *Professional Engineers Act* are being met and to assess their individual roles in ensuring compliance with these requirements.

The procedures outlined are only conceptual; details are intentionally omitted.

3.1 Owner's Nomination of Agent

The owner nominates an individual or organization to act as the owner's agent. This individual or organization organizes the necessary design and construction services to meet the owner's needs for work regulated under the *Building Code Act* of Ontario. The agent may or may not have any of the professional qualifications necessary to execute the work. The agent is responsible for selecting the professionals who will assume responsibility for the design of the total building project.

3.2 Selection of Professional Organization or Firm to Assume Responsibility for the Design of the Total Building Project

The owner's agent should select a professional or firm with appropriate qualifications and experience. The professional or organization selected should have the capability to provide overall professional services for the total building project, including design, contract administration and general review of construction.

Prepared by the owner or the owner's agent, the scope of the assignment should establish the owner's needs. The scope should clearly establish the designers' responsibilities to meet all codes and legislated requirements in effect.

3.3 Documentation of Total Project Requirements

The professional or firm retained by the owner's agent should prepare all necessary plans, sketches, drawings, graphic representations, and specifications to establish the owner's needs and compliance with the *Building Code Act* and other legislated requirements, and to provide the chief building official with the necessary documentation to issue a Building Permit.

3.4 Application for a Building Permit

The owner's agent should apply for a Building Permit and advise the chief building official of the names of the professionals responsible for the work's design and general review of construction. The owner's agent should ascertain from the chief building official the method by which required documentation related to construction activities should be communicated.

Chief building officials should satisfy themselves that documentation clearly establishes professionals' responsibility for the manufacturer-designed systems and components employed in the work.

3.5 Selection of Contractor

Owners should select by tender or by negotiation firms to act as contractors/constructors. Negotiations should be based on a defined scope of services that clearly outlines firms' responsibilities with respect to the *Building Code Act* and other legislated requirements.

3.6 Selection of Manufacturer-designed Systems and Components

Manufacturers should be selected to supply and/or install manufacturer-designed systems or components on the basis of documentation clearly establishing:

- ◆ the owner's needs;
- ◆ professional responsibility for design in accordance with the *Building Code Act* and other legislated requirements;
- ◆ the requirement for a suitable Certificate of Design;
- ◆ requirements for a Quality Assurance Program;
- ◆ requirements for a Certificate of Manufacturing Conformance;
- ◆ requirements vis-à-vis installing or erecting the components;
- ◆ requirements for independent inspection and testing;
- ◆ the necessary documentation for submission to the chief building official; and
- ◆ requirements for general review of construction of the system or component and the approval process.

3.7 Construction

The contractor/constructor should meet with the owner's agents, designers, general review engineers and manufacturers of systems and components as often as is necessary to determine:

- ◆ the intent of the design, including any special conditions or procedures that require explanation;
- ◆ interfacing requirements between manufacturer-designed components;
- ◆ approval processes for all necessary documentation for construction and any necessary design modifications to correct deficiencies;
- ◆ manufacturers' requirements for modifying components;
- ◆ requirements and timing for independent inspection and testing of components;
- ◆ the general frequency, schedule, and notification required for general review of construction;
- ◆ that all necessary permits have been obtained;
- ◆ the chief building official's notification requirements; and
- ◆ what certification documents are to be submitted as part of the acceptance of the work.

3.8 General Review of Construction

General review engineers should carry out general review in accordance with the *Guideline for Professional Engineers Providing General Review of Construction*, which is published by Professional Engineers Ontario.

3.9 Final Review

The contractor/constructor should correct all deficiencies, and submit to designated professionals, and/or the owner's agent, required Certificates of Design, Certificates of Manufacturing Conformance, warranties, as-built drawings, operating manuals and other specified documentation.

The contractor/constructor should test all systems in accordance with the requirements of the contract documents, and submit reports to designated professionals and/or the owner's agent.

On approval of final documentation, designated professionals should submit a Construction Completion Certificate to the owner.

3.10 Occupancy Permit

The owner's agent should apply to the chief building official, with supporting documentation, for an Occupancy Permit or permission in writing to occupy.

The chief building official should check the supporting documentation and, if it is acceptable, issue an Occupancy Permit.



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