CE 42

Canada's Housing Construction System

The purpose of this document is to foster understanding of the elements of the system of construction and operation of buildings and houses in Canada.

Construction is a complex service and manufacturing industry, involving thousands of different component parts that are assembled into products and systems by a large number of workers both on- and off-site. Basic safety, health, accessibility and building protection features are addressed in construction codes. However, construction is primarily a market activity, the quality of whose products reflect the interplay of costs, time, availability of materials, skill and knowledge.

Each party involved in construction has certain responsibilities.

Owners have overall responsibility for their projects which includes: determining what will be built, meeting laws, and choosing reputable advisors and builders.

Designers have responsibility for producing functional working drawings and specifications that comply with applicable law and reflect owners' requirements; they may also perform site reviews for the owner.

General contractors have responsibility for overall construction, including buying, scheduling, workmanship, and management of subcontractors and suppliers.

Subcontractors have responsibility for their portion of the work (mechanical, electrical, drywall, excavation, etc.).

Manufacturers have responsibility for supplying products that meet both their advertised specifications and applicable standards.

Standards development organizations have responsibility for producing reliable, useable standards.

The **national government** funds the development of model codes through the National Research Council, overseen by the Canadian Commission on Building and Fire Codes (CCBFC).

Canadians expect certain fundamental things from their construction system:

- basic health and safety;
- reasonable durability/serviceability;
- choice; and
- value for money.

Provinces and territories have responsibility for adopting through legislation the building, fire and plumbing codes applied in their area.

Municipalities in most areas have responsibility for examining drawings for conformance with codes, and many inspect projects for compliance. (In some areas of Canada, this is done by provincial/territorial agencies. There remain a few areas with no public oversight.)

Because of the complexity of the system, there are practical limitations to each of these roles.

SYSTEMS TO HELP DETERMINE WHAT SHOULD BE BUILT

Owners must make the basic decisions about what they want to have built to suit their needs. Owners' degree of knowledge about the construction process may vary dramatically. Often, they hire designers or companies that offer design/build services to help them make those decisions.[1]

Speculative developers/builders make their decisions on what to build based on their expectations of what future buyers or renters will want, as well as technical factors related to proper design and construction. There are a number of sources of information to help with these decisions.

Manufacturers' information

Manufacturers of new products and systems have a significant interest in providing information about their products. While manufacturers are mainly interested in highlighting the advantages of their own products, their literature can also include notes and warnings on how their products should not be used or installed in typical situations. Sales representatives help answer questions or solve problems. Some large companies have full technical departments.

In addition, there are books that collect and publish competing manufacturers' information under standard specification headings. Many trade magazines also publish news briefs on product information and installation/design issues.

Standards

A standard is an agreed-upon, written-down set of requirements against which products and systems can be measured or compared. Standards are used for everything from product dimensions to structural design, and from labelling to sustainable forestry practices.

In Canada's National Standards System, thousands of volunteers—users, manufacturers, consumers, contractors, engineers, architects, government representatives, researchers, etc.—are involved in the writing and updating of these standards. Most work through the four non-profit standards development organizations accredited by the Standards Council of Canada: the Canadian General Standards Board, Canadian Standards Association, Bureau de normalisation du Québec, and Underwriters Laboratories of Canada.

Many standards are used voluntarily by industry and buyers. Others are made mandatory when they are referenced in codes and regulations adopted by governments.

Insurance requirements

Owners usually want to protect their construction investment with insurance coverage. Companies offering this service may have building design and construction requirements that go beyond the minimum required in codes.

Design and best practice guides

Approaches to design, performance and system quality control are set out in design and best practice guides. Some of the best known are published by associations and agencies working to improve the market for their members' products, and by government agencies such as the National Research Council of Canada.

Consumer information

Both private and public sector groups prepare and distribute consumer information, from "how to choose a renovation contractor" booklets, to extensive technical information aimed at property managers. These are often prepared by partnerships of groups such as industry associations, product manufacturers, retailers, utilities, financial institutions, research agencies and government departments. In addition, there is a large number of books, magazines, sections of newspapers, television shows and websites devoted to home and building topics.

[1] The use of professional architects and/or engineers is required by provincial/territorial law for larger and/or more complex buildings.

Drawings and specifications

Drawings are a graphical description of the work. Specifications are a written description. They set out general requirements, acceptable products, equipment, installation procedures, standards of workmanship, etc. Their scale and complexity vary widely, from simple one-page lists to multi-section documents. They are very important as legal documents, describing responsibilities and the quality of workmanship and materials.

Model codes

The Canadian Commission on Building and Fire Codes oversees production of the model National Building Code, National Plumbing Code and National Fire Code of Canada, plus other guidance documents. The model building code sets out minimum requirements addressing safety, health, accessibility and building protection. The model plumbing code deals with safe installation of potable water systems, and removal of wastewater to municipal or private sewage systems. The model fire code addresses fire safety during the operation of facilities and buildings. Other model codes (for example, electrical, gas and elevator codes) are produced by organizations such as the Canadian Standards Association.

Model codes have no force in law until they are adopted by a government authority with the appropriate jurisdiction. The model codes are very technical and presume that users are knowledgeable.

Provincial/Territorial codes

Today, most provinces and territories have passed legislation adopting either the national model building, fire and plumbing codes produced by the Canadian Commission on Building and Fire Codes, or variations that include provincial and territorial additions, exemptions, or amendments. The Acts establish systems of building regulation, scope of application, enforcement powers, permits, consideration of non-standard products and systems, inspections, penalties and appeals.

Other regulations affecting building

Provinces and territories have also established systems of planning and development review that affect what can be built, generally with a large municipal role. Official plans establish permitted land uses, and ensure appropriate services in new subdivisions and in established areas. Planning and zoning criteria may include minimum setbacks, lot coverage, density, massing, etc. Some municipalities have architectural controls affecting the appearance of new buildings.

Provinces and territories also oversee electrical and gas installations, with enforcement generally handled by municipalities or utilities. Provinces and territories have additional regulations for elevators, boilers and pressure vessels. There are also various occupancy licences required by either the province or the municipalities (liquor licence, care homes, day cares, etc.) and requirements that go with them.

Provincial and territorial laws for the environment, flood control, occupational health and safety, etc. can also affect planning, construction and operation of buildings.

SYSTEMS FOR QUALITY CONTROL

Once the design decisions have been made, focus shifts to construction. There are several systems to help avoid errors and assure the desired levels of performance and workmanship are obtained. The selection of reputable companies, site supervision and appropriate testing is essential. Construction code inspections by or on behalf of the authority with jurisdiction only provide a back-up review for those matters deemed to be in the public interest—for example, health and safety.

In-plant quality control programs

Material suppliers and product and equipment manufacturers have their own programs to control quality and ensure their products perform as expected. The programs vary in complexity, reflecting the differences

in the inherent risk in the products themselves. Reputable companies try to keep quality high to protect their reputation.

Third-party testing in plant

Many manufacturers design their production to meet published standards. This may require tests of inputs, components and finished product, monitoring, etc. Where there is a market, some manufacturers will also design some products specifically to exceed minimum standards, and publish test results in product literature.

Certifications

Certification organizations are accredited to confirm that specific products, installations or systems meet published standards. Certification marks will usually appear on products in an easily visible place.

Evaluations

It can be difficult and/or expensive to prove to municipal building officials that a new product provides the type of performance required by codes. The Canadian Construction Materials Centre (connected with the National Research Council) was established to make this easier, by assessing a product's conformity to the model codes' performance expectations on a national basis. Ontario has a similar process just for its own building code.

Testing on site

Some products and installations require site testing. Concrete, for example, is usually tested during placement. Tests are performed for the owner by a third party. The more complex the building, the more testing may be recommended by the owner's consultants. For complex facilities or systems, designers may analyze testing requirements and recommend "commissioning" protocols, based on risk assessment.

Contractors' inspections

Contractors' own site inspections are an extremely important part of the quality control process. General contractors/builders appoint site supervisors to review all the work included in the contract, to check that it has been done according to the drawings and specifications—by their own forces or by subcontractors. Similarly, trade contractors oversee the work of their own employees and sub-trades.

Architects' and engineers' review

Architects and engineers are often retained to review construction (mandatory for most larger projects, depending on provincial legislation, project size and complexity). They usually visit the site on a regular basis and review work at specific stages, before it is hidden by further construction or finishes. They also advise owners on progress, identify required tests and review results.

Drawings evaluation and inspections

Owners must apply to the municipal building department for the required permits and pay the required fees. Site inspections are usually part of the permit process, but only address the codes' minimum safety, health, accessibility and building protection requirements. In many municipalities, the fire services will also review drawings, focusing specifically on fire safety issues that will arise once a building is occupied. The building will then be inspected periodically to make sure that the fire safety features are maintained.

Private third party inspections

Some government jurisdictions allow private third party inspectors to do some, or all, of the work of a municipal building inspector. These inspectors must generally pass specific courses and/or be certified. In some areas, they are hired by the government; in others, they are hired by the owner of the construction project.

Warranty and insurance requirements

Some buildings, typically houses, are covered by warranty programs. These programs can require that

drawings be reviewed by program staff and site inspections be made to assess conformance with program requirements.

SYSTEMS TO IMPROVE BUSINESS AND TECHNICAL KNOWLEDGE

The construction industry employs many workers with various skill levels, from entry-level labourers to highly-skilled trades and specialists. There is an educational infrastructure in Canada to provide initial education appropriate for the job demands, make available ongoing short courses and updates, and register both firms and workers. Some provinces/territories have minimum training requirements for certified or licensed practitioners.

Trades training

Provincial/territorial governments are responsible for administering publicly operated training programs, including apprenticeship, trades training, vocational training and licensing/certification. Community colleges offer most of the courses for initial trade qualifications. There are ongoing efforts to coordinate training and apprenticeship requirements across the country, to facilitate labour mobility. Several provinces support specialized colleges for fire safety training.

Professional architects and engineers

Governing bodies for professional architects and engineers set training requirements across the country. To qualify for a license to practice, these professionals must complete a recognized course of study at an accredited post-secondary institution, as well as a period of internship. Specialist and updating courses are also available, and are mandatory in some jurisdictions.

Other courses

Many voluntary courses are available for workers and management in all types of trade and building firms. Some are offered through community colleges, some through associations, some directly through manufacturers. Certain courses of study may lead to accreditation, usually on a voluntary basis, that help people to demonstrate their qualification to perform the work.

Provincial/Municipal licensing

Requirements vary from province to province. All provinces set up self-regulating licensing bodies for architects and engineers. Quebec requires all contractors and trades to be licensed with the Régie du bâtiment du Québec. British Columbia requires all residential builders and renovation contractors to be registered with the Homeowner Protection Office. Many municipalities require specific trades to be licensed in order to conduct business in their jurisdiction.

SYSTEMS TO ALLOCATE RESPONSIBILITY

Basic responsibilities are established through the body of laws passed by the federal and provincial/territorial governments. In the common law jurisdictions, responsibilities are also established by court precedents. Other responsibilities are outlined in contracts. Building and safety codes acts are a fairly small part of the overall system to allocate responsibilities.

Legal framework

Quebec's civil code makes builders, architects and engineers who have managed or inspected the work, subcontractors (for their own work) and vendor/promoters jointly liable for defects in the work for one year. For major defects, that extends to a period of five years from the date of completion.

In the common law provinces and territories, most claims would be covered by contract law, the laws of negligence, and the statutes of limitations. The principle of "joint and several" liability means that anyone partially responsible for a construction defect that causes damages can be required to pay the whole amount if the other parties are unable. Statutes of limitations

set the time limit for pursuing claims. *Alberta's 1994 Safety Codes Act* sets out roles and responsibilities for all the parties to a construction project. There is a 10-year final limitation on claims arising from construction. *British Columbia's Homeowner Protection Act* sets penalties for people who build and sell homes without obtaining the required warranties.

Contracts

Construction contracts vary, but are usually based on industry standards. They generally include a description of the responsibilities and work to be done (often referencing drawings and specifications), price, construction schedule, warranty terms, insurances, and how changes, delays or disputes will be handled.

A contract is legally binding on the parties to it.

SYSTEMS TO PROTECT CONSUMERS

Building projects are complex on-site manufacturing and assembly operations, which usually face both time and budget constraints. It is usual to have minor defects that require repair or replacement. However, the limited scope of codes (safety, health, accessibility and building protection) means that they have little if any application to what is traditionally thought of as "consumer protection." Industry has, therefore, developed a number of ways to respond to problems, and some have been made mandatory by governments.

Company warranties

The standard warranty is one year from the date of substantial performance of the work. Longer periods may be specified in the contract documents for certain products and portions of the work, and longer manufacturers' warranties are to be issued to the owner. Guarantees from product and equipment manufacturers vary, depending on the expected life of the product.

Insured warranties (voluntary)

Insured or third party warranty programs are used in the housing industry. They are required by law in some provinces, and are available on a voluntary basis in the rest of the country.

Under these programs, a third party corporation agrees to fulfill the home builder's warranty to the homebuyer if the builder does not. The terms differ across the country, but normally include a one- or two-year full labour and materials warranty, plus coverage for major structural defects until at least the end of the fifth year. Some programs have additional coverage; some offer options, available for an additional premium.

Government-required warranties

In British Columbia and Quebec since 1999, and in Ontario since 1976, the provincial governments have legislation requiring some or all new homes to be covered by third party warranties or insurers. The Acts in these three provinces establish coverage, application, enforcement, penalties and appeals, plus criteria and provincial review of providers. They are quite different in their application, approach and definitions.

Bonds

A bond is a three-way agreement between the principal (usually the contractor), the obligee (usually the owner) and the surety company. In a performance bond, if the contractor doesn't perform the contract properly, the surety must remedy the default. Before issuing a bond, surety companies usually review a company's financial resources, staff, management performance and past experience. It can be very difficult for new or smaller contractors to obtain bonds.

Property insurance

Normal property insurance is not intended to cover defects in construction. However, it does provide protection to the owner from the loss of property in cases of fire or other disasters.

Advice

Consumers who face problems and are unsure of their rights and obligations can consult legal specialists familiar with the construction system. Useful general information, advice and support is also available from organizations such as the Consumers' Association of Canada. The Homeowner Protection Office in British Columbia has also published a guide for new homebuyers.[2]

The consumer's responsibility

Many buyers or users of construction services, especially homebuyers, do not have a full understanding of construction, business practices, and the protection they do and do not have under the system. A number appear to believe that codes and municipal enforcement are intended to cover more than they actually do.

All buyers have responsibilities for protecting their own best interests by:

- checking into companies' reputation, experience and qualifications;
- checking references;
- getting legal review before signing contracts;
- allowing sufficient time and money for better products, careful work and good inspections;
- choosing appropriate insurances and warranties;
- inspecting completed work;
- reporting problems promptly; and
- doing required ongoing routine maintenance.

SYSTEMS FOR RECOURSE

Errors and omissions insurance

As professionals in self-regulated professions, architects and engineers are barred from limiting their liability for negligent work. Because of this, together with the principle of joint and several liability, they can end up having to pay the full amount of damages if the other responsible parties are no longer available. Professional liability insurance can help to cover their potential liabilities, and is required in many provinces/territories.

Municipal liability insurance

Municipalities can face potential liability for negligent drawings examination or inspection by their staff. Some municipalities take out commercial liability insurances; others cover their liability through association-run programs; still others self-insure. Because of the principle of joint and several liability, municipalities can be drawn into disputes between other parties, even though their role has been very limited.

Lawsuits, mediation and the courts

It can be expensive and time consuming to pursue legal rights through the courts. Sometimes, defendants don't have enough assets for a case to be worthwhile to pursue. However, legal rights and precedents have an important impact on the advice given to consumers and companies, and on how business is conducted.

In addition, more and more contracts include a provision for disputes to be settled by mediation (a faster, less adversarial process), and some provinces have begun to include mediation as the first stage in the legal process. Warranty programs often use a form of mediation (conciliation) as a first response to claims.

SYSTEMS TO RESPOND TO PROBLEMS

The vast majority of construction problems turn out to be simple things, which can and do get fixed quickly. But some are more widespread, and more difficult to address. This is especially true of "system" problems that are caused

[2] Homeowner Protection Office, *Buying a Home in British Columbia: A Consumer Protection Guide* (Vancouver: HPO, 2009), available online at http://www.hpo.bc.ca/files/download/Bulletins/BuyingANewHome.pdf.

by the interaction of more than one product, installer, design specialty, etc. Even here, the construction system has networks and routes to identify and respond to problems.

Problem identification and response

Problems and complaints are tracked on both a formal and informal basis at various levels. They lead to product improvements and changes to buying and specifications.

Those that are not easily resolved get discussed in wider forums. Builders, designers and installers all discuss problems and solutions at their association meetings. Building, plumbing and fire officials do a similar thing through their associations. Product associations keep track of questions and complaints to help them improve design and features. Members of a standards-writing group may hear concerns and respond. Researchers may find they are getting a number of calls on the same issue. Warranty programs and insurers who have to pay out on claims will start doing their own investigations.

Research, development and information

The Institute for Research in Construction at the National Research Council has an ongoing program of research into building science. The Industrial Research Assistance Program helps provide access to information and support for innovation through a network of technology advisors. Canada Mortgage and Housing Corporation does extensive work to support research and development in housing. Natural Resources Canada has been a key player in work involving energy efficiency in buildings. Universities, research institutes and affected agencies such as utility companies get involved. Manufacturers and product associations do a significant amount of research into product improvements, new products and applications. Business and professional associations also support research.

Fire safety

Because of the importance of fire safety, fire codes require periodic inspection and maintenance of all fire safety systems in buildings. Although building owners are ultimately responsible for ensuring their buildings are safe, these periodic inspections play an important role in identifying safety problems and in having them fixed.

The components of good building

Good buildings require a healthy overall construction system, including:

- a well-functioning market;
- readily available consumer and industry information sources;
- a legal framework for the conduct of business;
- reliable standards and testing;
- mandatory minimum construction codes;
- site inspections and quality control;
- warranties and insurances;
- education and training;
- systems to identify and respond to emerging problems; and
- maintenance of safety systems.

SYSTEMS FOR KEEPING UP TO DATE

In addition to formal programs of continuing education and professional development, there are several other key ways for owners and industry to keep up to date:

Trade shows

Most consumers are familiar with Home Shows, which feature new products, services and design ideas aimed at the homebuyer or owner wanting to renovate. Similar shows are held specifically for industry on a regular basis, in Canada and

around the world. Shows may be industry-wide, or focus on individual specialties, such as plumbing, heating and air conditioning.

Trade publications

Numerous publications serve the construction industry and its various specialized groups. There are subscription-based publications, free-circulation publications supported by advertising, and newsletters issued by voluntary associations and institutes, individual companies, and industry organizations mentioned in this paper. At the consumer level, every newspaper in the country seems to run a "homes" section. New technologies, new products, demonstration projects, "how to" articles, identification and resolution of problems, and (for the more technical) scientific reports, are regular features.

Membership in voluntary associations

There are many voluntary-membership associations in the construction industry. Most share information among members and work cooperatively for industry improvements. This may include seminars, education programs, information programs for consumers/clients, conferences, etc. Many are actively concerned with construction quality, have committees that discuss problems and offer information sessions for members.

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