

BUILDING CODES – A GOOD TOOL IN THE RIGHT CONTEXT

Paper presented by Bruce Clemmensen¹ to the
Global Summit on Performance-Based Building Codes
November 2003

ABSTRACT

Building codes are very important tools for achieving society's goals in terms of health, safety and accessibility. In addition, they are increasingly being seen as a means of achieving other goals such as energy efficiency, minimizing greenhouse gas emissions, and sustainability.

While they clearly have a key role to play in achieving society's goals, it is important to recognize that building codes are only part of the process of building. Owners, designers, general and sub-contractors, and manufacturers (among others) all have an important bearing on what gets built, how it's built and how the buildings perform. Similarly, a well-functioning construction delivery system, effective consumer and industry information transfer, a sound legal framework for the conduct of business, reliable standards and testing, site inspections and quality control, warranty and insurance, education and training, and maintenance all contribute to the quality of buildings and building performance.

The proper development and application of building codes requires the separation of the technical development from the policy development. Objective-based and performance-based building codes benefit from a clear articulation of the policy objectives – which must recognize what codes can and cannot do (or would not do as well as other potential measures). Bodies having policy responsibility within a country's system of government are in the best position to decide these objectives – and the best way of achieving them. These decisions must be made considering the context within which codes exist and their limitations in order to ensure that regulation is appropriate and effective. In this discussion, the Canadian experience is used as an example approach.

Introduction

Buildings are an important part of the infrastructure of our society. As such, it is appropriate that society seeks to ensure that buildings meet certain standards. While building codes are clearly a key element in any strategy in this regard, they are only part of the overall building system – and are not always the most effective means of achieving particular goals with respect to building.

In discussing the appropriate role for building codes, it is important to make a distinction between society's *goals* for buildings, and the *objectives* of building codes. While there are many things that society may wish for its buildings – aesthetically pleasing, affordable to

¹ Bruce Clemmensen, Chairman, Canadian Commission on Building and Fire Codes, c/o Institute for Research in Construction, National Research Council, Building M-20, Montreal Road, Ottawa, Ontario, Canada.

purchase and operate, long-lasting – that does not necessarily mean that all of these *goals* should be reflected in the *objectives* of the building code. Regulation is not always the best way of achieving particular goals – it depends on the context and what alternative means may be available to achieve the goal.

This paper discusses how we in Canada go about deciding which objectives for buildings should be included in the building code and, given these objectives, how we seek to determine the best way of achieving them. The paper is grouped into the following sections:

- Recent Canadian experience – a review of the major changes in the process for formulating the building code in Canada over the past several years, including:
 - The move to objective-based codes; and,
 - A new code development process.
- Emerging issues and how to deal with them – why building codes are not always the best way to achieve society’s goals for buildings.
- Evaluating proposed changes to the building code.
- Why code requirements are specified as minimums.
- Sum-up – codes are only one element of the system required to meet society’s goals and promote better quality buildings.

Recent Canadian Experience

As a result of a strategic planning exercise in 1995, the Canadian Commission on Building and Fire Codes (CCBFC) decided that:

- The scope and content of our codes need to be clearly stated; and
- The code development system needs to be more responsive to the needs of the provinces and territories.

This has resulted in a continuous period of major change which led, first, to the development of objective-based codes and, second, to the creation of a new code development process for Canada.

The Move to Objective-Based Codes and the Context for Codes

The move to objective-based codes involved a detailed study of our existing codes, including:

- Developing a large database that documents the intent of every existing provision of our codes – i.e. the reasons why each of the provisions were included in the codes;
- Ascertaining the major objectives that the existing code seeks to achieve; and,
- Promoting a broad public debate about which objectives are appropriate for the code – as well as those that are not.

During this process, it became clear that our codes were not the best vehicles to achieve *all* of our societal goals with respect to buildings. Quality of construction, durability, liability, and the ability to compensate owners when things go wrong – all were identified as issues that were not appropriate objectives for the building code. In order to achieve these broader societal goals, it is necessary to recognize the importance of other key elements in the construction system – i.e. we need to understand the context in which the codes exist. Important elements of this context include:

- A well-functioning market – with knowledgeable and accountable ‘professionals’ (designers, builders, manufacturers, contractors etc.) who understand building and stand behind their product, and knowledgeable consumers who know their obligations and have access to the information they require to make informed decisions and choices.
- A legal framework for the conduct of business – so that all parties can be held accountable for their actions.
- Reliable standards, testing and design guides – so that ‘professionals’ and owners can have confidence in the materials and processes used in construction, and that these will be installed properly.
- Warranties and insurance – to provide a measure of assurance to building owners that any defects in the ultimate product will be rectified.
- Education and training – to enhance the knowledge and skills of those involved in the building process.

Building codes are an important part of a modern building system, but these other elements have a key supporting role to play in achieving the objectives of the code. Designers and owners typically have expectations that go well beyond the minimum requirements specified in the building code, and the industry is capable of providing a product that meets these higher expectations. Therefore, while it is important that building codes articulate the minimum requirements acceptable to our society in terms of safety or other objectives, they should also seek to support the market in achieving higher standards – or at least not to impede this process.

The replacement of prescriptive building codes with objective- or performance-based codes is a major step in this direction. The new codes are intended to promote a better understanding of what the code is trying to achieve. They allow building regulators to focus on objectives and minimum solutions – to seek to promote better conformance with the objectives of the code and to foster innovative ways to achieve these objectives. Clearly articulating the objectives of the code allows designers to either utilize historically accepted solutions or to propose alternatives with equal or better performance.

Formulating a New Code Development Process

A broad approach is required to deal with scope issues. There will always be debates (and legitimate differences of opinion) about what should be in the building code. Most properly, this is a political question – not a question for technical committees.

In Canada, building regulation is a provincial/territorial (not a national) responsibility. However, sensibly, the provinces and territories have recognized that a national ‘model’ building code that can (if necessary) be adapted to particular provincial or territorial circumstances is a better approach than a series of unrelated codes. Nonetheless, it became clear that our technical base was not adequate to deal with scope issues. We are developing a system that identifies issues of scope (or policy) together with a separate process to deal with them.

Formulation of the model national building code in Canada is the responsibility of the Canadian Commission on Building and Fire Codes (CCBFC) – an independent Commission which is responsible for all decisions regarding model codes. The CCBFC is comprised of volunteers who approach the issues from three different perspectives – one-third are building regulators, one-third are from various parts of the building industry, and one-third have a more general perspective on the issues. All members of the Commission sit as individuals and are free to make decisions on a consensus basis – they are not tied to particular positions on issues that may have been taken by broader interest groups to which they may belong.

The process for code development that has been adopted in Canada seeks to achieve the following:

- Clear accountability;
- An open, transparent process;
- An opportunity for all to participate and be heard;
- Elimination of duplication of effort, resulting in a better use of resources;
- Timely response to proposed changes;
- Flexibility and clarity of code requirements;
- Consideration of the economic impact of requirements; and
- Technical excellence.

The development of the building code is not devoid of political input. While the CCBFC is responsible for the formulation and updating of the model building code, there is a separate committee made up of the provinces and territories which:

- Provides policy advice to the Commission, and
- Provides a forum for the discussion of issues of mutual concern to the provinces and territories – including issues that may be beyond the scope of our codes, but have importance in the broader context discussed previously.

The committee of the provinces and territories must approve any new objectives for the code and monitor proposed additions to the code. Normally, adding new objectives would involve extensive consultation and agreement among the provinces and territories. There is extensive exchange of information and representation between the CCBFC and the committee of the provinces and territories which, while they have distinct responsibilities, are nonetheless working towards the same goal – the formulation of a model national building code.

In addition, while there have always been broad public consultations on matters relating to both scope and technical requirements, unlike in the past, this is now undertaken jointly and simultaneously by both code writers and regulators.

Emerging Issues and How to Deal with Them

We need to be careful in formulating building codes. On any particular issue or proposal for change, we need to ask the question whether the best way to achieve a particular societal goal is through building codes. To decide this, we need to:

- Understand the context;
- Examine whether there are approaches that may work better (e.g. economic and market forces); and
- Be deliberate – the system is slow to deal with emerging issues, but this is not entirely bad since it ensures that there is a well-considered process.

In Canada, the objectives of building codes have traditionally related to issues such as health, safety and accessibility, but new objectives, such as energy efficiency, minimizing greenhouse gas emissions and sustainability, are increasingly being discussed. With some of society's goals for buildings, it is not clear-cut that regulation through the building code is the best solution. So, while something may be recognized as a *goal* for society as a whole, it is not always necessarily the case that it should be an *objective* of the building code. For example, most people would agree that it is desirable to have windows in a building and that, where possible, these should take advantage of pleasant views, etc. – but do we need to put this in the building code? Any home builder who built homes without windows or with fewer windows than his potential purchasers wanted, would soon find himself out of business. There is a serious question whether such requirements should be in the building code. The CCBFC has a proposal out for public consultation to remove the provision requiring a window for “view of the outdoors” from the model code.

Similarly, privacy is important – but does the building code need to require doors on washrooms to ensure privacy, or can we assume that most designers (and owners) are sensible enough to figure this out on their own? Could a code requirement for doors on washrooms be a hindrance to the development of the infinitely more functional doorless washrooms that are now common in public buildings? Regulators need to recognize that, where the market has a clear interest in achieving the same objective, regulation through the code may be unnecessary and possibly counterproductive.

Or, protecting the owner's investment. This is an understandable question whenever there are significant failures yet it cannot be addressed effectively by building codes. It is a very complex subject with implications for affordability (in the case of housing). Purchasers need to balance longer-term performance with initial costs that fit their means.

Or, appearance. This type of issue is very difficult, if not impossible, to regulate through the code. Painting interior steel beams and columns, filling holes for countersunk nails in wood flooring, driving drywall nails beneath the surface – none of these are code requirements.

Or – here's a more difficult one. There is much debate in Canada about how to implement the Kyoto Protocol. Increasing the energy efficiency of new buildings is one of the options being discussed – it is unclear as yet whether this will result in changes to the building code or be addressed through market instruments to achieve the goals. But, as discussed, it

would be short-sighted to think that everything can be solved through regulation. Many factors need to be considered. For example, appropriate energy prices would provide a powerful incentive to conserve energy – water meters save water, we know that this works. Whether additional building regulation is the answer is still an open question.

Evaluating Proposed Changes to the Building Code

The cycle for changing the model national building code in Canada is long – and that is entirely appropriate. Revisions to the code must be very carefully considered and, other than in exceptional circumstances, this is undertaken on a five-year cycle.

Proposals for changes come from a variety of sources, and each is carefully considered. In looking at each proposal, we seek answers to the following questions:

- *What is the problem that the proposed change seeks to address?* From the Commission’s perspective, it is important that any change align with the objectives specified for the model code. If the proposed change seeks to address a problem that is not in our mandate, proponents must first engage in a process to establish that the new objective of the measure is something that should be an objective of the building code.
- *How will the proposal fix the problem?* When examined in detail, many proposals are found to be ineffective in addressing the targeted problem. A recent debate in Canada looked at the viability of requiring sprinklers in new single-family houses. While very costly, proponents argued that requiring sprinklers in all new houses would save lives. However, exhaustive studies have determined that the *marginal* improvement in safety with sprinklers, compared to the code-specified mandatory wired-in smoke alarms, is very small.
- *Is there a better way to address the problem?* As discussed, many of society’s goals for buildings are not easily addressed through a regulatory approach.
- *Can the proposal be enforced at the time of plan review or site inspections?* Many proposals, such as requirements for a minimum life span for building components (e.g. a roof), are not realistically enforceable through building regulation. Similarly, mandating some level of ‘construction quality’ is a questionable objective since it is very difficult to devise a meaningful test to measure this. In our view, such goals are best left to the market, supported by an adequate liability framework.
- *Is the proposal cost-effective?* It is important that the objectives of the code be achievable in a cost-effective and efficient way. For example, with respect to the debate on requiring sprinklers in new houses, research on the issue found that wired-in smoke alarms actually have a *negative cost* – the benefits in terms of lives saved far outweigh the costs of installation of the detectors. Wired-in smoke alarms are mandatory in new houses in Canada, sprinklers are not.

Undertaking the assessment of a proposal to change the code is a slow and difficult process – it requires a lot of rigour. Often, it requires more clarity of thought NOT to do

something than to try to do it. Recognizing the limitations of trying to do too much with the code, even if the goal is appropriate, is better than including something that will not work – and might have deleterious side effects.

Code Requirements – Minimums, for Good Reason

Another lesson that we learned from this process was the importance of *minimum requirements*. Including broadly acceptable minimum requirements in the code is a valuable service to society in general, and the building industry in particular – though the concept of what is ‘acceptable’ is constantly changing.

Given a particular objective of the building code, such as safety, building codes provide a very important support for the building industry by specifying particular minimum solutions. For example, the code helps stakeholders with questions such as: *How safe is ‘safe’?* Without some guidance from the building code, practitioners would need to start from the beginning every time something different is built in order to answer questions such as minimum snow or wind loads. Most designers and builders seek a higher standard than specified in the code but, by identifying the base line, the code provides the comfort of knowing they are at least covering the minimum that has broad agreement.

Objective- or performance-based codes, of course, improve on the old prescriptive model by facilitating innovative solutions that may be a more appropriate (or less costly) means of meeting the objectives for particular buildings.

Promoting the cost-effective provision of buildings and infrastructure is important to our economy. Regulators need to ensure that the objectives of the building code establish realistic minimum acceptable standards. Buildings are an essential part of the infrastructure of society and, in a world of limited resources and competitive markets, it is important that this infrastructure be provided in a cost-effective manner.

Conclusion

To sum up, building codes are clearly an important foundation for promoting good quality buildings that meet society’s stated and unstated goals. And, we are making them better by moving to objective-based codes. These provide more latitude to designers and other professionals in terms of how to achieve the stated objectives – they are then free to utilize innovative materials and methods that may provide better performance and/or have lower costs, or to stick with the ‘acceptable’ solutions.

However, returning to the theme stated at the start of this paper, the context for building codes is extremely important. Building codes are only part of the process – other elements have a key role to play. Well functioning markets with professional building practitioners, a sound legal framework, reliable standards and testing, warranties and insurance, education and training – all have an important role to play in the process of promoting the construction of better quality buildings.

So, in Canada, the Commission responsible for formulating the model national building code views the potential efficacy of codes with some humility. Enforcement of a regulation

through the building code is not the only means of achieving the goals that society establishes for buildings – and is often less effective than alternative non-regulatory measures. Building codes are a good tool for achieving society’s goals for buildings – but, depending on the context, there may be other, more effective, means of achieving the goal.

The main lesson for us is that broad debate is important.