

2001 OBJECTIVE-BASED NATIONAL BUILDING CODE OF CANADA WILL IMPACT INDUSTRY.

John W. Archer,
Canadian Codes Centre, National Research Council Canada

Background:

Canadian industry is fortunate that our country is one of the few large developed economies with a single national building code. One single code breaks down internal barriers to trade, allows all regions to enjoy the same standard of construction requirements, and eliminates the inefficiencies that would occur if every jurisdiction wrote their own codes. The people who write the national building code like to think that their work is one of the fundamental reasons why the Canadian construction industry is efficient, effective and world competitive.

The body responsible for overseeing the national model code development process is the Canadian Commission on Building and Fire Codes. This group of men and women, from all sectors of the industry, recently surveyed the future of building codes in Canada. This survey produced a strategic plan that identified the work that needed to be done to maintain the value and effectiveness of Canada's national building and fire codes.

Key components of that strategy were:

- Make the codes more flexible in their application, so that effective solutions are not closed off just because they don't meet the strict interpretation of the requirements.
- Improve the clarity of the requirements so designers know what they are supposed to do.
- Reduce the complexity of the code, so designers and regulators don't have to jump from one part of the code to another looking for applicable requirements.
- Structure the code so that all needed requirements are in a logical order.
- Make the code more effective in dealing with renovation.
- Don't let the code be a barrier to innovation.

Discussion of how to achieve these improvements led to agreement that the model national building and fire codes should be reformulated or restated so that there was a clear statement of the objective of each requirement. And they should be re-ordered so that the logical connection between requirements could be seen. These new building and fire codes have come to be called objective-based codes.

How are Objective-Based Codes Developed?

The process of reordering and restating the existing codes in an objective-based format has been underway for over a year. It is a big job. Each and every requirement in the building and fire codes is being examined to determine what specific intent it has. Is it there to protect the safety of the occupants of the building? Is it there to protect the

participation of industry-led code committees, is leading to the identification of the fundamental or root objectives of the codes.

What are these root objectives? It is clear, and it is something that we have known all along, the building and fire code requirements are intended to protect the safety and health of building occupants. A reason addition to the code has been the extension of these objectives to persons with physical and sensory disabilities. The intent analysis is, however, identifying a number of additional, and some may find controversial, root objectives underlying code requirements.

One of these may be the protection of property. Why does the building code ask for fire separations between buildings and parts of buildings to be two hours or in some cases even four hours? Clearly it does not take that long to safely evacuate the occupants of the building. What about an industrial building in a remote area? Most do not have high occupancy loads and are easy to evacuate. Why do we care if they burn to the ground? Let the owners buy insurance. One reason may be that whole communities can be wiped out if the major source of employment is destroyed in a fire.

There are other possible root objectives being discovered in the analysis. The part of the building code dealing with residential construction is a source of many. There seems to be a requirement or two that is intended to facilitate the construction process – making it easier for the next trade to do their job. For example, why is there a requirement that the tops of concrete foundations be poured level. You can always shim the plate. Why are there requirements addressing the cracking of ceramic tile. That would seem to be a quality issue. Is it an objective of the code to be concerned with the quality of finishes?

Needless to say, all of these apparent root objectives will need to be closely examined. And they will be. Currently, all the Standing Committees supporting the national model code development process are focussing on the intent analysis. Each of these committees, made up of industry people, has the job of examining the results of the intent analysis, correcting it where their expertise suggests, and approving it. This work is expected to be mostly complete by the middle of 1998. All of the analysis will be made available for general public review. Some of it is already available on our web site. Come and take a look for yourself.

What Will the New Codes Look Like?

Starting now, based on the work already completed, the first prototypes of the new objective-based codes are being worked on. What are they going to look like? We don't really know. But I can tell you some things.

First, and perhaps most important, there are not going to be a lot of new requirements that people will have to learn. The new code will not force you back to code school. The current requirements of all of the 1995 national model code documents will be available as solutions in the new code. There may be some changes to the requirements, but few.

Only those that are urgent changes will be considered – those that impact on health, safety or accessibility.

What will change is the way in which the codes look. At the moment we are thinking that there will be two basic parts to the code documents. One will be a small document setting out the objective hierarchy of the code requirements. That is, it will show how each requirement is tied to another and how it leads to a root objective. An ideogram for this is shown in Figure 1.

The second type of code document we expect to be much larger, maybe eventually even larger than the current code documents. Why is this? You will remember that it is the intention to keep all of our existing code requirements – they have been serving us well. They will in fact continue as “acceptable solutions” to meeting the objectives of the code. However, we expect that with each passing year, more and more solutions to the objectives will be developed and added to the code. New technologies, innovations, better ways of doing things that can be shown to meet the objectives of the code will all be put up on the shelf for everyone to use.

This is probably a good point to raise the issue of performance-based codes. You will have noticed that I have not once used this term to describe the new objective-based codes. Performance requirements have been held out as the “holy grail” of the future by many code writing organizations. Indeed, in the international context, there seems to be a mass migration to performance codes. And they are attractive. They offer perhaps the ultimate in flexibility. However, our study of the situation concluded that developing a new code based solely on performance requirements would be folly. We just don’t know enough building science to establish appropriate and verifiable measures of performance for all areas of building regulation. As well, some code requirements do not lend themselves to a performance-based solution and are better left as prescriptive or specification-type requirements.

The beauty of an objective-based code is that you don’t need to care how the requirement is expressed, as long as it leads to a solution to the objective. If you have some perfectly good prescriptive requirements – and the codes are full of them – then use them. If you do have or develop performance requirements and measurement techniques associated with them, you can feed them into the code as they become available. In fact, the new code would give you a choice – meet the old prescriptive requirement as an acceptable solution to the objective, or follow the performance path and perhaps do something innovative.

A big advantage of the objective-based approach, in allowing the continued use of the existing requirements as solutions, is that those familiar with the code do not have to start from scratch. At the same time it allows the code development process to concentrate on the identification of additional acceptable solutions, widening the choice available to the industry.

When Will the New Codes be Available?

Our work plan calls for us to have completed the intent analysis by the middle of next year. Before then we will start to develop the initial document describing the new objective-based code documents. We expect to have this document released before the end of 1998. In that document we will set out the objective-hierarchy of the existing building and fire codes, showing where each requirement fits in to that hierarchy. This will be a companion document to the current 1995 National Building Code and National Fire Code now being adopted by the provinces and territories. The document will state to the designer and the regulator the purpose of each requirement.

This document will form part of a general public review of the progress of the move to objective-based codes. It may also trigger important discussion of what we want our building and fire codes to do for us. That is, what should be the root objectives of the codes? Should they be broadened? Should they be contracted to a narrow set of fundamentals?

The results of the public review will lead to the drafting of the new model objective-based building and fire code documents. Our plan is to publish them in the year 2001. They may resemble the two types of documents I previously discussed – one small and setting out the objectives, the other large and setting out the acceptable solutions to the objectives. The provinces and territories could adopt one or the other or both of the documents as their building and fire code. Over time we do not expect the objectives of the codes to change much, at least without considerable broad debate. However, we do expect that the repertoire of acceptable solutions to expand rapidly and easily.

Summary

In summary then, why are we making this effort to change to objective-based codes?

We believe that objective-based codes will be more flexible in their application. The letter of the requirement will become less important when everyone understands just what the requirement is attempting to achieve. Designer and regulator will be able to work together.

We believe that, expressed as objectives, the requirements will be easier to understand. When people know what they are supposed to do, they do it better. The result should be safer, healthier and better quality buildings.

We believe that objective-based codes will reduce the complexity of the requirements. The code is fifty years old. It is about time that someone took a close look at, and what more effective way than a close analysis of the purpose of each requirement. It is my personal belief that many requirements will be dropped as redundant and ineffective.

We believe that by restructuring the code so that all needed requirements are in a logical order, that it will be easier to use as both a design and a conformance assessment tool.

You all know about that feeling when you get called from the construction site by the inspector who says you forgot something. We shouldn't be making a complex process like designing and constructing a building any harder than it is.

We think that a restructuring on an objective-basis will make the code more effective in dealing with renovation. The current building code was written for new buildings. It has a great deal of difficulty dealing with older buildings. An objective-based code should make it easier to determine the essential improvements that need to be made in renewing a building.

Finally, we think that objective-based codes will encourage innovation in the construction industry. Because the purpose of the code requirement will be clear, the development of solutions will be clearer. It is essential that our codes be more welcoming of innovation. Innovation is a key to the long term health and prosperity of the construction and therefore to the country.

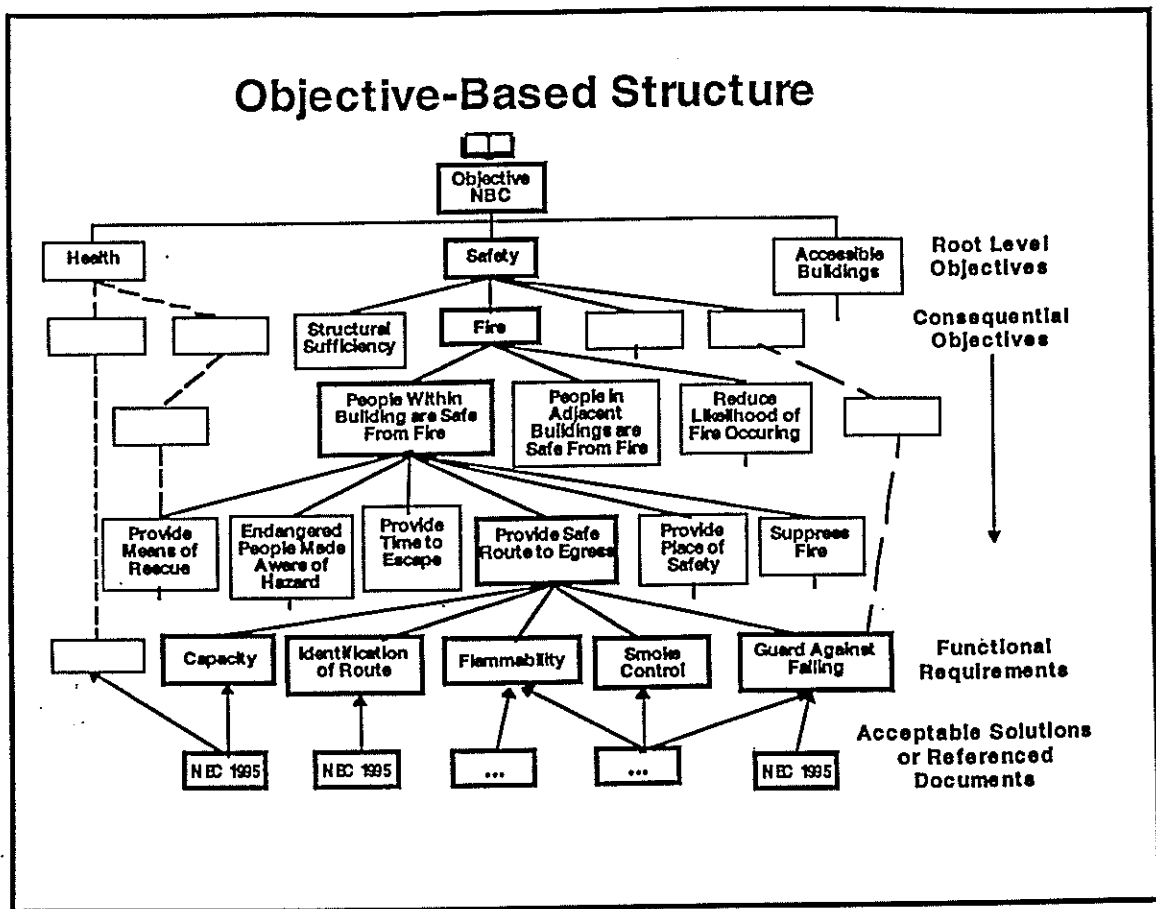


Figure 1.