TG11 - Performance Based Building Codes

A Report on the International Conference on Performance Based Codes and Fire Safety Design Methods in September 1996 in Ottawa, Canada

by John Hunt

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Earlier Idea Revisited

The idea of a performance-based building code is not new. The early research undertaken by the Nordic countries to develop such an approach to building controls began as far back as 1963.

The catalyst was the need to overcome trade barriers that resulted in well-meaning but restrictive practices at national borders. International trade is a tremendous stimulant to the process of change. The proliferation of performance-based code development throughout the world makes an excellent example.

CIB, through TG11, in conjunction with the National Research Council Canada and the Society of Fire Protection Engineers, USA, hosted an international conference on "Performance-based Codes and Fire Safety Design Methods" during September 1996 in Ottawa, Canada.

CIB has recognised the importance of including the writing on regulations within the field of documentation research by setting up a Task Group TG11 (under the W60 Performance Concept in Building Working Commission) whose objective is to produce a practical approach to developing a performance-based building code.

Around 250 delegates from 24 countries attended the Ottawa Conference which is a measure of worldwide interest in the performance approach.

Papers were presented on countries that currently operate performance-based codes, specifically England and Wales, Sweden, Australia and New Zealand.

CANADA

Canada is now committed to the performance approach. The first stage of Canada's evolution is to adopt an ‘Objective’ structure. This will involve an evaluation of the current prescriptive National Building Code of Canada to identify and incorporate objectives for the existing prescriptive requirements and to clarify the intent of individual clauses. This is expected to be completed by 1998.

The second stage is to then reassess the overall regulatory objectives and to restructure the building code into the hierarchical structure that has been adopted in the New Zealand Building Code. The new millennium will have arrived before the evolution is completed in around 2001.

SWEDEN

The fully performance-based building regulations in Sweden (introduced in 1994) were accompanied by legislation which now requires the building owner to assume sole responsibility in proving that the building complies with the regulations. This means the owner must have the knowledge and expertise within an advisory team and can no longer leave matters of safety to be decided or checked by the territorial authority. Since 1986 Swedish universities have educated some 200 fire protection engineers to serve a population of 8.8 million. Comparisons are strong between the approach to structural engineering and the new direction of fire engineering, which mirrors the situation in New Zealand.

THE USA

The future prospective for the Model Building Codes in USA is very interesting. In recognising "in this time of global economic expansion, fair trade agreements, and exploding construction activities abroad, the United States must now position itself to be competitive in the new environment. This will require the creation of a single unified system of construction regulations development and a more aggressive movement toward performance-based code" stated

Jon Traw, President, International Conference of Building Officials. This is the American objective. To achieve this end, it is proposed that a new organisation, the International Code Council established in 1994, will undertake unified development of a single performance-based code out of the three model code groups - the Building Officials and Code Administrators, the International Conference of Building Officials, and the Southern Building Code Congress International.

When asked why the name International Building Code was selected, the blunt response from Jon Traw was "When we go to sell our Code to China we will have greater success than if our Code was named the American Building Code". A target date of around 2000 was suggested which is guaranteed to pre-date the US change to metrication.

The American Society of Fire Protection Engineers is one of the driving forces in breaking free of the restrictions imposed by the traditional prescriptive fire codes in the US. This accounted for the emphasis on fire-related papers at Ottawa. Professor David Lucht of Worcester Polytechnic Institute, which has developed very close associations with the Fire Engineering Department of University of Canterbury, is a strong advocate of the limit state design method commonly used by structural engineers, as a model to be promoted for fire engineering.

He draws strong parallels between the reliability of various fire protection systems incorporated into a building with structural ‘strength’ of the building, while loads are defined in terms of combined effects of threats such as exposure to carbon monoxide, heat and smoke.

AUSTRALASIA

New Zealand had a very visible presence in Ottawa with five separate presentations. These were:

- Performance-based Code: The New Zealand Experience
  John Hunt, BIA
- Education for Performance-based Codes
  Charley Fleishmann, University of Canterbury
- The ‘Culture’ of Performance-based Fire Codes
  Andy Buchanan, University of Canterbury
- Necessity and Invention in Fire Engineering Design, A New Zealand View
  Dick Gillespie, Fire Risk Consultants Ltd, Auckland
- New Zealand Case Study (Exercise for Workshop)
  Carol Caldwell, Caldwell Consulting Ltd, Christchurch, and Dick Gillespie, Fire Risk Consultant Ltd, Auckland.

Australia and New Zealand Lead the Field

With the addition of four papers from Australia, the delegates at Ottawa were left in no doubt that Australia and New Zealand are not only active participants in the performance approach to building regulations, but current leaders in this arena. This achievement, as far as New Zealand is concerned, owes much to the international exchange of ideas. In our case, we benefited from the use of the hierarchy model developed by Nordic countries, the detailed format of the England and Wales regulations and Approved Documents, and free access to research from Australia.

A sizeable part to the original C4 "Spread of fire" acceptable solution, and latest research into the spread of aerosols from flushing toilets, was made readily available by the Department of the Environment in London. In return, Australia has relaunched its Building Code of Australia in 1996 as a fully performance-based code using the New Zealand Building Code as the model.

Evolution v Revolution

Most countries have adopted an evolutionary process to building regulation reform. In comparison, New Zealand underwent a revolution in time, breadth of scope and completeness. My observation on this point is that the change must be undertaken quickly. To take the evolutionary approach is to be neither one system or the other; people will naturally resist change and the majority are unlikely to modify their way of thinking or method of operation until literally forced to do so. The short 6-month introductory transition period for the New Zealand Building Code demonstrated this inertia.

The evolutionary or ‘slowly-slowly’ approach is promoted in most countries because the writers of the new performance codes are the same people who are still writing or amending the prescriptive rules that are in place. Naturally, they find it difficult to let go what they previously produced.

Further complication, recognised by the CIB Task Group, is that a performance-based building code operates only as well as the supporting legislation allows. Unless that supporting or administrative legislation is developed in tandem all the proposed performance mechanisms are greeted with "What ifs? " These relate ad nauseam to speculation over changes in use, alterations, waivers, exemptions for building consents, and ongoing maintenance. To my knowledge, except for New Zealand, and England and Wales, all codes writers, including those in Australia, are divorced from legislation writers. Therefore the two parts of the system are not being developed simultaneously, so the answers to the "What ifs?" are all conjecture.

The growing international interaction of contributors in their respective fields, especially that of fire engineering, is quite exceptional. International conferences on performance-based building codes now feature regularly, with Hong Kong and Israel also being recent host countries.

The partnering in research studies and the knowledge growth is almost bewildering, and credit must be given to those who are willing to participate and share their experiences from the private sector with their colleagues half a world away but still within the global village.

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