

IRCC110203

Preparing Ourselves for the Roadmap

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IRCC Keynote, November 3, 2003

Washington, DC

Introduction:

- Opener: Good morning. Wow. Am I excited to be here. Just think of it, a Global Policy Summit here in the United States, to draft a roadmap to bring Performance-Based Building Regulation to this country and to spread it throughout world! For someone who has been advocating “performance” for most of his professional career, this is an event of major significance. But, announcing such a meeting is relatively simple. Producing a viable roadmap is a much bigger task.
- The organizers have done a terrific job of lining up an impressive array of speakers highly qualified to address all key aspects of making performance-based building regulation a practical reality. Collectively, they and we, the participants, through the discussions in the new few days, have the task of making sure the key points are made to outline the roadmap. So what is it we need to do, for this summit to be successful? We need to work together, committed to a common goal. That requires we need to have a clear understanding on a number of critical points. My purpose this morning is to align this diverse group behind the single task of articulating the essentials for a roadmap to PBBR.

- I will begin by trying to get us all on the same page regarding the expected outcomes for this summit. The key to this is expectations and motivation. But first, I think it only fair to say where I stand.
- Jack's Bottom line: I believe performance-based is the way to go. This has been the focus of my entire professional career, and something sadly, I feel we give more lip service to than substance.
- I am not as firm a believer in regulation as some on the program; however, I appreciate the need for it, and as long as we have to do it, it seems to me the best way to go is performance vs. prescription.
- Performance-based regulation is something we ought to be working hard to make happen as soon as possible.
- Bringing performance-based building regulation to reality and doing it well will not be a slam dunk, but it will be well worth the effort.
- Nonetheless, major issues remain to be worked. In fact, the four key points I will speak to in a few minutes remain largely as unanswered questions in my mind. But these are precisely the sorts of issues that the roadmap must address.
- Similarly, I know there are others, I suspect some of you, for whom an epiphany may be needed to come to the same resolve I have on this topic. If you count yourself among those yet to be convinced that PBBR is the way to go, I urge you in the sessions which follow to air your reservations and concerns. For, if the roadmap is to get us where we want to go, it must address your issues as well. More to the point, for it to be us use to all of us it must lead us all to the same place and that must be a place

we all want to go. So, what do we need to do to prepare for the mapping process? I think we need to begin by looking candidly at our motivations for coming to this summit and our expectations for its outcome.

Motivations. I suspect there are many different reasons some of you are here. Some truly believe, and are ready today to begin the journey, even without a roadmap. Others among you know you want to take the trip and are ready to get to work on developing the map. Some of you may have come simply to contribute to the dialogue without yet having a sense of commitment to either the destination or the ways to get there. Others among you may be here because you are convinced PBBR has a darker side, that it is a bad thing, that it will do harm to you, your business or to others. One thing is certain. We have different reasons/motivations for coming to this summit. That is okay. It would probably be very dull if it were otherwise. In fact, the very success of the summit depends on the energetic engagement particularly by those among us who have the greatest concerns about the benefits or viability of PBBR. However, there is one caveat. And that leads me to the topic of expectations for the outcome.

Expectations. It is good we come with different perspectives on the topic. Clearly, our motivations for coming color our expectations for the outcome. However, for the summit to be successful, at some point most, if not all, of us need to arrive at a common view on the desired outcome for the summit, and then work together to make it happen.

The organizers really expect this meeting to produce a draft of a roadmap. But, do you? What needs to be done or said to convince you it is possible for this summit to produce a draft roadmap, and stimulate you to help make it happen? Your response probably depends on your motivation for coming, and, I would guess, it also depends on your sense that your concerns or issues will be heard and taken seriously. That said, it also depends on your willingness to listen, to listen perhaps as you have never listened before, so that you can hear the responses of others that say why or how your issues can and will be addressed in the roadmap.

In short, the success of this summit depends on each and every one of us being willing to articulate our issues and concerns, to listen, open-mindedly/fairly to the responses of others, and to be willing to accept new information gracefully and rationally. I trust this is true for everyone here, because we have some really meaty issues to address. Let me kick off the dialogue by briefly presenting my main concerns. There are four of them.

Snell's four issues:

- 1. We need to be clear about what we mean by “performance-based building regulation.”** Others later in the program will offer fine definitions of it, so I'll just talk briefly about it. Let me take it a word at a time.

Performance. The main point is that it is not prescriptive. Rather officialdom sets minimum levels of “performance” but does not prescribe *how* they are to be achieved.

The idea being this enables providers to offer increasingly better, safer, faster, less costly products designs or systems. That is to say, at its core, performance-based regulation is intended to facilitate beneficial innovation, i.e. change. Oops!

Beneficial to whom? How? With what consequences?

Based. What are we talking about the performance of here? Materials of construction? Products? Systems? Whole Buildings? Businesses? Families? Economies? All of the above? Something else? Isn't it important to be specific about the object the performance of which we are intending to manage better? Here, a systems perspective is essential, since all the elements I just mentioned are interrelated so that the optimization of one may diminish the performance of others.

What is the system of systems that we should focus our attention upon when we speak of performance –based building regulation? What end results are desired: fewer deaths and injuries; lower costs; better service lives; happier people; more successful businesses; more open, fairer markets; stronger, more competitive economies, ??

Also, “based” implies a method or approach. Earlier I said we speak of “Performance” as opposed to “Prescription”. Performance determination requires, by definition, the ability to quantify outcomes, or simply the **ability to measure and predict outcomes**. Lacking this ability, one is left to qualitative descriptions.

Sometimes that is the best we can do. At essence, prescriptive regulation relieves us from having to be explicit about “why” or be accountable for outcomes. Rather, it's simply, “do it this way and things will be okay”. How do we know? How can we know if we cannot measure or predict? In the absence of the ability to measure and

predict performance the only way we can be sure is if we stick to the same old things that have worked, or seem to have worked, in the past.

Given that the ability to measure and predict performance is essential to the performance approach, just how good are we at doing this? What can, or more to the point, what can't we measure and predict that we must to have meaningful "performance-based regulation of buildings? For example, recently Congress passed the National Construction Safety Team Act which tasks NIST with carrying out investigations of building failures which involve significant loss of life or the potential for significant loss of life. This is an enormous responsibility. Who among us has in the past been able to quantify the failure modes of highly complex building systems? This is something NIST is learning first hand as they work to complete the two year investigation into the mechanisms of collapse of the WTC towers. Clearly, we need a new discipline for measuring and predicting the performance of complex building systems including failure mode analyses.

Please, if you do nothing else over the next few days, work this one hard. What is needed to improve our abilities to measure and predict building performance? Who has to do what? What should be the priorities? Priorities for research, for education, for training, for development of new devices, etc.?

Regulation. Others on the program, experts in the broader subject of the role of regulation in society, will speak to the why's and how's of regulation and how it

needs to be interrelated with market and other mechanisms for influencing societal behavior. My issue is we need to rethink both the role of and our approach to building regulation. I am not alone in this view. A large number of the organizations here are supporters of an initiative led by the National Conference of States on Building Codes and Standards, called, the “National Alliance for Building Regulatory Reform”.

Whereas the initial motivation for this initiative was increasing demands from the states for e-government and single portal service centers, it soon became clear it makes little sense to go online with the same old systems and procedures that have frustrated so many for so long. Rather, it is argued, one should take advantage of the capabilities afforded by the new technologies for rethinking and streamlining the regulatory process. Much has happened in recent decades to reinforce this resolve. I am excited to see EPA and others who are students of regulation generally and performance-based regulation in particular on the program. Their input is crucial to our success in this summit.

Yet, I am deeply concerned that we have little or no scholarship on the subject of building regulation. When was the last academic thesis written on this subject? Who is analyzing how well what we are doing works, etc.? Domestically, in the Construction Industry Institute, the FIATECH consortium, at CIFE, Carnegie Mellon, Georgia Tech and elsewhere we see R&D underway to better understand alternative strategies and processes for construction and the emergence of new theories of construction. Globally similar efforts are underway in CIB, at VTT, and various centers in Japan, Australia, New Zealand, and elsewhere. But, what about new

theories of regulation of buildings: Who is doing this essential work? Students in schools of construction or architecture take courses, heaven help them, on the building code – what it is, how to apply and interpret it - but in most instances they are not discussing past or present theories of building regulation or offering new ones.

2. Is PBBR really better regulation? What is the building regulatory system? Who is responsible for it? How does it handle innovation? How well does it facilitate use of new technology for buildings, for sensing, for modeling systems and their performance? How are our answers to these questions different for PBBR? What can be learned from other domains of regulation? How do we measure how good regulation is or even whether or the extent to which it is necessary? What does PBBR cost? Have we made the business case for its value added? How do we measure performance of a regulatory system? Ultimate outcomes? How does the regulatory system influence what is built or how well buildings work?

How do different regulatory systems influence the behaviors of those regulated? Do some persuade or motivate those who would cut corners, or who think minimization of their costs is the right thing to do to do differently? Do any of them encourage others to pursue optimization of net benefits to the occupant or owner as a means of maximizing their own returns? Do any help keep pace better with rapidly changing technology so regulatory requirements can be met more cost-effectively and net benefits to all increased? Does PBBR incentivize beneficial innovation or favor the status quo and past practices? Does the building regulatory system - as it stands or would it under some

concept of PBBR - promote open markets, freer trade, beneficial growth, new and better jobs in construction?

To what extent is PBBR likely to help society respond to the new challenges of terrorism, sustainability, wellness, and aging populations? How should it be applied in distinction from past practices to assure positive movement in these directions? Can it help society better articulate its needs and priorities? It is good to see societal expectations grafted into the program for the summit since after all it is society that pays the bills for regulation and the people should expect to see clearly what they are getting for their expenditures.

Some contend PBBR will help society make better risk management decisions. PBBR and Probabilistic Risk Analysis, PRA, are an attractive couple. If we go this route who'll provide the risk data, certify it, the methodologies, and practitioners? What about the perplexing issue of risk perception? Will PBBR require us to quantify those things society prefers not to discuss and politicians shy away from talking about? Surely there are policy implications that we need to address to work this sort of thinking into our roadmap for PBBR.

3. Will PBBR lead to better buildings? How can we tell, what metrics will we use?

The last time I looked at the data, construction was a \$1.3 trillion domestic and over \$3.4 trillion global market. These facts are not lost on material and product developers. They are actively working to produce better, safer, less costly, more efficient building materials

and systems. They are applying the fruits of the latest in scientific and technical advances from nano- and bio- technology to information technology.

Most of the research being conducted at NIST's Building and Fire Research Laboratory and at similar labs around the world is aimed at developing improved measurements, test methods and models for assessing the various aspects of building performance, and ultimately I assume, whole building performance. For example, these include science-based models for service life prediction vs. traditional product life aging or weathering exposure tests. They include small and real scale test apparatus and increasingly computer-based models verified at real scale.

The potential for "better, safer, less costly, and more efficiently produced" buildings is vast. What will PBRR do to facilitate the flow of these exciting new developments safely into the commerce of building?

For example, I don't know about you, but I firmly believe, buildings have a lot to do with the health as well as the safety of the population. After all, most of us spend most of our time within structures of one sort or another. Yet, we have but a faint clue as to the role buildings play in the health and wellness of their occupants, and even less understanding of their role in occupant productivity and happiness. Clearly, in the distant past health concerns were central in the minds of building regulatory officials who produced the basic sanitation requirements for buildings. Today we are just beginning to understand what may be necessary to provide healthy air in buildings in terms of ventilation, control

of volatiles, etc. Nowadays, mold is a big topic of concern yet current building regulations seem unable to prevent its occurrence or impacts.

But, what about the more subtle health implications of buildings? For example, what the health care folks call nosocomial infections? It is perfectly clear, some designers and owners of high end commercial/institutional buildings do things which result in occupants who are healthier, more productive and happier than similar occupants of other buildings. Why? How? What would be the net benefit to society if buildings – e.g. hospitals, schools, offices, theatres, etc. weren't places that so efficiently transmitted diseases from person to person? Isn't it likely that a focus on “wellness designed buildings” would be a more cost-effective approach to health care than total reliance on pills and medical procedures? It is amazing to me that in this day and age, we don't have sufficient understanding about building performance to answer such questions. This is not fanciful thinking on just my part. I urge you to take note of the exciting work led by John Eberhard through AIA in partnership with GSA and pioneering researchers at NIH.

My point is to advocate PBB analysis and design as a vehicle for making better decisions about what we build, what we seek to achieve with what we build, and how ultimately, it performs. Buildings are built to serve other needs. They are not constructed simply to meet an accumulation of regulatory requirements developed primarily to prevent recurrence of past woes. The key to the role of PBBR as “better regulation” is the extent to which it facilitates the emergence of “better” buildings that serve higher social ends.

4. Does/will PBBR promote beneficial globalization? Globalization is high on the list of current buzz words. Like health care, nanotechnology, and information technology it is one of the “must mention” current factors to consider when doing about anything. So what is it? Can we agree on what beneficial globalization would be? Do we agree it means freer trade, open markets, trust and respect among trading partners so that you get what you pay for, you can be sure what you buy will not only work but also function as intended, and that all applicable standards have been met? More to the point, can one assume globalization of PBBR means that the applicable standards are ones which reflect relevant aspects of performance truly so the likelihood of tragedies or even unpleasant surprises is minimized? This is a far cry from what we have today. Unhappily, today, firms, industries, nations and blocks of nations strive to press their prescriptive requirements on others for market or national advantage, often blocking out higher performing products or designs. Is there political advantage to pursuing PBBR in this context? Can a legitimate case be made that PBBR will enhance other national/political agendas thus attracting resources to the many issues to be addressed in our roadmap? If so, then how must we direct our energies to gain the resources needed to make PBBR real everywhere? What metrics do we use here? What points of view? What other issues do we face today that PBBR may relieve, and are there others it may exacerbate?

Wrap-up and concluding thought/challenge. I have tried to present an impassioned plea for doing our homework thoroughly as we press the case for PBBR. I have argued that PBB is even more important than PBBR, that there are other bigger fish to fry on the

social, national, and political agendas, but that PBB and PBBR can help advance many of those causes as well.

I see PBBR not as an end in itself but as a means to critically important other ends. I have asserted that PBBR is fundamentally dependent upon our ability to measure and predict performance and that is something that we still don't do very well. Yet, make no mistake, PBBR is far superior to its prescriptive precursor. Think of it this way. The best prescriptive requirement is a performance-based prescriptive requirement; one which can be shown to enhance resulting performance. PBBR goes the additional step of leaving the door open for the next and subsequent improvements and does so in a means which enables assuring that such subsequent changes are indeed beneficial.

These are some of my concerns, issues, and convictions. What about you? What issues do you have that the roadmap must address? There are many challenges, and things to include in our roadmap to success. The biggest issue we face is mounting the will to go there, the commitment and motivation to change. I hope I have encouraged you all to risk it. To do otherwise is to invite repetition of history's bitter lessons.