

Shaping Expectations for Performance-Based Building Regulations

by

Daniel J. Alesch

Center for Organizational Studies
University of Wisconsin-Green Bay

Paper Prepared for the Global Policy Summit on the Role of Performance-Based Building Regulations in Addressing Societal Expectations, International Policy, and Local Needs

National Academy of Sciences, Washington, D.C., November 3-5, 2003

Author Contact:

Daniel J. Alesch, Professor Emeritus
920-468-0132
dalesch@new.rr.com

Shaping Expectations for Performance-Based Building Regulations

Abstract

One is hard-pressed to identify a groundswell of expectations about and support for a set of international performance-based building standards. The growing pressures of international commerce, however, could generate substantial demand for such standards to the extent that they can help ensure the reliable flow of reliable products.

Global interdependence based on the quest for low-cost production does not come without cost. Tightly-coupled networks have been created so firms can realize greater efficiency, but tightly-coupled systems do not have much slack. The lack of slack means that, when things do go wrong, the ripples are far-reaching and spread quickly. Things can go wrong because of extreme or even modest events that damage buildings and other structures, whether from natural hazards, willful or mindless acts of destruction, or industrial accidents. Extreme events, rare for any specific community, are remarkably common around the globe and, thus, they create problems for individual firms many times each year. In less developed countries, firms may use buildings not capable of withstanding much more stress than that imposed by gravity. In more developed countries, firms competing on the basis of cost often use older, cheaper buildings constructed under significantly less rigorous regulations. And, where the culture permits or turns a blind eye, bribery and dishonesty in permitting, materials, construction, and maintenance add to the problem. Consequently, buildings used for international trade or production are often unlikely to be able to perform well under stress.

Direct governmental regulation requiring stronger buildings and generating higher costs of production are unlikely to be popular at home if the perceived effect is to reduce the ability of companies in the affected area to attract or retain jobs. Any effort to raise the standards of performance for buildings and, hence, costs will meet sharp resistance unless there are effective assurances that all suppliers will be held to the same standards, so that the supplier firm can be assured that other firms will not receive preferential status.

The ISO model provides a useful example of how expectations about and demands for improved and consistent structural performance in the face of extreme events might be developed and implemented. Performance-based building regulations might be implemented in the relationships among firms in the pursuit of their business interests. This could result in widespread private implementation of standards that might not be otherwise adopted by national governments.

Shaping Expectations for Extreme Events: Performance-Based Building Regulations and the Global Economy

I've been asked to speak about emerging societal expectations, pressures, and threats and how they will impact building regulations over the next 10 to 20 years, with special emphasis on extreme events and with special emphasis on performance-based standards for buildings.

I believe it is appropriate and prudent that there be international performance-based standards for buildings. It is particularly appropriate for performance-based standards that address building performance associated with extreme events, because human settlement is increasingly concentrated in areas subject to large natural hazard events and because of the likelihood that we face a long period of political terrorism, much of which will be directed at occupied buildings.

People generally expect high levels of structural performance in the face of extreme events, but, at the same time, they are often unwilling to pay the marginal cost of achieving significantly higher structural performance. Certainly, people frequently demonstrate considerable reluctance to retrofit existing structures to meet higher standards against extreme events.

Consequently, I neither see nor expect to see any massive groundswell of societal expectations of greatly improved structural performance standards in the face of extreme events. Nor do I see a general, international groundswell for performance-based building standards. The problem is not that there is a great groundswell of unmet expectations. There may, however, be a small groundswell among those with intense interest in the subject – those who are laboring in the vineyard of performance-based standards who may feel that there ought to be a greater groundswell.

What about other forces that are likely to generate demand for performance-based building standards to help mitigate the effects of extreme events? What might be forces driving growing expectations?

One primary driver for international performance-based building standards, I believe, is that there is great variance, internationally, in building standards and regulations and in building performance when stressed by extreme events. At the same time, national borders have become increasingly porous with regard to labor, capital, production, and markets. The variance, coupled with the markedly increased porosity of national borders, increases the cost, inconvenience, and uncertainty for firms doing business in the global economy.

One might make a case that standards of social, business, and political accountability are, episodically and sporadically, ratcheting upward, creating pressures for international performance-based building standards that are more uniform and, generally, higher. The socially-perceived marginal utility of human life and environmental protection (usually) changes

in direct proportion to personal income and changing concerns by workers and governments as income increases. As personal income increases in developing countries, we should expect more concern from those countries and from their workers with safety from extreme events.

Secondly, concern increases episodically when international horror and indignation arise from the consequences of extreme events, such as Bhopal or the loss of thousands of lives from an earthquake in a less developed nation. Similarly, there is growing concern by most governments and among many people over serious adverse effects of intentional and inadvertent human intervention in natural systems, some of which are legitimately labeled as extreme events. Finally, there are often political expectations concerning working conditions by nations that provide economic and developmental assistance to other nations.

Taken together, however, I do not believe that the pressure from changing social and political demands will have as much influence on international performance-based building standards as the demands of international commerce.

THE EMERGING DEMANDS OF THE NEW GLOBAL ECONOMY

It has been a global economy since Native Americans traded Calumet stone for sea shells in North America's Great Lakes region, since Phoenician traders plied the Mediterranean, and since Marco Polo returned home from China with silk and spices. Today, however, the world's economies are more tightly tied together and the range of intertwined activities is far broader than ever before. Trade time-lines are phrased in hours and days rather than months and years. The driving force for this rapidly accelerating global interdependence is, to a very large extent, the result of a continuing quest by individual firms for lower net costs so they can make more money.

The new global economy is dominated by tight, quick, and extensive coupling of business processes, organizations, and institutions. Businesses doing business in foreign places expect and demand a reliable flow of reliable products.

Global interdependence based on the quest for low-cost production does not, however, come without costs. Tightly-coupled systems provide firms with greater efficiency, but tightly-coupled systems do not have much slack for absorbing unexpected perturbations. The lack of slack means that, when things do go wrong, the ripples spread quickly and are far-reaching. Things can go wrong because of extreme or even modest events, whether from natural hazards, willful or mindless acts of destruction, or large accidents. Extreme events, rare for any specific community, are remarkably common each year around the globe and, thus, they create problems for individual firms virtually every year.

In less developed countries, firms may cut costs by using buildings not capable of withstanding much more stress than that imposed by gravity. In more developed countries, firms competing on the basis of cost often use older, cheaper buildings constructed under significantly less demanding standards. And, where the culture permits or turns a blind eye, bribery and dishonesty in permitting, materials, construction, and maintenance add to the problem. Consequently, buildings used for international trade or production are often unlikely to be able to perform well under stress.

Performance-based building standards, applied internationally, would have the effect of reducing at least some of the uncertainty about structural performance and about the continuity

of business operations following extreme events. Such standards would enhance safety, result in fewer premature deaths, protect inventory and the means of production, and, generally, reduce uncertainty in international business.

PRIMARY OBSTACLES TO WIDESPREAD ADOPTION OF PERFORMANCE-BASED INTERNATIONAL STANDARDS

If performance-based building standards have significant potential for improving things, why don't we have them already? What obstacles have to be overcome for adoption? Let me suggest four obstacles (each beginning with the letter P, just for the sake of compulsiveness) that have to be overcome for performance-based building standards to be adopted and to be effective.

Priorities

In the quest to attract business, create jobs, and raise income, less developed countries and regions within countries keep costs down and become more competitive by keeping building and other standards low. Reliability, to the extent it exists, is accomplished with easily replaced simple systems, redundancy, and substituting labor for capital. In more developed countries, the applicable building standards vary by the age of structure, so firms and locales often attempt to keep costs down by utilizing older, less expensive, and less reliable structures – and by drawing from low-cost labor, such as marginally-skilled and transient or illegal workers

Fierce competition for jobs, seeming indifference to the consequences of extreme events, and short-term thinking makes it difficult for many governmental jurisdictions to enact tougher standards. Direct governmental regulation requiring stronger buildings and generating higher costs of production are not likely to be popular at home if the perceived effect is to reduce the ability of local jurisdictions to attract or retain jobs. Efforts to raise the standards of performance for buildings that result in increased costs for products will meet sharp resistance unless there are effective assurances that everyone will be held to the same standards, thus ensuring that others will not enjoy preferential conditions.

Poverty

Recently, a friend told me about his visit this past summer to a factory in Asia where his company sells equipment. At one point in the production process, it is necessary to slow large rollers gradually from relatively high speeds to a complete stop to remove the product without damaging it. In this country and Europe, that is accomplished with sophisticated hydraulic and electronic braking systems. In the factory he was visiting, the braking was accomplished by a 12-year-old girl who slowed the machine by pushing her feet against the roller while braced up against a wall. Next to her was a large pile of tennis shoes with the soles worn off. The factory managers were hoping they could replace her with a mechanical braking system in the next few years. Poverty sets its own priorities.

Parochialism

Often draped in a figurative flag and topped with a wreath woven of tradition and intransigence, parochialism exists almost everywhere, inhibiting useful innovation from without.

Here in the United States, we plod arrogantly along, priding ourselves on our technical prowess and progress, while displaying levels of parochialism I find astounding.

Illustratively, we continue to use a medieval cluster of measurements that is irrelevant and alien to the rest of the world, except for Burma and Liberia, which, with us, are the only nations in the world not to have formally adopted the metric system. Instead, we expect others to adjust to our “system” of measures. For those of you who are strangers to our measures, permit me to give some simple examples of how it works:

- § An American barrel of dry measured is 105 dry quarts, but a liquid barrel is 31.5 gallons, unless it is a barrel of petroleum, in which case it contains 42 gallons. British barrels range from 31 to 42 gallons, depending.
- § A hogshead is seven firkins (US) or just under six firkins (British). Both are a little less than half a pipe.
- § A rod is 5.5 yards; four rods make a chain, which is the distance between two wickets. Ten chains make a furlong and, of course, eight furlongs make a mile.

What I find amazing is that so few Americans understand that their steadfast adherence to this bizarre system makes a difference in their collective ability to work with the rest of the world. But, such is parochialism and such is the chance of getting easy governmental adoption of a set of international standards.

Purloining

Expectations for building performance among nations and even regions vary as a function of marginal utility of income and cultural values. Unfortunately, however, even when high expectations hold sway and adequate standards are adopted, things do not always work out. Inferior design, materials, and construction are common even in places with building codes. Where the culture permits or turns a blind eye, bribery and dishonesty in permitting, materials, construction, and maintenance add to the problem. Consequently, buildings used for international trade or production are often unlikely to perform well under stress, especially when there is money to be made by using inferior buildings. After virtually every large earthquake or hurricane, we hear how buildings that failed were not built to code. It happened in Florida following Hurricane Andrew and it happens in many other regions and countries as well.

Administrative malfeasance and misfeasance sap the effectiveness of codes, regardless of whether they are based on specifications or performance.

CREATING POSITIVE EXPECTATIONS TO OVERCOME THE OBSTACLES

I have long thought that systems that depend on the charity and good will of people for their success are doomed to failure. Such systems are singularly susceptible to those who would undermine them by taking advantage. Systems that succeed are typically those that create powerful incentives for complying with desired behavior and exercise certain and exorbitant costs for failing to comply.

The challenge for those of us who are interested in the development and adoption of an international set of performance-based building standards is not how to meet growing expectations, but how to create growing expectations and, ultimately, an undeniable demand for such standards. This can be accomplished by recognizing and building on emergent relationships that stand to benefit from such a system of standards.

One model that has been particularly successful in building both expectations and demand for its standards is the ISO (International Organization for Standardization). ISO is private, voluntary, market-driven, and worldwide. Through its standards, ISO makes it easier for businesses to do business internationally, especially because of its relationship with the World Trade Organization. Businesses that want to compete effectively as manufacturers and suppliers both within and across borders have learned the advantages to themselves of being ISO compliant.

While ISO standards have to do specifically with the specifications and characteristics of products and materials, it is entirely conceivable to me that similar standards could be created and adopted for governing the conditions under which those products and materials are developed and the buildings within which the work takes place. Buildings that meet specified standards of performance provide assurances to suppliers and buyers – assurances about building costs, ability to meet necessary environmental standards for production, ability to withstand modest extreme events, and continuity of production. In short, a set of performance-based building standards adopted and implemented by leading organizations involved in international business would help ensure the reliable flow of reliable products to customers. It would create a level of demand that would ensure even more widespread adoption and implementation.

The ISO model provides a useful example of how expectations concerning structural performance in the face of extreme events might be developed and brought to bear internationally. The challenge is to sell performance-based structural design standards as a means for reducing business costs and helping to ensure the reliable supply of reliable goods and services across borders. Creating expectations and demand among businesses can ensure widespread private implementation of standards that might not be otherwise adopted by national or regional governments.