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Do standards and regulations supply the necessary incentive for sustainable building?

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Summary
Various environmental policies’ approach to sustainable development can serve as a baseline for assessing how well regulations and standards will promote sustainable building and construction. If followed up, existing acts, regulations and standards generally lead the industry in the right direction. Achieving sustainable buildings, however, will require additional action at the policy level. This article looks at acts, regulations and standards concerned with sustainable buildings nationally and internationally, including International Organization for Standardization standards currently under development. International standards and regulations do not yet address the problems of the developing world satisfactorily, though this issue is receiving growing attention.

Résumé
Diverses stratégies environnementales du développement durable peuvent servir de base pour déterminer dans quelle mesure la réglementation et les normes sont susceptibles de promouvoir une industrie de la construction durable. A condition d’en contrôler l’application, les lois, réglementations et normes existantes entraînent généralement l’industrie dans la bonne direction. Mais construire des bâtiments durables exige également une action sur le plan politique. L’article fait le point sur les lois, réglementations et normes nationales et internationales relatives au développement durable du bâti, notamment les normes de l’Organisation internationale de normalisation (ISO) actuellement en cours d’élaboration. Mais les normes et la réglementation internationales n’apportent pas de solutions satisfaisantes aux problèmes du monde en développement, même si cette question retient de plus en plus l’attention.

Resumen
El planteamiento del desarrollo sostenible en las políticas ambientales puede servir como base para evaluar en qué medida las reglamentaciones y normas fomentarán las edificaciones y la construcción sostenibles. De aplicarlas, las leyes, reglamentaciones y normas existentes generalmente indicarán a la industria el camino correcto. Lograr edificaciones sostenibles, sin embargo, requerirá acciones adicionales a nivel de políticas. En el artículo se analizan leyes, reglamentaciones y normas relacionadas con edificaciones sostenibles a nivel nacional e internacional, entre otras, las normas que se están preparando en la Organización Internacional de Normalización (ISO). Las normas y reglamentaciones internacionales todavía no tratan satisfactoriamente los problemas del mundo en desarrollo, aunque actualmente se presta más atención a este problema.

The meaning of the term “sustainable development” is disputed and complex. The most frequently quoted definition is that of the World Commission on Environment and Development (1987): “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” There are few specific agreed sustainable development strategies.

The International Organization for Standardization’s definition of sustainability is “the maintenance of ecosystem components and functions for future generations” (ISO, 2002a). The ISO standard in which the general principles of sustainable building are set out applies this definition and identifies the following elements:

Environmental. Design, construction and operation must implement DfE (design for environment) approaches. The healthy functioning of local, regional and global ecosystems must be promoted, and energy efficiency, toxicity, materials, durability, reuse and building operations must be incorporated.

Social. Buildings, individually and collectively, influence many aspects of human behaviour (including daily travel patterns) with their own substantial social costs and environmental costs. Design, construction and operation must incorporate collaboration, social impacts and continual improvement.

Economic. Sustainable building must incorporate full-cost accounting procedures into the development of buildings and constructed assets. It must address not only initial direct economic costs of development, but also associated direct and indirect social and environmental costs.

ISO standards under development in the sustainable building area
Within the International Organization for Standardization’s Committee on Sustainability in Building Construction (ISO/TC 59/SC 17), current standardization activity in the area of sustainable building and construction assets involves:

- Building and constructed assets - Sustainable building - General Principles;
- Building and constructed assets - Sustainability Indicators;
- Building and constructed assets - Sustainability in building construction - Framework for assessment of environmental performance of buildings;
- Building and constructed assets - Sustainability in building construction - Environmental declaration of building products;
- Building and constructed assets - Sustainability in building construction - Terminology.

These standards constitute a hierarchy (Figure 1).

In the proposed General Principles standard (ISO, 2002a) it is stated that this standard does not represent a benchmark against which a claim of sustainability can be made. Rather, it is a description of the general principles of sustainability whose purpose is to identify the relationship of these principles to the building industry and to establish a rationale for subsequent related standards. Some of these standards are described below.

Sustainability indicators
The aim of the standard on Sustainability Indicators (ISO, 2002b) is to define a framework with respect to sustainability indicators for buildings and groups of buildings. In this standard it is stated that the general understanding of the aspects of sustainability - including economic, environmental and social ones - is adopted. However, environmental and social costs seem to be missing. At least there are no defined indicators for these costs in the current version of this standard.

The following core set of indicators is recommended:

- use of natural raw materials;
- consumption of energy resources;
- release of environmentally harmful emissions;
- access (by public transport and bicycle or pedestrian traffic);
- service life;
- indoor conditions;
- outdoor conditions;
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Figure 1

Standards under development, and planned standardization in the area of sustainable building (ISO, 2002a)

- ISQ/AWI 15392: buildings and constructed assets – sustainability in building construction – general principles
- ISQ/AWI 21932: buildings and constructed assets – sustainability in building construction – terminology
- ISQ/AWI 21931: buildings and constructed assets – sustainability in building construction – framework for assessment of environmental impacts from buildings
- ISQ/AWI XXXXX: buildings and constructed assets – sustainability in building construction – framework for assessment of social impacts from buildings
- ISQ/AWI XXXXX: buildings and constructed assets – sustainability in building construction – framework for assessment of economic impacts from buildings
- ISQ/AWI 21929: buildings and constructed assets – sustainability in building construction – environmental declaration of building products
- ISQ/AWI 21930: buildings and constructed assets – sustainability in building construction – environmental declaration of building products – documentation of data relevant to operation, refurbishment and deconstruction

Environmental declarations

Environmental declarations aim to provide information (based on LCA, or life-cycle assessment) for manufacturers and consumers of building products enabling them to make decisions that will minimize the negative environmental impacts of building and construction work. There are several national initiatives in this area. The standard on environmental declarations of building products (ISO, 2000d) is intended to harmonize different approaches as far as possible.

In the environmental declaration of a product, the functional unit is given for the product's principle function over the entire life of the building (“from cradle to grave”). It implies that maintenance, replacement, etc. are to be included in the functional unit. The lifetime of a building in the Norwegian and UK systems is set at 60 years. The functional unit is therefore to be given for a corresponding period. Environmental declarations are regarded as part of a building's environmental assessment, and as only one of many elements of the sustainability concept.

Acts and regulations in this area

In many countries environmental requirements are included, to some extent, in building related acts and regulations. The most comprehensive requirements are found in technical regulations under the planning and building act and the regulation concerning requirements of buildings and products for buildings. It may be stated that building activity in all its phases (i.e. acquisition, use and demolition) should be carried out with a justifiable load on resources and the environment, and without deterioration of quality of life and living conditions. However, these requirements are not followed up in related regulations such as those concerning public enquiry and control.

Local governments responsible for following up on violations of regulations lack knowledge and tools in this area. To state that a building does not satisfy the environmental requirements of the regulations is entirely different from stating that a roof is inadequate considering the areas snow load.

Suitability in developing countries

Developing countries, with their rapid development and large populations, are very important in the context of sustainable development. Agenda
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21 for Sustainable Construction in Developing Countries describes the situation in these countries and discusses a strategy for action to reach sustainable development (CIB and UNEP-ITEC, 2002).

The main issue is that developing countries struggle with different problems than those of developed ones. While there are similarities, developing countries face greater differences and more extreme problems with fewer resources to deal with them. Critical issues are access to adequate housing and infrastructure, rapid urbanization, informal settlements, and lack of institutional capacity. Two factors in particular represent the difference between developed and developing countries: a significant portion of houses in the latter are built by family members (45-50% in Bolivia), and small local companies produce a very important proportion of building materials (often involving high emission rates).

Two main strategies have been identified concerning which way to go:
- follow the Western “model”; or
- establish a different vision of development, including non-Western values.

The principal barriers to sustainable building in developing countries are described, among other places, in the working document of Agenda 21 for Sustainable Construction in Developing Countries. They include:
- lack of capacity in both the construction sector and governments;
- lack of effective power in (governmental) environmental institutions;
- financing and uncertain economic environment;
- poverty and the subsequent low urban investments and ability to pay for services;
- lack of interest in the sustainability issue by stakeholders;
- technological inertia and dependency due to entrenched colonial codes and standards;
- general lack of data, standardization and codes to support, for example, the establishment of national benchmarks;
- a low level of environmental concern among citizens;
- lack of institutions to facilitate appropriate policies.

How to overcome these barriers cannot be described in detail in this article, but some important actions are suggested. Solutions need to be sought in many areas, including education, finance, policies, development of tools and benchmarks, development of standards, codes and regulations, and research.

Education is perhaps the most important. It entails educating professionals at different levels.

Another difficulty in reaching sustainable development is how to modify people’s daily activities. Collective effort is needed, and this might be regarded as the strength of developing countries. Norway’s “Environmental HomeGuard” (EHG) takes the task in hand. This NGO is a network of individuals, groups, organizations and institutions committed to changing their daily activities in ways that reduce use of natural resources, energy and environmentally harmful substances, minimize waste generation and protect biodiversity. They provide information, produce tools, recruit people for networks and help voluntary organizations, institutions, schools, etc., to improve their environmental profiles.

In implementing sustainability, the main players are the government and authorities, educational institutions and the research community. Involvement by the government and authorities is crucial and must include both policy and financial support. In addition, institutions need to have the power to enforce necessary changes. In many developing countries this would be a good place to start. In European countries where there is strong support by authorities, the success story has been different from the situation in countries without this support. The Netherlands and Denmark are leaders in the area of sustainable building in Europe.

The need to go beyond existing acts, regulations and standards to reach sustainability

The standards and regulations described above do not adequately address the problems of the developing world. In Agenda 21 for Sustainable Construction in Developing Countries, it is argued that planning acts, building codes and regulations adopted from the West often discourage or even forbid housing development based on traditional concepts, which often provide the most sustainable solutions. Building codes and planning concepts from the colonial period have been seen as superior to anything found in the colonies. This has created a general lack of confidence in home-grown solutions and traditions, which are actively discouraged. In addition, earth construction techniques came into disfavor mainly due to the technological changes brought by the Industrial Revolution and consequent demand from the consumer market.

A very important point also mentioned in the Agenda 21 report is the possibility for developing countries to offer sustainable development opportunities that are not common in the developed world. Through their cultural heritage, innovative local solutions and adaptability, developing countries might have one of the keys to sustainability.
In the developed world solutions are traditionally sought in new technology, while in developing countries tradition represents more people-centred development. This last view is consistent with the belief that people’s behaviour and choices will determine the success or failure of sustainable development and construction, not just the availability of sustainable technology.

Existing acts and regulations from the West are not necessarily suited to the developing world. Nevertheless, knowledge transfer is necessary to reach sustainable development in these regions. It might also be appropriate to ask whether modern buildings can be sustainable at all, as construction of a building always entails a load on natural resources and the environment. However, housing is necessary and provides economic and social benefits. By including these factors and substantially reducing the environmental load, sustainable building should be possible. Perhaps the construction industry is moving in the wrong direction – increasing the load on nature, often disregarding social aspects, and only including economic considerations in terms of the private investment economy. Sustainability will involve a total paradigm shift that the building industry is far from realizing.

Whether the revised standards, acts and regulations relevant to sustainable construction in this article can be interpreted as sustainable may be doubted. The General Principles standard provides a starting point, including a description of sustainability and the link to the building industry. The next step is the indicator standard, which aims to define indicators for buildings or groups of buildings. Comparing the core set of indicators with the ISO definition of sustainable building, it can be seen that they only address some aspects: socio-economic aspects in particular receive minimal attention. Standards on the next level of the hierarchy cover only environmental aspects, and thus only one of the three aspects of sustainable development. The methods used to assess a building’s environmental quality should be extended to include economic and social aspects. However, barriers in technology or demand and willingness to pay for improved buildings may not be eliminated through standardization.

At best, acts, regulations and standards represent what might belong in a vision of weak sustainability. They are a reflection of where we stand today technologically, and the degree to which the industry has realized the need for change. For example, zero energy dwellings are possible but are not required by today’s regulations. This is because it is inadvisable to move too fast, as economics in the industry limits the room for action (economics is also an element of sustainable development). Again, as industry struggles to meet new requirements, it is inadvisable to move too fast for economic reasons. However, standards may involve freedom to include drastic sustainability concepts. Acts, regulations and standards need to be under constant development and to implement new knowledge as it evolves.

An element missing in regulations today is maintenance and management (M&M). M&M is a very important part of sustainability, as it entails maintaining the benefit created through buildings for future generations. The standard on sustainability indicators could be used to start this process. However, a set of indicators also needs a method for monitoring the indicator and assessing the status of a building.

Conclusion
Existing acts, regulations and standards lead the industry in the right direction if they are followed up. However, to reach what can be called sustainable buildings requires additional action on the policy level. This should involve providing incentives and disincentives (e.g., through taxes) and funding and support for innovative businesses and technology. Special funding for good examples of sustainable buildings is still necessary. Some sources maintain that the “the time of the pilot project is surpassed, and that it is time to implement the knowledge in mainstream building”.

However, this is not the case. It is correct that what has been seen in pilots up to now should be included in mainstream building, but there is still a long way to go. As we are very far from the goal, pilot buildings are still useful for testing new technology and solutions. Finally, education is crucial when implementing change. The understanding of sustainable development and the changes this involves for industry must be included in all professional studies within building and construction. It can be expected that the type of changes needed will take at least one generation.

Notes
1. For more on the use of functional units to make comparisons on a like-for-like basis, see “Construction products and life-cycle thinking” by Suzy Edwards and Philip Bennett on p. 57 of this issue.

References

International Organization for Standardization, standards under development:
- ISO (2002b) ISO/TC 59/SC 3 N 469, Building and constructed assets – Sustainability – Sustainable indicators