
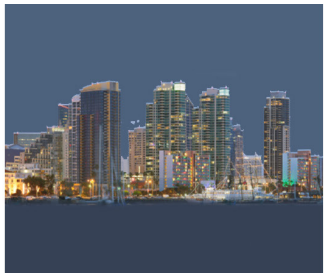

THE BROAD DIMENSION

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Living Building Challenge

LEED has taken us on an incremental path towards building green, increasing the standard to be achieved as technology and construction practices have improved. The Living Building Challenge has taken the opposite path, setting the bar at a height that few, if any, could meet, but then being willing to make allowances where technology and location make it necessary to do so. Launched in 2006, it is currently at version 3, and it requires confirmation that the building is performing up to the goals when in use, not just theoretically being capable of doing so.

The goal that the Living Building Challenge is aiming for is that of having buildings that supply all their own power and water, while utilizing renewable resources and being good looking, pleasant places to live and/or work. It does this through seven 'Petals' or performance categories, specifically Place, Water, Energy, Health & Happiness,

Material, Equity, and Beauty, which are in turn subdivided into a total of twenty Imperatives. All of the Imperatives are mandatory, but temporary exceptions acknowledge the fact that legal restriction, technology development, or other impediments may mean that full compliance cannot be achieved. Some of the requirements vary, based on what type of location the building is situated in. Scale Jumping, or collaboration between adjacent buildings or sites to achieve a goal, is also accommodated.

Place
This includes the Imperatives: 01) Limits to Growth, 02) Urban Architecture, 03) Habitat Exchange, 04) Human Powered Living. This Petal basically aims at protecting the natural environment while enabling healthy communities in which to live and work.

Water
This includes the Imperative: 05) Net Positive Water. The goal of this Petal is to provide all the building's water needs from collected rainwater and recycled waste water, while acknowledging that regulatory restrictions, among other things, may not allow that at present.

Energy
This includes the Imperative: 06) Net Positive Energy. On-site, non-polluting, renewable energy sources are to be available to meet up to 105% of the building's annual energy needs, and on-site energy storage is also to be included.

Health & Happiness
This includes the Imperatives: 07) Civilized Environment, 08) Healthy Interior Environment, and 09) Biophilic Environment. This Petal is intended to ensure that the building creates a healthy environment, and includes such things as operable windows, protecting the air quality, and incorporating nature and natural patterns into the design.

Material
This includes the Imperatives: 10) Red List, 11) Embodied Carbon Footprint, 12) Responsible Industry, 13) Living Economy Sourcing, and 14) Net Positive Waste. The intent of this Petal is to move construction towards the use of totally renewable and non-polluting materials by prohibiting the use of known toxic materials, using local resources where possible, compensating for the carbon impact resulting from the construction, and planning for the eventual recycling of materials.

Equity
This includes the Imperatives: 15) Human Scale + Humane Places, 16) Universal Access to Nature & Places, 17) Equitable Investment, and 18) Just Organizations. Here the aim is to ensure that the building does not impinge on the rights of others by damaging air quality, blocking views, obstructing access to natural resources, or other means, and that it promotes cultural and human interaction.

Beauty
This includes the Imperatives 19) Beauty + Spirit, and 20) Inspiration + Education. While acknowledging that 'beauty is in the eye of the beholder', this Petal aims at promoting beauty in design, and to make the built environment uplifting for its users. It also promotes using the development to educate and inspire others about making buildings eco-friendly.

The requirements above are for the full Living Building Certification. It is also possible to get a Petal Certification if you can meet the requirements of three of the petals (which must include Water, Energy, or Material as one of them) along with achieving Imperatives 01 and 20. Net Zero Energy Certification requires achievement of Imperatives 01, 06, 19, and 20, but the requirement for 06 (Net Positive Energy) is reduced to 100% from 105%.

Performance-Based Design

Performance-based design is a process for specifying performance goals, and establishing a methodology for achieving them. Building codes and regulations are commonly written in a prescriptive manner, and are

limiting when it comes to innovation. Performance-based regulations are open to innovative solutions, and in fact even prescriptive codes often include wording that allow functionally similar solutions to be considered, and thus provide room for performance-based methods to be used.

The process starts with defining the performance criteria. These may be related to the way a building behaves in the event of a natural catastrophic event, such as an earthquake or hurricane, or may be related to some other performance-criteria, such as having the building be net zero energy usage. The criteria do not define how something is to be done, just what the desired result is. Often existing, commonly-used criteria can be stated, but at other times new specific criteria needs to defined, along with a methodology for assessing whether the design meets the criteria or not.

The next stage in the process is to develop a preliminary design that is intended to meet the performance-criteria. Once that is done, the third stage is to test the design by means of an appropriate analysis or simulation, in order to check how it performs under the kind of situations that the performance-criteria envisage.

If the design performs as planned, then the work is done, at least for that point in time. If not, it is sent back for redesign, although sometimes it would also be appropriate to review the performance criteria first, to ensure that they are practical.

The philosophy behind performance-based design is very similar to that involved with value engineering. In both cases the object is to look at what the goal of the building owner is, and then come up with innovative ways of achieving those goals. And, as with value engineering, performance-based design can result in significant savings to the building owner.

The initial design might not have taken the building design much beyond a massing or early concept design stage, and the simulation used to check its performance would have been making a fair number of assumptions about work that was not yet fully designed. As the design continues, those assumptions need to be checked and the performance reassessed to ensure continued compliance.

Increasing energy performance standards, and the growing demand for Net Zero Energy buildings is a big driver for performance-based design. The required standards are moving beyond the point where compliance can be achieved solely by passing the requirement on to the HVAC consultant. The shape and orientation of the building, along with the amount of fenestration are all among the issues that are likely to come into play.

Seismic performance, and performance in other catastrophic events, constitutes another category that is well suited to performance-based design. Those catastrophic events may be natural, as with hurricanes or flooding, or man-made, as with blast-damage. With these types of events, ‘performance’ can normally be taken to mean the condition the building is left in after an event of specific magnitude occurs.

Financial PTSD

The economy is back to chugging along nicely, unemployment is dropping, and while the stock markets are playing bouncy-bouncy, the upward bounces are regularly hitting all-time highs. So why is consumer confidence not rising faster, leaving retail sales lagging? The drop in oil prices has resulted in more money being left in people’s pockets, and economists were predicting that that would spur them to go on a spending spree, but that hasn’t happened.

It seems that the population is suffering a form of ‘financial post-traumatic stress disease’, and that has to

be understandable. The Great Depression that started around 1929 sent shock waves through the population and left a generation that had a fervent distrust of financial institutions. Many literally preferred to keep their money under the mattress rather than risk putting it into a bank, let alone lend it to some businessman by investing money in the stock exchange.

The Great Recession pales in comparison to the Great Depression, but it has still been the deepest and longest lasting financial turmoil that the current population has experienced, and many are still feeling the effects. The lack of significant wage growth is one issue that gets mentioned regularly in financial reports, along with the fact that many of the employed are only in part-time jobs or otherwise under-employed. When someone is still not earning as much as they were before the recession hit, it is hard to convince them that the recession is over.

Consequently we end up in a chicken-and-egg situation. Domestic consumption accounts for about 70% of the US economy. With the US economy being so consumer-driven, and consumers fearing to spend because the economy isn't picking up fast enough for them, it is little wonder that the recovery has been struggling. And that hasn't been happening only in the US of course. Europe has been slower with their recovery, and still has many problems on their plate. The UK has just dropped into a deflationary period for the first time since the 1960s.

The slow recovery might have been good for construction in some ways. The recession hit the industry hard, and a lot of construction workers have left the industry, sometimes moving into other professions, sometimes leaving the country or simply retiring. The March 2015 report on the Architectural Billings Index (ABI) mentions that there are now 1.5 million fewer construction workers than at the peak of last construction boom around 2007, and an article on TheAtlantic.com says that Nevada currently has 60% fewer construction workers than it did during the boom. With construction work increasing again, this has resulted in shortages of construction workers across the US.

The main areas of construction growth appear to be in those regions where the hi-tech industries are located, and a recent article in the San Francisco Business Times spoke of the difficulty in finding qualified construction labor, and also reported on material shortages. Those material shortages had been exacerbated by the port strikes on the West Coast, but also relate to the manufacturing industry having to catch up with construction growth and changes in legislation regarding things like energy conservation techniques that require newer types of light fixtures, for instance.

Single family housing is the area of construction that still must make a serious recovery. This was the first area to go into decline and is the last one to pull back out. It is also the one that made most of the headlines with the foreclosures and the effects those had on people's lives. Add to that the amount of student debt that many potential first-time buyers now have, and the lack of demand does not seem out of place. The development of housing complexes for the 55+ age group seems to be continuing at a good pace, and the general consensus seems to be that the single-family housing market as a whole is set for increasing growth over the coming years.

With the new job creation we have been seeing, unemployment levels have been dropping back towards historical lows, which should start to accelerate the rise in consumer confidence again. Growth in the economy and consumer confidence tend to go hand in hand, and the summer months should see both of them moving in the right direction, bringing further relief to those still feeling the aftereffects of the downturn.

Geoff Canham, Editor