TEK NOTE

September 2010

Concrete Masonry and Sustainable Design are a Natural Fit

The green building movement has gained momentum over the past several years. Rating systems such as LEED and Green Globes have helped to drive this movement. Masonry materials can contribute significantly toward rating system compliance. (See **Figure 1.**) Now we must consider the implications of new green building codes that are being developed. ASHRAE/USGBC Standard 189.1 has been published as has the International Green Construction Code (IGCC). At times there have been unintentional consequences of using the rating systems. Most notably, in their misapplication in the form of requirements rather than providing guidance. Codes and standards on the other hand are legal documents with mandatory provisions that can be directly adopted by a city or state government.

Potential Concrete Masonry Contribution to LEED Rating

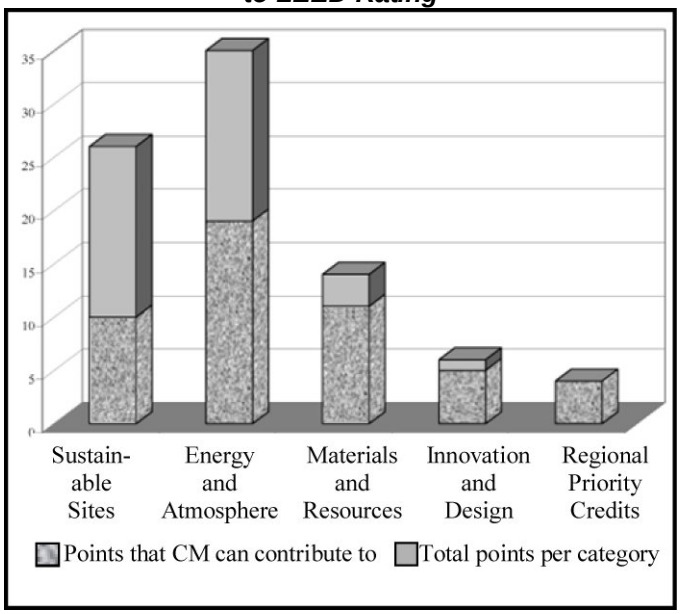

Figure 1.

How does masonry construction fit into the sustainable design movement? Many aspects of sustainability were inherent in masonry construction long before "green" and "sustainable" became buzz words. Let's look at the qualities masonry materials provide.

- **Longevity and Durability**
  These attributes are among masonry's greatest assets. Many masonry buildings have passed their 100-year anniversaries. Structures that last longest, require less maintenance, and can be adapted for reuse cast a smaller shadow on the environment. Unfortunately, durability and long service life of buildings have been overlooked in most green rating systems. Some designers using LEED have had to use an "Innovation in Design" credit to properly account for durability of masonry materials in their project. Many designers consider these masonry qualities to be one of the most critical elements of the definition of sustainability.

There is no doubt that longer lasting buildings will help save virgin materials and reduce construction waste. Existing green rating systems place more emphasis on recycled content than durability. In establishing environmental preferences, it may be more logical to start with reducing consumption of virgin resources rather that recycling them. **Figure 2** illustrates the relationship between durability and recyclability of construction materials. Masonry's high durability combined with good recyclable qualities make it an excellent choice for sustainable designs.

Building Materials Assessment

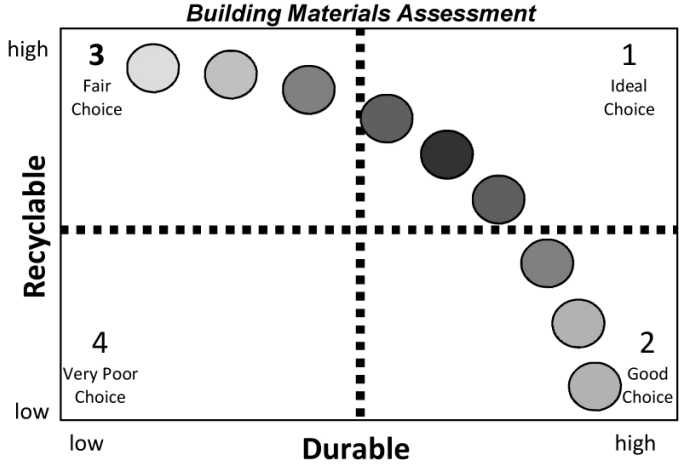

Figure 2.

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- **Resource Efficiency**
  Concrete masonry block are manufactured using some of the most abundant materials found on earth. The manner in which materials are collected, transported short distances, and incorporated into manufactured products with relatively little energy provide minimal negative impact on the environment. Concrete masonry manufacturers use more than 95% of extracted material in their production and the modular design of the manufactured block helps to reduce construction waste.

- **Byproduct Utilization**
  Concrete masonry products are capable of incorporating materials that have been recycled from other industries and consumers. Some recycled materials can be used as aggregate or partial replacement for cement in the concrete mix. Block themselves can be easily transformed into raw materials for new units or aggregates for other purposes.

- **Energy Efficiency**
  Because concrete masonry has high thermal mass, it provides very effective thermal storage. Masonry walls remain warm or cool long after the heat or air-conditioning has shut off. This benefit results in lower energy consumption in buildings. With proper design, masonry walls, especially cavity walls, can reduce peak heating and cooling loads; shift peak loads; moderate indoor temperature swings; and reduce the size of HVAC systems. Also, passive design strategies can be successfully implemented utilizing masonry materials.

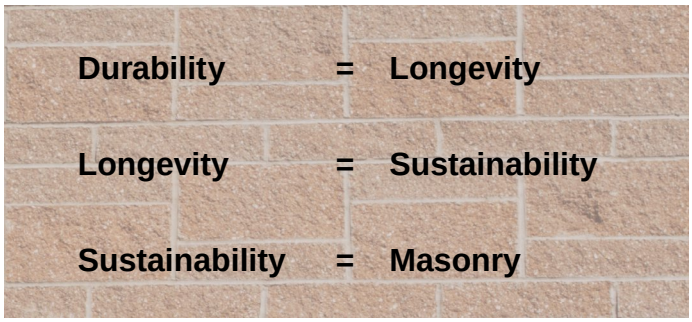
- **Safety and Protection**
  While most environmental rating systems include occupant health and comfort, they frequently ignore the safety and protection of those inhabitants. Concrete masonry structures go above and beyond other building systems in providing improved fire safety; shelter from hurricanes, tornadoes and earthquakes; and protection from blasts and bullets. Increased disaster resistance and improved durability are key components of sustainable buildings.

- **Aesthetics**
  The variety of sizes, shapes, colors, textures and patterns available in concrete masonry products provide unlimited design flexibility. Aesthetics plays a role in sustainable evaluations. It is more likely that people will hold onto their attractive, inviting buildings longer and use them adaptively.

- **Enclosure and Finish**
  Concrete masonry walls can provide both structural support and exterior/interior finish. This simplified wall system can eliminate the need for additional materials that require manufacture, installation, maintenance and repair. This reduces cost and conserves building materials.

  Interior masonry walls do not require paint or other finishes thereby reducing VOCs and improving air quality. The fact that concrete masonry is not a food source for mold can also improve air quality and lower potential repair costs.

- **Natural Fit**
  As designers move beyond simple consideration of environmental impacts to more thorough life-cycle based design, they realize concrete masonry is an affordable, locally available, and environmentally sensitive building material with an exceptional life-cycle. Its intrinsic qualities discussed in this technical bulletin make it a natural fit for sustainable design. It is anticipated as green building codes and standards evolve they will justly recognize all these important masonry attributes that contribute to practical designs, enduring structures and environmental responsibility.



"It is likely the environmental impact is much less if we build one 75-year building rather than three 25-year buildings."

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