

# Stone and the Green Movement: Supporting Green Testing and



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**C**an natural stone be considered a green product? A hasty “yes” answer without substantiated facts and figures could generate antagonism from people outside the industry. A casual “no” answer might hinder the advancement and promotion of natural stone in the fast-growing sustainable building industry. Although natural stone has been used as a traditional building material for a long time, a lot remains to be learned about its impact on the environment and how it supports sustainable building methods and principles.

Any claims the natural stone industry makes about the environmental friendliness of natural stone must be supported by credible testing and research. The sustainable building industry is very sensitive about and critical of unsubstantiated claims, which it labels “greenwashing.” Greenwashing is what companies or industries do when they try to make themselves look, or claim to be, more environmentally friendly than they really are. Environmental watchdog groups have relentlessly



# Building through Research



and publicly criticized previous green marketing campaigns by industries seeking to represent their products as environmentally friendly in order to take advantage of new markets created by rising environmental awareness.

There appears to be a lack of, or concentration on, research data to support natural stone as a green product for use in sustainable construction. Given the growing popularity of the sustainable building movement, the stone industry — in collaboration with green build associations — should initiate and support objective testing and research on the economic and environmental impact of natural stone in green building design and construction. Generally speaking, the sustainable building industry will be skeptical of using less-researched and less-tested materials. In order to determine where stone fits into the sustainable building trend, the stone industry must determine how environmentally friendly stone really is. Solid data about stone's environmental costs and benefits can then be used in the building product assessment process.

Once the environmental goals of a sustainable building project have been established, the assessment process for selecting the appropriate building products begins. An architect or product specifier must evaluate a number of products and determine what com-

pany or industry product information is credible and accurate and what is not. Determining this typically involves three basic steps for the architect or product specifier: investigating various suitable products, evaluating the information and selecting the product that best fits the project's goals and objectives. In the investigative stage, information such as product data sheets, Material Safety Data Sheets (MSDS), American Society for Testing and Materials (ASTM) testing data and any type of environmental claims, are needed to understand fully the product's capabilities and limitations. The next step is to evaluate the information and determine if any information gaps exist.

While evaluating such information can be an easy task if the products are similar, it can be a challenge if the material is different but has the same function. In these cases, more information will be needed, which can prove time consuming and frustrating. More supportive data — such as life cycle assessment and life cycle costing (both of which are discussed in this article) — can prove extremely valuable in the product evaluation stage. Finally, after considering the overall objective of the project and using what product data is available and makes sense, the architect or product specifier selects the appropriate materials.

In order to encourage the use of natural stone by the sustainable building industry, the stone industry needs to support research in two areas of great interest to the green building industry: life cycle assessment and life cycle costs.

## Life-cycle assessment (LCA)

When evaluating products to be used in sustainable construction, it is important to look at the opportunities, risks and trade-offs associated with various products over their entire life cycle. The life cycle of stone begins when the material is extracted from the ground, then processed, fabricated, packaged,



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transported, installed, used, possibly recycled and eventually given final disposal. At every juncture in this cycle, there are emissions and consumption of various resources. By factoring in all the costs (direct and indirect) and the loss and depletion of resources into one common metric, life cycle assessment offers a shared foundation of the environmental costs and benefits of a product, allowing architects or product specifiers to decide on the most suitable product.

Whether it is third party certification companies like Scientific Certification Systems or LCA tools like Building for Environmental and Economic Sustainability (BEES) or Athena's Institute's Environmental Impact Estimator, life cycle assessments on natural stone products would benefit many. At this time, no prominent information can be found on the life cycle assessment of natural stone. If this information could be provided, it would help promote the use of stone in green building. It also should be noted that the U.S. Green Building Council (USGBC), the nation's leading coalition on sustainable building, intends to integrate relevant and consistent aspects of LCA into future LEED® (Leadership in Energy and Environmental Design) programs.

**Life-cycle costs (LCC)**

Life-cycle costing is the "bottom line" of what natural stone really costs. The real value of stone — or any building material for that matter — is determined by its cost, durability, usefulness and aesthetics. Life-cycle costing is a method of assessing total costs accrued over time and a way to evaluate performance and long-term sustainability. It consists of initial costs (design and construction), operating costs (energy, water, sewage, waste, recycling and other utilities), maintenance, repair and replacement costs, and any other environmental or social costs. The durability and low maintenance of stone has allowed its continued use as a superior building material for centuries. Stone advocates

must use credible data to buttress the claim that the overall life cycle costs of stone are low. In addition to testing companies like Green Seal and the GreenGuard Environmental Institute, there are numerous tools and methods to calculate the life-cycle costs of various stone products and stone applications. By using some acceptable standard of life-cycle cost analysis to assist in the evaluation of stone products, advocates of stone would have pertinent data to support its use in sustainable projects.

In addition to researching the costs and environmental impact of natural stone, the stone industry should consider additional research and testing that could strengthen natural stone's use in sustainable design and construction.

**Water Use Reduction:** The volume of residential and commercial water use in and around homes and buildings is staggering. An important principle in sustainable building is to limit or reduce the use of potable water. Given this, stone advocates have the opportu-

nity to show the benefit and value of "Xeriscaping." Xeriscaping is simply landscaping with slow-growing and/or drought-tolerant materials to conserve water and reduce yard trimmings. Landscaping with stone and rock can be part of Xeriscaping. The use of stone supports this by conserving water, providing many attractive planting options, saving valuable landfill space, eliminating pest and disease problems, reducing fertilization and lowering maintenance. How much does Xeriscaping reduce potable water consumption for irrigation? That data needs to be determined.

**Construction Waste Management:** The sustainable building industry supports diverting construction, demolition and land-clearing debris from disposal in landfills and incinerators. Managing product waste, either by redirecting resources back to the manufacturing process or redirecting reusable materials to other appropriate sites, lowers the burden on landfills. In this area, the stone industry has the opportunity to show how product

waste from extraction and processing can be reused as construction site fill, in landscaping or recycled. In addition, it would be beneficial for state and national associations to develop waste minimization guidelines to help educate and train its members on how to reduce construction waste.

**Materials Reuse:** Some consider materials reuse one of the more economically proven of all sustainable design principles. Not only does it divert salvaged material from the landfills, it also reduces demand and cost for virgin materials, which further reduces the impact associated with the extraction and processing of stone resources. Stone suppliers that sell or promote "reclaimed" materials have a great opportunity to get the word out on stone's reusability. In addition, the stone industry could learn more about the benefits of deconstructing and reuse by collaborating with organizations like the Building Materials Reuse Association, which provides opportunities for interested parties to share information

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and increase knowledge and understanding of deconstructing and re-using building materials.

**Regional Materials:** The use of local available stone products has several advantages in sustainable building. There are clear energy cost savings relating to transportation of material over shorter distances. Increasing demand for building materials and products that are extracted and manufactured within the region supports the use of local resources, reduces environmental impacts and supports local economies. Further studies are needed to quantify the benefits of local stone products versus substitute products.

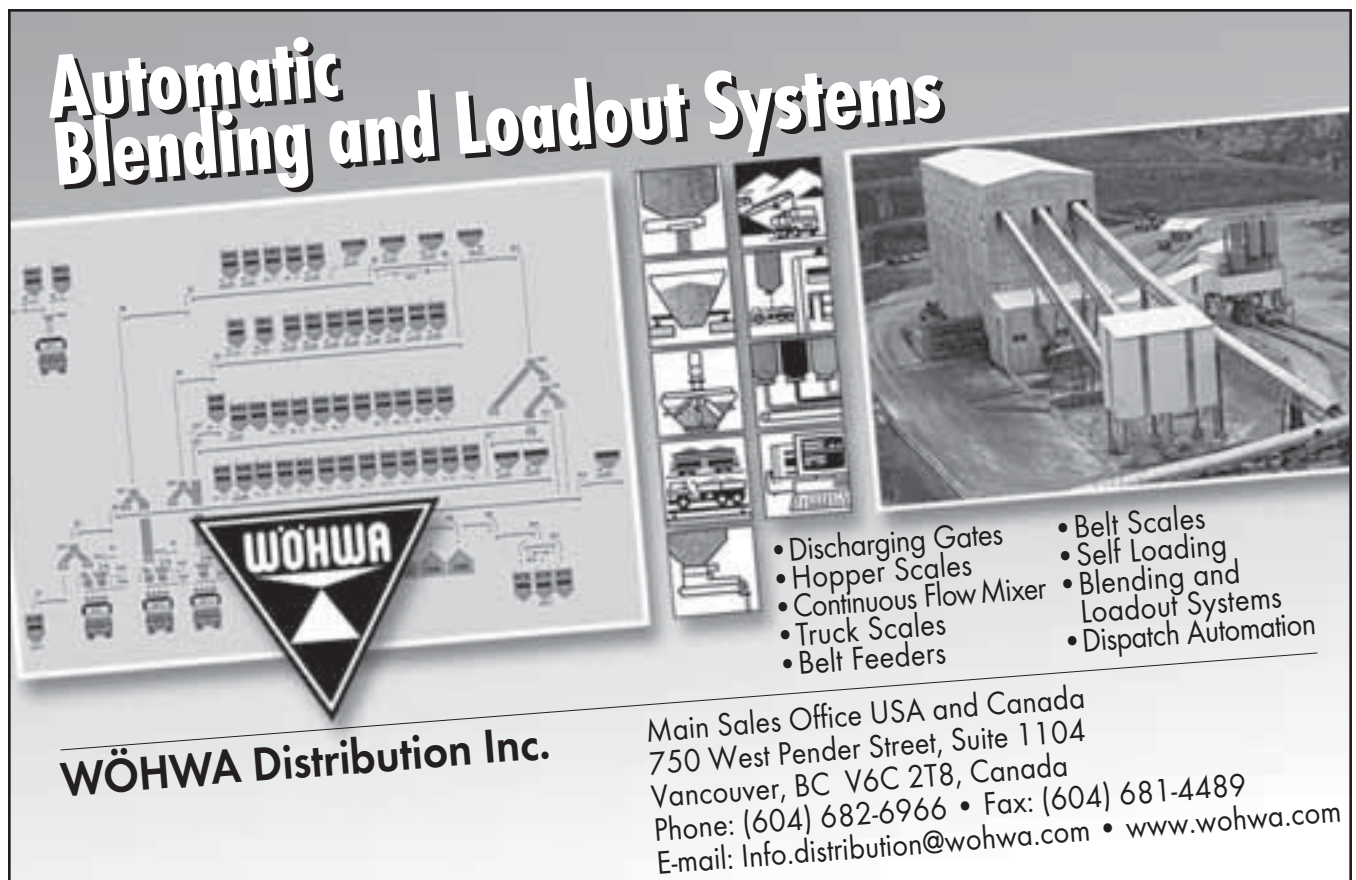
**Innovation:** Innovation is what gives companies (and industries) their competitive edge. The sustainable building industry looks favorably on innovative thinking that contributes a greater variety of solutions and challenges assumptions. There is an opportunity for the stone industry to show innovative ways that stone can be incorporated into sustainable design.

The stone industry could sponsor an "Innovations in Stone and Sustainability" award program similar to the Building Stone Institute's Tucker Awards or the Marble Institute of America's Pinnacle Awards. Not only would such an award provide design teams and projects the opportunity to be recognized for innovative uses of stone, it also would serve as an educational opportunity to show that stone can support sustainable design.

**Reclamation activities and benefits:** Another area of the stone industry that is not well known, which has led to misconceptions and inaccurate assumptions, is the reclamation activities of aggregate operations. One of the primary tenets of the building green movement is to conserve natural resources. Obviously, stone is a natural resource, and its extraction, processing and transportation has an impact on the environment and landscape. Most people outside the stone industry only know about the perceived impact of active aggregate mine sites. It is important for these people to be aware of the

reclamation that takes place afterwards and some of the interesting reuses of the land (some of which are more beneficial to the environment than before the operation began). The stone industry has the opportunity to educate the green industry and the public on the reclamation activities and benefits of responsible stone resource management before, during and after the stone has been extracted.

Is stone green? To respond to this question, the stone industry and stone advocates must first support testing and research in areas of green construction that are important to the sustainable building industry. The stone industry clearly would benefit from the significant number of outstanding scientific and educational institutions and organizations interested in and available to conduct research on the benefits of using stone in green building design. Without that type of information, stone's use in the fast-changing environment of sustainable design and construction could be limited. ■



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