GREEN BUILDING

How contractors can grow and profit by minimizing the environmental impact of construction projects

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When Francis Kent began recycling paving material nearly 30 years ago, he had to convince a lot of people the products made from crushed concrete and asphalt were an acceptable alternative to the construction building materials that come out of a conventional quarry.

"In the early 1980s, recycling wasn't fashionable," said John Kent, who joined his father in the family business and is now President of Oxford Recycling. "We had to fight to establish ourselves and prove to various municipalities and contractors that just because our product is recycled, that doesn't mean it's not as good as a virgin product. It meets required specs, and in fact, often exceeds them. But back then, we had a terrible time trying to convince people of that."

Eventually the practice caught on and the Kents today are running a large operation that sees upward of 1,000 trucks per day either delivering or picking up product. They've added tree grinding to their operation, producing valuable mulch from what formerly may have been landfilled, burned or buried.

Old practices often called for burning or landfilling trees and shrubs during clearing and grubbing. Today, more and more companies, such as Oxford Recycling, are turning them into reusable products such as mulch.

The rest of the construction industry is fast approaching the Kents' lead in what's rapidly becoming known as "green building," "sustainable design" or other terms that point to the idea of minimizing environmental impact through reducing the consumption of nonrenewable resources and waste.

A growing movement

The movement has been growing rapidly in the past few years as more consumers call for developers, designers and architects and builders to think about how they can build in a more eco-friendly way. The concept requires careful consideration in the planning stages, taking into consideration everything from how stormwater runoff can be used on site to selecting the most energy-efficient building materials. It often means using recycled materials throughout the construction process.

Industry professionals are taking green building and sustainable design into account and are joining such organizations as the U.S. Green Building Council (USGBC), a nonprofit organization that promotes such practices. It's grown to include more than 16,000 member organizations and 75 regional chapters, offering programs to educate construction personnel on green practices.

The USGBC also certifies green projects through its LEED (Leadership in Energy and Environmental Design) Rating System, "a nationally accepted benchmark for the design, construction and operation

of high-performance green buildings." It promotes a whole-building approach by looking at key performance areas, such as sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. Points are awarded to designate certification levels of Certified, Silver, Gold and Platinum. A LEED-certified project meets rigorous criteria, and the honor can reap rewards for those who designed and built it, putting them at the forefront for winning more projects. Those who use it also benefit through a more healthful living and/or working environment.

"Green construction is 30 percent to 50 percent more energy-efficient and 40 percent more efficient in water usage, plus it offers health benefits," said Ashley Katz, Communications Coordinator with the USGBC. "Currently, we have a little more than 1,500 certified projects in total, but our goal is to have 100,000 commercial buildings and 1 million homes certified by 2010. We've also raised our commitment to fund green-building research by increasing the amount given in grants to $2 million in 2008."

In addition to the increased use of recycled materials, nearly all new construction projects have other green considerations built into them, such as erosion-control measures, retention ponds to keep stormwater runoff on site, and balanced earthwork designed to cut down on the amount of import and export materials and compaction. Many call for disturbing as little ground as possible, as well as finding ways to save existing trees, or planting new ones.

In many cases, state highway departments have led the way by using existing roadway materials in the construction of new paving projects. Materials such as old concrete and asphalt roadbeds that used to be hauled away are now being crushed on site and reused as road base. Asphalt millings are used in shoulder materials or put back into the mix for new road pavement. Porous pavement that allows water to drain through it to the stone base and back to the soil is becoming increasingly more popular.

More efficient machines with Tier 3-compliant engines, such as Komatsu's Dash-8 excavators and new BR580 JG crusher, increase production with less fuel and lower emissions than previous models. Used in combination, as shown here, these machines can turn old pavement into new materials for reuse, rather than putting them in a landfill.

Efficient machinery reduces emissions

Reducing environmental impact in construction means more than just using recycled materials and careful jobsite planning. It also takes into account the machinery that's used to make the materials, move the dirt and lift building products into place. Equipment manufacturers are doing their part in conjunction with federal regulations and guidelines, which have included mandates that lower engine emissions, such as nitrous oxide (Nox) and particulate matter (PM). Both are considered significant public health risks.

Latest regulations require new diesel engines to meet Tier 3 standards, with stricter Tier 4 standards coming in the next few years. In some cases, the results have not only been lower emissions, but less fuel consumption as well, leading to the same or better production with lower operating costs. It's a win-win for the equipment user.

"That's been a great benefit of our ecot3 engines (the 'eco' stands for ecology and economy; the 't' for technology; and the '3' for Tier 3)," said Toshio Miyake, who was involved with product planning for Komatsu Ltd. during the development of ecot3 engines. "In addition to meeting the emission regulations, and thereby putting fewer pollutants in the air, we're also able to make a better machine.

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Komatsu, contractors join green movement

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"Initially, there was concern that emissions requirements might negatively impact some power and performance features. But we've overcome potential problems and we view the ecot3 engine as a big step forward in all respects for equipment users."

Manufacturing part of the process

Komatsu and other manufacturers are taking additional steps by making going green a consideration in the manufacturing process. When Hensley Industries, part of Komatsu Ltd., built its new foundry in Dallas, several steps were taken to improve efficiencies and recycle nearly 100 percent of the waste materials it generates in the process of making ground-engaging tools for mining machines.

During the planning stages, Hensley took into account how potential environmental issues, such as noise, smoke and odor, would affect not only the workers at the foundry, but its neighbors as well. The plant was built with a highly effective dust-collection system that moves the dust to outside containment units where it's eventually pelletized and sold for reuse in such products as concrete. Noise suppression was built in so a nearby school and apartment complex wouldn't be affected.

"We're very proud of what we accomplished as we set out to build a very modern facility that was environmentally friendly and an asset to our neighbors," said Paul Rudd, General Manager-Manufacturing, who helped design the foundry. "It's truly state-of-the-art and highly efficient. It's the cleanest manufacturing facility I've ever seen."

Factories such as Hensley Industries, part of Komatsu Ltd., are using more environmentally friendly practices during production. The plant, which makes ground-engaging tools for mining machines, recycles nearly 100 percent of its waste products, including dust, which goes into this containment area. It is pelletized and sold for use in other products, including concrete.

Continuing to grow

Contractors can invest in ways to help too. Using newer, lower-emission equipment, or retrofitting older equipment with more environmentally friendly engines can help out. Employing GPS-based site-preparation practices can help operations be more efficient. These systems allow users to get to grade in fewer passes with less wasted effort. More accurate grading requires less aggregate material for subbase, and increasingly, the subbase that is used is coming from recycled products, such as the ones Oxford Recycling makes.

"Much of the material we recycle would have ended up in a landfill. Asphalt and concrete do not decompose, so it's not beneficial to dump that material there," Kent noted. "Reusing the material is a way to reduce the environmental impact in variety of ways. Not only is the paving material reused, it often reduces trucking, which means fewer emissions. We've seen a gradual increase in the use of our recycled materials, and we believe it's only going to continue to grow." ■