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Turning Waste into Gold

A LONG-STANDING AGRICULTURAL CARE COMPANY'S NEW MARKETING AND SALES CENTER SETS A GOOD EXAMPLE OF ITS OWN VALUES OF RECYCLING AND REUSE.

BY CHUCK COX, LEED AP BD+C, CGP, WC AP

Safeguarding the environment is nothing new to John Deere, a world leader in providing advanced solutions for agriculture, construction, forestry, lawn and turf care, landscaping and irrigation. After all, for more than 175 years the company has been dedicated to serving customers whose

work is closely linked to the land—those who produce our food, fiber and fuel, those who beautify and protect our environment, and those who build and maintain our homes and critical infrastructure.

This deep respect for the environment is evident by the company's many programs

that foster a culture of waste elimination, water reuse, energy efficiency, recycling and completing the recycling loop in new products. A commitment to following LEED principles in the design and construction of all its new facilities is further testament to John Deere's sustainability ambitions.

NEW ECO-FRIENDLY MARKETING CENTER
John Deere's new marketing and sales center in Olathe, Kan.—its first corporate building designed to achieve LEED Gold status—is a strong affirmation of the company's dedication to sustainable construction practices. The

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126,150-square-foot facility houses nearly 500 marketing professionals who support sales branches and dealerships for the company’s agriculture and turf business in the U.S., Canada, Australia and New Zealand. Within the greater Kansas City area, the world-class facility is centrally located in a new Agricultural Research and Bioscience Corridor, which integrates nicely with John Deere’s strategic agricultural initiatives.

The marketing and sales center is situated on approximately 17 acres and includes state-of-the-art meeting and training rooms, the latest technology to communicate globally, a broadcast video production studio, and an open-office atmosphere to facilitate teamwork in strategic and tactical marketing initiatives. Designed by Holland Basham Architects, the three-story building with a center atrium prominently features limestone accents throughout the interior, offers unimpeded visibility to the outside and features excellent utilization of natural light. The building skin consists of a curtain wall, insulated precast concrete panels and locally quarried limestone. A limestone wall, 55 feet high and 200 feet long, runs from the exterior through the inside of the building.

CLOSED-LOOP APPROACH TO WASTE MANAGEMENT

In support of resource management and LEED certification



goals, the project team—consisting of John Deere, general contractor The Weitz Company and Lafarge—developed a “closed-loop” sustainable construction plan that coupled a waste recycling service with cement and concrete provision for the job. In implementing this novel concept, the team predetermined the specific types of waste that could be beneficially repurposed in the cement manu-

facturing process and dedicated one dumpster for collecting these various materials.

Systech Environmental Corporation, a wholly-owned subsidiary of Lafarge, collected this segmented construction waste from the jobsite and delivered it to Lafarge’s local cement plant on a bi-weekly schedule. With co-processing locations throughout North America, Systech is a leading provider

of co-processing services that allow customers to divert construction waste from landfills for beneficial repurpose. Its waste management program is a comingled service where unusable construction materials, which include paper, wood, textiles, rubber, most plastics (such as used insulation board and shrink wrap) and other waste products, are processed at an offsite facility.



The project contributed to LEED credits by using cement with a quantified recycled content of 24 percent and an associated recovered energy content of 32 percent.

IMAGE COURTESY OF THE WEITZ COMPANY

The intent of the LEED Materials and Resources Construction Waste Management credit (MRc2) is to divert construction debris from disposal in landfills and redirect recyclable/recovered resources back to the manufacturing process

and reusable materials to appropriate sites. The “closed-loop” sustainable construction plan made a strong contribution to achieving this credit by repurposing 50 tons of the project’s construction waste as alternative fuel for the ce-

ment kiln and as raw material component in the 1,400 tons of Type I/II Portland cement produced. This cement was then included in the 5,000 cubic yards of concrete that Lafarge’s ready-mix operations delivered to the John Deere jobsite.

In addition to the materials destined for Lafarge operations, the project team segmented other waste into various dump-

sters for beneficial reuse, such as metal destined for metal scrapyards and sheetrock that went to a plant that recycles wallboard. In total, 108 tons of construction waste was diverted from disposal in landfills, of which 50 tons was used in producing the cement and concrete for the project. By achieving a 90 percent overall diversion rate, the John Deere project earned

one point for 50 percent diversion (Credit 2.1) and one point for 75 percent diversion (Credit 2.1) under the LEED v2009 rating system for new construction. The upcoming version of the LEED v4 encourages the reuse, recycling and repurposing of construction waste.

RECYCLE AND REUSE

Construction waste contains high energy value and can be safely managed in high-temperature cement kilns while reducing the need for fossil fuels—mainly coal, petroleum coke and natural gas. Beneficial use of the construction waste as an alternative fuel source in the cement manufacturing process makes it possible to recover energy, conserve nonrenewable fossil fuel resources, reduce greenhouse gas emissions and divert waste away from landfills.

Not only is the energy recovered, but many wastes also contain raw materials (silica, alumina, iron and calcium) that are essential for cement-making that can be recycled back to the kiln as ingredients for new cement. Building products that have a portion of their constituent materials from pre-consumer waste generated by commercial and industrial facilities can reduce the impact on landfills and the need for virgin materials in new construction.

In addition to the construction waste, the concrete used in the John Deere project also included supplementary cementitious materials (SCMs) as a partial replacement for Portland cement. These industrial byproducts, which are considered pre-consumer waste materials, included slag cement (a reclaimed byproduct of the steel-making process) and fly ash (a coal-combustion byproduct of power plants). Reducing the amount of clinker in cement with SCMs not only recycles the waste stream of a manufacturing process that might otherwise be disposed of in landfills, but it also reduces the consumption of natural, non-renewable raw materials.

The John Deere project contributed to the LEED materials and resources credits by using cement with a quantified recycled content of 24 percent and an associated recovered energy content of 32 percent, according to a third-party verified ISO standard (ISO-14021). ANSI/ISO 14021 defines recovered energy as a characteristic of a product that has been made using energy recovered from material or energy that would have been disposed of as waste but instead has been collected through managed processes. “I was really impressed with Lafarge and their commitment to helping us achieve our waste management

and recycling goals,” says Jeff Stewart, The Weitz Company’s project manager for the John Deere facility’s construction. “They were a very active partner in the overall process and made our sustainable construction efforts a huge success.”

SOIL STABILIZATION

Expansive soils, which are known in every U.S. state and common in the Kansas City area, contain a significant amount of clay that expands when wet and shrinks when dry. Premature failure can occur to the overlaying structures if these volume changes, which can generate enormous forces, are not controlled.

To control potential expansive clay problems at the project site, 1,500 tons of fly ash were used to mitigate the shrink/swell properties of the soil under the concrete entryway, sidewalks and large parking lot in front of the building. “The use of fly ash to treat the soil made a strong contribution to achieving LEED credits for recycled content materials and did a fantastic job in making the soil more dimensionally stable and increasing its compressive strength,” adds Stewart. “I visit the sales and marketing center a couple times a month and the concrete pavement is performing great.”

SHOWCASE IN SUSTAINABILITY

John Deere’s new Sales and Marketing Center officially opened with a ribbon cutting ceremony in September 2011 and was awarded LEED Gold in June 2012. In addition to the cement and concrete, other green building products were used throughout the facility, such as sorghum board and ag-based wall coverings to pay homage to Deere’s long history. The building is also positioned to maximize views of a pond and prairie space and as many trees as possible were retained on the property, including a historic western soapberry tree. Other notable features include bioswales and bioretention ponds to control stormwater quality and quantity, native and drought-tolerant plant species and a lengthy nature trail with decorative plaques that include information about the site, the building and the LEED process. *edc*



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