

# SUSTAINABILITY BY DESIGN: DECONSTRUCTION - Diane Haworth



In the spring of 2006, Haworth, Inc., initiated a significant renovation of its existing Holland, Michigan, headquarters building, One Haworth Center. The two-phase project, completed in 2008, is registered under the LEED® for New Construction (LEED-NC) rating system. The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is a nationally accepted benchmark for the design, construction and operation of high-performance green buildings. The LEED approach to sustainability recognizes performance in five key areas:

- Sustainable site development
- Water savings
- Energy efficiency
- Materials selection
- Indoor environmental quality

LEED is a point-based system with levels of certification based on the total number of points awarded. The Haworth project is registered for LEED-NC at the gold level which means the project must earn at least 39 points.

## HQ

As part of the first phase of renovation, Haworth deconstructed a portion of the existing building. Under the LEED-NC rating system, up to two points can be earned for recycling or salvaging up to 75 percent of the construction waste generated. At the end of Phase One deconstruction, Haworth exceeded this benchmark by diverting over 99 percent of materials from the landfill.

U.S. building-related construction and demolition waste approaches 136 million tons annually, according to a 1996 EPA estimate. On average, only 20-30 percent of this waste is recovered. Haworth exceeded the average by recovering all but 1 percent of the 3,566 yards of deconstruction waste generated during Phase One.

Success was achieved through the combined efforts of the project contractor Turner Construction, and its subcontractor Homrich Incorporated, demolition and environmental contractors headquartered in Carleton, MI. Haworth suppliers and team members also supported the effort.

## Adaptive Reuse & Creative Recycling

During the first phase of the project (145,000 square feet), a number of reuse strategies and creative recycling opportunities were utilized. Items as minor as door locksets were removed intact for use in other Haworth facilities. Furnishings and furniture were donated to local schools and charitable organizations. Materials that could not be reused were recycled or down-cycled into a lesser value material.

## Steel/Metal Facts

Over 321 tons of steel and 12.5 tons of other metals were recycled in Phase One of the Haworth project.

Steel is North America's most recycled material, exceeding in volume aluminum, paper, glass and plastic combined. The reduction in greenhouse gas emissions from recycling this metal is equivalent to taking 140 cars off the road for one year.

Steel scrap has become the industry's single largest source of raw material. In fact, all steel currently manufactured contains at least 30 percent recycled content on average.

### Nothing Too Obscure

Haworth considered no amount of material too small or obscure to recycle. For instance, 75 gallons of hydraulic fluid from the existing elevators was drained and will be treated and reused in the new elevators. Other debris, such as concrete waste and general refuse, has been down-cycled for aggregate that is used in road-bed construction reformed into concrete bricks.

If materials could be reused they were, since reuse has the least impact on the environment compared to recycling, converting from waste-to-energy or sending waste to a landfill.

### School Donation

Some materials were donated to area schools in Holland, Michigan, including Black River Public School.

Architects and members of the school's planning team toured areas of the Haworth headquarters slated for demolition to identify usable materials for its new facility. By partnering with Haworth, the school received carpeting, lighting, and other materials of a higher quality than what could have been purchased within their budget. In all, materials with a replacement value in excess of \$60,000 were removed for reuse in the new school.

### Carpet Recovered

Carpet comprises nearly 4 percent of all landfill waste in North America. During

Phase One of Haworth's project, over 58,240 pounds of carpet tiles were removed and either donated to area schools or reused in other Haworth facilities.

The largest quantity was sent to a carpet tile recycling company, OPT3, a division of DPM Enterprises located in Kingsport, TN. OPT3 is one of a growing list of companies that has created opportunities from waste materials. Since it began recycling in 2003, the company has diverted over 1.2 million pounds of carpet tile from landfills.

OPT3 receives and sorts carpet tiles according to material content for either reuse or recycling. Tiles for reuse are cleaned, sanitized, and treated with a stain shield -- then offered for resale. Tiles that are not reusable are further sorted for down-cycling.

Down-cycled carpet tiles with PVC backing are either recycled into plastics used for molding (50 percent) or more carpet backing (50 percent). Carpets with a urethane back currently have no viable secondary market and are sent to a waste-to-energy facility for use as an alternative fuel source. This currently represents less than 5 percent of carpet tile processed. Overall, none of the waste from the reuse and recycling process is sent to landfill.

### Looking at Glass & Concrete Dust

Haworth partnered with Aggregate Management, LLC., headquartered in Troy, MI, to come up with a creative plan for using concrete waste dust from manufacturing and all of the waste window glass from the old building -- materials from two waste streams -- to make concrete construction blocks for the new building.

Concrete waste dust is generated through the normal Haworth TecCrete® access flooring manufacturing process. Several tons of concrete dust are generated daily by surface sanding and are normally recycled into road bed construction materials. The alternative use devised by Haworth and Aggregate

Management repurposed both this waste dust and the deconstruction waste glass into a useful new construction material that did not have to be purchased.

Recycling waste glass into new window glass would be the best case for sustainability; however, current technology doesn't support this. Therefore, finding this local and constructive use for waste glass keeps it out of the landfill.

Over 8,000 concrete blocks were created from 9.23 tons of glass and 3.25 tons of concrete waste dust. The final content of the block is 52 percent recycled glass and 2.5 percent concrete waste dust. By diverting these materials, Haworth saved energy and eliminated the use of new materials for aggregate.

### Closing the Loop

Why is it important to divert waste and materials?

Obviously, it reduces impact on the environment. It also benefits the community by providing donated goods and materials that free up tight budgets in the public and private sectors.

Perhaps even more importantly, as more waste is recovered, more opportunities are realized to use waste as a raw material. As the value of recovered raw materials increases, it will positively impact the environment, people and communities. It will also enhance profits, which will ultimately drive even greater levels of recovery.