



## A Kinder, Gentler Wrecking Ball

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"Basically, when we deconstruct, we don't get out the wrecking ball, we take the building apart." That's how Robert Keller, associate vice president for facility planning and operations at Miami University, describes the university's building deconstruction program. "We've been taking more steps each year for the past 10 years in our building recycling initiatives."

Brick by brick, colleges and universities like this one are taking down old buildings and recycling the materials for use on other parts of their campus and beyond.

The first project Miami attempted involved renovating a lab in the 90s, during which the old ductwork and other construction materials were removed and sent away for processing rather than to the landfill. The first complete building deconstruction, which took place about five years ago, involved taking down a WWII vintage housing complex that had been built originally as temporary apartments. "It was probably not done as thoroughly as more recent projects, but it was the first testing of the waters."

An even more thorough deconstruction initiative took place just three years ago when Miami dismantled Reid Hall, one of the residence buildings for the School of Business. Everything that could possibly be salvaged, including steel, doors, concrete, brick, roofing, and hardware was recovered and sold, recycled, or stored for later use.

"The project architect did some calculations and by weight, estimated that we recycled between 85% and 90% of the building," explains Keller. That's an impressive ratio, especially since, of the estimated **65+ million tons of non-residential demolition debris** generated every year in the US (between 155 lb/ft2 and 158 lb/ft2), which makes up 39 percent of the construction and demolition debris waste stream, the **recycling average is between 20 and 30 percent**.

Though much of the construction material was recycled or sold by the contractor (part of the agreement was that the contractor would recoup any profit from the materials), Miami planners did keep some for themselves. For instance, clay roof tiles were stored for future repairs on existing buildings and architectural items such as old doors were kept for use in restoration projects.

And when some of the alumni expressed their dismay at seeing their old residence hall torn down, the institution moved to quell their grief. "We saved some of the brick from the building, and at the next alumni event, it was all snatched up by people looking for a keepsake from their time in Reid Hall," remembers Keller.

But why didn't they retrofit Reid Hall to save the embodied energy of the building? According to Keller, the floor to floor heights were too low and it would have been difficult to get modern systems in the structure. The new residence hall is now significantly more energy efficient than the old. That, combined with the energy saved by reusing and recycling construction materials, makes the building's sacrifice worthwhile. "This is our new

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standard-we no longer demolish," Keller says.

Although Keller acknowledges that the process of deconstruction does take longer than wielding a wrecking ball and hauling the waste to a landfill, he believes this challenge is far outweighed by the benefits they receive. Though there's disruption on campus for a longer period of time during deconstruction, both the noise levels and dust are decreased: "Demolition is louder and dirtier for a shorter period of time."

UT-Houston also consulted an architect familiar with deconstruction processes when it became necessary to dismantle the Health Science Center's Graduate School of Biomedical Sciences (GSBS), a 37,368-sq.-ft. building built in 1974. The school had already established a very clear strategy for recycling and reusing the materials from the building by the time architects Berkebile Nelson Immenschuh McDowell (BNIM) stepped into the project. "They were fairly specific on what materials needed to be returned to the campus, which was to be sold in the marketplace, and which would be recycled," explains Steve McDowell, BNIM project lead.

Nevertheless, some research had to be conducted to find disposal options for certain things like toilet fixtures and windows. "These were a little more difficult to place so we had to work pretty hard to find out where we could source those materials out."

According to McDowell, one of the biggest contributions BNIM was able to make to the process was to formalize custody of the materials. "We felt that we needed to create a deconstruction spec in the same way that we write how to handle any construction waste on a project. We added process and metrics in terms of measuring the amount of each material- calculating the weight and in some cases making informed guesses." In addition to selling, recycling, and keeping some materials for themselves, UT Houston also donated some of the construction materials to nonprofits in the area, bringing the total diverted amount to approximately 70 percent.

What did the deconstruction process look like at UT Houston? McDowell felt that it was pretty elegant. "They spent their time taking things apart, stacking them, loading them up, taking them to the proper location, cutting the steel apart in a way that they could still use the bar joints or steel sections and then taking them to be reused by the state or the university. In reality, it seemed to make more sense the way they did it than knocking it over, making a huge mess, and then digging your way out of it." UT Houston had the luxury of space in which to store much of the materials as they were processed as well.

Although the new building did not contain any of the recycled materials from the old GSBS building, it did meet the project's energy efficiency expectations. "Our target was to be 40 percent better and I believe we met our goal," says McDowell.

When asked about potential drawbacks, McDowell had this to say: "I don't really think there are any. The other system relies on landfill and I don't think that's really an option that we're going to have for too many more years. The whole idea of continuing to tear things down and stick them in the ground is not a sustainable strategy in any way for the planet or our culture."

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