A Cleaner Concoction MaqCrete mixes cement with various waste products.

REPLACING TRADITIONAL PRODUCTS

Rock and a Hard Place

An alternative to standard concrete block made with industrial waste and plant fibers gets a nudge forward.

In May, the Green Building Alliance awarded a $20,000 Innovation grant to EcoBuilt Efficient Buildings, a Pennsylvania-based company that specializes in energy audits. EcoBuilt and Drexel University will use that money over a 12-month period to determine whether a greener alternative to conventional masonry blocks called MaqCrete—which EcoBuilt's principal, Dennis Crook, has been developing for the better part of three decades—can be mass-produced cost effectively.

The 60-year-old Crook, who runs the company with his wife Siti, is no Johnny-come-lately to the world of efficient construction. His first job in the early 1970s was with an insulation and home improvement company in Newton, Iowa, where his father was an industrial engineer for Maytag. "One of the lessons he taught me is that there's always a cheaper and better way to do things."

"It's not going to be easy."
— Dr. Michel Barsoum, Drexel University, about getting MaqCrete to meet existing performance standards

In 1985, Crook bought an abandoned steam plant in the Overbrook Farms district of Philadelphia, and after years of remediation turned it into a seven-unit housing development that qualified for energy-efficient certification under Owens Corning's "Thermal-Crafted Homes" program. More recently, his company built a duplex with two 1,680-square-foot homes in Lancaster, Pa., whose HERs were, respectively, 69 and 71.

Crook is a big proponent of improving a home's thermal package through better construction techniques and materials. MaqCrete's formula, which received a 20-year patent in 2002, consists of post-industrial waste and/or bio-based plant fibers mixed with Portland cement, but uses about 25 percent less cement than a conventional masonry unit. MaqCrete is 30 percent lighter than masonry block, with an R-23 insulation value. And it's fibrous, so screws have something to grip onto.

"What's revolutionary," says Crook, "is that the product can serve as a whole building system. It's fire-resistant, non-rotting, and users can attach other products to it," which would also reduce labor costs.

But Crook hasn't gotten MaqCrete past the prototype stage, and his latest challenge has been figuring out which binder combination will work best. Enter Drexel.

Dr. Michel Barsoum, a professor in the university's department of materials science and engineering, says MaqCrete's commercial fate lies in its meeting or exceeding performance criteria for concrete and cement that have become ingrained over centuries. Barsoum's own research team has been working for two years on an alternative concrete product made from blast-furnace slag, and what's kept it from passing ASTM's C1157 performance standard is that it sets five minutes quicker than conventional cement. — JOHN CAULFIELD

Courtesy EcoBuilt Efficient Buildings