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news

‘Big Dig’ House Makes Case for ‘Precycling’

By Mark Fitzgerald

For all the delays, cost overruns, and construction problems associated with Boston’s Central Artery/Tunnel (“Big Dig”) project, it’s refreshing to know that the new house in Lexington, Massachusetts, belonging to Paul Pedini, P.E., M.ASCE, is strong and watertight. Pedini, who for more than a decade supervised the construction of tunnels in the Big Dig, built his house from materials he salvaged from the \$14-billion endeavor—the largest and most expensive highway project in U.S. history—which placed Interstate 93 beneath downtown Boston and extended the Massachusetts Turnpike to Logan International Airport.

“It’s a monster,” says Pedini, who is the vice president of Jay Cashman, Inc., a construction company headquartered in Quincy, Massachusetts. “Most people can’t put a garden on their roof with three feet of soil and trees and marble statues and boulders six feet wide, but I can, because the materials are so incredibly strong.”

Pedini hauled 600,000 lb (272,160 kg) of steel and concrete—materials that had been part of temporary ramps built to keep motorists moving in and out of the city during construction—from Boston to the top of a hill in Lexington, a suburb west of the city and the site of his new home. “The concrete and steel were going to be crushed up and used as landfill,” he explains. “But knowing its strength and how it could be cantilevered crazy distances and hold up eighteen-wheelers, I thought, why not take advantage of this and use it in a residential application?”

The main structure of the house consists of Inverset panels—concrete slabs produced by the Fort Miller Company, Inc., of Schuylerville, New York—some of them 40 ft (12.2 m) long and weighing more than 20 tons (18.1 metric tons). The panels form the floors and the roof, and immense sections of steel function as beams and columns.

Acting as his own general contractor, Pedini brought his expertise in structural engineering to bear in erecting the frame, which was completed in a mere four days. “It looked rather imposing at first,” he recalls, “all that steel and concrete with these massive footings, huge piers outside of the foundation that go down to rock, which is almost a prerequisite for a house that weighs a million pounds.”

With its 4,300 sq ft (399.5 m), the house boasts wide-open spaces with tall windows, exposed steel beams, and broad surfaces of concrete that strike a modern chord. “One of the things that make this house so interesting is that you can develop interior spaces that are gigantic, because you don’t need interior walls,” adds Pedini, whose wife, Cristina Perez Pedini, p.e., is a water resources engineer. “She designed a water reclamation system for the roof garden, which is one of the other sustainable aspects of the house. We have drains that lead to a manhole below the garage slab, and that water is then pumped back up for irrigation.”

Designed by Single Speed Design, an architecture firm in Cambridge, Massachusetts, Pedini’s house recently won the Next Generation Award from the magazine *Metropolis*, an honor conferred on structural designs intended to improve the environment and advance sustainability. According to Pedini, there are numerous benefits in recognizing a second use for such materials as steel and concrete before the fabrication process. “If you know you’re going to have temporary structures like ramps and bridges that will be used only for a few months, instead of crushing them up and dumping the pieces into a landfill, why not have them precycled and then reuse them for a school or parking garage or public park?” he asks. “You could employ a number of labor-saving devices just by designing connections for assembly and disassembly and then save about eighty percent of your construction cost on that second use. This would be a huge win-win situation.”

Encouraged by these possibilities, Pedini recently formed the affiliate company icon (an auxiliary entity under Jay Cashman, Inc.) to further the viability of precycling. “Wouldn’t it be great if we could implement a national precycling standard that would force people to become more socially conscious and responsible?” he adds. “Even if people had to commit to the precycling of five percent of these kinds of materials, so much could come out of this from an economic and sustainability perspective. And because these materials are so strong the potential for using them is incredible. You could build an elevated park with grass and full-size trees—it’s almost like the materials disappear into the landscape.”