There’s too much concrete in the world to accurately quantify it, though estimates put annual production of the stuff at about 6 billion cubic yards. It’s an alarming situation, to be sure, with potentially devastating environmental effects. Consider that concrete under normal conditions has a lifespan of just 60 to 80 years--meaning that a significant number of the world’s buildings and bridges will have to be upgraded, if not entirely rebuilt, within our lifetimes.

How, exactly, will that be accomplished? Surely not through normal demolition, which would entail untold sums of waste, noise, mess, and expense. The ERO Concrete Recycling Robot, a portable concrete-eating machine, proposes an answer.

Developed by designer Omer Haciomeroglu, the conceptual robot “erases” concrete structures piece meal without any of the waste or dust associated with cut-and-dry demolition methods. It has the ability to separate concrete from rebar and recycle the materials right on-site before cataloging them for reuse.

In order to achieve the most efficient method of demolition, Haciomeroglu writes, “the process had to start with separation on the spot.” The difference lay in transitioning from “brutal pulverizing to smart deconstruction.” The intelligent way, according to Haciomeroglu, is to gradually pick apart the structure from the top down.

That starts with a very enlightened device. The ERO’s design looks like a next-generation Dyson appliance, only larger and built of presumably more durable material. The robot features a highly articulate mechanical arm fitted with a concrete-guzzling head, and a “vacuum” chamber made portable by Dyson-like balls. The latter enable the ERO to nimbly traverse a construction site as it scans the ground in search for optimal entry routes.

A hose plugs right into the base of the ERO, pumping highly pressurized jets of water through the robot’s head that break concrete down into its constituent elements. The aggregate is separated from the cement slurry and filtered; it’s pulverized into pebbles, packaged, labeled, and shipped off to concrete pre-cast stations. The water extracted from the concrete is captured and reused to clean excavated steel rebar of dust and rust.

The goal: “Every bit of the load-bearing structure is [rendered] reusable for new building blocks.” Ambitious, and for an untested design, perhaps overly so. Even so, the potential built into the ERO is huge, and if realized in the “near feature,” as Haciomeroglu predicts, it would prove groundbreaking.

Source: www.fastcodesign.com