Styrofoam Concrete

by **Thinkenstein** on April 15, 2010

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Intro: Styrofoam Concrete

There are many concrete projects, such as benches for sitting and walkway fill, that can be made using light-weight Styrofoam Concrete. By substituting Styrofoam trash for store-bought gravel in the concrete mix, one saves on not only weight, but also on the cost of materials.

To the best of my knowledge, Styrofoam is not a popular material for plastic recyclers. Recycling it at home eliminates transportation costs for this bulky and low-value material.

Many people don't own the property where they live, so maybe the incentive to build a castle for the owner over time is not there. Instead of filling our dumps with this stuff, we could be building cities out of it, if we were motivated enough.

I live on an island, and our dumps are filling up fast. Taking waste and finding constructive uses for it is the best way to gracefully live with all the trash we generate.

Styrofoam concrete probably has good thermal insulation, compared to rock concrete. It might be a useful construction material in both hot and cold climates.

step 1: An early experiment

This is a porous block of Styrofoam and cement. By filing blocks of Styrofoam with special tool I made using lots of roofing tacks, I was able to make a supply of pea size particles.

Using a soupy cement and water mix, I got the particles wet with the minimum amount of the mix needed to keep them stuck together. By using the minimum amount of cement, the air space between the particles is not completely filled and the block is porous. The block is fairly light weight. It's strength is not what solid concrete would be, but sometimes the light mix is just fine for the job.

I don't know what kind of uses this combination might have, but its porosity is interesting. Perhaps, it could be a filter for air or water.

Image Notes
1. A heat-formed PVC pipe handle.

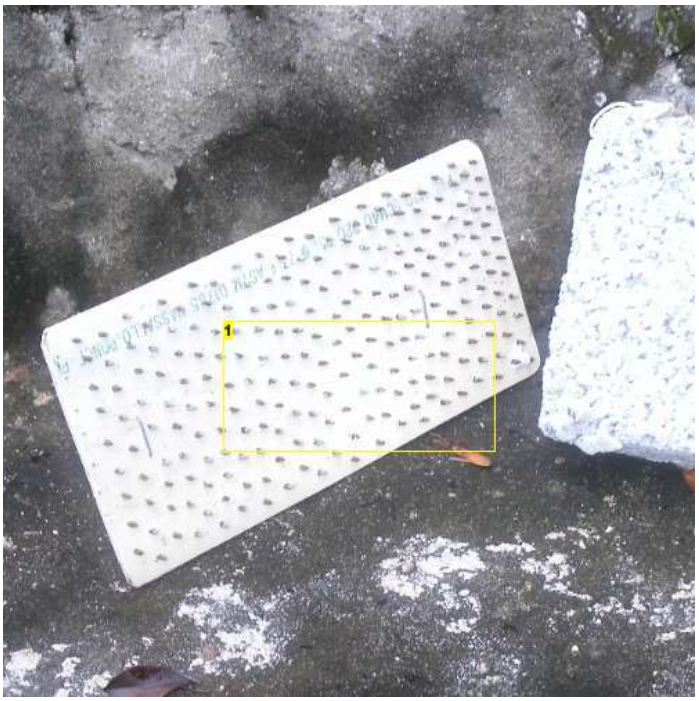

Image Notes
1. Lots of roofing tacks sticking through the rasping tool.

Image Notes
1. Water poured on top of the block passes through and rains out the bottom.

step 2: Another experiment

This experiment uses a regular mix of sand, cement and water, and the porosity between the gravel-size particles is saturated with the mix. The resulting concrete is stronger than the earlier experiment, but also heavier.

step 3: Chunking up scrap Styrofoam

The city's recycling department used to save me sacks of Styrofoam packing material that people threw in the trash. I made a hand-powered machine kind of like a tree limb chipper to rip it into smaller pieces.

Basically, it had a hand crank at the end of a pipe shaft. The shaft had some pretty wicked iron claws welded to it that dug into the foam that was fed into the machine. The teeth went between parallel sections of rebar, which formed a comb-like grate in the floor of the bin. The foam, caught between the claw teeth and the rebar got ripped to shreds and fell through the rebar grate to be caught in sacks below.

Although I no longer have the complete machine, you can see what the claw shaft is like, and what is left of the wood hopper.

Image Notes
1. Wicked claw.

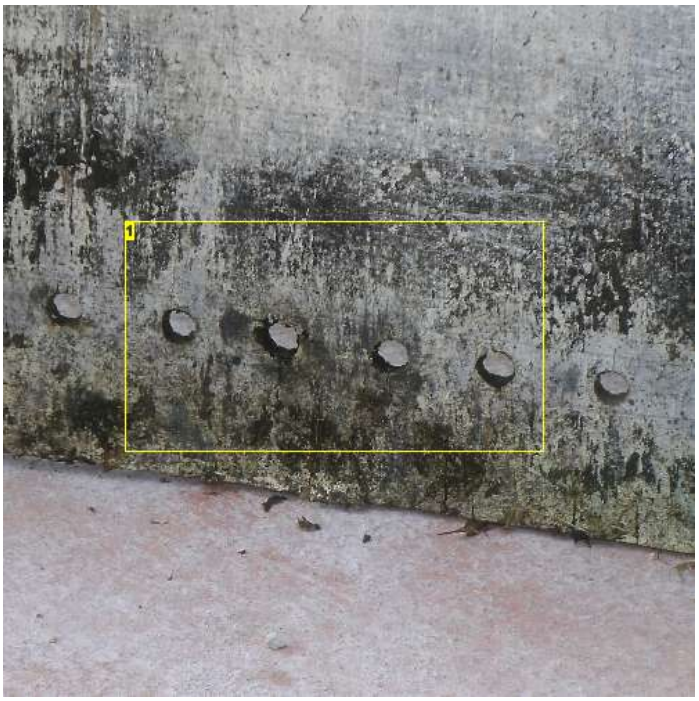

Image Notes
1. Holes for the rebar that makes the comb grate at the bottom.

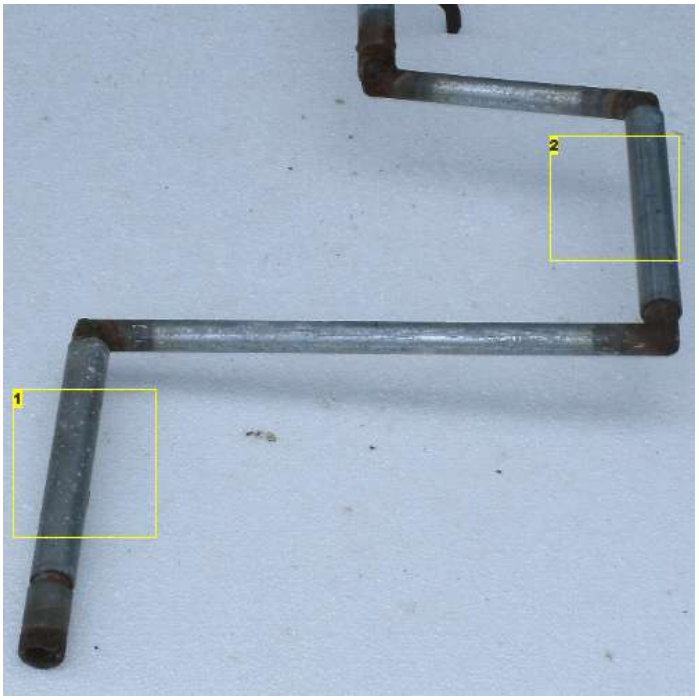

Image Notes
1. Loose pipe section protects the hands as the crank turns.
2. Loose pipe section.

Image Notes
1. This is the hopper the big chunks of foam go into. They get broken up and fall through the rebar grate into collection sacks.

Image Notes
1. Slot fits over the crank shaft.
2. Holes for the rebar that makes the comb grate at the bottom.

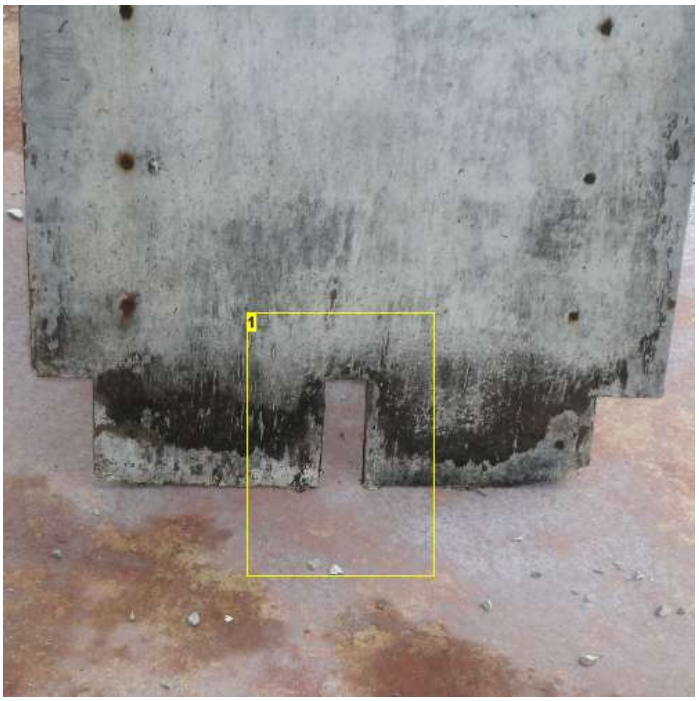

Image Notes
1. Slot fits over the crank shaft.

step 4: Bench seat

This bench is made of Styrofoam concrete. I used mostly Styrofoam packing peanuts to make it. As the cement was hardening up, I found I was able to carve it easily with a sharp machete.

"The "rocks" on either side of it are hollow "Trash Rocks", filled with some of my unrecyclable trash from years ago. See my other instructable on trash rocks here: http://www.instructables.com/id/TRASH-ROCKS-Eliminate-Unrecyclable-Trash

step 5: Sculpture uses

Styrofoam in the cores of cement sculptures helps cut down on the weight a lot.

This is a statue of my neighbor, Bartolo, emptying his coffee picking basket into a sack. I donated it to the town many years ago and it is located near the plaza. The armature is PVC pipe. The rest is a combination of materials, but Styrofoam is a big part of it. The reduced weight of this life-size cement sculpture allowed Bartolo, himself, to carry it quite a long distance from my house out to the road (just the figure, not the rock-like base, which was made on location).

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