

Are ecobricks the answer to plastic pollution?

July 25 2019, by Schalk Mouton



A student in Bontoc, Northern Philippines proudly holds his Ecobricks. Credit: Photo taken by Josephine Chan and Ian Christie. Creative Commons Attribution 4.0 International

The use of single-use plastics in households has become a pariah. Many people are trying to reduce the use of single-use plastics or to recycle them. One such innovation is creating "ecobricks"—filling empty two-litre plastic bottles with single-use plastics over time—and delivering these to collection points for use in constructing low-cost houses. Schalk Mouton asks Professor Herman Potgieter, the Head of the School of Chemical and Metallurgical Engineering, if ecobricks are really a good idea.

How to make Ecobricks

Take an empty two-litre [plastic bottle](#). Fill it with all your [single-use plastics](#) over time. Make sure to compact the plastics properly. When full, deliver at a collection spot. These "ecobricks" will then be used to build low-cost houses.

Professor Herman Potgieter answers questions about whether the planet's plastic trash tsunami can be stopped.

Are these plastic-based ecobricks safe for the environment?

As long as the plastic keeps its original form, yes. However, plastics are not biodegradable and all plastics—no matter what form or shape they are in—are made up of small, granular pieces that are between 5 to 10 micron (0.005 to 0.01 mm) large, and will eventually break down to that size. Most plastics are also sensitive to ultraviolet light and will break down when exposed to the sun. So no, plastic is not an ideal building material.

What happens to plastics when they break down over a number of years?

Plastics take very long to break down and they usually don't break down into liquid form but as smaller solids, called micro-plastics. Nobody really knows how long it takes for plastic to break down into its chemical compounds—it could be hundreds or thousands of years. Micro-plastics can cause tremendous environmental problems.

How do these plastics affect the environment in the long-run?

Plastics have a devastating effect on the fauna of the planet's oceans. These small plastic particles can cause havoc for animals such as whales and fish. In one instance, a dead fish was found with 22kg of plastic in its stomach.

Can chemicals result from plastic breaking down affect human, animal or plant health?

Not really, but plastics and micro-plastics of any size can pose a threat to living organisms. In the sea, they can block whales' digestive tracts, entangle sea turtles, and affect the photosynthesis of algae. They're also a problem in rivers and fresh water lakes. It could be that when you drink water out of a [plastic bottle](#), you are ingesting micro-plastics. Nobody really knows what the consequences are for the health of the consumer. It's best to take no chances—don't drink out of plastic bottles. Micro-plastics and microbeads (in various commercial products such as facewash and tooth paste) can be hazardous in the long term and microbeads have been banned in various products.

What is a better way to dispose of plastics in an environmentally friendly manner?

Ecobricks are an example of low-grade recycling, which is better than no recycling. High-grade recycling refers to recycling of the same product,

that is, recycling plastic bottles to be reused as plastic bottles. Another solution is to make products from biodegradable bioplastics. Yet another solution is just not to use plastic products where there are alternatives. At the Wits School of Chemical and Metallurgical Engineering, we are researching ways to break plastics down—through the process of *pyrolysis*—into its original forms, such as liquid carbohydrates and oils. We can then use these products in generating energy for [industrial processes](#). Through these processes, we can add much more value to the recycling of plastics in generating energy, which can lead to job creation, rather than merely using them in low-tech, low-cost recycling practices such as ecobricks.

Overall, is the idea of building houses with plastic bottles a good idea?

There are better ways to dispose of plastics, or to recycle them. If you use these plastic bottles as "bricks," you have to use something to bind them together. If you use normal cement, it has a quite a high pH of 12.5 (alkaline), so there is a possibility that there can be an interaction between the plastic and the cement, which can affect the structural integrity of the building. Plastics are also highly flammable. If a house built with plastic bottles catches fire, it will burn out of control, releasing highly toxic gasses such as dioxins, furans, mercury and polychlorinated biphenyls into the atmosphere. Further, burning of poly vinyl chloride liberates hazardous halogens and pollutes the air, the impact of which is climate change.

Provided by Wits University

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