

IDEAS TO CREATE CITIES OF THE FUTURE

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As the world population grows, the urban population also grows, so much so that it is expected that by 2050 it will reach 70% of the world population. Cities continue to attract millions of people around the world annually. Therefore, by bringing together more and more population, it is necessary to create the cities of the future, based on sustainability. A truly sustainable city of the future does not differentiate between resources and waste. What's more, they understand waste as an opportunity, a starting point for something new. Lately, various ideas and initiatives have emerged on how we could build urban environments using waste. Next, we will analyze three of these trends.

1. Urban mining

The cities are gradually becoming the mines of the future, while the traditional mines are depleted. The natural resources necessary for the production of construction materials, such as sand and gravel, are increasingly scarce, although we can find them in huge piles in our urban environment.

The technology for recycling copper has evolved enormously over the last decades and specialized companies are already capable of recovering the metallic waste from old electrical cables.

In addition, Professor Thomas Graedel, from the Yale School of Forestry and Environmental Science, points out that these buildings built from recycled materials not only take advantage of those recycled materials, but also help save a lot of energy, which is necessary to exploit mines of new raw materials.

The reuse of aluminium, for example, requires only 5% of the energy originally required for its production. Aluminum is widely used in buildings, but these are periodically remodeled and rebuilt, thus freeing up the aluminum for further recycling.

2. Conversion of waste into construction materials

At the Design Academy in Eindhoven, Tom van Soest, co-founder of StoneCycling, developed a method for pulverizing recycled building materials from demolition sites to create a new type of stone which can be turned into products such as surface materials and tiles.

We continue in the Netherlands, where the designer Mieke Meijer and the Vij5 design studio have created NewspaperWood, which, as its name suggests, is a wood-like material made from recycled newspapers.

Other producers, such as the American company ReWall, have developed a material made 100% from reused crushed beverage cartons (in a process that does not use water). Initially, the recycled material was intended for interior wall cladding, but when pressed together it can function as a structural building material.

Other materials have been designed anticipating a second use as a construction material. Alfred Heineken, owner of the famous brewery, designed the so-called "world bottle" with the architect John Habraken in the 1960s. The glass bottle was box-shaped, and once its contents were emptied, it could be used as a brick. However, this project failed, due to the belief that it would not be well received by consumers.

In this same line, based on a similar concept, we highlight the United Bottle project. The plastic bottles fit together, forming a piece similar to a brick, valid for construction. It is a marketing oriented idea.

3. Experiment with biological materials

The possibilities can be further expanded if we redefine waste as everything that is totally useless or superfluous, and not as we have defined it up to now. There are many materials that a priori may seem useless and even disgusting, but in reality they are not. These include biological materials

derived from bacteria or fungi.

Henk Jonkers, from Delft University of Technology, has developed a process that mixes bacteria and nutrients to create self-healing concrete. Concrete can easily break under a lot of pressure, but by incorporating calcite bacteria into a traditional concrete mix, small cracks can be closed.

In New York, Ecovative is developing materials made from agricultural by-products and mycelium from fungi. The mycelium, once its growth process is interrupted by lack of light and heat, turns into strong materials with structural parameters comparable to stone and concrete. This material was first used as a structural building component in the summer of 2014 in a collaboration between Ecovative and The Living, a New York architectural firm.

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