

## Something in an Average between Living and Non-Living

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These considerations are an evolution of the technology proposed in: <https://actascientific.com/ASMI/pdf/ASMI-04-0908.pdf>

Everything in nature is interconnected, for billions of years after the formation of the planet, all substances, plants, living beings appeared and developed in the interaction of various transformations and cycles.

The emergence and development of industrialization began to affect the circulation of chemical elements. Each of them and their combinations, after use, changes its state, structure, appearance. All items that are created in factories are used by humans and then become garbage. After using some products, substances can be converted into others. For example, glass and metals, paper, plastic are melted down to make other products, food waste and organic compounds are composted. However, collection and reuse processes require significant costs and effort. 90% of all waste goes to landfills and landfills. Only developed countries, such as Japan, Sweden, recycle all waste and do not have landfills. In underdeveloped countries, landfill areas are increasing day by day. Large volumes of waste during storage for a long time create an unprecedented problem for nature - a new phenomenon.

Considering all these processes in dynamics, one can notice that a landfill or landfill has some signs of a living organism. Nature seeks, as quickly as possible, to return all used substances to its natural circulation. Everything quickly decomposes, turning into dust, dust, compost. All of this is organic. Food waste, wood products, paper, manure. Almost every single item thrown on the ground decomposes fairly quickly.

When all this is collected in multi-meter layers together food and organic waste with products made of plastic, glass, rubber, other items made by mankind and mixed nature cannot solve such a problem. Combining with air and water, landfill gas, methane, carbon, poisonous liquid, compost are formed. With a lack of air, the waste begins to burn and emit smoke, stench, and heat.

Like a diseased organ of a living being, inflammation occurs - an abscess. The facts of numerous fires of large piles of garbage indicate that the temperature in the sources of fire reaches 230 degrees Celsius. This is the ignition temperature of paper - the closest material to ignition in waste.

A simple thought arises: to combine all these processes into a single system, arrange the waste in such a way that it is possible to take control and management of each of the transformations without special costs and remove useful substances and components. From this perspective, the most significant elements from recycled waste are methane gas, heat and fertilizers. All of them can be useful for energy production and crop production. Only from the disposal of these components will the anthropogenic impact on the atmosphere and soil decrease.

But what if we create such a technology? A waste treatment device for the city, which is a cylinder with a diameter of 50, 100, or more meters, a height of 50, 100, 200 meters. A freight elevator or other lifting mechanism is installed at the very top. All garbage from the city rises up and is dumped into this cylinder. The advantage should be for organics - food waste, paper, rags, wood, manure. Various processes take place along the entire height of the cylinder. The top layer begins to release gases. They can be caught with perforated pipes suspended vertically. A vacuum is created in them, gases are sucked out, methane is separated and burned in the furnaces of thermal power plants.

All layers gradually and continuously mixing, descend down, replacing the unloaded finished compost.

The second zone in height from the top is the zone of pyrolysis or combustion. The mass pressed by its own weight without air releases heat up to the ignition temperature - this is 230 degrees Celsius. Inside this mass, pipes are installed in which water passes to remove heat. The moving water heats up and stabilizes the temperature of the mass before it ignites. And the water in the pipes turns into steam, which can turn the turbines of electric generators, carry heat to heat housing, for hot water supply.

After the temperature decreases, the mass falls even lower into the third zone. Air, water are supplied here, the temperature drops to a level sufficient for microbes and bacteria. The mass is treated with bacteria, worms and turns into compost.

All these operations follow as you go down, passing through all the stages shown.

Additionally, you can create a process for manufacturing products from thin-walled pipes, inside which plastic is sintered with glass and other indigestible material. For this, double coaxial pipes are installed - with a large cross section, and inside their thin-walled pipes of a smaller cross section, into which plastic and other small inorganic wastes are thrown. When heated up to 150- 200 degrees, plastic melts and envelops glass and other medium-sized objects thrown there from above. Pipes filled with hardened plastic are taken out, cut and used in construction, for example, as supports and poles. Can be square or any other section. Cut into segments, they can become bricks for laying walls, for many other construction tasks.

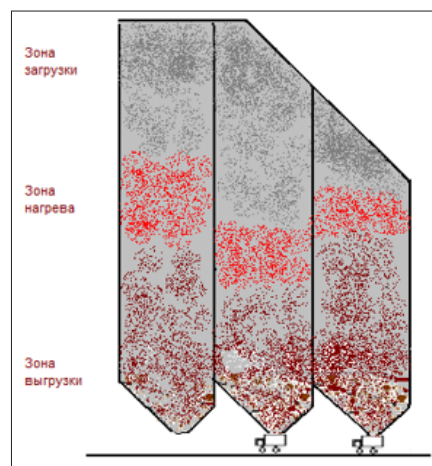
All these processes with the output of hot water or steam, gases and liquids, compost can be combined into a single technological line with control and management.

The mass of waste is continuously mixed and falls down under the action of gravity at speeds corresponding to the mass, size and shape of the individual waste elements. Heating and composting zones are determined by the quality of the waste and the conditions created. Fecal water supply seems to be the most rational. All processes are controlled and automated. The pressure of the array and its friability can be additionally controlled by changing the flow area or its shape. The heights of the zones of action of all these transformations and the speed of movement are determined by the composition of the waste, the quality, the ratios of the components, are determined empirically and are regulated by heat removal, air and water supply.

Below, automated vibrating sieves are installed, the finished compost is unloaded and transported to the fields. After such exposure, almost nothing remains of any product. What remains on the sieves - glass and metal - is sent for remelting; everything else, including the remains of plastic and polyethylene, is returned for re-processing - into the pipe of building materials.

The essence of the technical solution lies in the fact that all garbage without prior sorting is placed in a single collection. Plastic products - bags, dishes, glass - into a thin-walled pipe for building materials. The flow rate is controlled by the rate of compost formation.

Experimental - design and research developments of the project should lead to the creation of a completely new engineering structure. Perhaps from cylindrical towers, with a diameter of 5 meters or more, set in a circle, forming an extra-large cavity inside the circle with a height of 20-200 meters or more. The height and dimensions are determined by the volume of waste, experimentally and the required processing speed. Inside the towers and between them, different personal cycle processes can be carried out. The top covering of a single design - can be made in the form of a mountain with a variable height - is combined for various purposes of various types. For example, under recreation areas with observation platforms, under greenhouses. Structurally, you can use the height of the structure to design inclined surfaces for ski slopes.



The recycling scheme shows the current mechanism for recycling household waste.

Such a gravitational bioreactor can collect waste from the entire city and transport waste from existing landfills and landfills. Pre-sorting and separation of different types can be reduced. Most of the waste should be organic. The experience of waste disposal in this way, the content of the components, management will accumulate and increase efficiency.

Such smaller-scale devices seem rational and promising. Indeed, if you look at catering establishments - restaurants, canteens, sanatoriums from this point of view, you can see that waste is sent to the trash. At each of these enterprises, it is possible to create a device of a smaller volume, for example, a cylinder from standard barrels without a bottom and a lid, delivered and strengthened in the form of a single cavity of 5-10 meters. Insulate outside and lay pipes over the entire height to trap heat and gas. Use heat and gas for space heating and water heating, and scatter the compost in flower beds and sell it.

If we further reduce the scale, then the principle is applicable to individual private houses and cottages.

Thus, as a result of the reduction of areas under landfills, the process of converting waste into useful substances is accelerated, and this leads to the return to nature of the cycle of substances, on which the climate and the future of our descendants and all life on the planet depend.

To restore the natural circulation of substances means to preserve the climate.

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