

# Construction waste for road filling

By Zaifara Yakshigildina

## For Habitat for Humanity Challenge

Roads made of secondary rubble, as a rule, are laid either to temporary habitats. or these are secondary roads with low traffic. Such roads lead to mining sites, mines, oil rigs, and hard-to-reach areas .Such road surfaces are not advisable to build from expensive materials, they have applications in cities, on intercity highways. In cases where we are talking about temporary roads, it is necessary to choose a suitable inexpensive material, which we will discuss below. For secondary temporary road surfaces, it is advisable to use secondary construction materials :secondary crushed stone ,concrete rubble, concrete slabs, asphalt chips, broken crushed bricks. Secondary materials have worse physical properties without loss of strength, but gain in price.Secondary building rubble has long been defined as a separate group of low-cost building materials. Large construction holdings and enterprises do not get rid of broken construction debris after the demolition of buildings and premises. Such waste is processed independently, crushed. they are cleared and sent back to work. Customers do not always need new expensive materials, so the demand for secondary crushed stone is quThe rubble of bricks is formed during the dismantling of old buildings, which are usually broken with a mechanical hammer. Brick scrap is obtained in the production of bricks, which are then sold at a large discount. The resulting material is used for various purposes, one of which is the repair or filling of roads, this is especially true for suburban country roads, with holes and mud in bad weather. Before filling the temporary road, it is advisable to crush the brick rubble with special mechanisms, so that the size of the fragments is approximately the same.

What is the advantage of such a material? The brick has clay in its composition, which perfectly absorbs moisture. In the soil, crushed broken bricks perfectly grasp with wet soil, water does not stagnate in it, the surface is rough, on which the wheels of cars will not slip. The priority is to fight the silicate white brick, it is more resistant to various destructions. The layer of broken bricks should be provided in advance, in different cases it may be different. If this is the entrance to the construction site, where heavy trucks will move, then the thickness of the brick filling from the rubble should be accordingly. If we are talking about a suburban area where cars will drive, then the thickness of the crushed brick may be less.ite high. Reinforced concrete waste after the destruction of various buildings has a large size, unsuitable for use due to its size. They are further crushed by special mechanisms to achieve relatively identical sizes. They are often mixed with construction debris, bricks, and earth. Therefore, without additional cleaning, it is not suitable for use, the price of such a concrete rubble is low.

Recycling of concrete is its processing, cleaning, crushing into a homogeneous fraction and further implementation. Simply put, materials are given a second life, a second chance to serve people. The final product is concrete crushed stone, which has high strength and hygroscopicity characteristics. Crushed concrete can be used for further laying of asphalt on it. Secondary crushed stone

This definition refers to a set of certain building materials that have been used, such as brick chips, concrete rubble, waste rubble, asphalt.Such a set is often the best option with a small budget for a temporary road.

Secondary crushed stone

Places of application

Recycled crushed stone has a number of places where it is successfully used:

construction of roads with low loads,

concrete aggregate,

drainage systems, strengthening of mobile soils, filling of factory and warehouse floors, production of concrete products. A temporary road made of cheap secondary rubble is made according to a well-developed scheme:

remove the top soil,

fill the lower roadbed with large crushed

stone, ram the laid crushed stone for strength and smooth roadbed,

lay a small fraction of secondary crushed

stone is finally rammed and put into operation.

Provided that the temporary roadbed will not be driven by heavy cargo vehicles, the installation procedure can be simplified. Also, such a road does not have to be rammed with a roller, you can drive along it with ordinary dump trucks.

If this is a country road, for passenger cars, you can use a medium and small fraction of secondary crushed stone.

#### Selection of secondary crushed stone fraction

If the road leads to construction sites, heavy trucks will move along it, without a large fraction of 40-70 mm can not do. Such crushed stone must be laid in the form of the first layer on the base, on top of the rammed, rasklinit smaller – 10-20, 5-10 mm fraction. Otherwise, there will be a rut, there will be slush in it – water and mud, where the equipment will slip. Good results are shown by laying asphalt crumbs on top of crushed stone. It fills all the voids, giving the road the status of a monolithic road. If possible, it is desirable to make the roadbed gable, this will allow the water to roll to the sides, without accumulating directly on the road. In the world, the processing of construction waste is mainly carried out by two methods. The first method involves the recycling of garbage from the construction site at the site of its occurrence. To do this, the necessary equipment is installed on the construction site, which turns the garbage into a clean fractional product. But this method has one significant disadvantage. Waste has to be processed in a residential area, and this requires special environmental protection measures. In addition, the placement of equipment in the residential area completely eliminates the possibility of its round-the-clock operation. The second method is based on the recycling of garbage from construction sites on specially designed complexes. This method also has a number of advantages and disadvantages. Stationary complex Stationary waste recycling complexes allow you to process large amounts of construction waste. They can recycle garbage regardless of its composition. As a result, construction waste is recycled, and secondary crushed stone is obtained. Associated materials, such as plastic or polyethylene, are also extracted. In the process of recycling, garbage goes through several stages. At first, all the imported waste passes through the conveyor, where it is manually sorted and some materials are separated. Then the waste is collected in a hammer-type crusher, where a magnet is installed, which selects all metal inclusions from the garbage. This is followed by several more waste processing units, which bring them to the smallest fraction. From it, commercial concrete is obtained,

which is used as recycled construction waste for roads. Mobile jaw plants Despite the fact that stationary waste recycling plants have high productivity, mobile recycling plants are more efficient. They can be used at the construction site, no garbage collection is required. One of these installations is a mobile jaw unit. Its two surfaces are called cheeks. One surface is stationary, the other rotates and moves up and down. A piece of concrete clamped between the surfaces experiences pressure, as a result of which it collapses into rubble of different sizes. The fraction size can be adjusted by the distance between the surfaces. Mobile cone installations The principle of operation of mobile cone installations is similar to jaw installations with the only difference — the crushing of construction debris occurs between the two walls of the cones. The waste enters the upper part between the cones and is crushed as a result of their rotation. When properly loaded, it is possible to grind not only as a result of the rotation of the cones, but also as a result of the friction. Rotary installations The main parts of such an installation are the rotor with the bits mounted on it. The rotor rotates at high speed. As a result, the pieces of garbage thrown by the beeps hit the special plates located inside the device. Hitting them, the solid debris breaks up into smaller pieces. To obtain a finer fraction, installations with multiple rotors and reflective plates are used. Hammer and impact-centrifugal crushers The principle of operation of processing devices of this type is based on the rotation of special hammers at high speed. As a result, the material is crushed by hitting it with hammers. More efficient grinding takes place on impact-centrifugal crushers. The principle of their operation is similar to hammer crushers. The only difference is that the pieces of garbage under the action of centrifugal force fly off and hit the special plates. On such processing equipment, it is possible to obtain a fine fraction of concrete and crushed stone. Rotary installations The main parts of such an installation are the rotor with the bits mounted on it. The rotor rotates at high speed. As a result, the pieces of garbage thrown by the beeps hit the special plates located inside the device. Hitting them, the solid debris breaks up into smaller pieces. To obtain a finer fraction, installations with multiple rotors and reflective plates are used. Hammer and impact-centrifugal crushers The principle of operation of processing devices of this type is based on the rotation of special hammers at high speed. As a result, the material is crushed by hitting it with hammers. More efficient grinding takes place on impact-centrifugal crushers. The principle of their operation is similar to hammer crushers. The only difference is that the pieces of garbage under the action of centrifugal force fly off and hit the special plates. On such processing equipment, it is possible to obtain a fine fraction of concrete and crushed stone. In order to obtain fine-grained debris, it is recommended to use roller units. According to the principle of their work, they are similar to a rotary crusher. In their design, there are two rotors that rotate towards each other. Between them, the garbage is filled in. For better grinding, the rotors can be equipped with spikes. This ensures garbage collection and more efficient operation of the installation. Vibrating screens The main part in the design of the vibrating screen are sieves, which have different sizes of holes. This allows you to sort construction debris by size. Usually such installations are used in crushing and screening plants. Self-propelled crushing plants All the previously considered plants were stationary. They are transported by transport to the site and installed for recycling. But along with such devices, self-propelled crushing plants are also used. They have a number of advantages over stationary and mobile shredders. They can be used in the most inaccessible places and swampy areas, as the crusher is installed on the tracks, which exerts less pressure on the ground. A significant disadvantage of self-propelled crushing plants is their low productivity. Recycling of waste When processing construction waste, the question arises about the feasibility of such a process. But the answer to this question is unequivocal. This is cost-effective, and the use of recycled construction waste has a positive impact on the environment. The scope of application of such waste is very wide. It can be used to fill swamps, ditches, and temporary roads with construction debris. It is also possible to reuse metal parts of buildings.





Various Capacity Stone Crusher Plant







Construction debris, which is proposed to be used to fill up roads, once served as a human home and was not considered dangerous. Construction waste can



be used for road construction, which means that the area of waste from construction dumps will be reduced !

It is possible to make rings with perforations for sewerage from crushed construction debris.



Method of installation of the treatment plant

To build a septic tank from the rings, you need to purchase all the necessary materials. Immediately you need to buy nine rings of concrete for the construction of three sewer compartments.

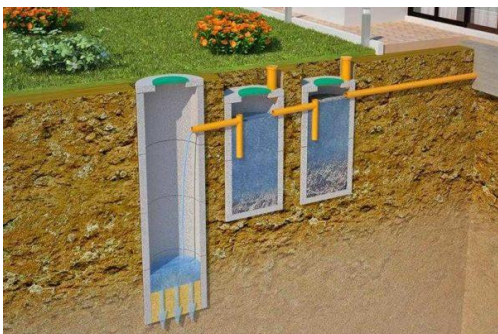
Next, in one rad, you need to dig three wells, while the depth of each should be three meters, and the diameter of 2.8 meters. Experts recommend digging ditches together. One person will perform land work, and the second bucket and a rope tied to it will lift the earth to the top.

After such actions, at the bottom of the first two recesses, you need to make a pillow of concrete.

Now you can start installing a treatment plant made of concrete rings. They need to be placed one on top of the other with the help of lifting equipment.

The gaps formed at the joints of the rings must be filled with glass in the liquid state.

If you get a certain distance between the walls of the structure and the walls of the pit, then you need to fill it with soil.



And also from the crushed construction debris, you can make blocks for the foundation.

A good alternative to a monolithic foundation is a foundation made of blocks-special reinforced concrete

products such as FBS. It belongs to the category of prefabricated structures, but in compliance with the technology of the device, the technical and operational characteristics are not inferior to solid cast ones. Its main advantages, due to which it is in great demand among developers – are the speed of installation and lower cost compared to monolithic concrete structures.



Speed of installation-the installation of reinforced concrete products is carried out by crane, which significantly speeds up the construction process. The minimum time for solidification of the solution – even when installing an armopoyas on top of the base, construction work can continue after 1-2 weeks (depending on weather conditions). When pouring a monolithic foundation, you need to wait at least 28 days, which are necessary for the concrete to gain the design strength. Lower cost compared to similar structural features of monolithic reinforced concrete structures. The presence of mounting loops and grooves eliminates any difficulties with the installation of blocks. Long service life - in compliance with the installation technology for at least 100 years.

From construction debris, you can make very cheap and beautiful long-lasting fences.

The most common fillers are crushed stone, pebbles and even large stones. However, there are also original solutions, when steel baskets are filled with construction "garbage"



or wooden saws.



What to do with concrete and reinforced concrete waste, which is increasingly clogging up huge areas? This question is of interest to many specialists and ordinary citizens. Currently, such a direction of



combating this phenomenon as concrete recycling is gaining popularity, which allows not only to dispose of waste, but also to use it again. Why do you need to recycle W/W waste?

Recycling is the processing of concrete waste with the possibility of their secondary use. For its organization, you will have to incur certain costs, but they pay off at the expense of:

Disposal of all accumulated waste in previous years.

Exceptions to the significant costs of transporting garbage to landfills that may be located far enough away.

Improving the efficiency of concrete mixing equipment due to timely and complete cleaning of the walls.

Exceptions to fines for environmental violations.

In addition, the recycled material obtained after processing can be used by themselves or sold to other organizations and individuals. Secondary raw materials help to reduce the profitability of the new concrete mortar, due to its use as a filler.

The secondary raw materials obtained after recycling can be used as follows:

laying a pillow under the foundation or floor;

formation of the base for concrete or asphalt pavement during road construction;

when preparing concrete with a strength of 10-20 MPa;

for the manufacture of various concrete and reinforced concrete products;

formation of a covering of temporary roads, replacement of a ground, alignment of platforms;

filling of pedestrian paths, garden paths;

covering of parking areas for vehicles;

when decorating suburban areas, landscape design.

Thank you very much, dear Sirs ! Thank you for your patience, I hope you liked my idea-saving on the face than digging the ground to get sand ,clay, stones-it is better to recycle construction debris and use it a second time.I wish you a good mood sea of smiles ocean of happiness and good health !!!