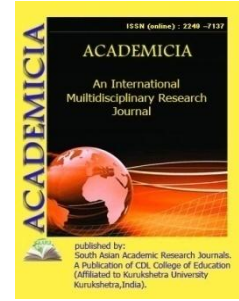




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RECYCLING OF OLD ASPHALT CONCRETE

Karimov Ravshan Xikmatullaevich*; **Botirov Alisher Akxmadjonovich****;
Ohunjonov Zukhriddin Nosirjonovich***;

*Teacher of the department, "Drawing geometry and engineering graphics",
 Fergana polytechnic institute, UZBEKISTAN
 Email id: ravshankarimov19720505@gmail.com

** Teacher of the department, "Drawing geometry and engineering graphics",
 Fergana Polytechnic Institute, UZBEKISTAN
 Email id: botirov.alisher@gmail.com

*** Teacher of the Department, "Drawing geometry and engineering graphics",
 Fergana polytechnic institute, UZBEKISTAN
 Email id: zuhridin12345ohunjonov@gmail.com

ABSTRACT

This article is about the optimal ways to recycle old asphalt concrete. The advantages of recycling old asphalt concrete are material savings, labor, energy and equipment savings. Currently, the roads are being reconstructed, which increases the demand for recycling old asphalt concrete.

KEYWORDS: *Asphalt Concrete, Energy, Resource, Sand, Gravel, Grader, Crusher, Pile, Plasticizer, Coating, Bitumen, Drum, Mixer.*

INTRODUCTION

In recent years, asphalt concrete obtained from the surfaces of obsolete road surface is widely used in Russia. This in turn has the following advantages;

1. Material savings.
2. Energy saving.
3. Recycling of old asphalt.

Two types of equipment are used to restore the old asphalt concrete:

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1 Asphalt concrete structures available with additional equipment

2 Special devices

The increase in the volume of repair work requires a significant reduction in their importance at the expense of the organization of resource-saving technologies, including the processing and recycling of old asphalt concrete in ABZ.

Regeneration of old asphalt concrete in ABZ allows:

Use of all old asphalt concrete on the road;

Extensive use of additives of stone, bitumen materials and plasticizers during regeneration. This converts the given ready mix and the energy in road construction corresponds to the traffic intensity of the road to save material resources.

The plant uses old asphalt concrete obtained by milling or crushing using bulldozers, graders or other machines for processing. In the latter case, in the preparation of a coarse-grained mixture, asphalt concrete is crushed by crushing and screening of pieces not exceeding 40 mm. Asphalt concrete with a high bitumen content is purposefully ground at a temperature not exceeding 15-200 ° C. At high temperatures, the material adheres to the crushing additives. In the case of adhesions, the efficiency can be increased by adding up to 30% of mineral materials by periodically cleaning the grinder blades with soapy water.

It is recommended to use immediately crushed asphalt concrete for the preparation of asphalt mixtures. If necessary, the material is stored in piles with a height not exceeding 2 - 3 meters.

A layer of crushed asphalt concrete is covered with sand to prevent baking. From time to time the materials are mixed using an excavator.

The main task of the technological process is to reduce the impact of high-performance processing on the binding properties of old asphalt concrete, as well as to protect the environment from pollution. At the same time, they strive to make the most of the old asphalt concrete in the updated mix.

A cube and drum mixing device is used to obtain the reconstituted asphalt mixture.

In regeneration, the heating of the old asphalt concrete during the regeneration of the asphalt concrete in the mixing device is mainly provided by the heat exchange with the heated mineral.

The advantage of this technology is that the existing mixing devices allow them to be used without re-equipment or with low equipment.

In the second case, measures such as lowering the temperature and installing a screen in front of the drum burner to partially heat the bitumen in the old asphalt concrete from the flame, or installing an additional drying drum to heat the asphalt concrete at lower temperatures than the mineral heating temperature, relative to the heating temperature of new mineral materials.

Periodic effect of asphalt concrete mixer operation (Figure 1)

A) Transfer the old asphalt concrete directly to the mixer.

B) Delivery of old asphalt concrete past the drying drum.

C) Using a double drying drum:

1) old asphalt concrete; 2) new mineral materials; 3) the carrier; 4) drying drum; 5) mixer; 6) bitumen; 7) accumulating bunker;

The old asphalt concrete is delivered directly to the mixer or to the mineral materials that pass through the drum. (Figure 1)

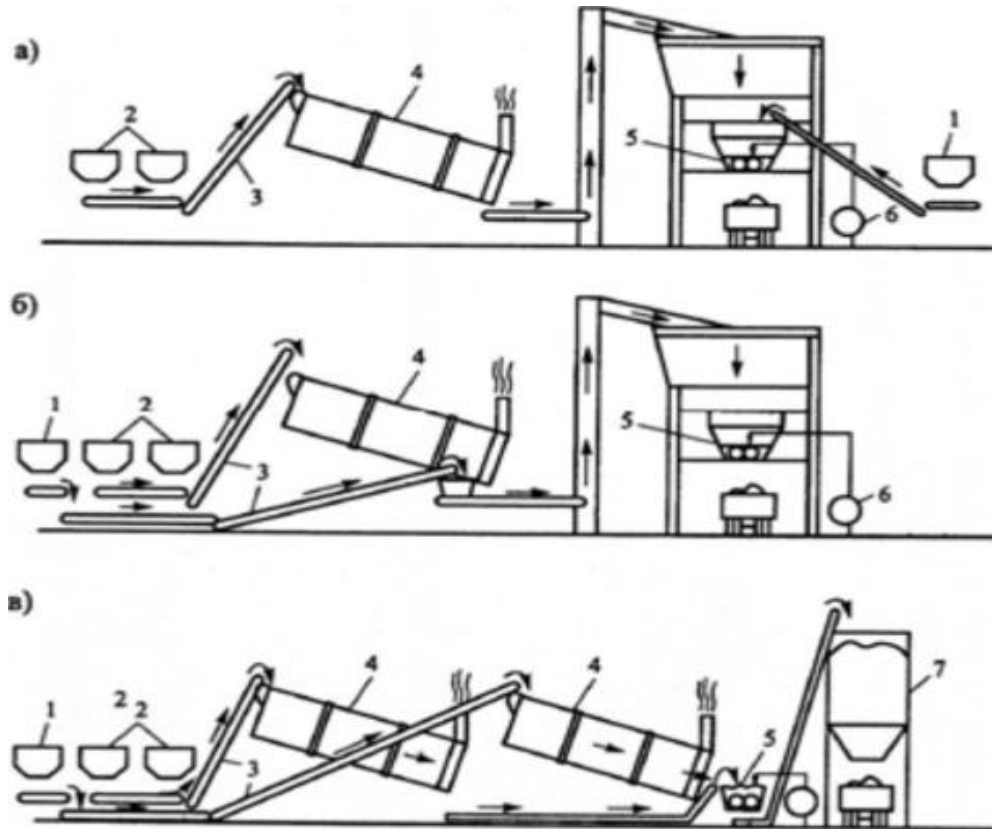


Figure 1

Processing of asphalt concrete in drum mixer devices:

A) With direct heating;

B) With heat dissipation screen;

C) With the delivery of materials in installments;

1. Old asphalt concrete; 2. New mineral materials; 3. Carrier; 4. Drum mixer; 5. Bitumen; 6. Heat dissipation screen; 7. Concentrating bunker; 8. Distribution device;

The DS-154 can be used to process old asphalt concrete as well as to prepare a mixture of new mineral materials. However, the high temperature (600 ° C) inside the mixer in the kiln zone leads to significant changes in the bonding properties in the old asphalt concrete. In this case, additional air pollution occurs and the binders in the old asphalt concrete eliminate overheating.

A slight change in the design of the mixer significantly reduces air pollution and prevents overheating in old asphalt concrete. Such a modification of the mixing device is a protective, heat-conducting screen mixer that prevents the flame from coming into direct contact with the material.

When using this technology, the maximum amount of old materials should not exceed 20-30% depending on the weight of the returned mixture.

The temperature of the mineral materials (sand and gravel) should be approximately 220-260 ° C to ensure the required temperature of the finished regenerated mixture.

The specific value of the heating temperature of new mineral materials is determined by the amount of old asphalt concrete in the regenerated mixture, its required temperature, as well as the moisture content of the old asphalt concrete.

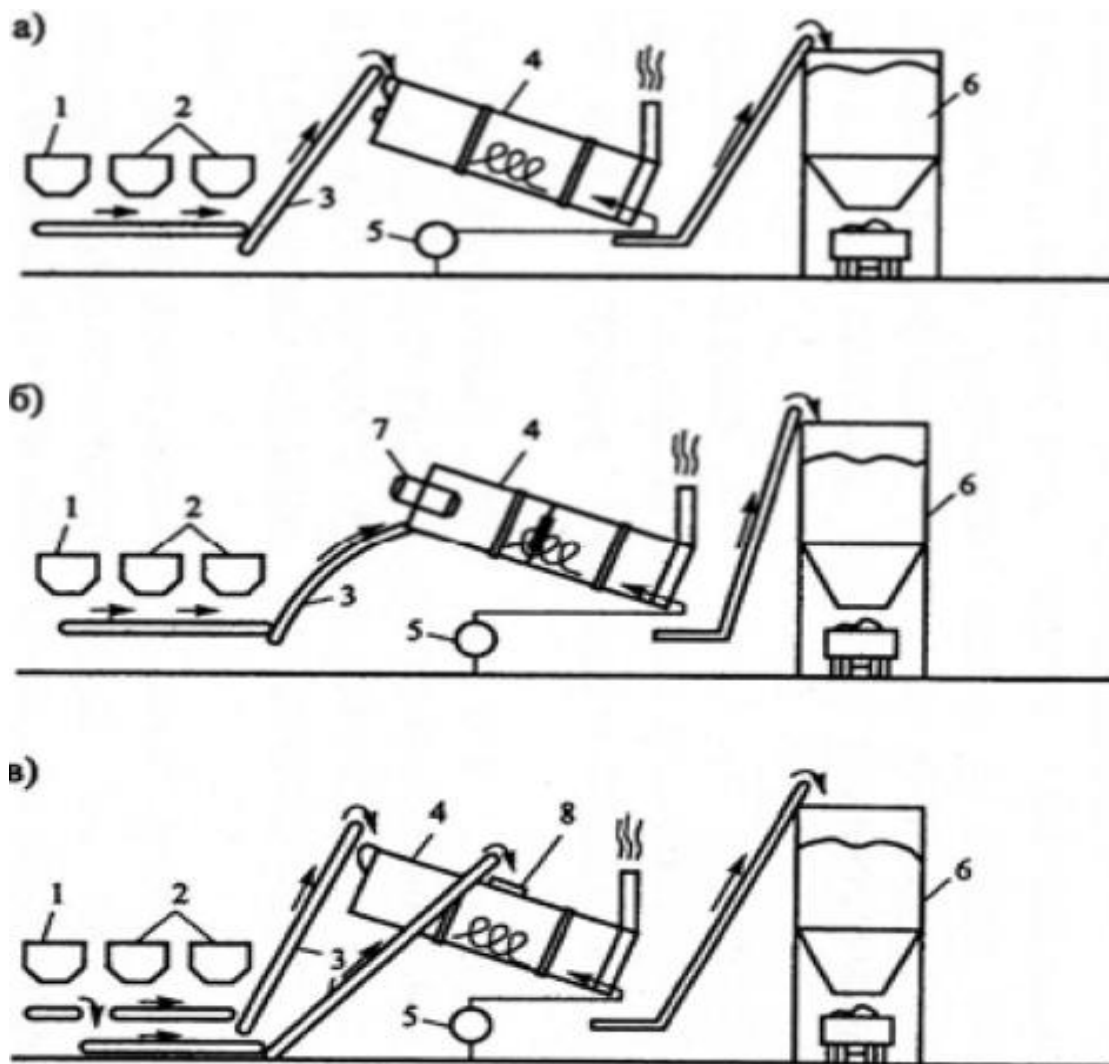


Figure 108

In the processing of asphalt concrete in devices with two drying drums, direct heating of the old and heating of heated stone materials are used in series. (Figure 108)

The temperature inside the 1st drum where the mineral materials are heated is much higher than the temperature inside the 2nd drum used to heat the old asphalt concrete directly. The final heating of the old asphalt concrete is done by heat exchange with the heated mineral materials during mixing.

It is possible to use hot exhaust gases inside the first drum as the cooling water in the second drum, which significantly reduces the energy density of the process, as well as allows the preparation of renewable mixtures up to 70% of old asphalt concrete.

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