MEASURES FOR WATER PROTECTION OF BRIDGES INTERMEDIATE STRUCTURES.

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Annotation: *This article discusses issues such as improving modern waterproofing technologies and materials for waterproofing reinforced concrete bridges and their effective use.*

Key words: *Gidroizol, bitumen, asbestos, cellulose, hydroglass insulation, epoxy, polymerization, Portland cement, quartz sand, andesite or diabazon.*

The concrete of the intermediate device and supports of the bridge is protected from moisture in the environment and leaking water, as a result of which there are no distortions in the concrete, it prevents the reinforcement from rusting.

In modern construction, various materials are used for the construction of bridge structures. For example, metal and steel [1].

The condition of the concrete pavement is affected by external and internal factors. The first type includes chemical, physical and biological effects, that is, surface contact with wind, water currents, chemicals or microorganisms. The second type of factors include the processes occurring in the depth of the material. First of all, we will talk about chemical reactions that occur between certain substances. The more aggressive the substance that has penetrated the material, the more obvious the damage. Corrosion of concrete can be from the atmosphere or can occur in a liquid environment, which is equally dangerous for the integrity of the structure [3].

Hydrophobic cleaning of bridge structures is a complex process that involves stopping traffic on the structure and using heavy equipment.

Let's look at the most common materials and manufacturing companies that are in great demand in modern construction.

Almost all elements of bridges need hydrophobic treatment, but among them, structures in direct contact with the ground are the most vulnerable. These include the back walls of the supports and the back surfaces of the support walls, bent wings and some other elements. For them, the most useful option for waterproofing is bitumen-based coating type materials [5].

It should be noted that bituminous waterproofing in the form of mastics is traditionally used in all climate zones. The hydrophobic layer includes seven layers of materials: four bitumen mastics applied using hot technology and three layers of fiberglass-based material equipped with a reinforcing frame. After that, the final finishing layer consisting of bitumen mastic is distributed on the surface and a layer of sand-cement mixture or finely dispersed concrete is laid on top of it [2].

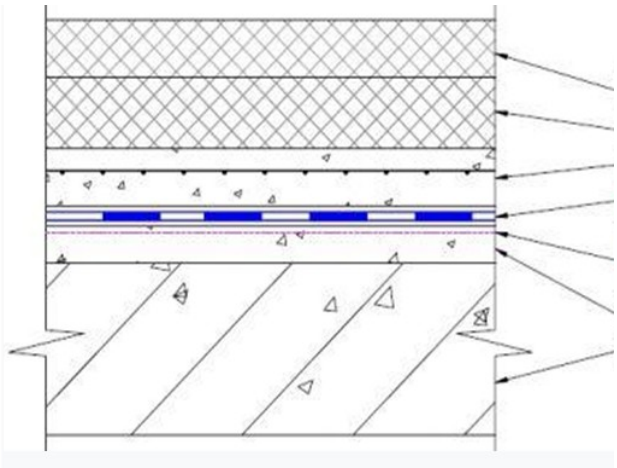

Figure 1. The top layer of asphalt concrete
The lower layer of asphalt concrete
Protective layer with reinforcement
TEHNOELASTMOST B
Polymer-bitumen TechnoNIKOL #3
Leveling layer
Reinforced concrete slab

Famous companies producing coating waterproofing:

• TechnoNIKOL,

• FlexLock (an important component of the mixture is polyurethane),

• Bitumen,• BASF va boshqalar [6].

Such materials are classified as a type of waterproof surface. Mastics form a strong protective waterproof layer on the surface, in case of a violation of its integrity, the damaged area is covered again with a hydrophobic composition. Waterproofing materials used for the processing of bridge structures should, first of all, have a high level of adhesion to various materials and the ability to reliably protect the structure from moisture. Traditionally, one of the best types of materials

is gluing compositions [4]. They are especially important in cases where there is aggressive water in the soil that is in contact with the bridge elements. At the same time, backfilling of the back surface of the walls with soil with drainage properties is also used, in which there is a mandatory device for draining water under the slope.

In addition, it is very important to protect all internal surfaces of the structure, as well as the surfaces of the slabs in the carriageway of the bridge from the effects of liquid. A drainage system consisting of pipes that removes excess liquid is installed. The edges of the roll materials are necessarily installed in the recesses of the sides [7].

TechnoNIKOL is also a manufacturer of high-quality roll waterproofing. For example, "Technoelastmost" roll-on innovative concrete material, made on the basis of modified bitumen with the addition of polymers, is in great demand. This material is great for waterproofing concrete and reinforced concrete structures. Technoelastmost is very elastic, easy to install at any ambient temperature and does not require the use of a gas burner. In addition, this composition is characterized by excellent adhesion to various surfaces, which guarantees a solid connection with the base [10].

Laying TECHNOELASTMOST with bitumen-polymer primer produced by TechnoNIKOL begins with thorough preparation of the leveled working surface. Such a primer dries very quickly, and also protects the surface of the bridge structure from the negative effects of corrosion [9]. Only after processing the base, you can start fixing the waterproofing material. Repair of bridges is carried out by installing a patch from a roll waterproofing compound.

In modern construction, it is common to use a material such as polyurea, which makes it possible to waterproof the bridge deck along the entire width of the superstructure in just one pass. Such waterproofing hardens quickly, and after 24 hours the movement of trucks is allowed on the bridge.

Waterproofing materials used in bridge construction are divided into applied, glued and sprayed types. In applied protection, cold painting and hot liquid application are carried out [8]. In cold painting, grade III and IV bitumen burned in heavy gasoline or kerosene, as well as resin varnishes are used. Cold painting is the first layer, after which 2-3 mm thick hot coating is applied. As a special hot-applied waxy material - a mixture of fine asbestos fibers of bitumen is used.

Bitumen-based wraps and new synthetic rubber-based materials (butyl rubbers) are used as adhesive protective materials.

The main way to work with bituminous waterproofing materials is to paint the concrete once and glue it without mastic. Heating heaters covering the width of the material to be glued are used to melt the surface painted with bitumen.

When bituminous waterproofing materials are used, there is a need to develop new waterproofing materials to limit the heat.

Polymerization (preparation) is carried out by solidification of waxy resins. Depending on the type of hardener, epoxy adhesives can be prepared in a normal or heated state. Hardeners used in cold process in bridge construction: hexamethylenediamine, polyethylene polyamine and triethanoldiamine. The technological properties of the glue are determined by the type and size of the hardener by adding plasticizers and additives. The amount of hardener is 10...15% of the weight of epoxy glue. Dibutyl phthalate and polyetheracrylate are used as plasticizers. 5...30% of them are added in relation to the weight of epoxy glue. If the plasticizer is added excessively, the strength of the glued area will decrease and its deformation will increase.

The filler does not affect the elasticity of the glue during polymerization and mainly causes a change in the temperature expansion coefficient of the glue and a decrease in the consumption of the epoxy glue. Portland cement, crushed quartz sand, andesite or diabase flour are used as fillers in bridge construction.

In order to create a joint using high-quality glue, the surfaces to be joined must be well prepared for gluing. The surface of the concrete should be clean, dry

and solid. Cleaning of surfaces is carried out with sandblasting equipment and mechanical brushes.

The viability of adhesives in enoxide resin is 2...2.5 hours at a temperature of 20°C to 25°C. At a lower temperature, the viability of the glue is extended.

Adhesives used for joining concrete are heated at low temperatures and cold. Adhesives have also been developed to bond old hardened concrete with newly poured concrete.

The conclusion is in place. It is desirable to use high-strength concrete in load-bearing, mainly prestressed bridge structures. If the concrete of the intermediate device and supports of the bridge is protected from environmental moisture and leaking water, as a result, there will be no damage to the concrete, and it will protect the reinforcement from rusting. By using bituminous waterproof materials, it is possible to protect concrete from environmental moisture and increase its service life by two times. Adhesives are considered a structural material, and when gluing together concrete parts, if the strength of the joint is not less than the strength of the concrete of the structure being glued, it is considered economically effective and extends the service life of the furnace.

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