



Concrete reinforcement with basalt rebar mesh for roads and parking spaces

Technological map

1. Common issues

Following technological map includes issues regarding transportation, storage and arrangement of the basalt rebar mesh on construction site. Preliminary preparation of sand soil under asphalt-cement surface on the construction site is not included in the presented technological map. These works are carried out in accordance with the project approved for a particular site. Basalt rebar meshes are supplied to the construction site with appropriate diameter, In accordance with the size of the mesh cell, the width and length of the mesh. Rebar and rebar mesh can be delivered as in rolls as well as unfolded. After unfolding rolls product gets the original look without any deformation.

High physical-mechanical characteristics: low weight and density; High strength and low elongation module High corrosion resistance to alkaline areas; Low thermal conductivity, electrical conductivity, radio and magnetic transparency; Forecasted operating life duration is not less than 80 years; The thermal expansion coefficient close to the concrete determines the advantages of using basalt rebars in various aggressive and climatic environments in comparison with the use of glasses and metal bars.

Basalt rebars do not lose strength in temperature variation. The operational range of temperature variance is -70°C , $+100^{\circ}\text{C}$. These advantages significantly increase the areas of use, inter-item repair, and service life of the product.

2. Areas of application

This technological map is used in the following areas of the construction industry:

1. Roads with asphalt-concrete pavement;
2. Protection works of roads and channels;
3. Reinforcement of roads slopes;
4. Construction of concrete playgrounds and floors;
5. Hydraulic structures;
6. Bridge girders;
7. Water treatment facilities;
8. Civil and industrial construction.

3. Work organization, work performance technology

Before the start of the work, the materials (basalt rebars and basalt rebar meshes) are transported in wrapped condition in rolls or unfolded and cut in required parameters. Product must be marked and the labeling should indicate: Name and address of the manufacturing enterprise; Product name; batch #, rebar diameter; mesh cell dimensions, Dimension unit (mesh length and width); Date of manufacturing.

Storage conditions: rebar mesh rolls - both in horizontal and in vertical position, rebars and rebar rolls in horizontal position. Storage is permitted both indoors and outdoors (See photos below).

Prior to the installation of the reinforcement mesh, a single layer of polyethylene film is laid on the concreting area on the artificial base (ground) under the asphalt-concrete cover prepared according to the project design. In case of transverse and longitudinal adhesion of polyethylene tape, it is overlapped by 10 cm. To reinforce the concrete rebar mesh is unfolded over the polyethylene film. In case of transverse and longitudinal adhesion, the rebar meshes should be overlapping by 10 cm, the overlapped areas are fixed with plastic fixers. In case of cutting basalt mesh roll, nearest intersections of the rebars are cross fixed together on the both sides with 100mm plastics fixers. Cut roll must be fixed with the plastic fixers to avoid self-unfolding and marking should be made to indicate the current parameters of the product, afterwards the product must be stored until the next use. Concreting is done on the area prepared in this way.



4. Requirements for the quality of work

Basalt rebar mesh is produced with 4-8mm diameter rebars. Maximum width of the mesh is 26000mm. Length depends on order requirements. Rebar mesh must meet following characteristics:

1. Elasticity module; 71000 Mpa
2. Elongation Coefficient on break - 0,022

3. Density 1,9-2,0 gr/cm³
4. Color - Greenish brown
5. Tensile strength in warp and weft 1100 Mpa
6. Compression strength in warp and weft 500 Mpa
7. Following is not allowed when handling with basalt rebar mesh: cut or crushed sections from the surface; Separation in the mass of the rebar; Damage to the reinforcing fibers as a result of mechanical impact.

5. Work schedule

Before handling basalt rebar mesh, work schedule should be defined:

Name of the working process	Unit	Work volume	Duration of the work in minutes
Transported material unloading, and storage by hand (2 workers)	100 m2	100 m2	4 min
Unfolding and fixing polyethylene layer (2 workers)	100 m2	100 m2	10 min
Placement of basalt rebar (2 workers)	100 m2	100 m2	10 min

6. Material - technical resources

In addition to the basalt rebar mesh delivered to the site, further list is required:

1. For every 1000 m2 mesh, 200 pieces of 100 mm long plastic fixers are required (single), which are necessary in case of cutting the mesh to cross fix the nearest rebars and to fix the residual mesh for storage;
2. In order to cut the basalt rebar, it is necessary to use the rebar cutting scissors. Polyethylene film can be cut with a stationary knife.

3. Roulette (dimensional)
4. Arrangement of this work does not require any special machinery.

7. Security technology and Labor protection

Workers should be provided with: Special clothes, masks, protective sunglasses, gloves.

During the process of unfolding the mesh and cutting it in necessary areas, attention should be paid to not let a mesh be unfolded itself. Cut parts for the mesh should be cross fixed using 100mm fixers in a timely manner.

Manual loading of products - in case of manual unloading, the mass of the material should not exceed 80 kg.

8. Environmental measures

Basalt rebar is a non-flammable, hard-to-burn, non-explosive material.

Basalt rebar does not undergo thermo-chemical destruction during operation and does not emit harmful substances.

Basalt rebar mesh waste is environmentally safe. Does not require recycling or storage in special containers.

9. Technological and economic indicators

Substitution of steel reinforcement mesh with basalt rebar mesh gives a considerable economic effect of 10-30%.

The economic effect increases on transportation of products. Basalt rebar is approximately 10 times lighter in weight compared with steel rebar, and also 2 times less in volume.

Person/hours expenses on 100m2 road construction, when layering basalt rebar meshes

Working time 8 hour, 2 workers

Name of the working process	Work volume m2	Duration of the work person/days
Concrete-Asphalt road reinforcement with basalt rebar mesh 100m2 – 24 minutes. 2 workers	1000 m2	2 person/0.5 day

Contents

1. Common issues	1
2. Areas of application	2
3. Work organization, work performance technology	2
4. Requirements for the quality of work	3
5. Work schedule	4
6. Material - technical resources	4
7. Security technology and Labor protection	5
8. Environmental measures	5
9. Technological and economic indicators	5



Coca Cola plant, Natakhtari, Georgia – 44 000 m²; year 2020.



LaFarge cement plant, Poti, Georgia– 1.5 km road; year 2017.



HeidelbergCement plant, Georgia – 18 000 m²; year 2019.



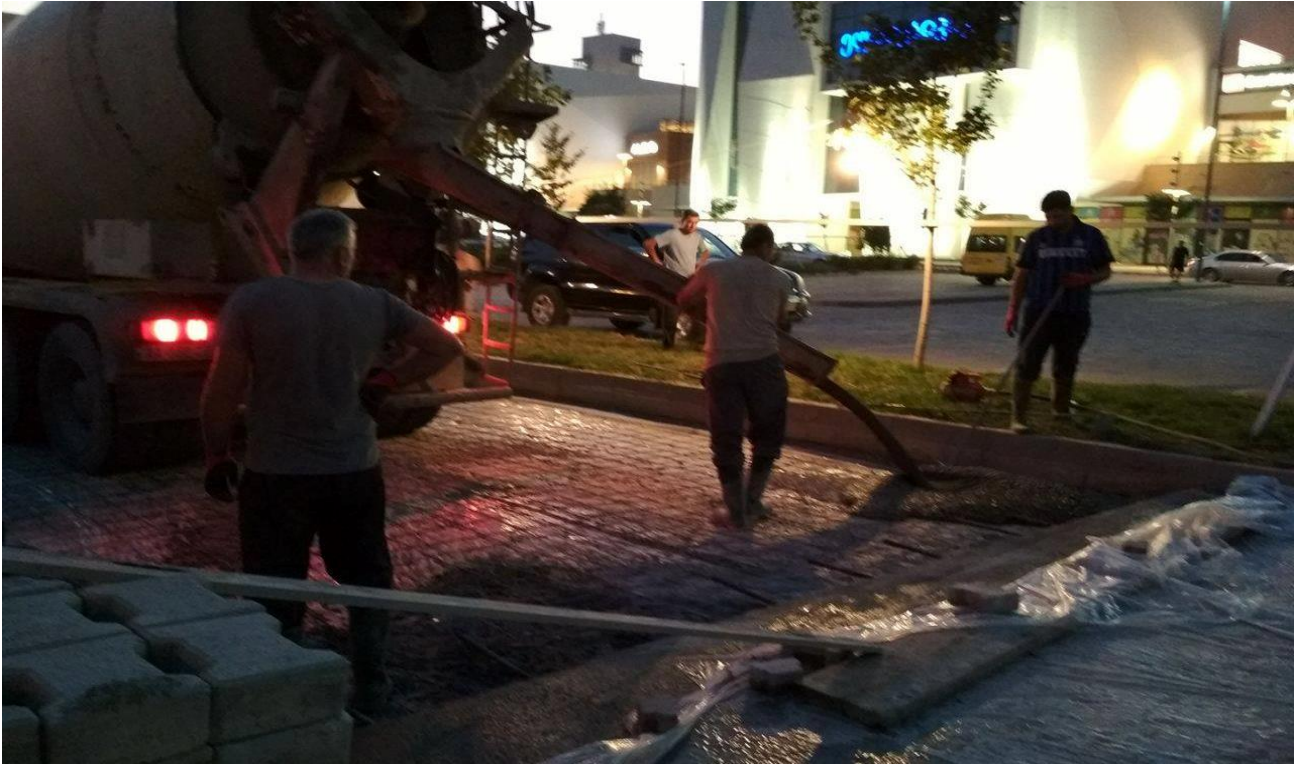
Kobi parking, Georgia – 31 000 m²; year 2020.



Tegeta car service, Tbilisi, Georgia – 5 000 m²; year 2020.



Water channel in Ananuri, Georgia -- 22 000 m²; year 2018.



East point (shopping mall road), Tbilisi, Georgia – 10 000 m²; year 2017.



Café in Batumi, Georgia – 5 000 m²; year 2020.