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**USE OF GABIONS IN LANDSCAPING AND ARCHITECTURAL ART  
DECORATION OF HIGHWAYS AND CITY STREETS**

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**Abstract**

In landscape architecture, the size, shape and material of gabions are determined by the area of the landscaped area. Gabions can be used not only for landscaping, but also for erosion protection. Gabions are used not only to decorate the site being landscaped, but also protect river beds from erosion, strengthen slopes and prevent soil erosion. Additional ornamental plants can act as small architectural forms from gabion structures, the stems and leaves of which encircle the lattice of the structure and combine beautifully with the stone. For plant roots, forms can be provided in the form of a gabion structure filled with fertile soil.

**Keywords:** Landscape, design, architecture, decorativeness, flowers, gabions, size, shape, materials, choice, landscaping, small architectural forms, use, decoration, flower beds, composition, urban, attractive appearance, easy installation, cleanliness of materials.

**Introduction**

The organization of green work in urban construction and scientific research is based on one of the main problems of modern times. On October 30, 2019, the President of the Republic of Uzbekistan decided to find a solution to the problem "Concept for the protection of the environment of the Republic of Uzbekistan until 2030", and on December 30, 2021, the decision "O" was adopted by the President of the Republic of Uzbekistan for the improvement of environmental protection in the republic, improvement of the efficiency of the organization. ego realization. V mire prodoljaetsya globalnoe poteplenie.

It affects the surrounding environment. Naselennye punkti - subsequent reforms in greening and beautification of cities, districts, villages and settlements will also contribute to increasing the quality of the surrounding environment. Stepen ozeleneniya yavlyaetsya pokazatelem kultury naseleniya. The reasonable use of gabions and landscape architecture adds to the beauty of the city. Demograficheskie issledovaniya pokazyvayut, chto lyudi selyatsya v zelenykh zonax i migration iz etix territoriy nablyudaetsya redko. All over the world gabions are used for fences and urban greening in European countries, such as Germany, France, Italy and Belarus.

Rasshirenie vidov dekorativnykh derevev i kustarnikov, ispolzuemykh v ozelenenii, poisk i vyvedenie sortov i vidov kustarnikov, sposobnykh adaptirovatsya k usloviyam nashey strany, sodержanie po nauchno obsnovannym technology yavlyayutsya odnimi iz actualnykh zadach



sovremennosti. ego realization takje izuchalas na urovne stran SNG. V osonom ispolzovalsya pri ozelenenii gabionov v Almaty, Kazakhstan.

Ozelenenie naselennyx punktov, uluchshenie microklimata yavlyayutsya odnimi iz peredovyx idey sovremennosti. And the goal is to continue the reform, realized in all spheres, with the development of a strategy for the development of the Republic of Uzbekistan in 2022-2026, known as "New Uzbekistan", i.e. the project "road map".

Eta strategy vklyuchaet sem prioritynyx napravleniy. In order to realize the reform of the city, a recreational park was created and the old one was reconstructed. Gabion is used in landscape design, especially in street greening. There is an increasing need for large numbers of decorative trees in the city and the republic. Eto stavit pered plantatorami vajnye zadachi, takie kak vyvedenie kachestvennyx i nedorogikh dekorativnyx sajentsev, sootvetstvuyushchix standardnym trebovaniyam, razrabotka tekhnologii bystrogo vyrashchivaniyam. Topical topic – modeling of proper approach to design and calculation of gabion walls, soblyudenie tekhnologii ix razmeshcheniya and khranenia, sozdaet vozmozhnosti dlya solution ekologicheskikh i gradostroitelnyx problem, kotorykh mojno izbejat s moshchyu gabionov. V nastoyashchee vremya poyavilis novye metodologii stroitelstva, a takje proektirovaniya s ispolzovaniem razlichnogo programmnoo obespecheniya, oblegchayushchego prakticheskoe primenenie konstruksii.

Scientific realization of the Cabinet of Ministers of the Republic of Uzbekistan No. 59 dated 9 March 2009 "Regulations for the work of public welfare facilities with consideration of the requirements of modern architecture and urban planning" and other normative legal documents. dissertation. B opredelennoy stepi slujit increase. In addition, in 2013, the decision of the Cabinet of Ministers of the Republic of Uzbekistan "Dalneyshee razvitie landscape design in the Republic of Uzbekistan, improvement of the architectural and artistic form of national points and rural territories, improvement of the system of training personnel and retraining of specialists in landscape design" was adopted in 2013.

## **MATERIAL AND RESEARCH METHODS**

Phenological observations I.N. Baideman "Metodokiya izucheniya fenologii rastenii", "Vegetative reproduction of plants" developed by M. Browse for the purpose of vegetative reproduction of trees and shrubs, evaluation of the scenic quality was carried out based on the method of N.I. Shtonda.

## **RESULTS OF RESEARCH**

Gabions are becoming increasingly popular in landscape design. It is not surprising that with the help of reliable mesh structures filled with stone material, an infinite variety of small architectural forms can be created: unique retaining walls made of gabions that divide multi-level land into horizontal terraces, noise vertical gabion structures are used in the design of parks, constructions that create water bodies and embankments that serve as barriers, etc.

For small architectural forms made of gabion structures, additional decoration can be plants, the stems and leaves of which surround the grids of the structure and blend beautifully with the stone. Forms in the form of a gabion structure filled with fertile soil can be provided for plant roots. Gabion structures have good drainage properties, which prevent the accumulation of water in the structure and its destruction during freezing and thawing.



The flexibility and strength of gabion structures allow the structures to gain strength over the years. The ease of installation of the structures makes them more economical than traditional concrete structures. The environmental friendliness of small architectural forms made of gabions, combined with the possibility of growing ornamental plants and placing street lights on them, makes any landscape natural beauty and unique.

Currently, gabions are used in landscape design as flowerbeds and small architectural forms. The shape of the bed from gabions can be cylindrical or rectangular. (Fig. 1) It is made of galvanized mesh welded to a cylindrical rod with a diameter of 3 mm. Wire mesh of this diameter comes in rolls and is easier to bend into circular shapes. Welded mesh made of 4 mm wire is produced in 3000x2000 mm flat cards and is most suitable for collecting flower beds from rectangular, polygonal and trapezoidal gabions.

Rectangular flower beds can be used as independent elements of landscape design or together with welded gabion structures to create a single gabion style: gabion walls, dividers, gabion terraces, gabion fences, etc.

According to the shape, rectangular flower beds made of gabions are divided into one-part and multi-part for planting single and, accordingly, many types of flowers in separate sections of the flower garden. During assembly, welded mesh is used for gabions with a diameter of 4 mm with rectangular 50x100 or square cells 50x50 mm. Accordingly, a wall thickness of at least 150 mm can be used with a small cell of 50x50 and a stone fraction of 40x70, which provides the same filling as stone without voids. Choosing a 50x50 cell grid additionally guarantees maximum structural strength and simplifies the filling process with smaller fractional stone. For gabions with a cell size of 50x100 and a stone fraction of 70x120, when using a welded mesh, it is recommended to choose a gabion wall thickness of 200-250 mm. The use of a 50x100 grid provides maximum aesthetics, but imposes high requirements on stone filling (combination with the maximum addition of stone of a larger fraction).



Fig. 1. Using fabric from gabion for flower composition



Fig. 2. Building a bed from a gabion

Using the example of the technology of assembling a flower bed from 50x50 cell mesh gabions with dimensions 1000x1000x500 (LxWxH) with a wall thickness of 150 mm. For production, we need a bottom 1000x1000 mm, an outer box with 4 meshes of 1000x500 mm, an inner box with four meshes of 700x500 mm, 1000x150 mm (2 pieces) and 700x150 mm (2 pieces) size covers, connecting links (150 mm) fasteners are required. welds new cards. using the example of the technology of assembling a flower bed from gabions made of 50x50 cell mesh with dimensions of 1000x1000x500 (LxWxH) with a wall thickness of 150 mm. In addition, you need a geotextile fabric with a density of 200-250 g / m<sup>2</sup> to lay in the flower bed itself and under the gabion structure. It is recommended to use dark-colored geotextiles (if installed poorly, the white color will be visible from the stone).

After adjusting the size of the welded cards, we fasten the structures of the outer and inner boxes to the bottom with gabion spirals. Next, we connect the edges of both boxes vertically with spirals. At the next stage, we place the internal ties (L-150mm) evenly on the walls of the flowerbed in a checkerboard pattern with 250x250 steps. Then we lay the geotextile fabric in the flower bed. In order to avoid seasonal expansion and contraction of the soil inside the flower bed, it is recommended to additionally use 2-4 gabion ties with a length of 1000 mm (go along the entire structure of the flower bed and fasten the outer edges of the gabion structure). Next, we fill the walls with 40x70 fractional gabion stone to the top mark of the flower bed and attach the covers. At the final stage, we fill the soil for the subsequent planting of flowers, bushes, etc. The geotextile fabric inside the flowerbed prevents the soil from washing through the gabion structure and additionally protects ornamental plants from moles and other various disasters. Also, it is not allowed to flood the flower garden during heavy rains or floods.

In addition, various small forms are made from gabions: decorative elements, flower stands, arches, fountains, benches, etc. Gabions for small structures are mesh frames, the cavity of which is filled with natural stone, which has an attractive appearance and long service life.



**Figure 3. Appearance of small architectural forms**



**4 pictures. Vases for flowers**

Small architectural forms made of gabions are often used in landscape design and are a modern solution of designers. With the help of high-quality gabions, you can create almost any small architectural form, and by choosing the right filling for gabions, you can create everything in an exclusive form and look. Production and installation of small architectural forms for beautification of the city or garden. Vertical gardening using stands with flowerbeds in urban lawns. Installation



of arches with flower vases, gazebos made of metal monograms, landscape forms for decorating city parks and squares.



**Fig. 5. Architectural forms of gabions**

Advantages of small forms:

- Form flexibility (no restrictions for designers);
- The strength of the structure and the strength of its service;
- Affordable price compared to competing designs;
- Attractive appearance;
- Ease of installation.

#### **DISCUSSION OF THE RESULTS**

The advantage of gabions: environmental friendliness of materials.

Gabions are made of environmentally friendly and high-quality materials: low-carbon steel wire with a protective zinc coating, which extends the service life of the structure. It can also be



reinforced with a layer of zinc coating. To perform their tasks, gabions are filled with natural stone, which in itself is already a natural product. The production of gabions is not harmful and does not harm the environment. No harmful or toxic substances are used in production. Gabions are environmentally friendly products.

**Durability of the structure.** When talking about the service life of gabions, you can rely on the construction rules and regulations that determine the periods between major repairs in 25 years. However, in our case, the guaranteed service life of gabions made of zinc-coated wire is at least 40 years, and gabions made of wire are more than 70 years. We are talking about maintaining the integrity of the gabion mesh structure after exposure to environmental and erosion processes. As for the integrity of the gabion structure, it remains in its original form as a result of the process of natural synthesis of the stone, which has been in a static state for many decades. Even after the netting breaks down, the retaining structures retain their shape for an additional 90 years. This information is based on the experience of the first use of gabions as shore protection on the Reno River: they still retain their form and function after more than 130 years. And this takes into account that in those days galvanized wire could not be used.

**Design plasticity.** In the construction of gabions, unlike concrete structures, gabions have the quality of plasticity. Due to the stone-filled mesh structure, gradual shrinkage occurs in the working position. With a small displacement of the earth, the structure reacts with additional plastic, which cannot be said about concrete structures that can deform or collapse.

**Optimal logistics.** Konstruktsii dostavlyayutsya na stroitelnyuyu ploshchadku v upakovkax 1.6 x 2.0 x 0.5 m (partly from kamnya) avtomobilnym i zhelenodorozhnym transportom. For example, a standard tented flatbed truck with a body size of 13.5x2.5x2.7 m can be transported in an open 20 ton gabion construction volume of 2200 m<sup>3</sup>. In this case, the cost of transportation is 150 sums for 1 kg of product, with a radius of 200 km. Stoimost malotonnajnyx autoperevozok nemnogo dorozhe: naprimer, pri dostavke do 1.5 t – dostavleno. Razgruzka osushchestvlyaetsya s pomoshchyu traditional crane, podruchnyx sredstv ili vruchnuyu, poshtuchno.

**Easy to assemble.** You do not need special equipment, machines or mechanisms to assemble gabions. You will need small mechanization tools, assembly wires, skillful hands and patience. Depending on the size of the gabion retaining structure and the time interval, the size and composition of the installation group is formed. To assemble the structure, you need to open the shipping package, straighten the structure into a rectangular shape and fasten it along the edges with a mounting wire. Then the structures are pulled together and installed in the design position. After that, the gabion stone is gradually filled by hand and the covers are pulled into place. In multi-level structures, each row is filled step by step after the completion of the previous one. Traditional forms are installed to level the structures before filling with stone. The average installation speed of an experienced specialist is 1.5-2.0 m<sup>3</sup> of gabion per work shift.

**Gabion price.** The cost of the structures themselves is about 10-12% of the total cost of small and large works. The main costs are for the gabion netting, stones, and if you can buy cheap stone near the job site, then the total cost is paid for the project. In addition, the ability to independently install



gabions reduces costs by about 40%. For example, the price of 1 m<sup>3</sup> of lime with delivery is about 675,000 soums, and 1 kg of stone with delivery is 2,000 soums, and 1 m<sup>3</sup> of gabion net is up to 70,000 soums. Savings in favor of gabions can be from 10 to 30%.

**Multi-functionality.** Gabions are multifunctional. The main purpose of gabions is protection of protective walls, banks of reservoirs and rivers, strengthening of soil surfaces and various hydrotechnical structures: dams, dams, dredging works, etc. At the same time, gabions can be used in landscape design together with other materials or independently in the construction of indoor structures, flower beds, benches, barbecues, waterfalls, cascading structures. As defensive structures and in the construction of temporary troop deployment points along the perimeter, prefabricated gabions for military purposes play a special role.

Gabions began to be actively used in Central Asia at the end of the 90s, although the standards for the use of mesh structures in road construction in the construction of artificial structures were developed more than half a century ago. They did not find active use due to the protective coating for the wire. The construction and installation process required a lot of work: it was much easier to use concrete or concrete slabs, which were then produced in significant quantities and were in short supply. Currently, due to their functionality and wide distribution, gabions made of double torsion mesh are often included in projects of federal importance in the construction of roads, aqueducts, etc. These structures also apply to corrugated spiral metal pipes, which replace prefabricated metal corrugations

**Aesthetics.** Speaking about the aesthetics of the final gabion structure, it should be noted that natural stone gives the finished structure its originality and looks more useful against the background of the concrete retaining structure. The use of gabions in the construction of a dacha will emphasize your work of art, especially against the background of standard solutions. In addition, you can choose the filler independently depending on the material (it can be not only stone, but also glass), color, arrangement, or use combined materials that will fill a new masterpiece of landscape art.

## CONCLUSION

Because gabions are an aesthetically clean product, it is appropriate to use them in landscape design. Small architectural forms made of gabions are often used in landscape design and are a modern solution of designers. Gabions have a number of advantages: they are environmentally friendly products, durable and plastic, easy to assemble, easy to transport and, of course, aesthetic pleasure.

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БАЛАНСИ ВА ЯШИЛ ЭКИНЗОРЛАРИГА ТАВСИЯ ЭТИЛАЁТГАН МАНЗАРАЛИ  
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