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Application of Composite Fittings in Construction Future

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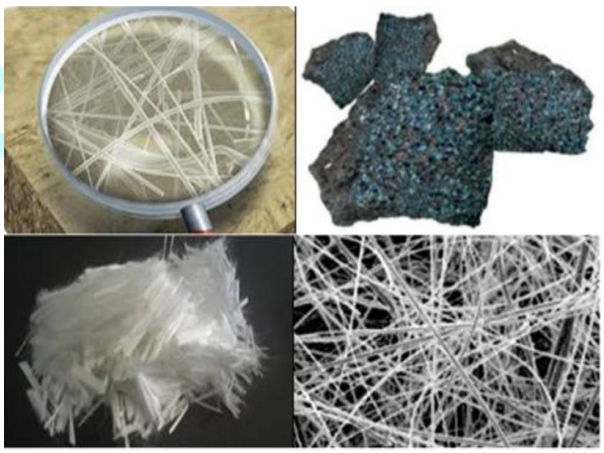
Abstract: This article presents the advantages and disadvantages of using composite reinforcement in construction in comparison with traditional steel reinforcement.

Key words: composite and steel reinforcement, construction, basalt fiber.

Today, construction is impossible to imagine without concrete and reinforced concrete structures, reinforcement. In many countries around the world, some of the steel rebar used in the construction industry is being replaced by non-steel composite rebar. The use of non-metallic composite rebar in our country in the construction industry will significantly reduce the demand for steel rebar. This can lead to austerity in our country. A number of enterprises for the production of composite reinforcement were launched. The new enterprise was created on the basis of the Decree of the President of the Republic of Uzbekistan dated December 26, 2016 "On measures to continue the implementation of promising projects for the localization of finished products, components and materials in 2017-2019." In particular, in the village of Egizbulak, Forish district, Jizzakh region, a joint venture with the British company Liegh Barreir LLP in the form of Mega Invest Industrial LLC produces composite reinforcement based on basalt fiber. We can say that composite rebar is an advanced invention of recent years, since steel is a modern building material that can replace rebar and can be widely used in construction. Conducting various tests of composite reinforcement in the laboratory, at construction sites, prefabricated structures and improving its technological processes will lead to a sharp decrease in demand for steel in the construction industry of our country. Composite rebar is a non-metallic material that is obtained by heat treatment of glass and basalt fibers. The raw material for composite reinforcement is epoxy



1-picture: General view of basalt fibers

resin as a binder made of 80% fiberglass or 20% basalt fiber.

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2-picture: Basalt rebar

Basalt fiber is produced from rock solution and is used as an effective and reinforcing additive for foam concrete, polystyrene concrete, standard precast concrete. Basalt fiber has high chemical resistance and reduces the impact resistance of materials, abrasion resistance, cold resistance, water corrosion and crack formation. Since this material is made of natural stone, it can be widely used in waterworks, heavy traffic roads, bridges, nuclear power plants, cast floors and other places. Composite hardware is one of the most widely

3-picture: Composite reinforcement mesh

used materials today, and there are many main reasons for this. Composite reinforcement, in turn, replaces steel reinforcement, as it can be gradually used in reinforced concrete structures, since their strength is sufficient. Advantages of using composite rebar in construction: steel rebar begins to corrode due to air humidity, and as a result of this continuous process, rebar degrades its basic properties over time. Composite hardware does not rust, does not rot and can be used in damp rooms under the influence of moisture; composite reinforcement does not change its state in the temperature range from -70^0 C to 100^0 C; the weight of composite reinforcement is 9 times less than the weight of steel reinforcement of the same strength and reduces the cost of lifting the load 5 times in terms of transportation costs. Composite reinforcement can significantly reduce the consumption of reinforcement in the structures used due to its higher tensile strength than steel reinforcement; Based on the research carried out, it was concluded that many years of experience have proven that composite fittings have a 3 times longer service life than steel ones.

Disadvantages of using composite reinforcement in construction: after the temperature of composite reinforcement exceeds 600^0 C, it begins to destroy the inner fibers, and, naturally, as a result, this reinforcement loses its strength; Composite fittings cannot be welded with a simple electric welding machine, like steel fittings, which, in turn, indicates the need for special work. the possibility of deformation of composite reinforcement in flexible elements must be confirmed experimentally; Composite fittings today are a modern building material. It can be used in the construction of low-rise buildings, but the use of this type of device in the construction of multi-storey buildings, in turn, requires many years of experience and requires the determination of design parameters. The use of composite reinforcement in multi-storey buildings is not recommended as it is recognized that its use in multi-storey buildings is relatively hazardous as it is resistant to deformation.

A number of scientific studies on the production of composite reinforcement are being carried out in Uzbekistan. In particular, in the laboratory of Binokor Service LLC, professors and teachers of

the Tashkent Institute of Architecture and Civil Engineering conduct research and achieve significant positive results. In recent years, important concepts for large-scale production of composite rebar have been developed in Uzbekistan, and large investments are being made Investment proposal

in many projects to develop this sector. One of such investment projects is planned to be implemented in the Navoi region of the Republic of Uzbekistan. Below we provide information about this project and planned works.

Name of the project :	"Production of basalt fiber and composite reinforcement"
Main goals of project	Expanding the export potential for the production of basalt fiber and composite reinforcement in the construction industry based on innovative NANO technologies.
Sphere / Industry	Production of construction materials
Implementation of Schedule project	2022 year
Location of project	"Nurafshon" LC Karmaninsky district, Navoi region,

Information about the project participants:

-initiator	"NAVOIY GIPS INVEST" LLC
-co-executor (the lead sectorial of Ministry/authorithy/Department	"O`ZSANOATQURILISHMATERIALLARI" JS and MIFT
Total project cost	20 million US dollars

Estimated sources of funding:

-own funds	12-15 billion soums
-loans of commercial banks	800-900 thousand US dollars
-the required volume of direct foreign investments	20 million US dollars
Composition of the main costs	Equipment and construction of a production building for the implementation of the project.

Projected profitability	
Projected payback period	5 years
Cash flows	Direct investments
Characteristics of the planned production	Basalt Fiber and Composite Fixtures
Capacity of project /Productivity	2,000-2,500 tons of basalt fiber. 3,000 tons of composite fittings.
Contribution to the project by the initiator	Quarry for raw materials, technology for the preparation of raw materials for the production of basalt fiber and fittings.

General information

Number and types of jobs created	1st stage 150-200 people 2 stage 200-300 people.
Environmental impact statement (project EIS), which includes expected types and volumes of waste, places of their utilization	
Information about the land plot for the construction of the enterprise	
Existing infrastructure	All the infrastructures are available and the railway line.
The required infrastructure	Irrigation water 10-15%
Upcoming construction and installation works	
Designed-estimated documentation	According to Investment Promotion Agency under Ministry of Investment and Foreign trade.

Production technology and parameters of main equipment

Type of equipment	TE BCF 1500-2000

Country of origin	Russia, "RUSCORDA" LLC and "VULKAN" SPA
Performance	2,000-2,500 tons of basalt fiber. 3,000 tons of composite reinforcement
Installed capacity	5000-5500 tons of ready products
Duty cycle	3 shifts
Periodicity of the planned –warning repair (design and preparation works)	Every quarter of year
Number of people involved in the production process and their functions	150-250 people

Conclusion: To date, opportunities have been identified to improve the technology for the production of composite reinforcement, improve the properties of raw materials, composite reinforcement in the construction of load-bearing structures of buildings and structures in Uzbekistan, and significant economic efficiency is achieved. Based on many years of research and experience, the results of their implementation have been summed up.

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