The OSCAR PUBLISHING Services
American Journal of Applied Science and Technology

VOLUME Vol.06 Issue 02 2026
PAGE NO. 46-50
DOI 10.37547/ajast/Volume06Issue02-04

The Importance Of Emulsification In Preparing Basalt Yarns For Weaving

M.M. Yo'ldasheva
Assistant, Department of Textile Product Technology, Jizzakh Polytechnic Institute, Uzbekistan

N.Q. Suyunboyeva
Student, Department of Textile Product Technology, Jizzakh Polytechnic Institute, Uzbekistan

Received: 20 December 2025; **Accepted:** 11 January 2026; **Published:** 16 February 2026

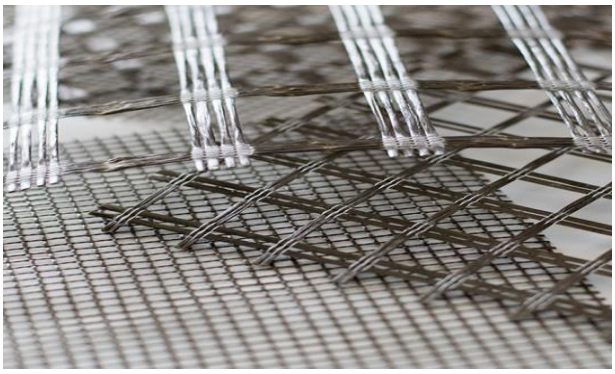
Abstract: This research focuses on increasing the strength of basalt yarns produced as a new textile fiber in the conditions of Uzbekistan. It discusses the production of competitive, import-substituting textile fabrics with high operational properties.

Keywords: Basalt, basalt fiber, basalt type, emulsion, (resination).

INTRODUCTION:

The ultimate goal of the reforms carried out in all sectors of our country is to create decent living conditions for all citizens living in our land. The production of products that meet modern requirements by textile enterprises is of great importance in increasing the welfare of the people. Effective measures have been taken to liberalize foreign trade, tax, and financial policies, support entrepreneurship, guarantee the inviolability of private property, organize deep processing of agricultural products, and ensure rapid regional development. Strengthening the social protection of citizens and reducing poverty have been defined as priority directions of state policy.

As a result of the reforms over the last five years, the necessary political-legal, socio-economic, and scientific-educational foundations for building a New Uzbekistan have been created. On May 23, 2019, the President of the Republic of Uzbekistan, Shavkat Mirziyoyev, adopted a Resolution "On additional measures for the rapid development of the construction materials industry".



Systematic work is being carried out to ensure stable growth rates for the production and export of competitive products, as well as the modernization and technological renewal of enterprises. The President spoke about creating favorable conditions for the rapid development and diversification of the sector, attracting investment in the processing of local mineral raw materials, and increasing the volume of construction material exports.

Conducting scientific research to create new types of competitive, import-substituting fabrics from basalt yarns produced in Uzbekistan is one of the urgent tasks of today. At this point, the question arises: what is basalt, what is it made of, and where is it found?. Basalts are the most common rocks on Earth and other planets of the solar system. Basalt belongs to the basalt family and is a magmatic volcanic rock of basic composition. The term likely originates from Greek, where "basalt" (bselt or bsalt) refers to a "boiling" stone containing iron.

It is advisable to conduct extensive scientific research to produce technical fabrics for specific purposes based on the study of raw material quality indicators and the proper organization of technological processes. Currently, basalt fiber materials are produced and used in all sectors. These include mechanical engineering, shipbuilding, energy, chemical and oil industries, electronics, utilities, metallurgy, cryogenic machinery, construction materials, aviation, and the textile industry. In the conditions of Uzbekistan, conducting scientific research on the production of textile fabrics with high performance properties from basalt fibers, which are being produced as a new type of textile fiber, is one of today's pressing tasks. This includes manufacturing competitive fabrics that can replace imports and developing new types of such fabrics.

In the conditions of Uzbekistan, conducting scientific research on the production of textile fabrics with high performance properties from basalt yarns, which are being produced as a new type of textile fiber, as well as developing competitive fabrics capable of replacing imports and creating new types of such fabrics, is one of the most urgent tasks today.

At this point, the question arises: what is basalt, what is it derived from, and where is it found? Basalt is one of the most widely distributed rocks on the Earth's

surface and on other planets of the solar system. Basalt belongs to the basalt family and is a basic magmatic volcanic rock of the normal hydroxide series. The term is believed to have originated from the Greek language. The word “basalt” is also referred to as bselt or bsalt, meaning “boiling” or “iron-containing stone.”

In the production of new composite fabrics based on basalt fibers, it is advisable to carry out extensive scientific research to properly organize technological processes and to study the quality indicators of raw materials in order to manufacture technical textiles intended for specific purposes. At present, basalt fiber materials are being produced.

of

These materials are used in almost all sectors. They are applied in mechanical engineering, shipbuilding, energy, chemical and oil industries, the electronics industry, public utilities, metallurgy, cryogenic machinery and equipment, the production of construction materials, the aviation industry, and the textile industry. Basalt yarns are delivered to weaving enterprises in the form of cylindrical packages. Initially, basalt yarns with high linear density are taken from the raw material warehouse and wound onto bobbins during the rewinding process. The purpose of the rewinding process is to adapt the yarn packages for subsequent stages by increasing their volume, checking their thickness uniformity, and cleaning them from various impurities.

For basalt fabrics, yarns with high linear density are mainly used. One of the most important parameters in basalt fabric production is yarn strength, as this parameter directly affects the quality characteristics

the finished product. The preparation of basalt fiber and carbon fiber yarns for weaving involves the emulsification (resin impregnation) process, which is considered a crucial technological step. The importance of this process has been extensively studied by foreign researchers. Numerous experimental studies have been conducted to improve the impregnation properties of thermoplastic resins into reinforcing fiber yarns. In addition, various analytical approaches to resin impregnation of fibrous yarns have been developed.

In particular, Wolfrath et al. (2006) analyzed the impregnation of polypropylene into fibrous yarns based on Darcy’s law using the FS method, and discussed the impregnation state of each layer as a function of time and pressure. Bernet et al. (1999) carried out a resin impregnation analysis using the CY method to evaluate the quality of the impregnated products based on their void content. [3]

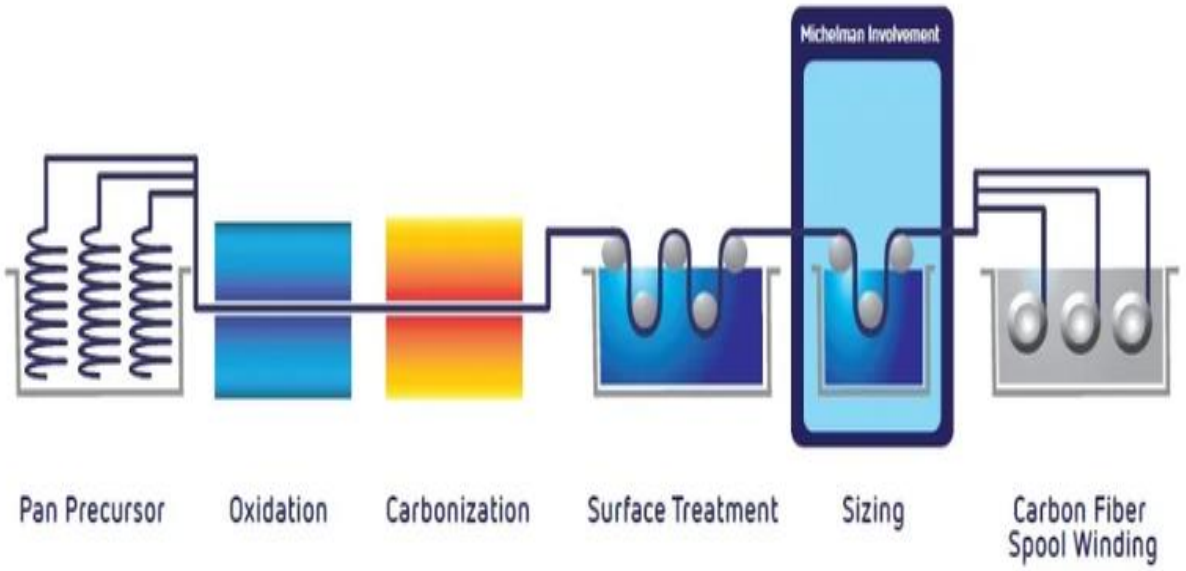


Figure 1. Technological scheme of emulsifying basalt and carbon fiber yarns.

Basalt yarns offer advantages such as high stiffness, high tensile strength, low weight, high chemical resistance, high temperature resistance, and low thermal expansion. When purchasing basalt fiber products, attention is usually paid to the composition, but the type of basalt fiber used in production is more important. It is advisable to carry out the emulsification (resination) process together with rewinding and warping processes.

Basalt fibers are usually combined with other materials to form a composite. When impregnated with plastic resin and cured, it forms a reinforced polymer that has a very high strength-to-weight ratio and is very stiff, though somewhat brittle.

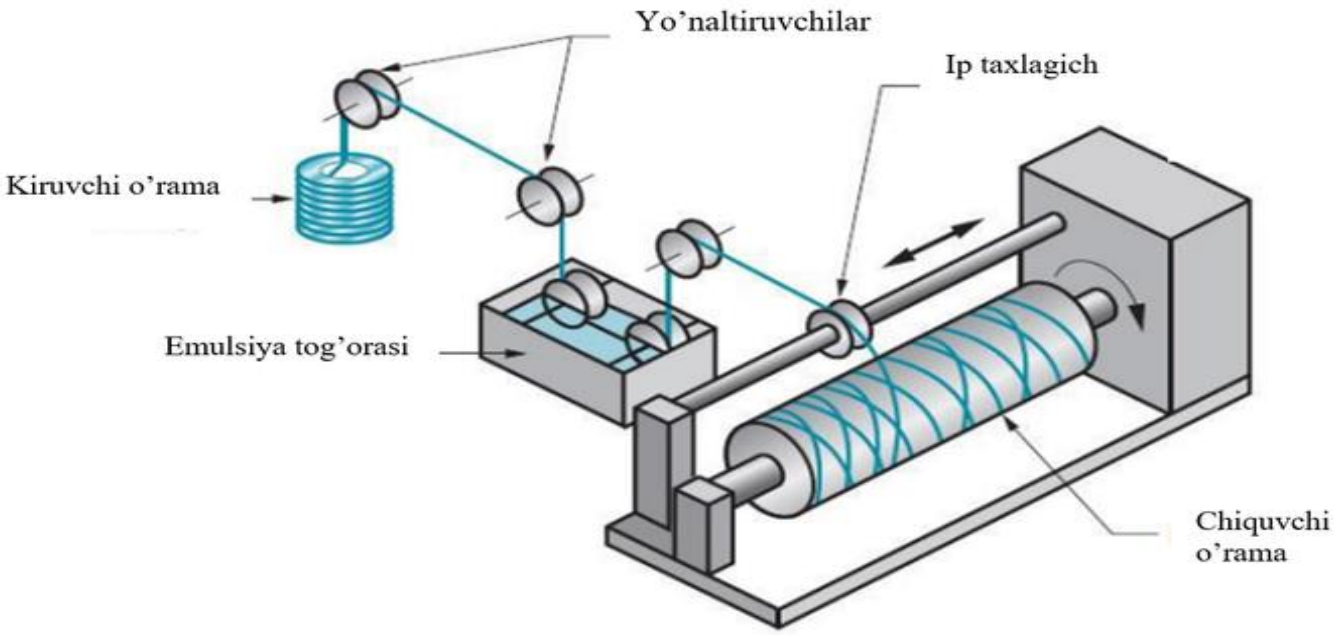


Figure 2. The emulsification process during the rewinding of basalt yarns.

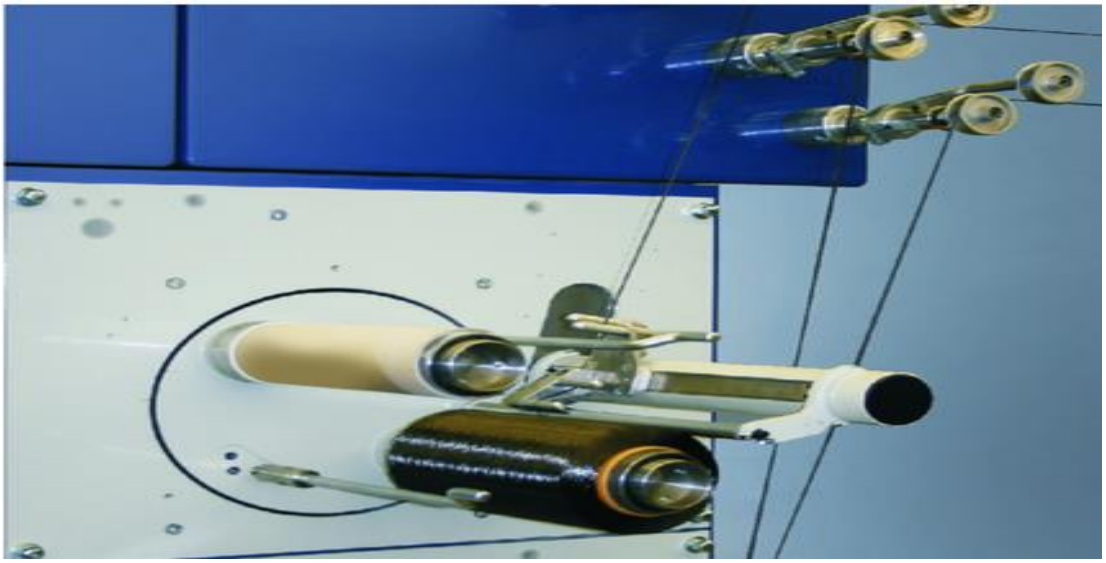


Figure 3. The technological process of rewinding basalt yarns.

Due to the very slow production process for basalt fiber yarns, the speed of this movement is very low. Therefore, it is appropriate to add emulsification (resination) to this process.

REFERENCES

1. Decree of the President of the Republic of Uzbekistan dated January 28, 2022, No. PF-60 "On the Development Strategy of New Uzbekistan for 2022-2026".
2. Resolution of the President of the Republic of Uzbekistan dated May 23, 2019, "On additional measures for the rapid development of the construction materials industry".
3. Shota K., Toshiko O. and others. Experimental and analytical investigation on resin impregnation behavior in continuous carbon fiber reinforced thermoplastic polyimide composites. Mechanics of Advanced Materials and Modern Processes (2018) 4:6.
4. Journal: Basalt fiber composite materials technology development, 2005. (www.basaltm.com).