Analysis of designing striped pattern fabrics on weaving looms

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Abstract: The article presents the results of research on the production of striped patterned fabrics and the study of their physical and mechanical properties.

Keywords: weaving technology, rapier weaving loom, shuttleless loom, cam shedding mechanism, fabric formation process, striped fabrics, fabric quality control

In the global textile industry, meeting the growing demand for various types of clothing and products, and the use of new equipment and technologies to fulfill these demands, is taking one of the leading positions. The volume of the global textile market is expected to grow at an annual growth rate (CAGR) of 7,6% from 2023 to 2030. This indicator is associated not only with the proper organization of technological processes in the production of textile industry products but also requires the design of manufactured products, forecasting quality indicators, and implementation into practice. In this regard, the effective use of the technological capabilities of equipment and devices is of great importance in improving technological processes.

Comprehensive measures are being implemented to increase the share of the textile industry in the national economy of our republic, to develop indicators for the preparation of new types of woven fabrics by analyzing the technological capabilities of weaving looms, and to widely introduce the results of scientific research into production, and certain results are being achieved.

A number of renowned foreign scientists, including S.Adanur, S.Maity, K.Singha, M.Abdelfattah, N.Gokarneshan, N.Jegadeesan, P.Dhanapal, J.Szosland, Z.Baolin, G.Yueyang, C.Ruiqi, N.G.Novikov, V.P.Sklyannikov, A.A.Martinova, O.S.Kutepov, G.V.Stepanov, E.A.Onikov, T.Yu.Kareva, Ye.N.Kartashova, and M.V.Nazarova, have made significant contributions to the study of weaving looms, the possibilities of fabric creation on these looms, the main mechanisms of various weaving looms and their improvement, and the potential for creating patterns on fabric surfaces using weaving techniques.

Scientists from our country, such as E.Sh.Alimboev, O.A.Ahunbabaev, G.N.Valiev, B.Kh.Baymuratov, A.D.Daminov, P.S.Siddiqov, B.K.Khasanov, S.S.Rahimxodjaev, D.N.Qodirova, S.A.Xamraeva, M.Doniyorova, and N.Yusupova, have conducted scientific research in various years on optimizing technological

parameters of fabric formation on different weaving looms, improving certain mechanisms of looms, and developing new assortments of fabrics based on structural parameters of various fabrics and artistic decoration using weaving methods.

As a result of these scientific studies, significant progress has been made in improving weaving technology and weaving looms, as well as enhancing the structure and physical-mechanical properties of fabrics produced for various purposes.

Despite significant progress in producing various fabric assortments during the weaving process, it is necessary to analyze the technological capabilities of weaving looms and acknowledge that there are still issues and problems to be resolved in the design and production of striped fabrics.

The quality of fabric and equipment for its control, fabric defects, modern sorting, cleaning, and measurement processes, issues of automatic fabric quality control on the loom, fabric selvedge and mechanisms for its formation, selvedge holders, rolled selvedge and mechanisms for its formation, as well as factors influencing loom productivity are thoroughly examined. Considering the centralized control and management system of modern weaving looms, it is concluded that such a system provides advantages such as inputting all technological factors into computer memory during the fabric production process on the loom, monitoring technological factors even during loom operation, quickly changing and controlling factors related to the assortment, producing fabrics with various indicators through programming, adjusting the weave range, altering fabric density along the weft, utilizing a central lubrication system, and transmitting all loom factors to a common control center.

In modern rapier weaving looms, the selection of weft color is controlled by a microprocessor. The maximum weft insertion speed is 1620 m/min, with the capability to insert weft yarn ranging from 0,77 tex to 3333 tex. The movement of the rapiers is controlled by a microprocessor and coordinated with other mechanisms.

In a study aimed at identifying methods to expand the assortment capabilities of modern weaving looms, a method for determining the assortment potential of cam-operated shedding mechanisms in modern shuttleless looms has been proposed.

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