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PREPARATION OF FLAX FIBER FOR THE PRODUCTION OF COMPOSITE MATERIAL

Marko Wischnowski[1], Alexander Janssen[1], Karl-Heinz Lehmann[1], Viktor Reimer[1], Andrey Dyagilev[2], Denis Bykouski[2], Thomas Gries[1]

[1]Institut fuer Textiltechnik (ITA) of RWTH Aachen University, Aachen, Germany
[2]Vitebsk State Technological University, Vitebsk, Belarus

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Abstract. *The article describes the technology of preparing a fibrous product for the formation of composite materials. The developed technology allows the maximum use of the strength characteristics of natural fibers in the formation of composite materials.*

Currently, in the formation of composite materials, along with chemical fibers, natural fibers are widely used. Since natural fibers, as a rule, are inferior to chemical fibers in strength characteristics [1, 2], an urgent task is to maximize the strength of natural fibers during the formation of composite material [3–6]. For this, it is necessary that the fibers in the composite material be straightened and positioned in a direction that maximizes the use of the strength of the fibers when they stretch during bending of the composite material.

Thus, in the production of composite material using natural fibers, it is necessary to form a layer of parallel straightened fibers. Today, there is no industrial technology that allows fully automating the process of forming a fibrous layer of unbound fibers that would allow the formation of composite material of complex spatial structure: sports equipment, dashboards and car body parts, etc. The formation of such materials requires the use of a lot of manual labor.

In the industrial production of composite materials, woven and braided preforms are widely used. Woven preforms are widely used in the formation of flat and curved composite materials. Braided preforms allow the formation of composite materials of complex shape. For example, woven preforms made of natural fibers are used to strengthen hockey sticks. They form a woven texture of natural fibers on the surface of the product [7, 8]. Composite materials are widely used in the automotive industry [9]. For example, a composite material formed by weaving a drive shaft of a car with carbon fiber can significantly increase the maximum allowable torque without increasing the diameter and weight of the drive shaft.

For the production of preforms using the technological processes of weaving and braiding, yarn and threads are used that have strength characteristics that can withstand the mechanical stresses that arise during their formation. Yarn from natural fibers, as a rule, has sufficient strength characteristics, which are achieved due to its twisting. The strength of the yarn is achieved by increasing the friction force arising between the fibers during the twisting process. The use of yarn for reinforcing composite materials does not allow the full use of the strength of the fibers from which it is formed, since the fibers as a result of twisting are not in a straightened state, and they form spiral or helical curves [10]. In this regard, the formation of a composite material requires the use of fibrous products, the fibers of which are parallel to each other or have minimal twist. It can be linen

roving or sliver. Such structures of fibrous materials reduce the friction forces between the fibers forming them. Therefore, the tensity is small, which does not allow the use of such materials in the technological processes of weaving and braiding.

Specialists of the Institut fuer Textiltechnik (ITA) of RWTH Aachen University using the Allma Type ESP 2 hollow spindle twisting machine developed a technology for preparing fibrous product from natural fibers to form a composite material. Using the developed technology, the fibrous product increases strength by wrapping with a polyamide thread with a low linear density [11]. In this case, the fibers forming the fibrous material are not subjected to twisting and retain their spatial structure. The polyamide yarn as a result of the wrap creates a compaction of the fibrous material, which increases the tensity arising between the individual fibers. Such preparation of the fibrous material increases the breaking load of the fibrous material.

Figure 1 shows a photo of the formed package with the prepared linen roving and the composite material formed using it [12–15].

Figure 1 – Prepared linen roving and composite material formed using it

Conclusions

The developed technology for the preparation of the fibrous product allows to increase its breaking load, while maintaining the straightened state of the fibers. This allows maximum use of strength characteristics of natural fibers in composite materials for various purposes.

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ПРОЦЕСС ПРОИЗВОДСТВА ХЛОПЧАТОБУМАЖНОГО БИНТА НА СТАНКЕ FITTEX

Алимова Х.А.[1], д.т.н., Авазов К.Р.[1], доц.;
Бекмуратова З.Т.[2], ст. преп., Алланиязов Г.Ш.[2], асс.
[1]Ташкентский институт текстильной и лёгкой промышленности,
г. Ташкент, Республика Узбекистан
[2]Каракалпакский государственный университет имени Бердаха
г. Нукус, Республика Узбекистан

Ключевые слова: хлопчатобумажный медицинский бинт, петля, цепочка, крючковые иглы, основовязальный трикотаж.

Реферат. *В статье рассмотрена технология выработки нового образца хлопчатобумажного медицинского нестерильного бинта на станке FITTEX. В исследовании описано изготовление бинта нового образца с переплетением цепочка и с прокладыванием утка без уработки.*

Замена растворов кровеостанавливающих средств текстильными материалами способствует ускорению остановки кровотечения, экономии дорогостоящих лекарственных препаратов, позволяет использовать их не только в условиях операционной, но и в различных других.

В данной статье анализируются возможности технологического оборудования для выработки высококачественных хлопчатобумажных медицинских бинтов на станке Fittex с применением сокращенной технологической цепочки [1].

Получаемый бинт нового образца по всем показателям превосходит традиционные марлевые бинты. В процессе формирования бинта основные нити провязываются трикотажным способом. За каждый рабочий цикл, состоящий из 10 операций, формируется элемент бинта, который товарным регулятором отводится и наматывается в рулоны.