ISSN 2181-8622

Manufacturing technology problems

Scientific and Technical Journal Namangan Institute of Engineering and Technology

INDEX COPERNICUS INTERNATIONAL

Volume 8
Issue 4
2023

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Crossref doi
SLIB.UZ Scientific library of Uzbekistan

EXPERIMENTAL DETERMINATION OF THE CLEANING EFFICIENCY OF THE FIBER IN THE PIPE

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Abstract:

Objective. Experimental studies are presented in the article in order to improve the efficiency of fiber cleaning in the pipe in textile enterprises. The device was designed and prepared for experimental research. Based on the results of the experiment conducted on the prepared device, graphs were constructed. The resulting graphs showed that the cleaning efficiency increased with the increase in air speed.

Cleaning the fiber from impurities in textile enterprises consists in increasing the cleaning efficiency of the fiber due to the installation of a special pipe in the front part of the cleaning machine.

Methods. When cleaning fibers from impurities in textile enterprises, inclined blades installed at an angle inside the pipe lead to effective separation of impurities from the fibers.

Results. From the graph built on the basis of the experiments carried out in the device, it can be seen that the maximum amount of cleaning efficiency of the machine at different levels of fiber contamination, different amounts of air flow, and different work efficiency is when the fiber contamination is 2.5%, the air speed is 20m/s, and the work efficiency is 1200kg/h. The cleaning efficiency is 36 was 9%.

Conclusion. In textile enterprises, the fiber cleaning efficiency of the machine is considered one of the main indicators, and it affects the quality of the product obtained in the next technological machines. Based on this, it is advisable to correctly choose the deviation angle of the device and the geometric dimensions of the blades located inside it when cleaning the fiber in the proposed device.

Keywords: fiber, pipe, cleaning efficiency, device, air velocity, performance, fiber contamination.

The application of aerodynamics in the textile industry is wide and varied. In addition to the study and control of aerodynamic effects on fiber and fiber structures, all the technology of fiber materials takes place in a viscous air environment. Due to the small mass of fibrous structures and a well-developed surface area, they are greatly affected by air currents, boundary layers of moving machine elements (for example, sawing gears) and many other effects and technological processes, along with the rotation of working organs [1]. Due to insufficient knowledge of aerodynamic processes, some design features of machines (for example, drum grooves of combing machines) were created based on many years of work experience [2,3].

After breaking the bales in the spinning mill, it is necessary to separate the impurities in the fiber. A special device for the separation of impurities was designed and prepared (Fig. 1). The experimental device consists of an inlet 1, a cleaning mesh surface 2, a waste pipe 3, and a fiber outlet pipe 4. The fibers move through the inlet 1 along with the air flow and are separated from impurities from the surface of the cleaning mesh surface 2, the impurities fall through the waste pipe 3, and the cleaned fibers leave through the outlet pipe 4. Before conducting the experiment, the contamination of the fiber is determined. Determining the cleaning efficiency of the device is determined by the following formula [4-21]:

$$K = \frac{C_1 - C_2}{C_2} * 100\%$$

where K- cleaning efficiency; %;

C_(1-) dirtiness of fiber before cleaning, %;

C_2- fiber after cleaning, %.

The experiment is carried out in the following order: The dirtiness of the fiber is determined in a special device. A sample of 500 grams of fiber is taken. The fiber is placed

in the inlet and air is introduced. The air velocity was calibrated using a cup-shaped anemometer (Fig. 2).

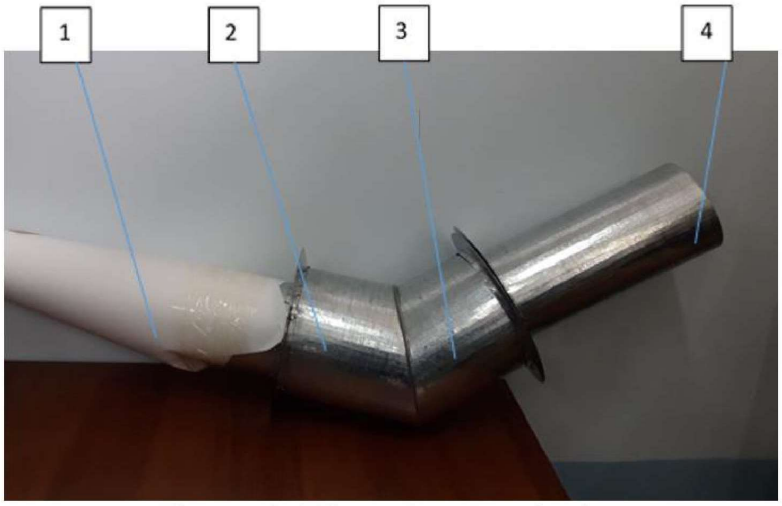

Figure 1. Fiber cleaning device
1-inlet throat; 2-mesh surface; 3-dirt pipe; 4- outlet pipe

Figure 2. Cup-shaped animometer

In order to change the direction of the movement of the fiber in the pipe, the pipes 1 are installed inside the pipe, and the collecting chamber 2 is installed to remove impurities (Fig. 3).

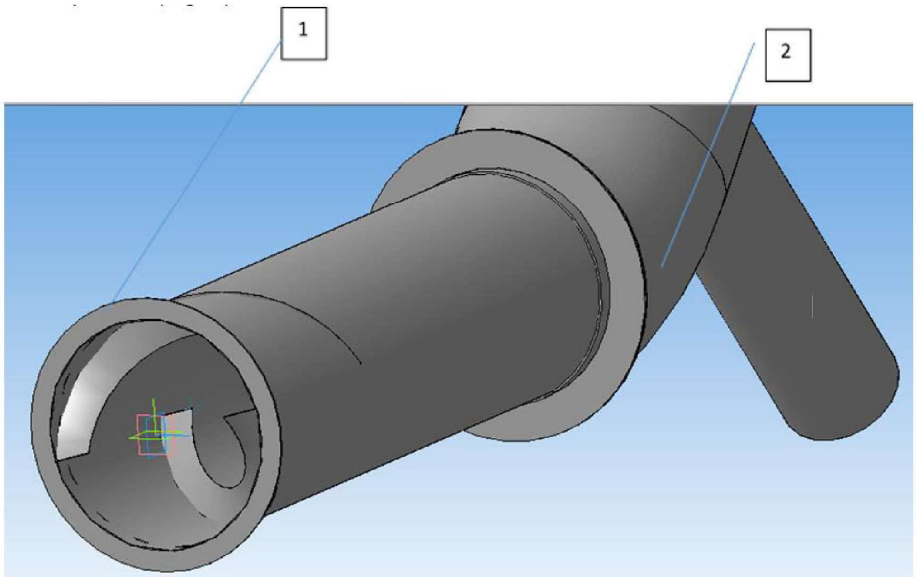

Figure 3. Paddles (1) installed in the pipe to redirect the fiber movement in the pipe and a collection chamber (2) to remove impurities

Experiments were carried out at different speeds, impurities and fiber masses. The experiment was carried out for Namangan-77, grade 1, class 2, fiber with 2.5% impurity (Fig. 4).

Figure 4. Experimental setup

The results of the experiment are presented in Table 1.

Table 1

S/n	Impurity of fiber %	Air speed m/s	Productivity kg/hour	Cleaning efficiency % repetitions					
				1	2	3	4	5	Average
1	2.3	18	1000	34.15	34.09	34.05	34.3	34.02	34.12
2	2.4	19	1100	35.6	35.9	35.10	35.4	35.14	35.43
3	2.5	20	1200	36.9	34.12	36.14	36.06	34.21	35,49

The results of the experiment show that the cleaning efficiency of the device increases with the increase of air speed. But it should be noted that due to the fact that the speed of the air increases too much, the fiber flow speed increases, so the cleaning efficiency decreases. The results of the experiment are presented in graphic form (Figure 5).

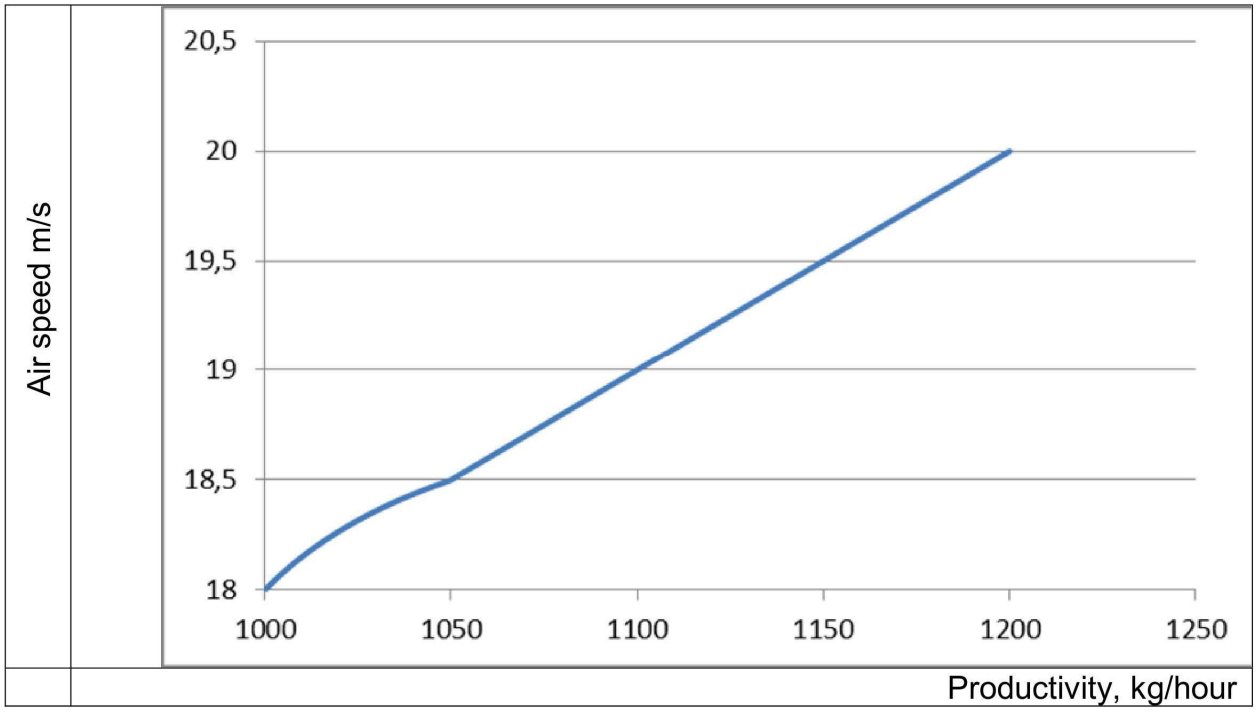

Figure 5. A graph of the dependence of air speed on the performance of fiber cleaning

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PROBLEMS IN CLEANING COTTON-SEED AND THEIR SOLUTION

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Abstract:

Objective. to identify problems and give recommendations on the processes of cleaning cotton at the cotton gins of the region, taking into account the increase in demand and the need for the use of cotton fiber in the republic and the world in the near future.

Methods. analysis of the state of the cotton industry and cotton processing factories in Uzbekistan today, as well as the level of demand and consumption of cotton fiber at the world level. Determine the factors that negatively affect the quality of cotton fiber by studying the activities of cotton processing factories in the regions of the republic. Analysis of the achievements and shortcomings of ongoing research in this direction.

Results. in the process of studying the activities of cotton ginning factories in the region (Kosonsoy, Norinsky, Torakorgon, Namangan regions), it was scientifically proven that the УХК cleaning line was used to clean cotton from small impurities, as a result of which the quality of the fiber and seeds was violated due to mechanical impact on pieces of cotton.

Conclusion. the development of the correct technological process and the creation of new devices and equipment for obtaining high-quality products from raw cotton at ginneries is of particular importance.

Keywords: raw cotton, textile industry, cotton industry, updating technology, cotton fiber consumption, ginneries, raw cotton quality, development program, material and technical base, number of neps (entangled fibers), cotton impurities, seed damage.

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