

Hygienic Features of Sorting and Spinning in the Production of Wool

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ABSTRACT

Relevance of the topic. *Wool is the oldest fiber known to man. It was one of the first fibers to be spun into yarn and woven into cloth. Wool production dates back more than 10000 years, and to this day, protecting the health of workers in the production of wool and developing measures aimed at improving working conditions is the most important task of hygiene and occupational pathologies. The work of workers associated with exposure to intense noise and vibration, high dust content and hard physical labor, leading to a decrease in working capacity, and later to disability and occupational diseases [1,3.] At all stages of the production process, wool is affected by physical (dust, temperature, humidity, noise, vibration), chemical (pesticides, chemicals), biological factors. [2,4,5] In addition, wool production is characterized by great physical stress. All of the above urgently requires the development of hygienic regulations, [7] guaranteeing labor protection and health of workers employed in. wool production [5,6,7] This issue became especially relevant with the release of the Decree of the President of the Republic of Uzbekistan dated 07/08/2021. "On measures for the fundamental improvement of the industry and wool production. [6,7,8]*

KEYWORDS: *working conditions, spinners, physical labor, strenuous physical activity, wool production.*

The aim of our study. For this purpose, the organization of working conditions for workers and engineering services and the hygienic assessment of working conditions for spinners, sorters of engineers have been studied. It is known that in recent years, measures have been taken to improve technical equipment, improving the working conditions of persons whose work is associated with harmful factors. However, these measures do not exclude the stress of the physiological functions of the body of workers, which are an important factor in the working capacity and, ultimately, the state of human health.

In woolen production with aggravated working conditions is the work of sorters, carders and spinners. Adverse effects on the body are: noise, meteorological factors, air speed, waste from cleaning machines and harmful factors in case of violation of the technological process of the technical equipment used in the spinning shop. The equipment and mechanism are complex in design and operation, associated with the physical effort of the muscles of the hands, static stress and constantly repetitive monotonous movements, which cause an increased load on the organs of the central nervous system, the cardiovascular system, pulmonary ventilation and, ultimately account leading to fatigue.

Materials and methods. The studies were carried out using physiological and hygienic methods: dynamometry, spirometry, tonometry, determining the heart rate in 90 workers with a variety of working conditions: 30 shop workers, sorters, 30 combers and 30 engineering and technical workers (control). A contingent of workers aged 25 to 35 years old, with work experience of 5-15 years, was selected.

The main group of workers - sorters, spinning shop and spinners had direct contact with harmful factors (noise, vibration, dustiness and intense work). Of the total number selected, 28% were women and 72% were men. The criteria for the study were: indicators of dynamometry, VC, heart rate and indicators of maximum blood pressure, muscle strength of the arm before the start of work, at the end of work and an hour after the work shift.

Results. The work of sorters, carders and spinners is rated as heavy intense (3rd category of intensity), for engineering and technical workers - as moderate (2nd category of intensity) according to the following results of physiological and hygienic research methods: Table No. 1

Indicators of muscle strength of the right and left hands in workers of the main group and engineers

Professions	Getting Started M + m	In the endwork M + m	After work (in one hour)
spinners	34.3+4.1	30.5+3.7	32.3+2.5
	29.5+3.5	28.1+3.2	26.1+2.3
sorters	36.5++4.0	30.7+3.8	34.7+2.5
	29.5+3.5	28.3+3.2	29.4+3.4
I.T.R.	34.5+4.2	33.5+4.0	34.4+4.1
	34.3+3.3	32.5+3.2	29.9+3.2

(Note: the numerator is the muscle strength of the right hand, the denominator is the muscle strength of the left hand).

The results showed that the respiratory rate and VC of workers in the main group and engineers with an increase in tension, labor time is accompanied by an increase in respiratory rate and, accordingly, a decrease in VC, however, there is a significant difference in the indicators among the main and control groups.

Indicators of vital capacity of the lungs and respiratory rate in workers of the main group and engineer No. 2

Professions	Getting Started M + m	In the end work M + m	After work (in one hour)
combers	39.+ 1.2	2.7+0.8	3.6+1.2
	20.0+0.6	24.4+1.3	2.23+0.8
sorters	4.1+1.4	3.5+1.03	3.8+1.2
	20.1+1.0	26+1.1	22+1.1
I.T.R.	34+1.2	3.2+1.1	3.3+1.2
	20.1+0.6	22.1+0.1	20.4+0.3

(Note: the numerator is the heart rate, and the denominator is the maximum A/D).

It is known that gas exchange indicators are interconnected with the hemodynamic states of the body, in particular, in the process of increasing the intensity of physical activity, the heart rate increases, blood pressure rises.

Table #3

Indicators of pulse rate and blood pressure in workers of the main group and engineers.

Professions	Getting Started M + m	In the end work M + m	After work (in one hour)
combers	74.9+1.3	92+1.4	89.2+1.3
	120.0+1.3	127.5+2	121.1+2.2
sorters	77.1+0.8	96.7+1.1	80.2+2.0
	118.9+1.8	127.5+2.6	123.4+2.2

I.T.R.	76.9+1.3 1201+1.3	80.8+1.7 123.6+1.8	78.0+1.6 120+1.4
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Conducted physiological and hygienic studies of the labor zone of workers in wool production showed that there are a number of significant shortcomings in the design of machines and workplaces of sorters, combers and spinners.

Workers are forced to stay in an uncomfortable working position for a long time during work, make unnecessary movements, perform monotonous repetitive actions with constant intense physical activity. The static load of the muscles of the hands is also great, which is the cause of fatigue and even overwork of workers in this profession.

The muscle strength of the right hand in the main group at the beginning of work averaged 34.3, at the end of work - 30.5, an hour after the shift - 32.3, while in the engineering and technical services (control group) it was at the beginning of work 34.5, at the end of work - 33.5, and an hour after the shift - 34.4.

The muscle strength of the left hand in the main group was 29.5-28.0-26.1, respectively, and in engineering and technical workers - 34.5 at the beginning of work, 30.5 - at the end of work and 29.9 - an hour after work. The data presented show that the decrease in arm muscle strength increases with the increase in working time in both groups. At the same time, the decrease in strength in I.T.R. the right hand averages 4.2 percent, while in the main group it is approximately 10-17 percent.

The decrease in muscle strength of the left hand in both groups is insignificant. Recovery of muscle strength in the main group took longer than in I.T.R.

The ventilation function of the lungs was studied using a breath analyzer (AD-01) combined with the Neuron PVEM, which records the frequency and vital capacity of the lungs (flow - volume). [10].

It follows from the table that VC and NPV in the main group have shifts by 1.2 times, and in ITR by 0.7 times. Respiratory gas exchange in the main group is reduced by 15-20%, while in ITR by 5-6%. The indicators of respiratory functions an hour after work in both groups did not have a significant difference, they were equal to 28 minutes for the main group, as well as for the engineer. These data confirm that the indicators of external respiration are closely interconnected with the nature of the intensity of labor processes and physical activity.

The increase in heart rate at the end of work, compared with the beginning of work, for the main group was 12-35%, and for engineers only by 5-6%. The stroke volume of the heart increased by 14-20% in the main group, and in the ITR only by 8-10%. At the same time, it was found that the change in the rhythm of heart contractions is closely related to the nature of physical stress, the increase in blood pressure in the main group was 4-8%, and in the engineer - 2-3%

Results and discussion. The results showed that the respiratory rate and VC of workers in the main group and engineers with an increase in tension, labor time is accompanied by an increase in respiratory rate and, accordingly, a decrease in VC, however, there is a significant difference in the indicators among the main and control groups.

It is known that gas exchange indicators are interconnected with the hemodynamic states of the body, in particular, in the process of increasing the intensity of physical activity, the heart rate increases, blood pressure rises.

Conducted physiological and hygienic studies of the labor zone of cotton mill workers showed that there are a number of significant shortcomings in the design of lathes and workplaces of sorters, combers and spinners. [8]

Workers are forced to stay in an uncomfortable working position for a long time during work, make unnecessary movements, perform monotonous repetitive actions with constant intense physical activity. The static load of the muscles of the hands is also great, which is the cause of fatigue and even overwork of workers in this profession.

Conclusions. The nature of the work of workers in the woolen production can be attributed in terms of severity and stress to the 2nd - medium and 3rd - category of tension. [12]

The work of sorters, carders and spinners differs markedly from the nature of the work of engineers, primarily in terms of physical stress, as well as dust, noise and vibration. Improvement of working conditions, technological processes, optimal organization of the workplace, compliance with technical equipment, compliance with sanitary and hygienic requirements for occupational health, rest determine the efficiency of the production process while maintaining the health of workers and maintaining high efficiency of labor resources. The results obtained can serve as an optimal point for the development of rational tactics for sanitary-hygienic and preventive health measures among workers in the woolen production.

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