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Assessment of Sanitary and Hygienic Factors of the Working Environment in Carpet Production

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Abstract: This article examines the carpet weaving of the peoples of Central Asia. An analysis of carpet weaving as one of the oldest types of decorative and applied art is carried out. The development of carpet weaving techniques of the peoples of Central Asia and the features of making carpets of various types are described.

Keywords: Carpet weaving, peoples of Central Asia, patterns, carpet production.

Relevance. In modern conditions, carpet production is one of the fastest developing branches of the textile industry and the entire national economy as a whole. The carpet industry, a promising industry, employs a significant number of workers, the vast majority of whom are women.

The production of carpets and carpet products includes a number of independent technological processes, both common to the entire textile industry - spinning, weaving, dyeing, and specific to this industry - carpet weaving, carpet weaving, finishing, restoration, heaving, etc. At the same time, a complex takes place in production conditions characteristic unfavorable factors that have a harmful effect on the body of workers.

However, the vast majority of hygienic studies presented in the scientific literature are devoted to traditional processes of spinning, weaving, dyeing (Vopilkina G.I.,1; Vishnevskaya S.S. Gorshkov S.I., Balitkova A.A., Gorshkov S.I., Artemyev V. I., Balitkova A.A., Bakuleva N.S.). At the same time, until now in the scientific literature there have been only isolated works devoted to occupational hygiene in carpet production (Lutov V.A. et al., Maltseva O.M.; Kolesnikova A.V., Maltseva O.M., 198I; Masharipov R.). We also did not come across any works covering the working conditions and health of workers in the production of polymer carpets, where the combined effect of physical and chemical factors on the body of workers is noted.

Previously, in experimental studies, the combined effect of vibration with benzene, acetone, toluene and other industrial poisons was studied (Solomatin N.I., 1987; Pokrovsky V.A., Faustov A.C. et al., 1982; Mironov Yu.N., Tartakovskaya L.. Ya. and others). However, there are no sources in the literature that would cover the issues of the combined effect on the body of styrene and general vibration that take place in the production of polymer carpet products. Directly related to the safety of using polymer carpet products, “ finished ” with styrene-butadiene latex; Normative documents on sanitary control and hygienic regulation of the burden in these products have not been developed.

In this regard, the relevance of our research is determined by a number of problems that, until this work, have not found their solution:

1. The lack of comprehensive scientifically based studies of technological processes and factors of the production environment in all sectors of carpet production.

2. Insufficient and often contradictory data on the health status of workers and its dependence on occupational hazards.
3. The paucity of studies on the nature of the combined action of chemical and physical factors
4. The lack of a scientifically based comprehensive set of measures to create safe and favorable working conditions in carpet production.

Purpose and objectives of the research. In connection with the above stated, the goal of our work was a comprehensive sanitary and hygienic assessment of working conditions and the health status of workers engaged in carpet production, taking into account the isolated and combined effects of occupational factors on the body, the development of a set of preventive health measures aimed at improving working conditions and reducing morbidity, comfort and increase the performance of workers in this industry.

To achieve this goal, the following tasks were identified:

- carry out a comprehensive sanitary and hygienic assessment of working conditions in the main branches of carpet production: red -spinning, carpet-weaving and carpet-knitting;
- study the influence of production factors on the development of fatigue and the health of workers;
- study the influence of some factors of carpet production (noise, vibration, styrene) on organic matter during their isolated and combined action in an experiment on animals;
- to develop a scientifically based set of health measures for carpet production workers, as well as preventive measures necessary when using polymer carpet products.

This work was carried out in accordance with the scientific research plan of the Bukhara State Medical Institute named after. Abu Ali and bn Sina.

Scientific novelty and theoretical significance of the research. For the first time, the work provides a comprehensive hygienic assessment of working conditions in all sectors of carpet production, presents a detailed description of the main working professions and unfavorable occupational factors, causes and sources of occurrence.

For the first time, a comprehensive study of the health status of workers in various specialties of carpet production was carried out and a pattern was established of the dependence of the incidence of leading nosological forms of diseases on the influence of occupational factors, length of service, age and gender of workers.

The features of the impact of production conditions on the development of fatigue, hearing impairment, as well as on the psychophysiological status of the body of workers in basic professions have been studied.

Experimental studies in acute, subacute and chronic experiments on animals revealed for the first time the basic patterns of the combined effect of styrene and general vibration on the body with accompanying noise under conditions simulating industrial conditions.

For the first time, a comprehensive comprehensive physical-hygienic, sanitary-chemical and toxicological assessment of polymer carpet products finished with styrene-butadiene latex was carried out.

Based on the research results obtained, a set of health-improving measures has been scientifically substantiated, developed and implemented in various branches of carpet production.

Methods and scope of research. To solve the problems, modern hygienic, physiological, clinical, toxicological, biochemical, morphological, sanitary-chemical, physical-hygienic and mathematical -statistical research methods were used.

Production and hygienic studies were carried out in the dyeing-marginal, carpet-weaving and carpet- knitting (carpet-knitting] industries of Sanoat-Gilam JSC. They included a hygienic assessment of the technological process and equipment, physical and chemical factors of the production environment, characteristics of severity and labor intensity of workers.

In production conditions, over 2,500 hygienic studies of the microclimate, lighting, noise, vibration, dust, and the content of toxic substances in the air of the working area were carried out, as well as descriptions of more than 20 individual professions.

In hygienic studies, generally accepted methodological techniques and equipment were used. Quantitative determination of styrene, butadiene and acetic acid vapors in air was carried out using highly sensitive methods:

CONCLUSIONS

1. Modern carpet production is a diversified, fast-growing and promising branch of the textile industry, employing a huge number of workers, the vast majority of whom are women. “At workplaces in carpet production, conditions are created for workers to be exposed to such unfavorable factors”

such as general vibration, broadband noise, high dust levels and toxic pollution ! substances in the air of the working area, forced working posture, nervous- emotional and visual tension, physical activity, monotony of work, microclimate disturbance.

2. As studies have shown, the nature and severity of unfavorable factors in the working environment are determined by the perfection of the technological process and equipment.

It has been established that noise exceeding the maximum limit affects workers of the main professions - spinners, weavers, carpet weavers, and workers in preparation shops. The highest noise levels are created by shuttle weaving looms and old-style knitting machines. In the workplaces of carpet weavers servicing old-style knitting machines, permissible vibration levels were also observed to be exceeded. A common unfavorable factor for workers in basic professions is dust from natural and synthetic fibers, the concentrations of which in the air of the working area in some cases exceed the maximum permissible concentration. At the same time, at the workplaces of carpet weavers, exposure to styrene occurs at the level of permissible values.

In the loading areas of dyes, thickeners and acetic acid overflow at chemical plants, due to the lack of mechanization and sealing of the production process, these substances enter the air of the working area in concentrations exceeding permissible levels. Pollution of the working environment is also facilitated by the absence or incorrect equipment of local exhaust ventilation.

3. The study of morbidity with temporary disability and the results of an in-depth medical examination by medical specialists made it possible to establish that the leading forms of diseases among carpet production workers include acute respiratory infections, diseases of the musculoskeletal system, hypertension, vegetative-vascular dystonia, skin infections and subcutaneous tissue, inflammatory diseases of the female genital organs. Inflammatory diseases of the eyes, diseases of the ear, nose and throat, pharyngitis and tonsillitis, and bronchitis are often detected. In the production of polymer carpets, an increased incidence of diseases of the arteries and veins, liver, gall bladder, and pancreas is additionally noted, which suggests the possibility of the influence of specific occupational factors on workers.

4. In all workshops, the incidence rate of people in the main professions is higher. I will increase the workload by adjusting to the level and length of service of the workers. In this case, the determining factor is work experience in the specialty. This dependence is more pronounced in women.

Final indicators of morbidity with temporary disability. In the dyeing-spinning, carpet-weaving and carpet-knitting industries, they were close to each other and were at the industry average level chains and associated occupational hazards.

Thus, in dyeing and finishing production, three main stages of the technological process can be distinguished: dyeing, fiber mixing and spinning.

As studies have shown, at the stages of dyeing and mixing fibers, there are vapors of acetic acid in the air of the working area, the concentrations of which at work places near the filter bath and on the padding are at the level of the SB (5 g /i3) or slightly exceed it (5.3 + 0.3 - 5.8+0.2 mg/m3.). At the same time, at non-permanent workplaces near the box feeder during loading, fiber dust concentrations exceeding 100 mg/m3 are observed. At other workplaces, the concentration of acetic acid and dust levels in the working air do not exceed acceptable levels.

The most unfavorable working conditions at this stage are established in the premises of the chemical station, where, with an open overflow of acetic acid, its concentration reaches 32.9 + 0.6 mg/ me. At the same time, when loading dyes and thickeners into the cooking tanks, the dust concentration in the air ranges from 155.3 to 307.0 mg/m3.

In the spinning shop the main professional ones! Harmful effects include broadband noise and air dust. At the workplaces of spinners, noise occurs that exceeds permissible levels by 8-10 dB and at frequencies of 4000-8000 Hz - by 6-9 dB. At other workplaces the noise does not exceed the maximum limit. Dust levels at the workplaces of spinners and carders are close to the GIK level. However, when cleaning carding machines using the 1- blow method, dust concentrations reach 30.9+4.0 - 37.0+2.7 mg/m3. The total vibration created by the equipment does not exceed the maximum permissible concentration.

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