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OCCUPATIONAL HEALTH OF MODERN SILK WEAVING INDUSTRIES AND THE DYNAMICS OF THEIR WORK CAPABILITY

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Abstract

The working conditions of women in modern silk weaving industries are characterized by a complex of unfavorable production factors: dustiness, noise, insufficient, uneven illumination, high temperature and relative humidity in the warm period of the year, and the intense nature of the labor process. In the dynamics of the working day, weavers' working capacity decreases. The data obtained indicate the need to develop and implement measures to prevent the adverse effects of production factors.
Keywords: silk weaving production, working conditions, weavers, working capacity.

The silk processing industry in Uzbekistan is one of the most developed sectors of the economy, which employs a huge contingent of women.

In Uzbekistan, the production of natural silk is increasing from year to year. Among the fabrics made of natural silk, aurora atlases occupy a special place - fabrics of the national assortment, which are in high demand, especially among the population of Central Asia.

In Uzbekistan, in the cities of Fergana, Margilan, Bukhara and others, there are large silk-weaving mills and factories, where women mainly work. Joint ventures are being created, equipped with new imported equipment, new modern technologies are being introduced, which leads to a change in working conditions, to an increase in intensity, neuro-emotional tension and intellectual labor processes. The levels of parameters characterizing production factors (dustiness of the air in the working area, noise, unfavorable microclimate, severity and intensity of labor processes) also change, which creates additional requirements for the body of women in the course of their work.

The purpose of the research was to identify unfavorable production factors at the workplaces of weaving silk weaving industries and their impact on the dynamics of performance indicators.

Objects and methods of research. The studies were carried out at the Namangan enterprise JSC "Atlas", the most modern and reconstructed silk weaving enterprise of the republic.

Working conditions were studied by traditional methods using a psychrometer, anemometer, aspirator, luxmeter in accordance with the requirements of the Sanitary Rules, Norms and Hygienic Standards of the Republic of Uzbekistan No. 0294-11 [4], 0141-03 [6], 0324 -16 [7], building codes and regulations 2.01.05-96 [9], as well as the methodology "Methodology for assessing working conditions and certification of workplaces according to working conditions" [8].

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To characterize working capacity in the dynamics of the working day, chronometric observations were carried out using the method of "rough photography". At the same time, data were recorded on the duration of the main working operation - the elimination of cliffs. Particular attention was paid to the hourly registration from the beginning to the end of the working day of the time of the main production operation [1, 2, 3].

Research results. The technological process for the production of silk khansatin fabrics begins with the locking of raw silk, which is then rewound from skeins onto spools, after which the silk thread is twisted with under-twist, it is twisted, rewound from spools to skeins, and the twisted thread is boiled. , centrifuge spinning, rewinding from coils to coils, warping (libitovka), dyeing of libits, probing, weaving, designing, packaging, marking and transfer of finished products to the warehouse. Winders, spinners, weavers, and warpers are employed in the technological process of manufacturing silk fabrics. The most popular profession is the profession of a weaver.

Studies have established that silk dust is determined in weaving workshops at the workplaces of weavers in the breathing zone, its concentration does not exceed the maximum permissible concentration (MPC), averages 5.7 ± 0.5 mg/m3 (MPC - 6 mg/m3). However, although the dust content of the production areas of silk weaving industries is insignificant and does not exceed the maximum permissible concentrations, systematic inhalation and prolonged exposure to silk dust can adversely affect the respiratory organs and contribute to the occurrence of chronic atrophic pharyngitis, nasopharyngitis and rhinitis [(V. P.Saakadze, 1976)].

Table 1 presents data characterizing the average shift indicators of the microclimate of weaving shops in the spring and summer periods of observation.

Table 1. Average shift indicators of the microclimate of weaving workshops in the spring and summer periods of observations

Site name	Microclimate indicators					
	Air temperature in ^{0}C		Relative air humidity in %		Air mobility in m/s	
	n	M±m	n	M±m	n	M±m
Spring observation period						
Weaving	70	25,6±0,4	70	49,8±0,8	17	0,5±0,2
Summer observation period						
Weaving	70	34,2±0,7	70	52,5±1,3	18	0,8±0,2

As can be seen from the table, the average shift air temperature in the spring at the workplaces of weavers was 25.6 ± 0.4 ^{0}C at a relative humidity of 49.8 ± 0.8% (this level of relative humidity is associated with a technological need to reduce breakage silk thread and is provided by the operation of ventilation and humidification equipment). Air mobility at all surveyed workplaces was insignificant, averaging 0.5±0.2 m/sec. The study of microclimate indicators at the main production sites of silk-weaving industries in the warm season showed that the highest average shift

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temperatures were observed in weaving shops - 34.2 ± 0.7 ^{0}C, with a relative humidity of 52.5 ± 1.3% and mobility 0.8± 0.2 m/s.

To assess the thermal state of weavers working in the described microclimatic conditions, temperature indices were calculated, integral indicators reflecting the combined effect of air temperature, air velocity, humidity and thermal radiation on heat exchange with the environment.

Considering that according to the category of severity of work, the work of weavers belongs to category IIa, the permissible level of the temperature index is 27.0-30.2^{0}C.

The calculation of the average temperature index per shift in the warm period of the year showed that it fluctuates for weavers from 30.2 to 30.7^{0}C, averaging 30.5^{0}C, i.e. exceeds the allowable level.

Table 2 presents data characterizing the noise indicators of the main production facilities of silk weaving industries.

Table 2. Noise indicators at workplaces of weavers

Machine type	Noise level (dB) in octave bands geometric mean frequencies								General level noise
	65	125	250	500	1000	2000	4000	8000	
shuttle	71	82	88	90	89	84	81	70	94
shuttleless	72	78	82	86	84	80	76	71	89

As can be seen from the table, operating weaving equipment generates noise at workplaces, which is of a constant nature, belongs to the medium-frequency class. The operation of shuttle looms creates noise at workplaces, the total level of which is 94 dB, shuttleless looms 89 dB, i.e. exceeds the maximum permissible level from 9 to 14 dB and is one of the most significant adverse production factors. is the noise, the general level of which at different workplaces

Measurements carried out at each workplace in the dynamics of the first, most optimal work shift, showed that the level of illumination and the coefficient of natural light do not meet hygienic standards. Artificial lighting is carried out at all weaving enterprises with fluorescent lamps, natural lighting through side light openings. As a rule, as you move away from the light opening, the level of illumination of workplaces decreases. In weaving areas, the average level of illumination was 100 ± 6.8 lux, the coefficient of natural illumination was 0.2 ± 0.1%.

The severity of the labor process of weavers is determined by the fact that they service from 2 to 4 looms. They monitor the correct operation of the machine mechanisms and every 3-5 minutes change the empty bobbins in the shuttles to the filled ones. In the process of work, the weaver performs a number of techniques related to the technological process of silk weaving (eliminating weft breaks, searching for a "fold", regulating the warp tension, cleaning the fabric from knots and specks, correcting the warp, dressing prices, developing marriage and small breaks in threads, picking up and surrendering duds, etc.). The work is done while standing, while she

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performs numerous quick and varied movements with the fingers of both hands. The severity of the labor process is also associated with constant body tilts up to 300 more than 300 times per shift.

The intensity of the labor process is due to sensory loads - focusing more than 75% of the shift time. The duration of the working day is 8 hours, work is 3-shift with night shifts, the workload of the working day is 90%.

The study of indicators of the performance dynamics of weavers showed that it significantly increases from the beginning to the end of the working day (Table 3). If at the beginning of work the weavers eliminated the break in an average of 31.6 ± 1.6 seconds, then by the lunch break this figure increased to 37.7 ± 1.4 seconds, and by the end of work to 37.7 ± 1.4 seconds , i.e. by 25.3% from the background to the working level, which is apparently associated with work fatigue and due to unfavorable working conditions.

Table 3. Indicators of the performance dynamics of weavers

Break elimination time (sec)								
1 hour	2 hour	3 hour	4 hour	5 hour	6 hour	7 hour	8 hour	Reliability
M±m	M±m	M±m	M±m	M±m	M±m	M±m	M±m	$P_{1-8}<$
1	2	3	4	5	6	7	8	9
31,6± 1,6	27,9± 1,8	27,3± 1,7	37,7± 1,4	31,6± 1,7	31,5± 2,1	35,3± 1,7	39,6± 1,8	0,01

Thus, working conditions in silk weaving industries have an adverse effect on the state of working capacity of weavers.

CONCLUSIONS.

1. The main unfavourable production factors of modern modernized silk weaving industries are dustiness, noise, insufficient, uneven illumination, high temperature and relative humidity in the warm season, heavy and stressful nature of the labor process.

2. Working conditions at silk-weaving industries have an adverse effect on the state of working capacity of weavers, which decreases in the dynamics of work to 25% from the background to the working level.

3. To stabilize the level of performance, it is necessary to introduce recommendations to minimize the impact of adverse production factors on the body of weavers.

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