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Organization of Labor and Rest for Workers of the Agro-Industrial Complex During Field Work

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Abstract: This article presents the health status of workers in the agro-industrial complex of the Bukhara region. The factors influencing the health status of the working population are determined. At the same time, active work and rest of workers are recommended to maintain their health.

Keywords: agro-industrial complex, health, labor, rest.

Every year, over 15,000 people die in the enterprises of the agro-industrial complex of Uzbekistan, and about 180,000 people receive injuries of varying severity [1]. More than 75,000 workers of working age leave the agro-industrial production sector every year due to loss of ability to work and disability. Due to injuries, illnesses, accidents and other circumstances related to working conditions in agriculture, over 450,000 people do not go to work every day. Over 125 million working days are lost annually due to injuries at work and various illnesses. The annual material consequences of injuries and illnesses amount to approximately 4.5 trillion rubles (direct damage combined with the cost of lost production) [1].

A study of the causes of agricultural injuries has revealed that only about 10-12% of accidents are explained by design flaws in machines, while the rest occur due to preventable organizational reasons [2]. The most common of these are: allowing people to work who have not undergone introductory training, machine and tool failures, lack of proper supervision of safe work by administrative and technical personnel, failure to comply with work and rest schedules, which usually leads to emergency situations due to accumulated fatigue. Many farms experience a sharp increase in injuries and illnesses every year during the harvest season - from August to October, which is explained by the increase in the volume of work and its intense nature at this time, as well as unsatisfactory working conditions [3].

Maintaining high-level performance depends largely on a number of conditions, among which a huge role is played by the creation of a rational work and rest regime. A rational work and rest regime is a scientifically based alternation of the time an employee performs his work functions and breaks for rest and other needs, taking into account the types of work activities, working conditions, the level of mechanization and current legal norms.

The development and observance of measures for a rational work and rest regime is based on a solid legal framework, which makes these measures mandatory for execution. This framework includes national laws on the rational organization of the work and rest regime: the Constitution of the Republic of Uzbekistan, the Labor Code of the Republic of Uzbekistan, the Civil Code of the Republic of Uzbekistan (parts one, two and three with amendments and addendums). At the

same time, there are also internal regulatory acts. These include the charter of an agricultural enterprise, a collective agreement and internal labor regulations.

In plant growing, the work and rest schedule depends on the time of technological operations and natural and climatic conditions. The main operations include: fallow plowing, winter crop sowing, snow retention, cover harrowing, sowing early to late crops, cultivation, and harvesting. It is the timing of these operations, as well as the size of the sown areas, fallow areas, average annual number of agricultural enterprises, and the availability of agricultural machinery that have a significant impact on establishing the work and rest schedule.

Due to the specifics of agricultural production, during intense periods of field work, agro-industrial workers, machine operators, and driver-operators work during daylight hours, and if necessary, at night. This often happens during sowing and harvesting, when the time for technological operations is compressed by biological and natural factors. The time for technological operations also increases. At the same time, the shift time and the number of shifts increase, and the time for rest decreases.

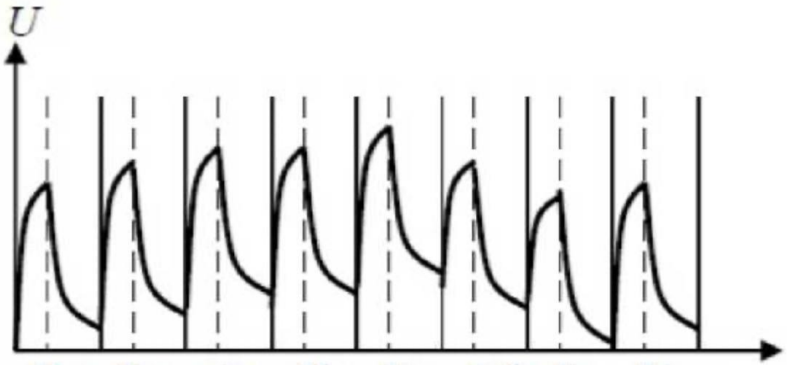

Fig. 1. Idealized typical fluctuations of functional shifts in the human body

To ensure a rational work and rest regime, one must proceed from human biorhythms. All processes occurring in the human body under the conditions of its own biorhythms are necessary to ensure life activity, since otherwise there will be

accumulation of values of non-restorable functional shifts [4]. Fig. 1 shows an example of idealized typical fluctuations of functional shifts in the human body.

It is evident from Fig. 1 that generalized periodic fluctuations of functional shifts in the human body are both daily and weekly in nature. With forced intensive work during the workweek, workday, a person accumulates residual functional shifts, which have time to fully recover only during rest. In the absence of the necessary conditions for rest, significant functional shifts will lead the body to diseases.

Therefore, the forced periods of biorhythms of biochemical processes of sleep and wakefulness cycles, work and rest regimes, dietary regimes and other cycles are adjusted by the body in such a way that all functions necessary for its vital activity fit into these forced frameworks [4].

The main factors on which the physiological reliability of the operator-driver depends are suitability for operating equipment in terms of health and psychological qualities, preparedness and performance. The overwhelming majority of accidents (RTA) occur due to the fault of the human operator as a result of his erroneous actions when operating agricultural transport equipment. In a state of reduced performance with the development of fatigue, operators make mistakes that lead to accidents [5].

It has been established that the degree of fatigue depends on the duration of work. The longer the working day, the more pronounced the fatigue, the more likely errors are. Statistics have established a direct relationship between the time spent operating equipment and the number of accidents. When driving a car for 7 to 12 hours, accidents occur 2 times more often, and over 12

hours - 9 times more often than when working for up to 7-8 hours [5]. It has been proven, for example, that the transition from an eight-hour to a twelve-hour working day leads to an increase in the frequency of errors made by the worker by 80-100% [6].

Such branches of plant growing as sugar beet growing, vegetable growing, gardening, viticulture, tobacco growing are characterized by a great variety of methods and ways of performing work operations, many of which are performed manually. Work in the open air is accompanied by both high and low temperatures. Harvesting of crops such as sugar beet and potatoes ends in late autumn at low temperatures and high air humidity; rice cultivation is characterized by the fact that the field is flooded with water for the entire growing season, as a result of which the use of machines is difficult. Working conditions during cotton cultivation are characterized mainly by the fact that the air temperature during the summer work period can reach 40°C or more. Often, the worker must adopt a forced uncomfortable working position. For example, during harvesting, the worker frequently bends and unbends the body, accompanied by a strong load on the muscles of the neck, back and legs, which subsequently leads to the development of musculoskeletal diseases.

In turn, monotonous engine noise, vibrations, non-compliance with sanitary and hygienic standards of microclimatic parameters in the vehicle cabin, non-observance of the work and rest regime, as well as the nature of work (round the clock), causing circadian arrhythmia in the vehicle operator, contribute to increased fatigue during a work shift. At the same time, the driver-operator's visual acuity decreases, the field of vision narrows, concentration of attention decreases significantly, the accuracy and coordination of movements is impaired, reaction time increases, the degree of automation of skills decreases, the pulse quickens, blood pressure rises, the sense of speed is lost, apathy, lethargy arises, readiness for action in case of unexpected changes in the traffic situation is impaired. Further, such a state, ultimately, leads to unconditional uncontrolled falling asleep at the wheel.

In the field, there is no possibility of carrying out sanitary and hygienic measures, there is no specially equipped room for eating. In fact, field agricultural workers are in extreme working conditions. They are subject to rapid fatigue (physical, nervous, acute and latent), colds. They suffer from hearing loss, due to the excess of maximum permissible noise levels of agricultural machinery and units. Due to functional overstrain, they are susceptible to occupational diseases of the musculoskeletal system, of which the following should be especially highlighted: periarthritis of the shoulder joint, stenosing ligamentitis of the dorsal ligament

wrist (styloiditis), epicondylitis of the shoulder, deforming arthrosis, occupational myositis, coordination neuroses, etc. The dynamics of occupational diseases in agriculture is presented in Fig. 2.

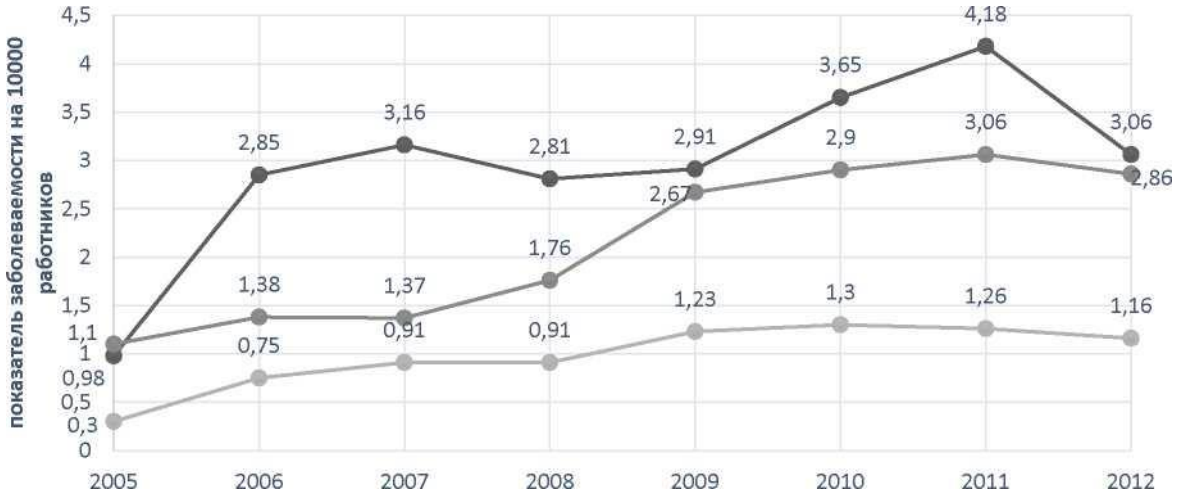

Fig. 2. Dynamics of occupational diseases per 10,000 workers in agriculture and some industries from 2019 - 2020.

According to statistical data [7] in Fig. 2 it is clear that agriculture in terms of the number of occupational diseases is ahead of such industries as construction, transport and communications on average over 7 years by 2 and 1.5 times respectively. Agricultural workers are most susceptible to occupational diseases.

During the working day, there are usually 3 phases of human performance, presented in the table.

Table. Phases of human performance

Item No.	Phase name	Phase duration, h	
		before lunch break	after lunch break
1	Working in	0.3 - 1.5	0.2 - 0.3
2	Sustainable performance	3 - 3.5	2 - 3
3	Increasing fatigue	0.2 - 0.3	1 - 1.5

The table shows that after the lunch break, a faster development is observed in phase 1, a shorter period of stable performance in phase 2, and the longest period of fatigue by the end of the working day in phase 3.

These scientific data are taken into account both in regulatory acts governing work and rest regimes and in internal regulatory acts.

Rest time is the time during which an employee is free from performing work duties and which he can use at his own discretion. This time includes breaks in work (usually for rest, meals and warming up), rest between shifts, days off during the week, holidays and vacation days. In order for an employee to restore his working capacity during the working day, he must be given a break of at least 30 minutes, but not more than 2 hours, which is not counted as working time [8].

If the employee's working conditions involve working outdoors at low temperatures, the employer is obliged to provide the employee with time to warm up, as well as the conditions for doing so. This time is also included in the working hours.

Any agricultural enterprise should always be interested in improving the work and rest regime, as this allows solving the following problems: combating fatigue of workers and ensuring daily high productivity, maintaining the long-term working capacity of agricultural workers, maintaining the health of workers.

As a result of theoretical and experimental research conducted at the patent level (Patent for Utility Model No. 146639), a mobile recreation complex (MRC) was developed for workers in agricultural field work [9]. The MRC relates to agricultural production, namely to the labor protection of workers in agricultural field work, and can be used in the system of recreational activities. The MRC ensures the creation of conditions for quick recreational activities, the prevention of occupational diseases among workers in agricultural production, and the reduction of fatigue.

MKR for workers in agro-industrial production, the scheme of which is shown in Fig. 3, contains a building 1 located on a mobile chassis (not shown in Fig. 3) and made in the form of a frame-metal structure, its walls 2 are covered with plastic or laminated fiberboard from the inside, the floor 3 is made of wood material and covered with linoleum, in the building, heat and water supply units (not shown in Fig. 3) and room equipment are attached to the power beams using brackets and fasteners, between the wall cladding 2 and between the chassis and the floor 3 there are power beams (not shown in Fig. 3), to which lightweight wall panels 4 with doors 5 are attached using brackets and fasteners, dividing the premises of building 1 into rooms 6, 7, 8, in the middle room a vestibule 7 is built from lightweight wall panels 4, to which a staircase with a platform 10 is installed on the outside, to the doorway 9, the gap between the wall cladding 2 is filled soundproofing material 11, in the vestibule 7 hangers with dryers 12 for work clothes are

installed, while on one side of the vestibule 7 through the doorway 13 there is a toilet 14 with a washbasin 15 and a bidet 16, and on the other side there is a rest and dining room 6, in the central part of which a transformable table 17 is installed, around which massage chairs 18 are located, near the lightweight wall panel 4 to the left of the entrance door 19 in room 6 there is a table 20, under the tabletop of which there is a refrigerator 21, on the tabletop there is a microwave oven 22, while above the table 20 there is a cabinet with dishes 23, and next to the table 20 there is a cooler 24, and on the wall 2 an air conditioner with an air ionizer 25 is rigidly fixed, and an audio system 26 is installed.

The MKR for workers in agro-industrial production works as follows. Before the lunch break, the MKR is aggregated with a tractor, which brings it to the place where field work is being carried out. In it, you can carry out quick recreational, sanitary and hygienic activities, and also take shelter from bad weather.

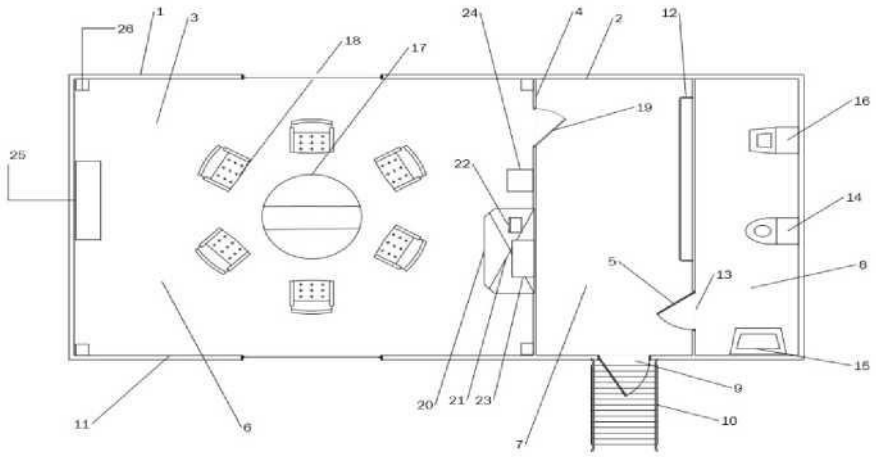

Fig. 3. Scheme of the mobile recreation complex:

1-building; 2-walls; 3-floor; 4-light wall panels; 5, 19-door; 6-rest and dining room; 7-vestibule; 8-personal hygiene room; 9,13-doorway; 10-stairs with a landing; 11-soundproofing material; 12-coat rack with a dryer;

14-bathroom; 15-washbasin; 16-bidet; 17-transformer table; 18-massage chair; 20-table; 21-refrigerator; 22-microwave oven; 23-cupboard; 24-cooler; 25-air conditioner with air ionizer; 26-audio system.

During their lunch break, workers enter the building of the complex via a staircase with a landing, where they can leave their work clothes on hangers with dryers in the vestibule and dry them if necessary. In the rest and dining room, workers can quench their thirst and hunger using household appliances (a refrigerator, a microwave oven, a cooler). In the rest and dining room, there is a transformable table that can be assembled or disassembled for convenience if necessary. After or during meals, recreational activities are held. Workers sit on massage chairs and first receive a relaxing massage that relieves tension from the muscles of the neck, back and legs, and by the end of the break, a toning massage, due to a preset program of massage chairs. The entire massage procedure is accompanied by aromatherapy and music therapy (sounds of nature, classical music), through an installed audio system. Also, optimal microclimatic conditions are created in the room due to an air conditioner with an air ionizer. Moreover, workers are isolated from extraneous noise (the sounds of operating agricultural machinery and units) due to the use of soundproofing material between the wall panels.

Thus, the MKR will allow for recreational activities for agricultural field workers due to the possibility for workers to satisfy their hunger during lunch breaks, perform sanitary and hygienic measures, and to rest and psychophysiologically relieve stress by using aromatherapy, music therapy, air ionization, creating favorable microclimatic conditions and aesthetic interior design.

The use of massage chairs will relieve tension from strained muscles. The listed measures will lead to a decrease in fatigue, increase labor productivity, and prevent occupational diseases.

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