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INFLUENCE OF PRODUCTION MICROCLIMATE ON THE BODY OF MAN

[1]Yusufjon Saidovich Beshimov
[1]Bukhara Engineering Technological Institute, Bukhara, Uzbekistan.

[2]Kakhramon Sanokulovich Rakhmonov
[2]Bukhara Engineering Technological Institute, Bukhara, Uzbekistan.

[3]Bakhtiyor Donyorovich Baratov
[3]Bukhara Regional Department of Emergency Situations, Life Safety Training Center

[4]Subkhon Esanovich Bozorov
[4]Bukhara Regional Department of Emergency Situations,Life Safety Training Center

ABSTRACT

The parameters of atmospheric air, which determine the climatic conditions in manufacturing plants, are the main properties. One of the main goals of this article is to ensure the uninterrupted operation of the human body in summer and winter without any stress at industrial enterprises operating in the republic. At present, there is clear evidence that a sharp change in the parameters of atmospheric air leads to a decrease in human labor activity and a decrease in labor efficiency.

KEYWORDS: *temperate climate, temperature, air pressure, air velocity, metabolism, relative humidity, heating, cooling*

INTRODUCTION

Climatic conditions are the climate of the air layer near the surface, that is, a natural process that occurs due to small differences in surface area within the local climate. Microclimate conditions are determined by the state of the environment. Therefore, when determining climatic conditions, the local climate of the forest differs from the intra-forest plains, the microclimate of the forest edge, the local climate of the city differs from the climatic conditions of some areas, streets, alleys, yards, etc. As the rise above sea level, the differences between climatic conditions begin to sharply narrow. The climate is largely dependent on atmospheric conditions. The differences between climatic conditions are very noticeable when the atmospheric air is clean and calm, and when the sky is cloudy, climatic conditions differ less from each other. Microclimate is the climate of these small areas. Observations are carried out on the basis of atmospheric air parameters to determine the microclimatic characteristics of each production site [1-4].

Indicators of climatic conditions in a work environment are air temperature, relative humidity, air pressure and air velocity, which collectively have a significant impact on human productivity, labor productivity and biological changes in the human body .

The constant moderate temperature in the human body is controlled by the activity of the central nervous system due to the metabolic process.

It is necessary to create calm, moderate climatic conditions so that the human body does not get tired, maintain a normal level of labor productivity, and preserve the characteristics of the biological state of the body. To achieve this balance, it is necessary to ensure that the four air parameters

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are in a state of mutual proportion. This balance ensures that the temperature in the human body goes through the temperature response in the human body without any stress, and that the person feels at ease and at the same time has a high ability to work [5].

MATERIALS AND METHODS

For the normal functioning of the human body, the air temperature in the workplace should be 18-25^{0}C, relative humidity 40-70% and pressure 740-760 mm. cm should be in the column. The process of temperature exchange between the human body and the surrounding air cannot be strongly influenced, since in such conditions the heat exchange between the media moves in details and without residue, that is, the heat leaving the body is equal to the rate of its absorption by the air. The heat transfer is complete. When such a balance in the air is disturbed, the health of a person working in this environment also changes [6-8].

When the ambient temperature is 18-250° C, the heat radiated by the human body is slowly dissipated in the air as dry dust in accordance with the law of heat transfer. When the temperature rises, the heat generated by the human body is released into the air as steam. That is, excess heat in the body manifests itself as sweat on the surface of the skin, flushing out saline solutions in tissues along the way under the influence of energy leakage from the muscles.

As the ambient temperature rises, the body's ability to transfer heat decreases and the evaporation process increases steadily, causing the body to quickly become weak. If the relative humidity of the air exceeds 80 percent, evaporation of sweat from the body becomes difficult and as a result, the exchange of temperatures between the body and the environment is disrupted. Such a violation negatively affects the productivity of human labor. When the speed of air movement increases, the temperature difference between the body and the air increases sharply, so the body begins to cool down quickly, and as a result, the human body causes diseases associated with colds.

The microclimatic conditions of the working environment have a huge impact on a person's performance and health. Knowledge of the influence of microclimate factors in human life practically in negative or positive conditions and the application of measures to mitigate it has a positive effect on increasing labor efficiency in the labor process. The use of microclimate parameters can be beneficial or harmful in some conditions. This is due to the fact that at high air temperatures it is positive, and at low temperatures it is negative.

Taking into account the maintenance of body temperature with a constant change in microclimate conditions, a good opportunity is created for the activity of biochemical processes in the body [9]. An increase in body temperature under the influence of the working environment negatively affects labor productivity, and this condition is called overheating of the body. Conversely, an abnormal drop in air temperature in a production environment can lead to various industrial accidents. Such a sharp drop in temperature is called body cooling. Sudden changes in the industrial microclimate create a catastrophic situation that disrupts life. Therefore, the human body has a physiological mechanism that adapts to the external environment, which is under the control of the central nervous system. The main function of this physiological mechanism is to maintain the thermal ratio by releasing excess heat released as a result of metabolism in the body into the external environment.

RESULTS

There are also factors that influence the microclimate of production, such as heat from the surfaces of machine materials, which leads to an increase in air temperature. Microclimate factors have a huge impact on the ability to work and human health. In a work environment, almost all environmental factors are affected simultaneously. In some cases, this effect can be beneficial. For example, in cold conditions, dehydration is more common as a result of dehydration, and in some cases, exposure levels may increase as a result of the combination. Thus, the rise in relative humidity and temperature creates difficult conditions for humans. In addition, increased air movement in the workplace is beneficial at high temperatures and negative at low temperatures. It can be seen that weather factors can have a positive and sometimes negative effect on a person in some cases, disrupting the adaptation of the human body to the external environment. The adaptability of the human body to the environment is the ability of the human body to maintain body temperature in the same range (36-37° C) based on physiological and chemical processes [10-12].

The adaptation of the human body to the external environment can be divided into physical and chemical processes. Physical adaptation of the human body to the external environment is determined by the adaptation of the body to body temperature, pressure, air velocity. Chemical adaptation of the human body to the external environment is characterized by a decrease in metabolism during the period of warming the body and an increase in metabolism as a result of cooling. Physical adaptation of the human body to the external environment is more important than chemical adaptation. Because all biochemical, chemical and physiological changes in the body are closely related to physical processes. The human body generates heat into the external environment in three ways.

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Table 1 below shows human heat emissions into the environment.

Distribution of heat by a person into the external environment during various activities
Table 1

№	Job categories	Infrared radiation	Convective heat transfer	Evaporation of fluid through the respiratory tract
1.	Light - I	45	30	25
2.	Average weight-I a	40	25	35
3.	Average weight -I b	35	25	40
4.	Heavy - III	30	30	40

As can be seen from Table 1, heat transfer from the human body, depending on the job category, is fast and complete, along with the evaporation of fluids through the respiratory tract relative to infrared radiation. In the process of convective heat transfer, this condition is much slower. This is because the metabolic process is very slow when heat is transferred from one medium to another. It should be noted that 80% of the heat released by the human body is released through the skin, 13% through the respiratory system. Also, 5-7 percent of the heat is spent on heating consuming products (food, water and air).

Industrial microclimate standards are a system of occupational safety standards specified in the standards. They are based on hygienic, technical and economic principles. Depending on the premises, the time of year and the category of work in enterprises, the permissible standards for temperature, relative humidity and air movement in the workplace are established [13].

All categories of work performed in the Republic of Uzbekistan are defined as follows:

1. Category I - light physical work: work performed while sitting, standing or walking, but does not require regular physical exertion or lifting a load, energy consumption is 150 kcal (172 Jw.) Per hour.

2. Category II - moderate physical activity: includes activities that consume 150-250 kcal (172-293 JS) per hour. This includes work related to constant walking and transportation of light (up to 10 kg) loads.

3. Category III - hard physical work: includes work associated with regular physical activity, in particular with the continuous movement and lifting of heavy loads (more than 10 kg) from one place to another. In this case, energy consumption exceeds 250 kcal (293 J / s) per hour.

The main parameters that determine the change in temperature during the season and normal conditions, calculated from the indicators that determine the microclimate conditions, are shown in Figure 1 below.

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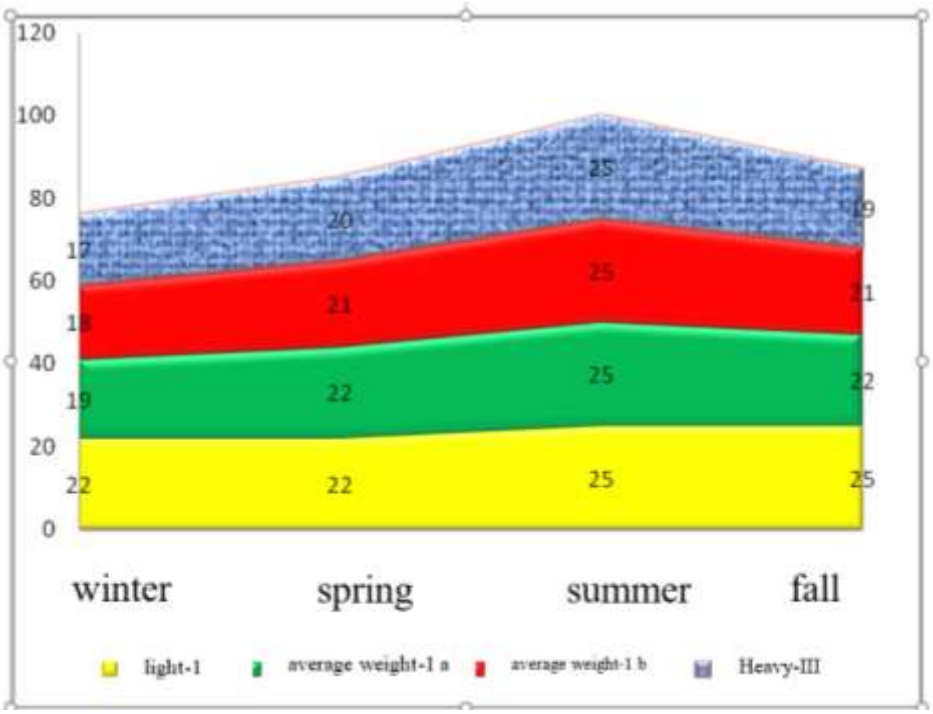

Figure 1. Dependence of temperature on activity

As can be seen from Figure 1, the change in the efficiency of human labor at the intersection of seasons is associated with temperature. Temperature, which is a parameter that determines the basic conditions of the microclimate, can have both positive and negative effects on the efficiency of human labor. Temperatures up to 25° C do not affect the efficiency of human labor. On the contrary, an increase in temperature at the workplace leads to labor productivity, negative consequences for the organism of workers, i.e. to the occurrence of various diseases. Changing seasons leads to a sharp drop or rise in temperature. This requires a change in temperature at this time.

Temperatures can drop or rise depending on the season. At the same time, the relative humidity of the air also changes with temperature. The higher the relative humidity, the more difficult it is to absorb the moisture released from the body, and the exchange of moisture between the air and the body is disturbed. As a result, the human body can suffer from various diseases. The exposure of the body to relative humidity, depending on the work activity of workers, can be very dangerous or lead to occupational diseases. Figure 2 shows the basis for determining the change in the parameters of normal air humidity during the seasons, depending on the efficiency of human labor.

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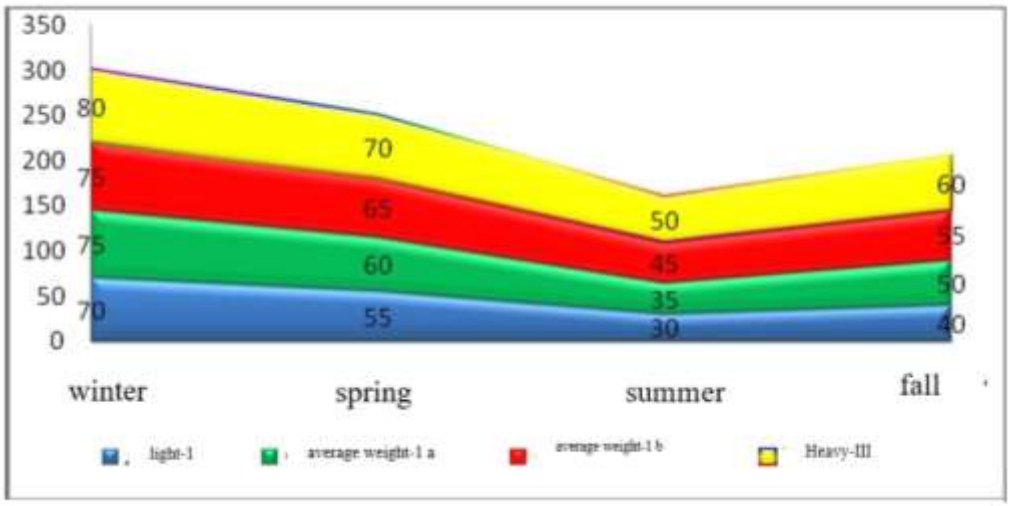

Figure 2. Relative humidity versus activity.

As can be seen from Figure 2, the continental climate of the republic is characterized by a very large difference in humidity between mountainous and lowland areas. Variability in relative humidity It is important to do this separately for each activity. High relative humidity reduces the release of body heat into the environment. As a result, the efficiency of human labor decreases. The relative humidity is such that the heat or sweat generated from the body can be exchanged in ideal proportions. It should be noted that the relative speed of air with relative humidity can interact with the body. The faster the air moves, the more fully you can exchange the energy released from the body. As a result of this exchange, the human body is exposed to perspiration and rapid cooling, which can lead to colds. Pressure standards are shown in Figure 3 [14-17].

DISCUSSION

Temperature, relative humidity and air velocity are defined as normal and acceptable values. Normal amounts are a set of microclimate indicators that ensure the normal functioning of the body and maintain a warm state without increasing adaptive responses to the external environment during prolonged and regular exposure to a person, which creates sensitivity to heat and is a condition for increasing productivity.

Permissible microclimate conditions are a set of microclimate indicators that counteract and quickly normalize the body's activity and changes in thermal conditions, an increase in adaptive reactions to the external environment, which do not deviate from the possibilities of physiological adaptation. There are no health risks, but abnormal sensations of warmth, mood swings, and decreased performance may occur. An air conditioner is also required during normal operation. In some cases, for example, it is necessary to comply with hygienic requirements for work and rest, when the volume of rooms with high heat transfer or heating is large, but use all means to prevent overheating and freezing of the body.

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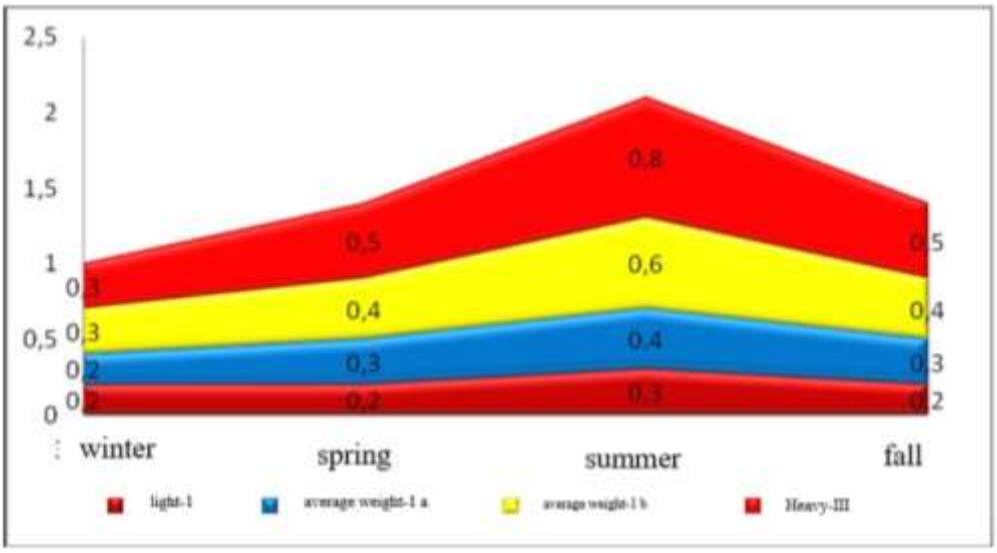

Figure 3. The dependence of the speed of air movement on the activity.

Acceptable norms are that during the cold and transitional periods of the year, the average daily outdoor temperature fluctuates somewhat wider beyond + 10 ° C or, accordingly, below permanent workplaces, and that the air temperature at the workplace increases during the hot season (especially in Central Asia and workplaces where heat dissipation is possible). This is because the outside environment is hot and it is difficult to lose a lot of heat.

CONCLUSIONS

However, even in this case, the norms limit the maximum. In workplaces with high heat transfer, the air velocity is also determined by a slight excess.
It is necessary to develop coefficients that take into account the size of the premises, the simultaneous release of both heat and moisture, the conditions for the artificial preservation of constant temperature and humidity. The harder the job, the lower the temperature and the higher the air movement.

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