THE INFLUENCE OF THE INDUSTRIAL MICROCLIMATE ON THE HUMAN ORGANISM

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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 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 layer of air near the surface, which is 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 intraforest 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 you rise above sea level, the differences between climatic conditions begin to narrow sharply. The climate largely depends on atmospheric conditions. Differences between climatic conditions are very noticeable when the atmospheric air is clean and calm, and when the sky is cloudy, climatic conditions are less different from each other. Microclimate is the climate of small areas. Observations are carried out on the basis of atmospheric air parameters to determine the microclimatic characteristics of each production site**.[1-10]**

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

A 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, temperate 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 make sure that the four parameters of air are in a state of mutual proportion.

For the normal functioning of the human body, the air temperature in production should be 18-250C, and the process of temperature exchange between the human body and the surrounding air cannot be strongly influenced, since under such conditions the heat exchange between the media moves in detail and without residue, that is, the heat leaving the body , is equal to the rate of its absorption by air i.e. the heat exchange process is sour. heat exchange is completed. When this balance in the air is disturbed, the health of a person working in this environment also changes.

When the ambient temperature is 18-25°C, the heat radiated by the human body is slowly dissipated to the surrounding air in accordance with the law of heat exchange. When the temperature rises, the heat generated by the human body is released into the air as vapor. That is, excess heat in the body manifests itself in the form of sweat on the surface of the skin, washing away saline solutions in the 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 constantly increases, causing the body to quickly become weak. If the relative humidity of the air exceeds 80 percent, the evaporation of sweat from the body becomes difficult and as a result, the exchange of energy and temperature exchange between the body and the environment is disturbed. Such a violation negatively affects the productivity of a person. When the speed of air movement increases, the temperature difference between the body and the air increases dramatically, so the body begins to cool down quickly, and as a result, the human body causes diseases associated with colds**.[11-15]**

The microclimatic conditions of the production environment have a huge impact on human performance and health. Knowledge of the influence of microclimate factors in human life in practically 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 detrimental in some conditions. This is due to the fact that at high air temperature it is positive, and at low temperature 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 [1]. 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 an industrial environment can lead to various industrial accidents. Such a sharp drop in temperature is called cooling of the body. 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 **[16-21].**

There are also factors that affect 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 production environment, almost all microclimate factors are affected simultaneously. In some cases, this effect can be useful. For example, in cold environments, dehydration is more likely to occur as a result of dehydration, and in some cases exposure levels may increase as a result of the combination. Thus, an increase in relative humidity and temperature creates difficult conditions for humans. In addition, increasing air movement in the workplace gives a positive result at high temperature and a negative result at low temperature. It can be seen that weather factors can have a positive and sometimes negative impact 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. The adaptation of the human body to the external environment can be divided into physical and chemical processes. The physical adaptation of the human body to the external environment is determined by the adaptation of the body to body temperature, pressure, air velocity. The chemical adaptation of the human body to the external environment is characterized by a decrease in metabolism during the warming period of 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 releases heat into the external environment in three ways. Table 1 below shows human heat emissions to the environment.

TABLE 1 THE DISTRIBUTION OF HEAT BY A PERSON INTO THE EXTERNAL ENVIRONMENT DURING VARIOUS ACTIVITIES.

№	Categories of work	Infrared radiation	Convective heat transfer	Evaporation of fluid through the respiratory tract
1.	Light degree - I	45	30	25
2.	Intermediate degree-I a	40	25	35
3.	Intermediate degree-I b	35	25	40
4.	Severe degree - III	30	30	40

As can be seen from Table 1, heat transfer from the human body, depending on the category of work, is fast and complete, along with the evaporation of liquids 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 generated by the human body is released through the skin, 13% - through the respiratory system. Also, 5-7 percent of heat is spent on heating consumer products (food, water and air).

Industrial microclimate standards are a system of labor 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, enterprises establish permissible standards for temperature, relative humidity and air movement in the workplace **[22-28].**

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 not requiring regular physical activity or lifting of a load, energy consumption is 150 kcal (172 joules) per hour.

2. Category II - moderate physical activity: includes activities consuming 150-250 kcal (172-293 J.S.) per hour. This includes work associated with constant walking and carrying light (up to 10 kg) loads.

3. Category III - heavy 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 the normal conditions calculated from the indicators that determine the conditions of the microclimate are shown in Figure 1 below.

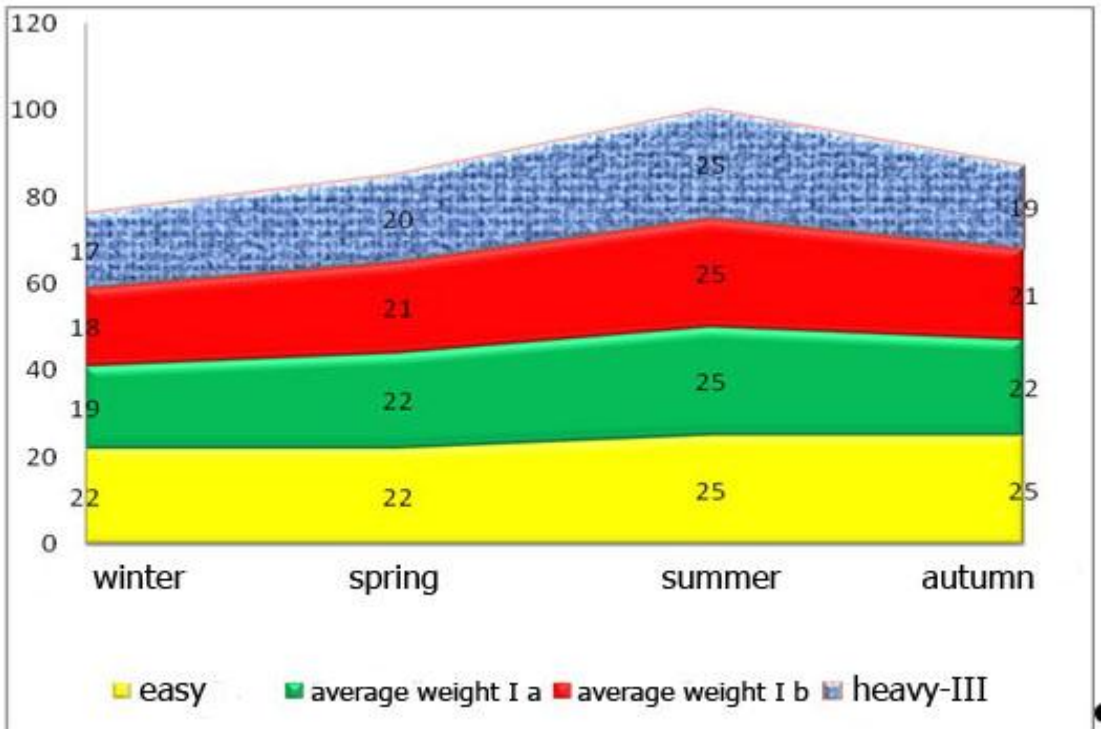

Figure 1. Temperature versus activity.

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 in the workplace leads to labor productivity, negative consequences for the body of workers, i.e., to the occurrence of various diseases. The change of 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 time of year. 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 impact of relative humidity on the body, 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.

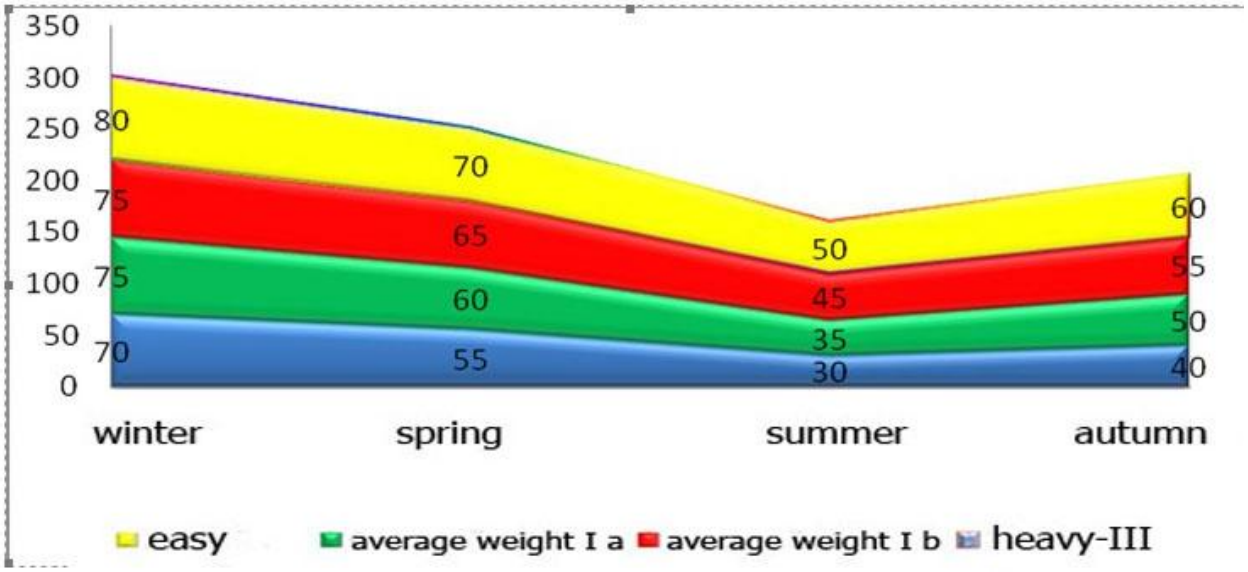

Figure 2. Relative humidity versus activity

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. Relative Humidity Variability It is important to do this separately for each activity. High relative humidity reduces the release of heat generated by the body into the environment. As a result, the efficiency of human labor is reduced. The relative humidity is such that the heat or sweat given off from the body can be exchanged in ideal proportion. It should be noted that the relative air velocity 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 undergoes sweating and rapid cooling, which can lead to colds. Pressure standards are shown in Figure 3 **[29-32].**

Temperature, relative humidity and air velocity are defined as normal and permissible values. Normal quantities are a set of microclimate indicators that ensure the normal functioning of the

body and maintain a warm state without enhancing adaptive reactions to the external environment with 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, strengthening adaptive reactions to the external environment that do not deviate from the possibilities of physiological adaptation. There are no health hazards, but abnormal sensations of warmth, mood swings, and decreased performance may be observed. Air conditioning is also required during normal operation. In some cases, for example, it is necessary to comply with hygiene requirements for work and leisure, when the volume of rooms with high heat transfer or heating is large.

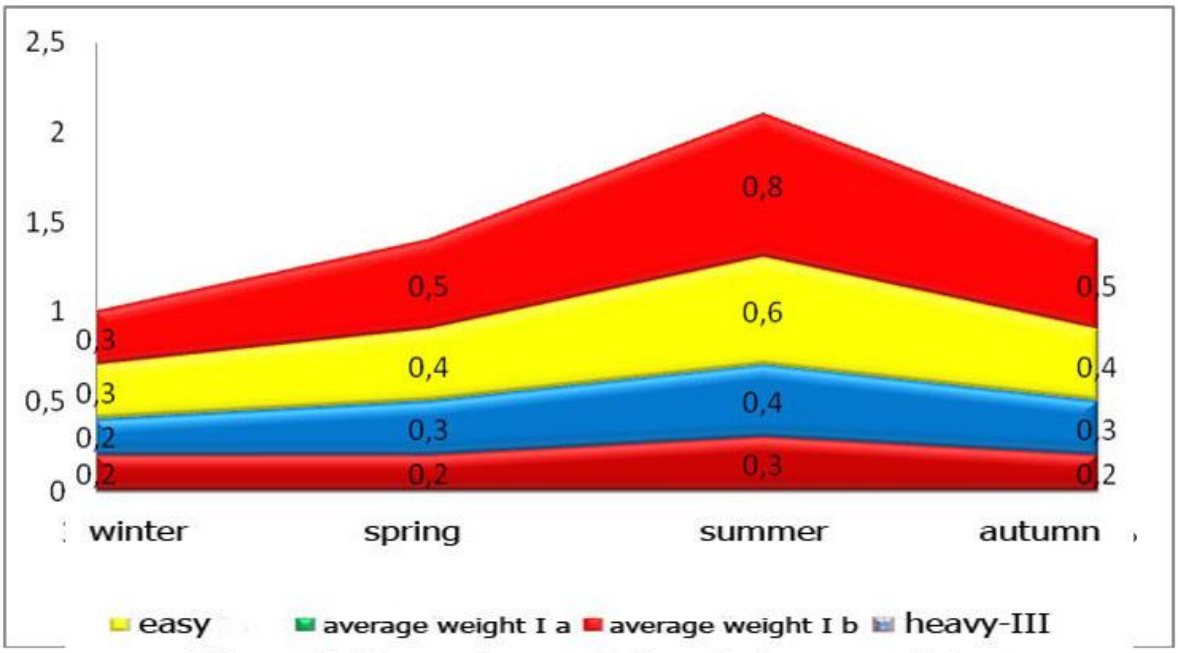

Figure 3. Dependence of air velocity on activity.

Permissible norms are that during the cold and transitional periods of the year the average daily temperature of the outside air fluctuates somewhat more outside + 10 ° C or, respectively, below permanent workplaces, and that the air temperature in the workplace increases during the hot season (especially in Central Asian environments and workplaces where heat dissipation is possible). This is due to the fact that the external environment is hot and it is difficult to lose a large amount of heat.

However, even in this case, the norms limit the maximum. In workplaces with high heat transfer, the air speed is also determined by a slight excess**.[33-36]**

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 artificially maintaining a constant temperature and humidity. The harder the work, the lower the temperature and the higher the air movement.

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