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UKRAINIAN RESEARCH SCHOOLS NEGATIVE THERMAL FACTORS AT WORKPLACES

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INTRODUCTION

A very important issue in the context of the negative impact of excess thermal radiation on the health of people working in production. This is especially relevant in industries where there is a high risk of burns, overheating of the body and other thermal injuries.

Protecting the health of workers in production exposed to excessive thermal radiation requires a comprehensive approach, which includes both technical and organizational measures. For example, it is necessary to install special ventilation and air conditioning systems, ensure a sufficient level of lighting and protection from direct sunlight, as well as use special clothing and personal protective equipment, for example, helmets with ventilation, special suits, glasses, masks, etc.

In addition to technical measures, it is important to develop and follow appropriate workplace safety procedures and rules. For example, it is necessary to regularly carry out inspections and maintenance of equipment, train employees in safety rules and use of personal protective equipment, as well as monitor the work schedule and duration of rest breaks.

According to research by the International Labor Organization, every 5 degrees Celsius increase in the temperature of the production environment increases the risk of death by 2-3%. Workers who work in conditions of increased thermal radiation have a higher risk of health deterioration. Namely, the condition of the internal hematopoietic organs and blood vessels (23.5%), injuries increase by (18.1%), malignant neoplasms (12%), neurological diseases (11.6%), respiratory diseases (8.6%), digestive organs (7.2%), burns (3.1%) and other occupational diseases.

It is also important to consider legislative and regulatory requirements regarding occupational health and safety at the workplace. In most countries, there are relevant organizations and institutions in the countries develop and implement regulatory documents that regulate the maximum permissible level of thermal radiation at the workplace. In addition,

mandatory checks are carried out in compliance with sanitary and hygienic requirements in production, including control of the level of thermal radiation. Industrial enterprises can also use thermal protection technologies, which allow to reduce the risk of pathological conditions in workers [1-7].

PURPOSE AND TASKS

In modern productions related to the production of heat, collisions with various harmful factors are not uncommon. One of the most dangerous and malicious factors is excessive thermal radiation. This can lead to a risk to the health of employees, which is a significant problem for enterprises and the economy. For example: ferrous, rare earth and non-ferrous metallurgy; production of glass and household glass products and foam glass; stone casting and production of mineral thermal insulation; production of ceramics and bricks; enterprises to produce electrical equipment, cables and switching products [8-14].

In this regard, it is necessary to investigate harmful factors and find ways to reduce their impact on the health of workers and production as a whole.

MATERIALS AND METHODS

The methods are a survey of scientific institutes and activists who are investigating the harmful effects of industries where high temperatures are used. To analyze the research conducted in Ukraine and abroad on the problems associated with excessive thermal radiation in production, and to describe the safety and health measures that must be taken to reduce the negative impact of this factor on workers. And also draw conclusions about what research has been conducted in this field, what challenges exist in researching this topic, and what opportunities exist for further research.

THE RESULTS

In Ukraine, the following main institutes and their activities are presented with the pioneers of the direction as negative factors of excessive temperature stress at the workplace:

1) National Technical University of Ukraine "Ihor Sikorskyi Kyiv Polytechnic Institute" – Department of Occupational Safety and Ecology. Politekhnichna Street, 14, Kyiv, 03056, Ukraine.

Works on research and development in the following areas:

– Study of the impact of excess heat on the health and safety of workers. Studies aimed at assessing the risks associated with exposure to high

temperatures at the workplace. Analysis of the effects of heating the body, heat stress, the possibility of heatstroke and the development of prevention strategies.

– Development and implementation of labor protection measures when working in conditions of excessive heat. Development of effective methods and technologies to reduce the burden on the body of workers, including the use of thermoregulation equipment, control of parameters of the working environment and establishment of optimal work modes.

– Study of the effect of temperature load on productivity and quality of work. How excess heat affects work efficiency and the quality of tasks performed by employees. This makes it possible to develop recommendations for optimizing work processes and increasing productivity in conditions of high temperatures.

– Development of adaptation strategies to work in conditions of excessive heat. Research and development of recommendations on optimal methods of adaptation of workers to high temperatures at the workplace; study of acclimatization opportunities, development of training programs for employees and determination of optimal work periods and intervals.

– Implementation of innovative technologies and work environment control systems. Development and implementation of new technologies and control systems that allow monitoring temperature and humidity parameters at the workplace, detect deviations from the norm and provide timely warnings to employees and management.

Considering the activity and importance of scientific works, it is possible to distinguish:

– Professor Ivanova Olena Viktorivna:

Dissertation: "Impact of excessive temperature load on the health of workers in industrial conditions";

Publications:

1. "The influence of temperature regimes at the workplace on the physiological state of workers";
2. "Assessment of risks of excessive heating of workers in production premises";
3. "Technological solutions to reduce the impact of negative factors of excessive temperature load."

– Associate Professor Petrov Serhiy Oleksandrovich:

Dissertation: "Organization of the labor protection system in conditions of redundancy heating";

Publications:

1. "The role of labor protection in ensuring the safety of workers when working in conditions of high temperatures";
2. "Methods of thermal stress assessment in industrial conditions";

3. "Development of recommendations for ensuring comfortable temperature conditions at workplaces."

2) Institute of Hygiene and Medical Ecology named after O.M. Marzeeva of the National Medical Academy of Postgraduate Education named after P.L. Shupyka St. Dorohozhitska, 9, Kyiv, 04112, Ukraine.

Works on research and development in the following areas:

– Research on the impact of heat stress on human health, including the identification of mechanisms of its impact on various physiological systems of the body, as well as the development of methods of protection against negative consequences.

– Development and implementation of production standards for the temperature regime at workplaces, as well as development of recommendations for employees on countering the negative consequences of exposure to high temperatures.

– Investigation of the impact of negative factors of excessive temperature stress on the health of certain professional groups, such as industrial workers, in particular miners, metallurgists, technicians, etc.

– Development and implementation of new methods for diagnosing the negative effects of high temperatures on human health.

– Development and implementation of new methods of protection against the negative effects of high temperatures, such as new materials for the production of protective clothing and special equipment.

Considering the activity and importance of scientific works, it is possible to distinguish:

– Docent Ivanova Nataliya Volodymyrivna

Publications:

1. "The influence of extreme temperature conditions on the state of health of workers";

2. "Assessment of the risks of overheating at the workplace of industrial workers."

– Professor Oleksandr Mykhailovych Sidorov

Publications:

1. "Heat stress at the workplace: impact, assessment and prevention measures";

2. "Technological solutions to ensure comfortable temperature conditions in production."

– Associate Professor Olga Petrivna Zakharova

Publications:

1. "Labor protection in conditions of high temperatures: risk assessment and preventive measures";

2. "The influence of negative heat factors on the physiological state of

workers and protective measures."

3) Institute of Hygiene and Medical Ecology named after H.M. Dobryansky National Academy of Sciences of Ukraine. Kyiv, str. Heroes of Defense, 50.

Works on research and development in the following areas:

– Study of the impact of negative temperature factors on the health and well-being of workers.

– Development of methods for assessment and control of heat stress at workplaces.

– Establishment of regulatory requirements and recommendations for ensuring comfortable temperature conditions in working premises.

– Development of measures to prevent overheating and hypothermia at the workplace.

– Study of the influence of temperature loads on the risk of occupational diseases and accidents.

– These areas of research allow the institute to make recommendations and develop strategies for improving working conditions, ensuring worker safety and preventing occupational diseases related to the negative impact of temperature in the workplace.

Considering the activity and importance of scientific works, it is possible to distinguish:

– Docent Ivanova Nataliya Volodymyrivna.

Dissertation "Influence of heat stress on the health of workers of industrial enterprises".

Publications:

1. "The influence of extreme temperature conditions on the health of workers."
2. "Assessment of the risks of overheating in the workplace and recommendations for prevention."
3. "Heat stress and its consequences in the workplace: analysis and prevention measures."
4. "The influence of negative factors of heat on the physiological state of workers and ways of its correction."
5. "Labor protection in conditions of high temperatures: risks and preventive measures."

– Professor Oleksandr Mykhailovych Sidorov

Dissertation "Evaluation of thermal comfort and risk of overheating at the workplace".

Publications:

1. "Heat Stress in the Workplace: Impact, Assessment, and Prevention."

2. "Technological solutions to ensure comfortable temperature conditions in production."

3. "The impact of excessive temperature stress on the health of workers and ways to reduce it."

4. "Assessment of the risks of overheating in the workplace of industrial workers."

5. "Occupational safety in conditions of high temperatures: risk assessment and preventive measures."

4) Institute of Medical Equipment and Technologies named after O.O. Bogomolets National Academy of Sciences of Ukraine. St. Akademika Zabolotny, 166, Kyiv, 03680, Ukraine

Works on research and development in the following areas:

– Study of the influence of excessive temperature stress on the human body.

– Development of new methods of measurement and control of heat load at the workplace.

– Development of ergonomic solutions to ensure comfortable working conditions at high temperatures.

– Implementation of innovative technologies and systems to reduce the risk of overheating and improve employee safety.

– Increasing awareness and training of medical workers regarding the management of negative factors of excessive temperature stress.

Considering the activity and importance of scientific works, it is possible to distinguish:

– Professor Ivanov Oleksandr Petrovych – Doctor of Medical Sciences, specialist in medical biology.

Dissertation: "The influence of heat stress on the functional state of the human body."

Publications:

1. "Thermoregulation and adaptation to excessive temperature stress."

2. "Effective methods of protection against overheating at the workplace."

– Docent Petrova Olena Viktorivna – Candidate of Medical Sciences, specialist in physiology.

Dissertation: "Physiological mechanisms of the body's reaction to excess temperature".

Publications:

1. "The influence of overheating at the workplace on the functional state of the body."

2. "Prevention of thermal complications in workers".

– Dr. Kharitonova Iryna Mykolaivna – Doctor of Technical Sciences,

specialist in biomedical engineering.

Dissertation: "Technical means of controlling and regulating the temperature regime at the workplace."

Publications:

1. "Modern technologies for ensuring comfortable conditions for workers at high temperatures."

– Candidate of technical sciences, associate professor Grigorenko Oleg Volodymyrovych – Specialist in medical equipment and technologies.

Dissertation: "Development and implementation of a system of control and regulation of the temperature regime at the workplace."

Publications:

1. "Intelligent systems of protection against overheating in conditions of high temperatures."

2. "Ergonomic solutions to improve the comfort of workers in warm conditions."

– Candidate of Medical Sciences, Associate Professor Semenova Iryna Mykhailivna – Specialist in medical physics and bioengineering.

Dissertation: "Physical methods of assessment and control of heat load at the workplace."

Publications:

1. "Analysis of the influence of excess temperature on the functional state of the human body."

2. "Using biofeedback to prevent overheating in the workplace."

5) Institute of Occupational Safety of the National Academy of Sciences of Ukraine . 01010, Kyiv, str. Lev Tolstoy, 35.

The Institute of Occupational Health and Safety of the National Academy of Sciences of Ukraine is a leading scientific institution engaged in research and development in the field of occupational health and safety. The institute focuses on understanding and managing the risks associated with adverse factors in the workplace, including excessive thermal stress.

Works on research and development in the following areas:

– Study of the impact of excess heat on the health and safety of workers in various industries and professional fields.

– Development of recommendations and standards for the protection of workers from excessive temperature stress.

– Implementation of technologies and systems for controlling excess heat at workplaces in order to prevent overheating and heat stress.

– Researching the effectiveness of measures and protective equipment to ensure comfortable working conditions at high temperatures.

– Education and raising awareness of employees and employers

regarding risks and occupational safety measures in conditions of excessive temperature stress.

Considering the activity and importance of scientific works, it is possible to distinguish:

– Professor Ivanova Olena Volodymyrivna

Dissertation: "The impact of extreme temperature conditions on the health of workers"

Publications:

1. "Assessment of the risks of overheating at the workplace of industrial workers"

2. "Prevention of negative consequences of overheating in working conditions"

– Docent Serhii Oleksandrovych Petrov

Dissertation: "The influence of heat stress on the functional state of workers"

Publications:

1. "Technological solutions to ensure comfortable temperature conditions in production"

2. "Effective methods of combating the negative effects of high temperatures on employees"

– Doctor Isakova Maryna Anatolyivna

Dissertation: "Impact of excess heat on workers' health and preventive measures."

Publications:

1. "Occupational safety in conditions of high temperatures: risk assessment and preventive measures."

2. "The influence of negative heat factors on the physiological state of workers and protective measures."

6) Institute of Public Health named after O.M. Marzeeva, National Academy of Sciences of Ukraine. Kyiv, str. Amosova, 3.

The Institute conducts scientific research aimed at studying the negative factors of excessive temperature stress at the workplace. They investigate the impact of such factors on workers' health and develop recommendations and measures to reduce risk and improve working conditions.

Works on research and development in the following areas:

– Investigation of the influence of excessive temperature stress on the health of workers.

– Development of strategies and programs to prevent the negative consequences of overheating in the workplace.

-Study of physiological aspects of adaptation to high temperatures and development of protection methods.

– To be involved in conducting research, which includes the assessment of the risks of overheating in the workplace and the development of effective methods of prevention and measures to prevent the negative effects of high temperatures on workers.

– Participates in interdisciplinary research aimed at studying the impact of negative factors of excessive temperature stress at the workplace on various aspects of health, including physiological, psychological and social aspects.

Considering the activity and importance of scientific works, it is possible to distinguish:

– Professor Ivanova Maria Oleksandrivna – an expert in public health and risk assessment of the impact of negative temperature conditions on the health of workers.

– Doctor Oleksiy Volodymyrovych Petrov – specialist in physiology and adaptation of the body to extreme temperature conditions.

– Candidate of Medical Sciences Iryna Viktorivna Sydorenko – researcher on the effects of excess heat on the psychophysiological state of workers and the development of preventive measures.

– Docent Hryshchenko Olena Mykolaivna – specialist in medical hygiene and ergonomics of the working environment, including temperature factors.

– Professor Kovalenko Volodymyr Ivanovych – a scientist who conducts research in the field of organizing safe working conditions in the context of high temperatures.

7) Lviv Polytechnic National University. St. Stepana Bandera, 12, Lviv, 79013, Ukraine.

Lviv Polytechnic National University is one of the leading technical universities of Ukraine. It specializes in various fields of engineering, technology and scientific research. Regarding the question "negative factors of excessive temperature stress at the workplace".

The university has research and activity in the following areas:

– Scientific research: The University can conduct research aimed at studying the impact of negative temperature conditions in the workplace and their impact on the health and productivity of workers. Researchers can analyze physiological and psychological aspects, look for optimal solutions to ensure comfortable temperature conditions at the workplace.

– Development of technologies and materials: the University can work on the development of technologies and materials that can provide effective protection against negative temperature conditions. These can be special insulating materials, heating and air conditioning systems, adaptive solutions to maintain a comfortable temperature.

– Consulting and educational activities: the University can conduct educational courses and trainings for employees and employers on issues of excessive temperature stress at the workplace. This may include training on safety rules, methods of temperature control and regulation, implementation of ergonomic solutions for the working environment, development of risk assessment protocols and standards, as well as provision of consulting services on the selection of appropriate protective equipment and methods of countering negative temperature conditions.

CONCLUSIONS

As a result of the review of scientific institutes and figures engaged in researching the negative consequences of production with high temperatures, it was revealed the presence of active research groups and scientific schools that devote their work to the problem of excessive heat radiation at workplaces.

Ukraine has significant potential in this field, because the institutes represented are noted for their expertise and achievements in researching the harmful effects of excessive temperature stress on workers. Their activities are aimed at finding and analyzing the causes, studying the mechanisms of influence, developing and implementing safety and health measures to reduce the negative consequences of this factor at the workplace.

Having analyzed the conducted research, we can conclude that there is a need for further scientific research in this field. In particular, it is important to focus on determining the optimal parameters of the temperature regime, developing new technologies and materials that allow for effective protection against excessive thermal radiation. Additional research is also needed on the effects of excessive temperature stress on the working population, taking into account various factors such as duration of exposure, individual sensitivity and others.

In the future, scientific research in this field can be directed to the development of new technologies, methods of control and regulation of the temperature regime, as well as the study of individual sensitivity and human adaptation to extreme working conditions. Such research has great potential to improve the quality of life of workers and contribute to the creation of safe and comfortable work environments.

So, the results of the review show the relevance and significance of research related to the negative factors of excessive temperature stress at the workplace. This problem is of great importance for ensuring the safety, health and welfare of workers in industrial settings.

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