



Social responsibility at the workplace
Tomsk Polytechnic University

Andrey Andrejchenko ^a

^a School of Energy Engineering, Tomsk Polytechnic University

Abstract

The author examines the influence of some factor of the working environment on the human body. It is known that real working environment is characterized by various harmful and dangerous factors. There is often no clear boundary between the dangerous and harmful factors, every factor can lead to health loss eventually. Therefore, in any manufacturing, it is necessary to guarantee employee safety at his/her working place. There are too many norms and safety rules. To ensure safety is the main task of the employer. This paper deals with dangerous and harmful factors, as well as measures to limit their impact on the employee.

Keywords: Harmful factors, electrical safety, radiation, lighting;

1. Introduction

Life safety is a system of laws and corresponding technical, socio-economic, hygienic, organizational measures that ensure safety, preservation of health and human working efficiency in the course of work.

2. Analysis of identified harmful factors of the working environment

In accordance with SanPiN (sanitary regulations and standards) 2.2.2/2.4.1340-03 [4], sanitation and hygiene requirements for the rooms that have personal computers (PC) are as follows:

- It is forbidden to place work places with a PC in the basement;
- The floor of the room must be flat and with an antistatic closure;
- The distance between the lateral surfaces of the monitors must be at least 1.2 m;
- Rooms with computers for adult users must have a floor of at least 6 m² per employee, and the volume must be at least 20 m³.

Rooms with computers must be equipped with heat system, air conditioning or efficient balanced ventilation. According to SanPiN 2.2.1/2.1.1.1278-03 [3], rooms should have natural and artificial lighting. The location of computer workstations in basements is not allowed. The room must contain a first aid kit, carbon-dioxide fire extinguisher for firefighting.

2.1. Electrical safety

Electric current passing through the human body can cause burns in the places of contact with live parts, damage of internal organs and cardiac arrest. Electrical safety is a system of organizational and technical measures and means to protect people from harmful and dangerous effects of electric current, electrical arc, electromagnetic field and static electricity [1].

Types electric shocks:

- the thermal effect of the current is manifested in burns, heating of the blood vessels, heart, brains and other organs that are in the path of the current flow to the critical temperature;
- the electrolytic action of the current is expressed in the decomposition of blood, which violates its composition and functions;
- the mechanical effect of the current manifests itself in a significant pressure in the blood vessels and muscle tissues;
- the biological effect of the current is manifested in the irritation of living tissues that causes the body reaction – excitation that leads to involuntary contraction of muscles.

At the most unfavorable outcome, the impact of electric current can lead to the death of a person. The user's computer workstation has a display, a keyboard and a base unit. Before starting work, a user should make sure that there are no wires that hang from the table or hang under the table, the electrical plug and the power wire are intact, and that there is no visible damage of the equipment and the workstation. Moreover, the likelihood of electric shock can be reduced by instructing personnel safety awareness, the rules of technical operations of the used equipment, the first rule of medical triage. A protective earthing device and neutral grounding must be carried out.

2.2. Requirements for electromagnetic and ionizing radiation in rooms

As a rule, the most dangerous sources of electromagnetic radiation are those whose actions are the most prolonged on the human body, in our case it is a PC. If we speak about a standard computer with a liquid crystal display, it is a system unit. The parameters of electromagnetic radiation at the user's computer workstation and the value of the electrostatic potential should not exceed the permitted values. The impact of electromagnetic radiation leads to eye disease, cardiovascular disease and skin disease [2]. The power rejection of the electromagnetic field at the workstation is achieved by the distance increase between the radiation source and the workstation with the help of the screens installation that reflects or absorbs radiation between the radiation source and the worker.

2.3. Lighting of premises and workplaces

Light is a natural condition of human life. Insufficient illumination of the workplace makes it difficult to work long hours and it causes fatigue and promotes the development of nearsightedness. Low levels of illumination cause agrypnocoma and drowsiness, it leads to the development of anxiety. Prolonged stays under low lightning are accompanied by the decrease of metabolic processes in the body and the weakening of its reactivity. The illumination of the working area is assessed in accordance with SanPiN 2.2.2/2.4.1340-03 [4]. According to SNIP II-4-79 [5], the workplace of the dispatcher, who works with a computer should be equipped with natural and artificial lighting. Natural lighting is provided through window openings with a natural light factor of KNI (coefficient of natural illumination) that is not less than 1.2%. The skylight from the window opening should fall onto the operator's workplace on the left side. Lightning of the table surface in the area where the documents are placed must be 300-500 lux. Local lighting should not create glare on the surface of the screen and increase the illumination of the screen by more than 300 lux. Direct brilliance from lighting sources should be limited. The

brightness of the luminous surfaces (windows, lamps) under view should not be more than 200 cd/m². The brightness of glare on the display screen should not exceed 40 cd/m². The indicator of blindness for the sources of general artificial illumination in rooms should be no more than 20, the discomfort rate in administrative-public rooms is not more than 40. The brightness ratio between the working surfaces should not exceed 3:1 - 5:1, and the ratio between the working surfaces and the surfaces of walls and equipment is 10:1. For artificial illumination of rooms with personal computers, it is necessary to use luminaires type LPO36 with mirrored lattices equipped with high-frequency starter devices. It is allowed to use direct-light luminaires, mainly reflected the light of LPO13, LPO5, LSO4 types with the luminous tube of LB type. It is allowed to use local lighting luminaire with filament bulbs. Lamps should be placed in the form of continuous or discontinuous lines to the side of the workplaces and being parallel to the line of user's sight at different locations of computers. To ensure the normative values of illumination in rooms, it is necessary to clean the windows of window openings and lamps at least twice a year and to replace the burned lamps timely.

3. Conclusion

The influence of factors on the human body is described, the means of group and individual protections from these factors are proposed. Moreover, the organizational issues of ensuring personnel safety during work are considered.

References

1. Belov, S.V. (2007). Environmental protection. Moscow: Higher School. P. 616.
2. Grachev, N.N. (2005). Protecting people from dangerous radiation. Vologda: PF Polygraphist. P. 317.
3. SanPiN 2.2.1/2.1.1.1278-03 Hygienic requirements for natural, artificial and combined lighting of residential and public buildings.
4. SanPiN 2.2.2/2.4.1340-03 Hygienic requirements for personal electronic computing machine and organization of work.
5. SNIP II-4-79 Design standards. Natural and artificial lighting.