



ANALYSIS OF THE WORKING FACTORS IN „MAN – MACHINE – ENVIRONMENT” SYSTEM

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Abstract

In the research literature, the work environment is often characterized as a physical, chemical, biological, social and cultural complex of factors that affect an employee at workplace. The work environment is part of the „man-machine-environment” system. In this system, „man” refers to a person as the subject in the workplace (e.g. operators, decision-makers), „machine” is the general name for any object controlled by man (e.g. tools, machines, computers), and „environment” describes the specific working conditions under which man and machine interact (e.g. temperature, noise, vibration, lighting, radiation, chemicals, hazardous gases etc.). Environment creates a wider or narrower set of factors which are affecting this system. The goal of this whole system is to create optimum conditions to achieve required results. The three main goals of optimization are to ensure safety, high efficiency and economy of „man-machine-environment” system. From the point of view of problem solving in this system the physical factors are very important and may represent a significant risk for employees. These factors affect the human senses, burden the nervous system and can negatively affect to overall health and cause stress. Factors can be external (from the environment, psychological, or social situations) or internal (illness). Examination and assessment of working conditions from the point of view of their impact on employees is challenging, time-consuming and it is essential to do it regularly in order to achieve reliable results. By comparing the results from previous and current assessments, it is possible to capture developmental tendency, identify progress or regress and subsequently decide on the next steps.

Keywords: workplace, environment, working factors, productivity, employee

1. INTRODUCTION

Humans spend in average 33 percent of their lifetime in the workplace. It is safe to say that job has a huge impact on quality of life whether positive or negative. The topic of negative impact of environmental hazards in workplace is more and more used in experts discussions as the time goes by. Employers can no longer underestimate this topic and must realize that it is necessary to ensure comfort and safety at workplace for the benefit of the whole organization [1]. Creating clean and healthy workplace environment with modern technical equipment is very important and it is not a low-cost matter for the employer. Many researches, projects and analyzes are focused on this topic due to its importance. The workplace must meet the required conditions which are set out in the legislation. Safety at the workplace can reduce numbers and possibilities of accidents and health issues of employees and improve business productivity. The creating of a suitable work environment enhances the ability of employees to become more productive. Interpersonal relationships and the relationships between work environment factors and workers are playing more dominant role in the overall job satisfaction and at workers performance [2].

Physical and mental health, motivation, well training of employees along with workplace conditions reflects on product quality and productivity of employees. About 116 thousand

people in Slovakia have a risky job that can have serious impact on their life, these people have the highest chance to have workplace accidents and suffer from occupational diseases. An average of 600 employees in Slovakia suffers from occupational diseases per year. Excessive noise, high dustiness and chemical hazards are the one of the most common causes of these diseases. Up to 88 thousand people worked in excessively loud conditions in 2015. It is estimated that one third of European employees (more than 60 million people) are exposed to high levels of noise for more than a quarter time of their workday [3].

General duty of employers is to ensure the health and safety of employees in all aspects and to carry out a risk assessments. The EU framework directive emphasizes the crucial importance of the risk assessment and sets out the essential provisions for employers.

2. WORK ENVIRONMENT QUALITY

Work environment is one of the most important factors in recruiting and retaining employees. It should create sense of safety and comfort so it can help to improve employees performance, reduce occurrence of human errors, work incapacity and occupational diseases. Achieving the right balance to satisfy everybody is not easy. It is important to realize, that employees are integral part of the workplace and they help to create work environment and can change or affect it with their behaviour [4].

The safety and health management systems are essential for business sustainability and the success of the company. Nowadays a strong emphasis is placed on modernization but aesthetics and practicality also should not be forgotten. With the knowledge of many external and internal factors of the work environment that directly affect the performance of the employee, requirements for creating a suitable workplace are increasing [5].

Only employees who are satisfied with the work and social conditions at the workplace can perform high-quality work. The level of employee satisfaction therefore impacts on the efficiency of their work, but also on their stability. In the context of the improvement of the working environment, it is recommended that the management of companies implement tools for improving and adjusting work environment with regard to quality.

Even such details as seamless and neat entrance to the building, reception appearance, lift quality and speed, look and equipment of common spaces, amount of parking places, it all create corporate image [6]. The first impression of entering the company is very important. Therefore the interior spaces should reflect the purpose the company management wants to achieve. The quality of the work environment is also influenced by a number of partial aspects such as superiors, co-workers, colleagues, clients, etc., Figure 1.

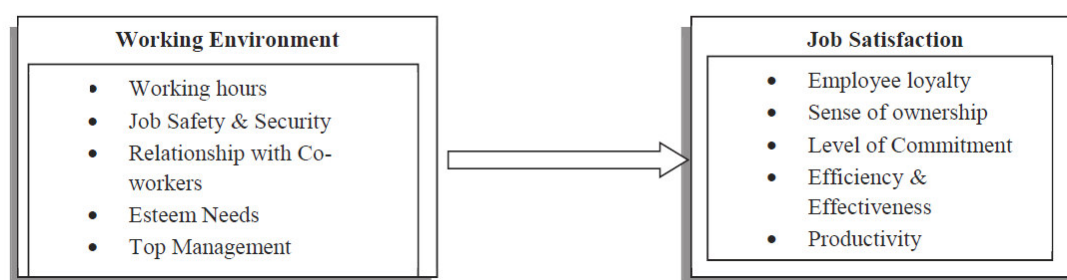


Figure 1. Work environment factors and job satisfaction

People stays indoors for most of their life approximately 70-80%, it is safe to say that design of workplace interior has significant effect on life quality. Some authors say that the loss of aesthetic sensation is closely related to a loss of ethical perception [7].

Creating and obeying work ethics is closely related to the transformation and adaptation of the work environment to provide a sense of safety and comfort. The benefit of providing a

good working environment to the employees is significant for both the organization and its employees.

The perception of workplace environment is subjective; it depends on an individual's emotional state, his nature, aesthetic feeling and needs. Employee may perceive the work environment positively or negatively and it is important factor for job satisfaction. According to human resources research, up to 42% of the interviewees decided to leave their jobs because of unpleasant and unsuitable conditions at the workplace. It is known that most of the people would prefer a comfortable work environment before higher salary. Clean, comfortable and aesthetic environment is a basic condition for human health and development. Organization and composition of the workplace environment in last decades has radically changed and this trend will continue. Major challenge will be to reduce monotonous tasks and time pressure because of their negative health impacts. Other stressful factors are fear of job loss, lack of appreciation or bullying. The 33% of male and 22% of female respondents said their health or safety is at risk due to their job [8].

3. „MAN-MACHINE-ENVIRONMENT” SYSTEM

All three parts of the system are equally important and influence each other, and therefore it is necessary to look at them as a whole and pay enough attention to every single one of them. In the literature, the work environment is often characterized as a set of physical, chemical, biological, social and cultural factors that may affect a person at workplace, Figure 2.

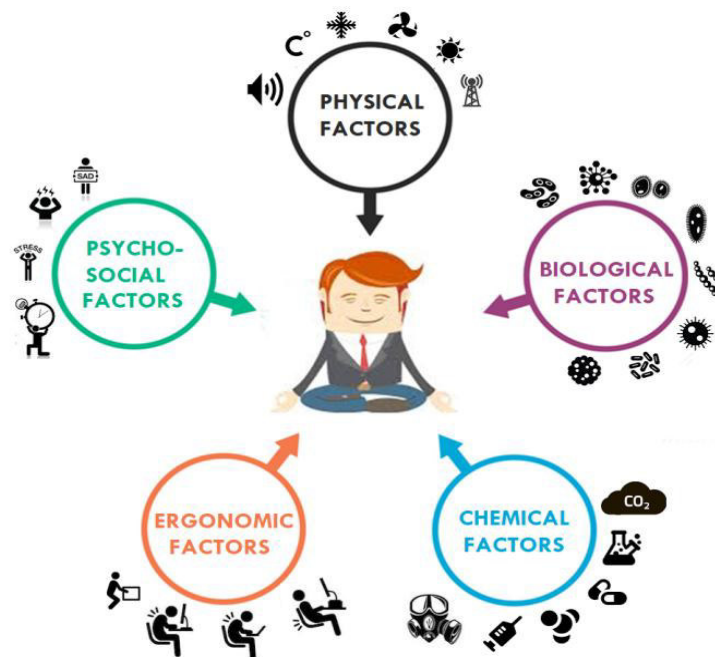


Figure 2. Men and influence of factors at workplace

Many work environmental factors influence the human capability and ability to perform physical work:

- Physical factors (noise, climate, lighting, vibrations)
- Biological factors (viruses, bacteria)
- Chemical factors (dustiness, toxicity)
- Psychosocial factors (workplace relationships)
- Ergonomic factors (body position)

Their negative impact depends on their intensity, duration and frequency. The most frequent factors of the working environment are noise, vibration, lighting, climatic conditions, radiation and chemicals.

4. STRESS AND EXHAUSTION

According to official statistics, more than every fourth employee in the EU is experiencing work-related stress [9]. Stress is a physical, mental, or emotional factor that causes bodily or mental tension and it can have negative impact on work performance. Job stress and job satisfaction are important factors affecting workforce productivity [10].

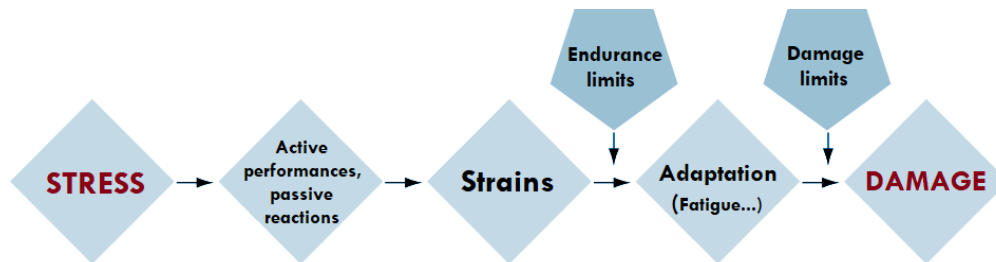


Figure 3. Stress development

The level of stress is directly proportional to the difficulty of the work task, the negative impact of work environment factors and workplace conditions. The presence of stress leads to unwanted burden of employee and its intensity depends on concentration, duration and composition of stress factors. This combined stress can be managed actively or passively, it depends on the behaviour and character of the individual. The active case will include activities to improve conditions at workplace and eliminate causes of stress, while in the passive case stress effects will be managed by natural body response. The ability of stress resistance depends on various factors, for example employee motivation, concentration, mental and physical health, character traits etc.

Conclusion

Examination and assessment of working conditions from the point of view of their impact on employees is challenging, time-consuming and it is essential to do it regularly (in certain cycles, e.g. annually) in order to achieve reliable results. By comparing the results from previous and current assessments, it is possible to capture developmental tendency, identify progress or regress and subsequently decide on the next steps which will help to ensure continuous improvement, achieve business objectives and customer satisfaction. If the implementations of work environment factors assessment and protection against its negative influence become an enterprise's rule and an integral part of the occupational health and safety management system, it can represent the one of the pillars for successful business. Public opinion surveys may be useful in detecting and eliminating potential work environment risks for employees in different sectors. These surveys also help to understand the differences between opinions and needs of people in different age, gender, level of education, profession etc. and to create optimal conditions which will also meet the legislative requirements.

Work environment has a positive impact on job satisfaction of employees. Bad conditions at work limit the employees from using their capabilities and reaching their full potential. This paper may contribute to the awareness of the importance of a positive work environment for the company's success. Optimization of the work conditions can help to increase the motivation of employees and their commitment level towards management. This will reflect on the productivity, quality and profitability. It also ensures that employees of the organization will

have easy work in a relaxed environment without the burden or pressure that would cause them stress. Progress in business will directly help the country's economy as productivity increases. The benefits of providing a positive work environment for employees are significant for both the organization and its employees.

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