

Chapter 1

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THE ROLE OF ERGONOMIC PROGRAM FOR CREATION ERGONOMICALLY ACCEPTABLE WORKING CONDITIONS

Abstract: The paper will include the description ergonomic program and their particular parts of which it is composed. It will also described its role in creating ergonomically acceptable working conditions. Ergonomic program creates the conditions for improving the working processes continuance and to ensure the ergonomics acceptable working conditions and setting working environment parameters to ensure the effectiveness of human labour. This is expectation to achieve an increase in quality of working comfort of the employees. The issue, which is the subject of the paper, is highly topical, because is determined by content of ergonomic program, which is a global standard for improvement of the status of man in labour - organizational systems. This program requires from company management to pay full attention to: health, psycho-physiological and anthropometric parameters of participation man at working process, level quality of physical and socio-psychological environment and workplace safety (work risks), evaluation of employees work performance and increasing demands of employer. Application of the ergonomic program in a company is in line with philosophy of the Corporate Social Responsibility and sustainable development.

Key words: ergonomics, program, condition, work

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1.1. Introduction

Human and especially workers may be taken as one of the limiting factors in working process. Therefore, it is necessary to prepare such appropriate work conditions that the worker is able to perform his/her work while minimizing the effects of risk factors. The elimination of risk factors effects should be achieved through the implementation of ergonomic programs. The efficiency of ergonomic program and accepted ergonomic measures is possible to express regarding the improvement of health and psychological comfort of employees, and economic benefits achieved through cost benefit analysis (VIČÍKOVÁ J., MARKOVÁ P. 2011)

In many workplaces, the work is performed in positions and working conditions that can be identified as being at risk in point of view of diseases (work above head with severe motor tools, long-term work in which the arms are level with the shoulders and the like). The costs of treating injured workers are covered from taxes of the population. In terms of ergonomics, but also in terms of safety and health at work is extremely unfair to employ persons for performing physically demanding work in difficult working conditions, for example: in the construction or at the forestry, as independent entrepreneurs and thus save the costs for expense of whole society in the health and safety area (HATIAR K. et col. 2008).

1.2. Ergonomic program in the company

The ergonomic programs represent the company individual supporting processes, which have set some specific goals. "The ergonomics is aimed at the efficiency of human work through," *ensuring the human health, i.e. also their physical, mental and social satisfaction together with cost benefits* (VIČÍKOVÁ J., MARKOVÁ P. 2011).

The role of ergonomics as one of the supporting processes in the company would be to carry out the tasks associated with checking of the

work impact, work equipment and working environment for employees' health and subsequently perform by the measures of well defined activities to prevent negative impacts on their work performance. This should be done through ergonomic solutions (VIČÍKOVÁ J., MARKOVÁ P. 2011).

In the European Union apply several legislative materials and standards. These standards are intended with macroergonomic knowledge for solving specific problems in the field of micro and macroergonomics. In the companies are pursued in particular the impact of work and working conditions for health of the workers and then are being prepared specific company standards and programs. For example: yellow are marked work activities defined as hazardous, where can damage the health of some less able-bodied workers. Red are marked working activities and conditions defined as hazardous, which harm health for all exposed employees (HATIAR, K. et col. 2007).

As a supportive tool for the applications of ergonomic principles and knowledge is possible to use ergonomics program which is based on participatory ergonomics principles (VIČÍKOVÁ J., MARKOVÁ P. 2011).

This process has usually five stages cycle with following contents (COOK T. et al., 2000; GILBERTOVÁ, & MATOUŠEK, 2002; HATIAR K. 2004):

- **stage I** – identification of problems in the system, which is subject to investigation,
- **stage II** – analysis of the problem reasons and definition of their solution,
- **stage III** – problem solution proposal,
- **stage IV** – implementation into practice,
- **stage V** – evaluation of the solution benefits (health effect and cost benefit).

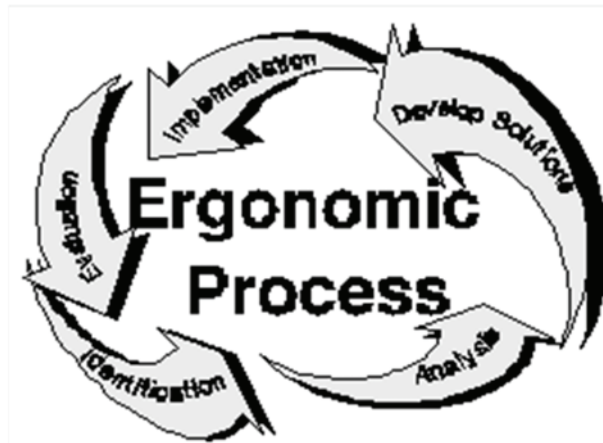


Fig. 1.1. Ergonomic process

Source: BEŇO R. ET AL. 2013

1.3. Work conditions in the company

Person spends about a third of the time his working life at work. Human health, his physical and mental state, affects factors of the work and work environment. At present, the impact of environmental factors is assessed most commonly by comparing the actual value with determined (permissible or recommended) value. Such an approach ignores a close synergy of several factors working environment (LUMNITZER E. et col. 2007).

Work environment can be defined as the sum of all material conditions of the work (machinery and equipment, handling equipment, personal protective equipment, other equipment of the workplaces, and raw materials, construction solution), **which in connection with other conditions** (technology, organization of work, the social conditions of work) **form factors of physical, chemical, biological, social, psychological and other influences on employee during the work process** (HÜTTLOVÁ E. 1994).

In the structure object of the study of ergonomics is on the top the person. Consequently, the principles of ergonomic design of workplaces and work environment are aimed on improving human participation in the work process (SZOMBATHYOVÁ E. 2004).

Creating the optimal working conditions is one of the most important sites of improving human participation in the work process. Positive acting working conditions allow extension of man's ability to work and increasing his working efficiency (SABLIK J. et col. 1997). Ergonomic rationalization should thus become common and everyday human activity for improving the work and living environment (BEŇO R. et col. 2013).

While working acts on the employees a number of factors working environment and work activity itself, many of which are entering into interactions. It is talked about their combined effects. The influence of each factor on a person can change by work, for example: employment potential, it can add up, to multiply, respectively to reduce or even to eliminate (BEŇO R. et col. 2013).

Generally it factors:

- *physical factors of the work environment,*
- *biological factors of the working environment,*
- *chemical factors of the work environment,*
- *psycho-social factors of the work environment.* (HATJAR K. 2004a, TICHAUER E.R. 1978).

In terms of the consequences of action of these factors on human health, they may be broadly divided into cumulative pathogenic, acute pathogenic traumatogenic a terminal (BEŇO R. et col. 2013).

All these factors affect on the ergonomic nature of the workplace, where ergonomics creates a fictitious "umbrella" protecting workers from harsh working environment. In the ergonomic studies are needed to identify risk factors at working process.

Risk factors can be broadly divided into (HATJAR K. 2004b):

1. *Modifiable risk factors*– their direct effect on the health and performance of employees we can influence by preventive measures. They are divided into:

- *physical* (temperature, noise, vibration, radiation, limited ability to customize workplace to the physical dimensions of employee),
 - *chemical* (toxins, heavy metals, carcinogens),
 - *biological* (microorganisms, plant and animal dander),
 - *psycho-social* (substandard housing, aggression, low income, unemployment, stress),
 - *customs and habits* (smoking, alcoholism, drug addiction, increased consumption of animal fats).
2. ***Unmodifiable or personal risk factors***– *their direct effect on the health and performance of an employee we cannot influence:*
- age,
 - gender,
 - body type,
 - physical dimensions (BEÑO R. et col. 2013).

Creating sustainable, flexible and ergonomically acceptable working conditions means respecting impact and limitations of the above factors and see to it that their impact anticipated in the project preparation and in adapting or improving the culture of the organization and its relationships while addressing sustainability of the environmental conditions (BEÑO R. et col. 2013).

1.4. The role of ergonomic program for creation ergonomically acceptable working conditions

One of the tools as you gain loyalty of employees, is the creation of appropriate ergonomically acceptable working conditions on which can be used the principles of ergonomics in frame of ergonomic programs (BEÑO R. et col. 2013).

The use of ergonomic principles, aimed at minimizing the impact of active work factors and working environment, has a positive impact on economic indicators too. These are directly affected by reducing the cost of sick leave, reducing the costs of litigation costs due to claims of employees for accidents, reducing the costs associated with recruiting,

incoming, job training, retraining new employees, reducing costs associated with the production of rejects in production, etc. It can be concluded that the achieved economic effect directly related to the health of employees (BEÑO R. et col. 2013).

The importance of ergonomic program consists mainly of creating harmony between technical design, product features and their adaptation to human capabilities and needs. The benefits are proven - from such an ordinary thing as a pleasant feeling of work in a pleasant environment on easy to use machines, documentable increase job performance or reduce the amount of errors. (HATIAR K., 2008).

The role of ergonomics should be to carry out the tasks of checking the impact of work, work equipment and working environment on the health of employees and subsequently to perform, with using appropriately defined measures, activities aimed at avoiding negative impacts on their work performance. This should be done through an ergonomic solution that applies two basic approaches (BEÑO R. et col. 2013).

The first approach, which can be described as an expert, is mainly applied in the development of new products, machinery and equipment. (HATIAR K. 2004a).

The second approach is a model of participatory ergonomics (HATIAR K. 2004a), which is used mainly in companies within the ergonomic programs as the process of improving working conditions by using methods of group problem solving in groups of employees. This group usually consists of representatives of company management, workers and if necessary from technicians. In frame of the ergonomic programs is applied mentioned model of the participatory ergonomics as the process of improving working conditions by using methods of group problem solving in groups of employees (BEÑO R. et col. 2013)

The implementation of ergonomic programmes to industrial companies, as one of the possibilities of labour productivity increase, the overall effectiveness of company's activity and also within the anti-crisis

measures together with new technology and searching for new materials have been prominent recently. (BOŽEKOVÁ J. et col. 2010)

Positive impacts of the ergonomic program have an influence not only on employees but mainly on the company, and, consequently, there are benefits for the state and mean a saving of all social benefits. The main benefits monitoring of which is important in the evaluation of ergonomic programme are introduced below:

Benefits for the company:

- lowering of sick leave of employees and occupational diseases,
- increase of labour productivity,
- cutting down of spoiled goods,
- quality work environment. (BOŽEKOVÁ J. et col. 2010)

Benefits for the employee:

- improvement of mental and physical condition of an employee,
- minimalisation of the manifestation of mental and physical tiredness,
- benefits in a social sphere,
- improved self-realisation with the positive impact on an economic situation of an individual and a family,
- motivation for higher performances. (BOŽEKOVÁ J. et col. 2010)

Benefis for the state (society):

- improvement of the health of the population,
- increase in the individuals standard of living,
- development of companies,
- saving from the payment of sick benefits, disability, widows and orphans pensions,
- social benefits and unemployment benefits (BOŽEKOVÁ J. et col. 2010).

1.5. Conclusion

Modern ergonomics is trying to return natural and pragmatic values and strategies, which in scientific and industrial revolution gave rise to tools, technologies and also new strategies. Instead of sophisticated

criteria and tabulated values takes a simple and pragmatic criteria such as: positive impact on health at the same time as detectable benefits of cost (HATIAR, K. et col. 2008).

Acknowledgements

This contribution is a part of research project VEGA No 1/0448/13 „Transformation of ergonomics program into the company management structure through interaction and utilization QMS, EMS, HSMS“.

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