

# **The social impact of technological development**

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## **Abstract**

Work and work environment are significant determinants of the health status of individuals and entire populations. The development of new technologies brings relief in many ways, most work is robotic and threatens much less risk of injury. The risks are still there, eg in the form of occupational diseases caused by inadequate working conditions and positions. The article deals with the model, which will make it possible to identify the hazards and the probability can arise. On this basis, it will be possible to find ways to avoid these risks in time.

**Keywords:** ergonomics, health of workers, occupational diseases.

## **Introduction**

For the transition from a manufacture production to factory production, the universality of work was necessary, which meant a fundamental change in the development of tools. Workers no longer made their tools, production separated from the machine user, and thus the adjustment to the individual person decreased. This development had a negative impact on the ergonomic relationship of man - machine and the development and emergence of new technologies continues. In those times, the first attempts to study human labour began to appear, looking for the optimal positions and movements at work and examination of the influence of environment on worker productivity. Over time, the formation of a new discipline - ergonomics to contribute to improving the conditions of humans, and their activities, to increase productivity, improve well-being and development of their personality (Chundela, 2005).

## **Importance of ergonomics on the health of workers**

Kral (1994) mentioned that applied Ergonomics arose from the union of disciplines such as occupational psychology, physiology, hygiene and safety, sociology, and anthropometry. Its main objective is to protect health, but also has positive effects on economic indicators, which translates into lower costs for sickness, injuries, performance, etc.

According to Tucek et al (2005), a healthy, skilled and motivated workforce is a key element of general socio-economic development. Prevention of health risks and protection and promotion of health has a positive economic effect at the national and company level, and thus the health of workers forms the foundation of effective performance at work for an employer.

Unsuitable working conditions for employees represent different risks of accidents and injuries which may be long-lasting and can result in so-called occupational diseases. They can result in complications for employers (compensation, restitution, etc.) and for the employees who provide a number of complications in the treatment and subsequent involvement in the work process. According to statistics the most common occupational diseases are caused by physical factors. Excessive vibration and long-term unilateral loading are factors which lead to the formation of most of these diseases. Using ergonomic knowledge, it is possible to reduce their occurrence or even

prevent it. The question is how best to determine when and where the risks may occur. This issue is addressed in the project "Optimization of multi-disciplinary design and modelling of manufacturing systems, virtual enterprise" under the auspices of the Grant Agency of the Czech Republic. The ultimate solution should be a model for determining the possibility of specific illnesses.

### **A model to determine the possibility of illness**

At the outset it was necessary to identify the disease which makes sense to deal with. As described above, selected occupational diseases caused by physical factors are investigated from an ergonomic point of view, namely:

- Diseases of blood vessels in hands while working with vibrating tools and machines.
- Diseases of peripheral nerves of upper limbs of ischemic and isthmal neuropathies while working with vibrating tools and machines.
- Diseases of bones and joints of hands or wrists or elbows while working with vibrating tools and machines.
- Diseases of tendons, tendon sheaths, insertions, muscles or limb joints caused by long-term excessive one-sided overtaxing.
- Diseases of peripheral nerves of the limbs of the constriction syndrome nature caused by long-term excessive one-sided overtaxing.
- Bursopathy caused by pressure
- Meniscus damage.

The next stage is the selection of types of positions on which the research will be conducted. Using simulation software it is possible to model these positions in specific orientations and to examine the over loading that may occur during the work process (Fig. 1).

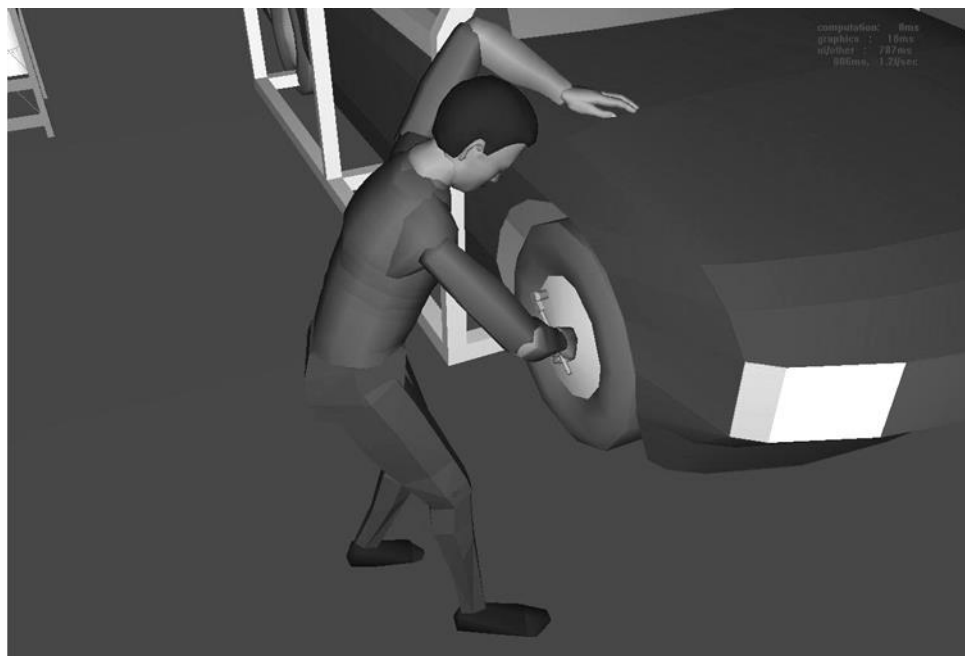


Fig. 1 Disease risk to tendon insertions from unilateral over loading (Own processing by author)

The project has established cooperation with experts in health studies, who are able to provide expert insight into problem solving and valuable information. The parameters that influence the emergence of diseases, such as height, weight, age, sex, etc. will be established.

The aim is to propose a model that will be able to set the necessary criteria to determine which risks threatens worker from occupational diseases, and how likely and in what timeframe the disease may occur. On the basis of such information it will then be possible to prevent possible risks, if necessary, and seek measures to reduce their occurrence or even prevent them.

## **Conclusion**

Development of new technologies provides manufacturers with the opportunity of producing their products faster, with better quality and in particular enables them to draw closer to the customers' needs. With each new technology, however, there are increasing demands on the abilities and skills of workers who must cope with this progress, which may pose an increased risk of health complications, such as from vibrating equipment, etc. On the other hand, developments in information technology, virtual reality, simulation and modelling allow these problems to be addressed and the creation of safe workplaces which meet the needs of employees.

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