

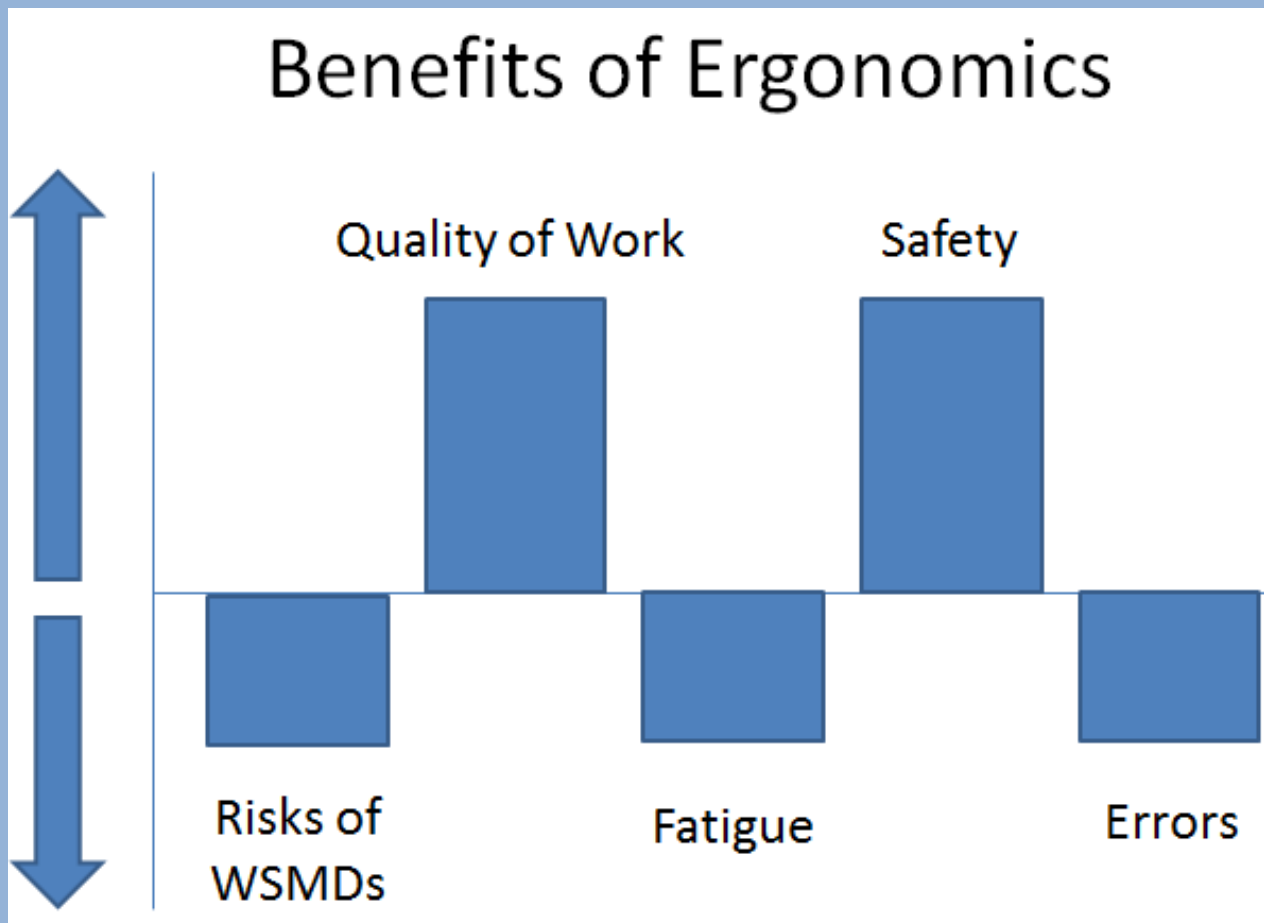
Ergonomics and effectiveness

Ergonomics is the science of work (gr. *ergon* - work, *nomos* - law). By definition, ergonomics, on the one hand, seeks methods, techniques, tools and forms of work organisation that increase the effectiveness of work and at the same time have a minimal negative impact on the health of the working person.

The effectiveness of human activity is closely related to human capabilities and limitations. Therefore, the following factors influencing human activity are in the field of interest in ergonomics:

- physiological,
- psychological.
- work organisation,
- working technique,
- the quality of the technical means of work (tools, machines, etc.),
- others.

Ergonomics and effectiveness (cont.)



Physiological factors

Physiological factors primarily influence the results of physical work.

The speed of action, strength, power and endurance can be increased within certain limits using appropriate training methods.

Physical fitness, which consists of such elements as:

- aerobic energy potential,
- anaerobic energy potential,
- physical condition (training),
- age, gender, height and weight,

is a prerequisite for the possibility of doing work from a physical point of view.

Physical work

In physical work, at first glance, the most important component to be assessed is the load on the muscles involved in the work.

However, it is important to realise that the skeletal muscles are one of the two elements of the musculoskeletal system, the so-called active element, which sets the muscles in motion. However, it is important to consider the importance of the passive part of the musculoskeletal system as well. Muscle contraction causes movement in the case of dynamic work or lack of visible shifts in the case of static work. In both cases, however, there is a load on the bones, joints and elements that stabilise and strengthen the joints. In the case of many ordinary daily activities (e.g. bending and lifting weights), these forces are much higher than the acceptable forces, i.e. those that do not cause damage to the elements of the locomotor system.

Postural angles

Another element of load considered in parallel are angles adopted by the segments of the working person's body. **These angles, called postural ones**, are often crossed, but also, what is worse, crossed and statically maintained for a long time, which is conducive to the occurrence of damage and ailments of the locomotor system. An example can be a sitting position, leaning forward, often raked with the head excessively lowered or excessively raised, e.g. in computer workstations with monitors placed on stands.

Biological rhythms

Biological rhythms are rarely considered a part of human life and have a significant impact on its functioning.

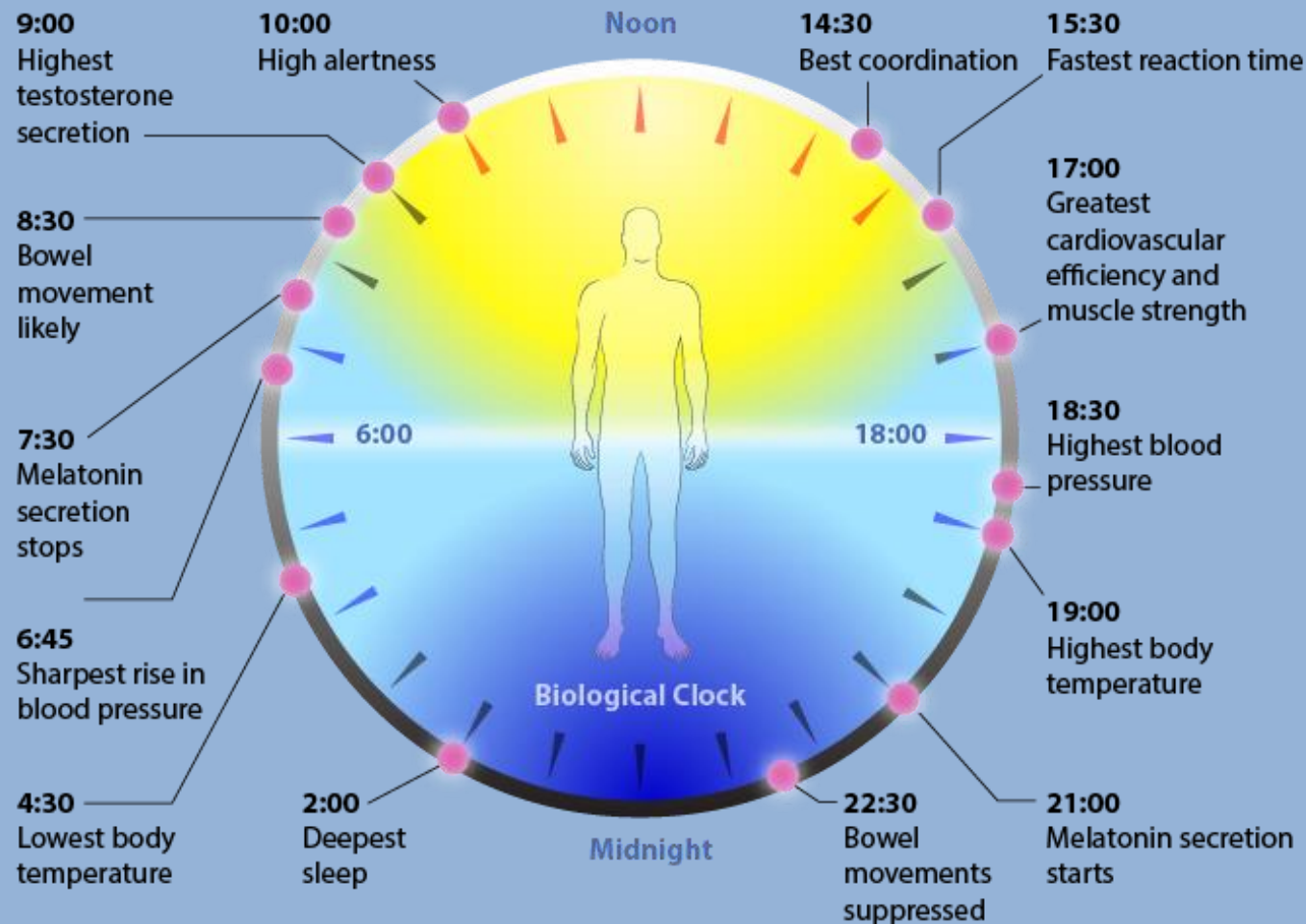
Some researchers even risk saying that "man is something different at different times of the day".

The daily rhythm, so different for many people, is mainly related to changes in internal temperature, intellectual activity, activity of most endocrine glands and changes in reaction to even simple physical factors, such as noise or vibration.

Imposed changes or limitation of the simplest, but probably the most significant form of rest, which is sleep, result in a clear deterioration of psychomotor fitness indicators - the time of a simple motor reaction increases, the result of tests on coordination of movements worsens.

It is also indisputable that cyclical (about one month) changes taking place in the body of women, which is reflected in the behaviour, quality and ability to perform work.

Biological rhythms (cont.)



Reasons for worsening performance

Failure to take mental factors into account in the work process leads to a worsening of work performance and, in the long run, affects the health of workers.

Overburdening with work is unfavourable, but also increasingly stressed as "**underburdened with work**".

In both cases there is a similar activation of the adrenergic system, the action of which determines the ability to perform work. It is therefore suggested that the psychological and physiological cost of working in conditions of insufficient (mainly) information load and in conditions of information overload may be similar. In today's industry, it is often (wrongly) believed that the employee will be satisfied with the knowledge and skills associated with his or her activities. At the same time, many employers believe that there should not be too many of the latter.

Reasons for worsening performance

"**Work deprivation**" and limiting the number of stimuli associated with it results in sensory or even emotional deprivation and leads directly to a decrease in job satisfaction and the quantity and quality of work products. On the other hand, **information overload** can be a source of stress and frustration, resulting from the mismatch of mental and perhaps intellectual abilities of the employee with the requirements of the task. Excess of activities, excess of decisions to take, responsibility for decisions, amount of information, many of which may not influence the direction of the decision - all these elements make it difficult to perform work and reduce the effectiveness of action.

Organisation of work

Work organisation, especially in human teams, influences the quality of activities.

Work organisation includes:

- division of roles in a team, which is usually not influenced by the employee in any way,
- division of competences,
- the way of performing the work (which is also very often imposed).

In all these elements, there is a mismatch between people and their activities. These observations can usually be made after a certain period of time, because at the beginning it is easy to mask such a mismatch - a particular influence of motivation is indicated here.

Organisation of work (cont.)

Usually, only in the case of exposed or otherwise important positions, the selection of an employee for the position is preceded by appropriate recruitment, taking into account the possibilities, but also the needs of the employee in relation to the position and potential tasks.

However, in the case of lower-level employees, their capabilities and needs are all too often completely ignored.

Appropriate working techniques

The development of a **suitable working technique** is a prerequisite for efficient operation (maximum benefits and minimum costs).

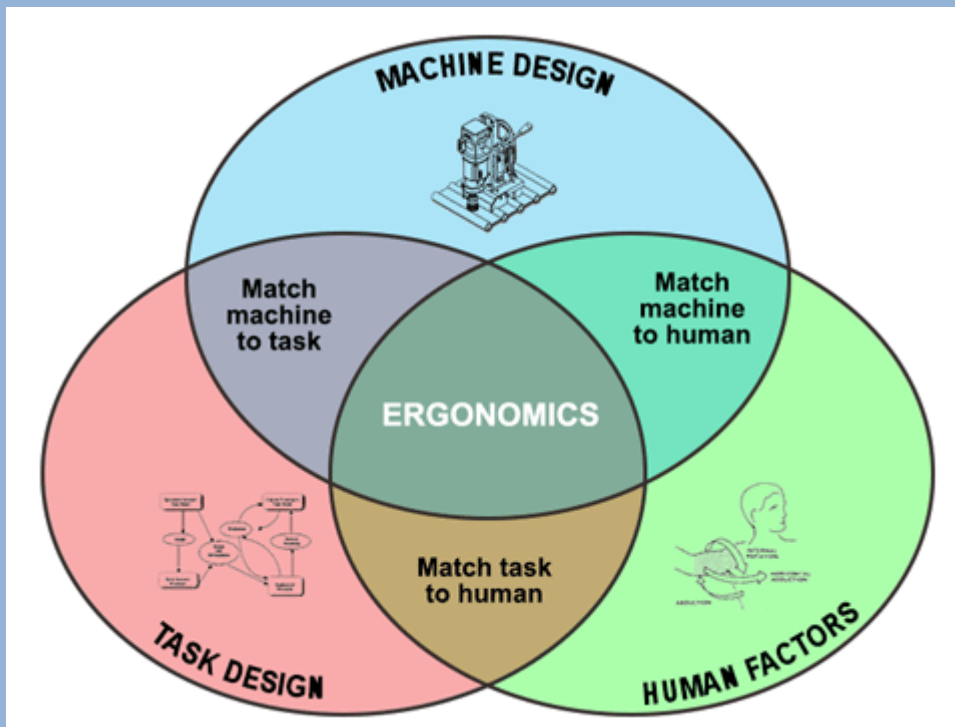
Appropriate techniques can be developed:

- in the course of work (relatively long time),
- learned (relatively little time is needed).

Subjecting an employee to the assessment of work technique is beneficial for the employer, but not the best perceived by the assessed - each assessment of work has a strong impact on their ego. It is often difficult for an employee to understand that better (and often safer) work translates into higher wages and reduction of work-related ailments.

Ergonomics

Ergonomics, using the results of research in the field of physiology, biomechanics, psychology and other sciences, shapes the working environment in such a way that a working person can give as much of himself as possible, without exceeding the limits of his capabilities.



Technology and man

Nowadays, technology has reached a level where man is one of the weaker links in work processes. The amount of information and its complexity often exceeds not only the ability to assess it properly, but also the perception itself.

There are fewer and fewer works in which heavy physical effort plays a decisive role. Gradually, dynamic physical exertion is displaced by work with low power requirements, often forcing one position, e.g. sitting or leaning for a long time.

The variety of tasks at work is limited to the absolute minimum in order to allow the employee to perform as many tasks every day as possible.

According to the majority of employers, the opinion and needs of employees do not count at all, because only the interests of the employer are important.

All these elements make up the image of the world in which we live and work, and that is why ergonomics is so important, showing human capabilities and the possibility of shaping the working environment taking into account the needs of people.