

What is ergonomics?

Ergonomics is derived from the Greek word *ergon* (work) and *nomos* (laws) to indicate the science of work. Ergonomics is an applied science that draws on many interrelated disciplines, such as engineering, psychology, occupational hygiene and physiology. It is the study of humans as components of complex systems, focusing on the interaction between people and technology. Ergonomics is about focusing on understanding the relationship between people in their work environment (both the physical and the organisation) and aims to ensure compatibility between the operator's capabilities and limitations with the demands of the task, job and/or work environment.

Ergonomics is also referred to as Human Factors, a synonymous term; the two are used interchangeably. The International Ergonomics Association (IEA) defines ergonomics as "the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimise human well-being and overall system performance" (<http://www.iea.cc/whats/index.html>).

Ergonomists are professionals whose job it is to contribute to the design and evaluation of tasks, jobs, products, environments and systems in order to optimise the compatibility with human beings so that people's capabilities and limitations are considered.

Ergonomics adopts a systems approach as many disciplines are considered in the application of ergonomics in the working environment. In order to optimise the environment, tool, product or design to suit human beings capabilities, ergonomists need to have a broad understanding of anatomy, physiology and psychology in order to understand the social, cognitive, physical, environmental and organisational considerations.

Various domains of specialisation within the discipline of ergonomics include:

- Physical ergonomics:

This is concerned with the anatomy, biomechanics, anthropometry and physical characteristics of humans. Relevant areas of study include working postures, manual materials handling and work-related musculoskeletal disorders.

- Cognitive ergonomics

This is concerned with mental processes, e.g. perception, memory and reasoning, which affect the interactions among humans and other elements in a system. Relevant topics include mental workload, stress, human computer interaction and training.

- Organisational ergonomics

This is concerned with the interaction between people, their social environment and technology, and is referred to as the socio-technical system. Factors include organisational structures, policies, fatigue management and communication.

Ergonomics considers three interrelated aspects that must be considered in any ergonomics risk assessment / programme:

1. The job: this includes the task, workload and the work environment (e.g. factory, office, mine). When designing the tasks people are required to perform, these should adhere to ergonomic principles to factor in the physical and cognitive limitations and capabilities of people.
2. The individual: this includes people's competencies, skills, personalities and risk perceptions. How people behave and their attitudes can impact on their performance and be affected by the task, organisation and job.
3. The organisation: this includes the workplace culture, resources, communication and leadership which have a significant influence on individual and group behaviour.

In industry, ergonomics plays an important role in the following examples, which can be implemented as part of organisations' ergonomics programme:

- Fatigue management
- Workplace design
- Office ergonomics
- Ergonomic risk assessments

Consequences of not considering ergonomics in the workplace can result in:

- Work-related ill-health and stress
- Accidents and injuries, e.g. work-related upper limb disorders
- Increased absenteeism
- Increased costs (compensation and legal)

Applying ergonomics in industry, at home and at work has the following benefits:

- Reduces the potential for error
- Reduces the potential for expensive re-design
- Increases efficiency of human performance
- Improves safety

For more information on ergonomics or any ergonomic-related matter, contact the Ergonomics Society of South Africa (ESSA) on ergonomicsssa@gmail.com or visit our website www.ergonomicsssa.com.

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