VÝROBA, PRODUKTIVITA A PRACOVISKO

MANUFACTURING, PRODUCTIVITY AND WORKPLACE

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Abstract
The goal of ergonomics is to provide maximum productivity with minimal cost, in this context cost is expressed as the physiological or health cost to the worker. In a workplace setting there are seldom a large number of tasks that exceed the capabilities of most of the work force. There may be jobs that will include a specific task that requires extended reaches or overhead work that cannot be sustained for long periods, by using ergonomic principles to design these tasks, more people should be able to perform the job without the risk of injury.

Key words
Design, Ergonomics, Workplace.

Introduction

Ergonomics has already been defined and its primary focus is on the design of work activity that suits the person in that it takes account of their capabilities and limitations. Matching the requirements of a job with the capabilities of the worker is the approach to be adopted in order to reduce the risks of musculoskeletal injuries resulting from handling materials manually [1].

Design and ergonomics

Proactive ergonomics emphasises the prevention of work related musculoskeletal disorders through recognising, anticipating and reducing risk factors in the planning stages of new systems of work or workplaces. In effect, to design operations that ensures proper selection and use of tools, job methods, workstation layouts and materials that impose no undue stress and strain on the worker. Additional costs are incurred in redesigning or modifying work processes therefore it is more cost effective to reduce risk factors at the design stage.

A proactive approach to ergonomics will ensure that:

- Designers will receive training in ergonomics and have appropriate information and guidelines regarding risk reduction.
- Decision-makers planning new work processes should have knowledge of ergonomics principles that contribute to the reduction or elimination of risk.
- Design strategies emphasise fitting job demands to the capabilities and limitations of workers. For example, for tasks requiring heavy materials handling, use of mechanical assist devices to reduce the need for manual handling would be designed into the process.
- Other aspects of design should be considered including load design, layout of the workplace to allow for ease of access when using mechanical aids and eliminating unnecessary lifting activities [2].

Ergonomics principles at workplace

The goal for the design of workplaces is to design for as many people as possible and to have an understanding of the ergonomic principles of posture and movement which play a central role in the provision of a safe, healthy and comfortable work environment. Posture and movement at work will be dictated by the task and the workplace, the body's muscles, ligaments and joints are involved in adopting posture, carrying out a movement and applying a force. The muscles provide the force necessary to adopt a posture or make a movement. Poor posture and movement can contribute to local mechanical stress on the muscles, ligaments and joints, resulting in complaints of the neck, back, shoulder, wrist and other parts of the musculoskeletal system [1]. 7

Ergonomic principles provide possibilities for optimising tasks in the workplace, these principles are summarised in Table 1 [3].

Tab. 1 Ergonomics principles at workplace [3, edited and supplemented by author]

ERGONOMIC PRINCIPLE		DESCRIPTION
Joints must be in a neutral position.		In the neutral position the muscles and ligaments, which span the joints, are stretched to the least possible extent.
Keep work close to the body.		If the work is too far from the body, the arms will be outstretched and the trunk bent over forwards.
Avoid bending forward.		The upper part of the body of an adult weighs about 40kg on average. The further the trunk is bent forwards, the harder it is for the muscles and ligaments of the back to maintain the upper body in balance.
A twisted trunk strains the back.		Twisted postures of the trunk cause undesirable stress to the spine.

Alternate posture as well as movements.		No posture or movement should be maintained for a long period of time. Prolonged postures and repetitive movements are tiring.
Avoid excessive reaches.		It is necessary to limit the extent of forward and sideways reaches to avoid having to bend over or twist the trunk.
Avoid carrying out tasks above shoulder level.		The hands and elbows should be well below shoulder level when carrying out a task.
Limit the weight of a load that is lifted.		There are guidance weight limits for both males and females, detailed shown in Figure 1.
Use mechanical aids.		Many lifting accessories are available to help lift and move loads.
Avoid carrying loads with one hand.		When only one hand is used to carry a load, the body is subject to mechanical stress.
Use transport accessories.		There are a large number of accessories such as roller conveyors, conveyor belts, trolleys and mobile raising platforms, which eliminate or reduce manual handling.

The numerical guidelines, which take account of weight, repetition and location of lifts as a means of identifying activities, which involve risk. In using the guideline weights in Figure 1, the assessor should take account of the type of work activity and have an appreciation of what realistic improvements can be put in place to avoid or reduce risk. When assessing manual handling activities it is important to keep in mind that weight is not the only factor that needs to be considered, other factors that should be considered include repetition, individual capacity, posture and the work environment. The guideline weights can be used to determine if the load is too heavy. Working outside these guidelines is likely to increase the risk of injury [3].

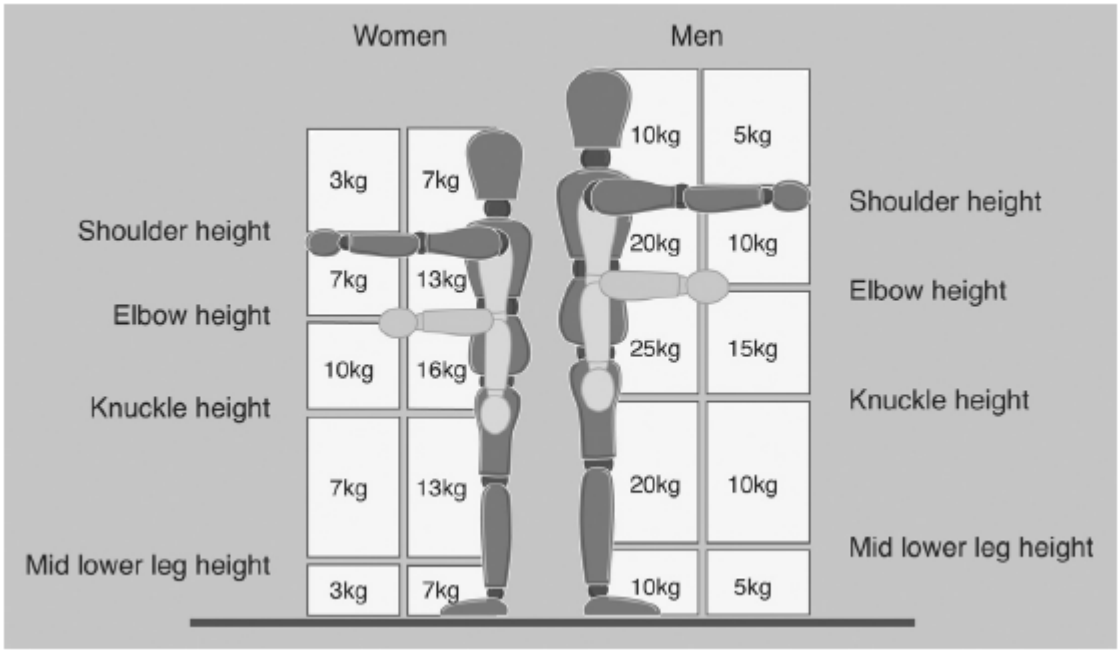

Fig. 1 Guideline weights [3, edited and supplemented by author]

Conclusion

Ergonomics applies information about human behaviour, abilities and limitations and other characteristics to the design of tools, machines, tasks, jobs and environments for productive, safe, comfortable and effective human use.

The goal for the design of workplaces is to design for as many people as possible and to have an understanding of the ergonomic principles of posture and movement which play a central role in the provision of a safe, healthy and comfortable work environment.

Key words

Design, Ergonomics, Workplace.

Literature

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[3] Materials provided by company.

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