

ERGONOMICS FOR THE SAFETY PROFESSIONAL

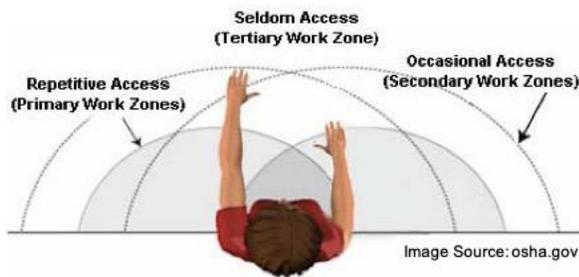
Introduction to Ergonomics (Part 1 of 6)

Dr. Patrick Carley, Professor, Doctorate of Physical Therapy

OSHA defines ergonomics as “the science of designing the job to fit the worker, instead of forcing the worker to fit the job”. While that appears like a fairly simple statement but there is much more to the process of understanding ergonomics. The true understanding of ergonomics is changing how we think about how we move and interact in the performance of various work tasks.

There are five basic components of engaging the ergonomic process:

1. Defining Work Zones



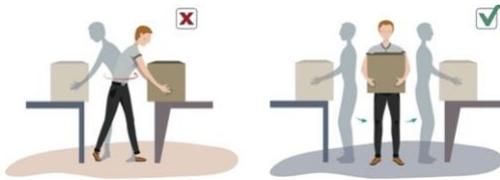
In manufacturing, assembly work, and construction, from the worker’s perspective, the work should be organized using a simple three zone approach. Things that need to be interacted with **frequently**, such as tools, parts, assembly, etc. should be within the elbow to fingertips reach or the **Primary Zone**. Those tasks, parts, tools, etc. that are **less frequently** interacted

with should be in reach from the shoulder to the fingertips or the **Secondary Zone**. Lastly, those items that are not often needed in the process of work tasks should be placed in an area where the worker must change their position to obtain, retrieve, or engage in the **Tertiary Zone**. ***All items or articles that are not relevant to the task should be removed or placed in the Secondary or Tertiary Zones, for example, pictures of family, tissue boxes, stuffed animals should all be placed out of the **Primary Zone**.

2. Key Movements

Material handling and lifting tasks are common activities in the industrial sector that require change in how objects are approached and manipulated in this setting. Ergonomically, there are three components to be aware of: posture, distance, and load assessment (PDL). Posture when bending should include not only bending the knees but also extending the head upward prior to lifting. This promotes back muscles to engage and **stabilize the spine** in preparation for lifting. The worker should practice getting as close to the object as possible to limit the distance between them and the object. Finally, lifting the object slowly will allow the brain and muscle create the right amount of muscle tension to handle the load. Reaching creates the opposite conditions and is consistent risky material handling methods that will ultimately lead to injury of the low back and hips.

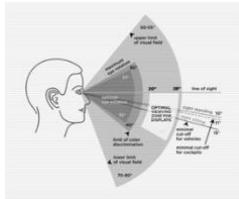
3. Awkward Postures



To understand and recognize awkward postures, it is critical to first define the neutral posture. The neutral posture is assumed when the employee stands upright, with the arms relaxed at their sides, the elbows bent to 90 degrees, and the palms facing inwards, as if to shake hands. When in this neutral posture the body is at its strongest and most stable

point, allowing the muscles to work most efficiently. With an understanding of the neutral posture, awkward postures can be defined as any positions that cause significant deviation from the neutral posture. An awkward posture is an ergonomic risk because failure to optimize the body will cause fatigue, unnecessary internal forces, as well as increase the possibility of impingements within the joints. A reasonable solution would be to put cushioned insoles with proper arch support in the worker's footwear. These insoles will prevent fatigue related awkward postures from occurring.

4. Everything follows the eyes



The body will make postural and positional changes to make sure the eyes can see the elements of work tasks. Some things to keep in mind; if the area or machine operations too far away, the worker may have difficulty seeing what is needed for the work task. As a result, they will lean forward to accommodate for the eyes. The worker will assume awkward postures for hours to view properly, especially for those wearing reading glasses.

5. Ergonomics – A Process

Therefore, one should expect that there will be a need to **re-assess** and adjust newly fitted or modified workstations understanding that there will most likely be a need for further modifications as the worker fine-tunes their adaptations to those changes – **Process not an end goal.**

While this is a basic approach to ergonomics, it also reminds us that ergonomics attempts to eliminate excessive motions and awkward postures is a basic way of eliminating barriers to productivity. More importantly, these changes will affect the worker[s] everyday interactions and thus will need to engage the worker in the process, educating them as they will ultimately benefit from those new modifications. The alternative for **NOT** participating in ergonomics will eventually lead to discomfort, sprains, and strains known as **Musculoskeletal Disorders (MSDs)**. This may lead to possible surgeries, worker's compensation claims, and even disability. As demonstrated by numerous studies, **the corollary to the ergonomic process is a substantial improvement in productivity.** Understanding the basics of ergonomics is just the beginning and once you start thinking about matching the worker with the work tasks, the outcomes are quite amazing.

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