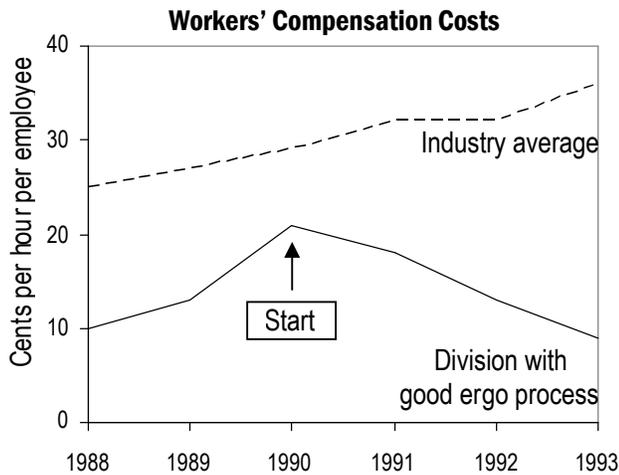


25 Ways Ergonomics Can Save You Money*

by Dan MacLeod

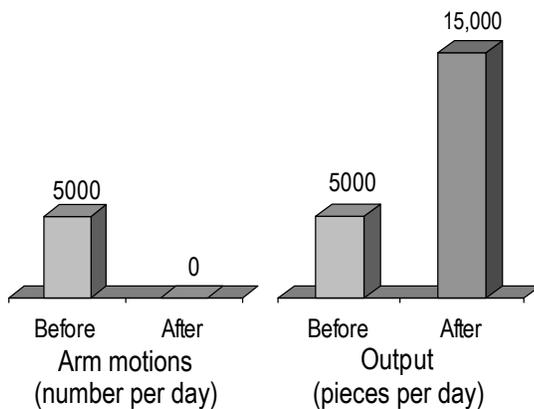
Ergonomics has gained visibility in recent years because of its value in preventing Musculoskeletal Disorders (MSDs). However, the tools of ergonomics can benefit employers in many additional ways.



1. Dramatic reductions in workers' compensation costs.

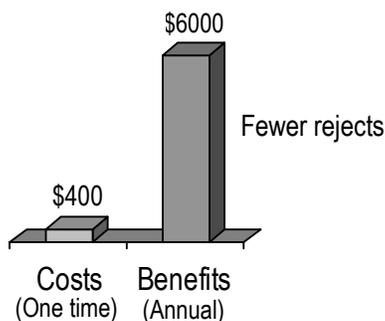
Good ergonomics programs have cut workers comp costs an average of 60% and up to 90% in some cases. You don't need to accept high workers comp losses as a cost of doing business.

The graph at left shows workers' comp cost data for a division of a major U.S. manufacturer in cents per hour per employee, plus equivalent data for the industry. The graph shows that the division had costs that were initially lower but rising faster than the industry average. After the division started the ergonomics program, its costs dropped while the rest of the industry continued to rise. After three years the savings was \$0.25 per hour per employee!



2. Improved productivity.

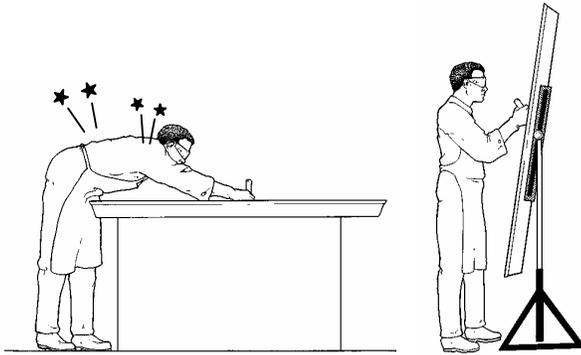
It is common for ergonomic improvements to increase productivity 10 – 15%. In fact, one of the more rigorous studies showed a 25% increase in output at computer workstations when using ergonomic furniture, while concurrently improving employee well-being. The book on which this summary is based contains an example from a printing facility where productivity increased 300%, simultaneously with reducing physical demands on employees.



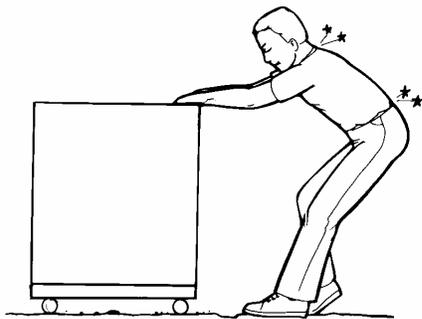
3. Fewer mistakes and less scrap.

People working in awkward and uncomfortable postures are not in a position to do their jobs right the first time. Mistakes are more common. The graph at left shows an example where a \$400 mechanical device eliminated a \$6000 annual loss in scrap, which was caused by employees simply not being able to perform a tedious, physically demanding task properly all the time. That's a 1500% return-on-investment in one year because of good ergonomics.

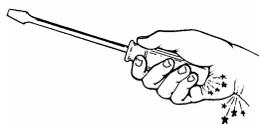
*This paper is a summary of Part I of *The Ergonomics Kit for General Industry* by Dan MacLeod (Taylor & Francis, Second Edition, 2006). Supporting documentation is provided in the book. Dan MacLeod is one of the most experienced professional ergonomists in North America.



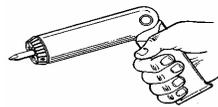
Awkward working positions reduce efficiency.



The higher the exertion, the slower the production.



More hand motions:
Slower



Fewer hand motions:
Faster

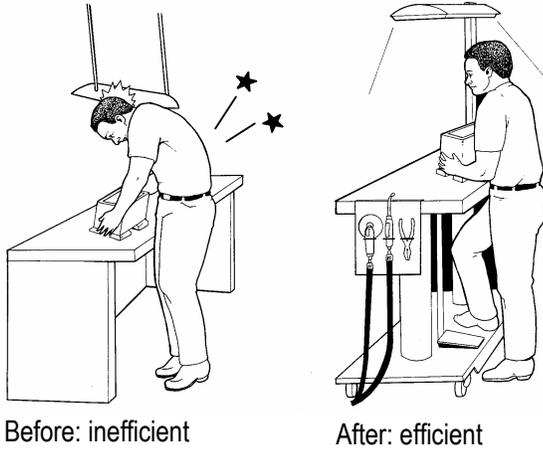
4. Improved efficiency with better working posture.

Working in awkward postures can directly reduce efficiency in three ways that ergonomics can help remedy:

- *Reduced strength* — Think of bending at the waist and reaching out across a large object and then trying to exert. You have little or no strength in an outstretched position like this. Consequently it takes you longer to complete a task than it would be if you were working in a proper position.
- *Less accuracy* in your motions — Again, think of reaching out across a large object and trying to do something intricate. You make a lot of mistakes and it takes a lot longer time, if indeed you can do it at all.
- *Faster fatigue* — When you work in an awkward posture, you tire much more easily, which slows you down.

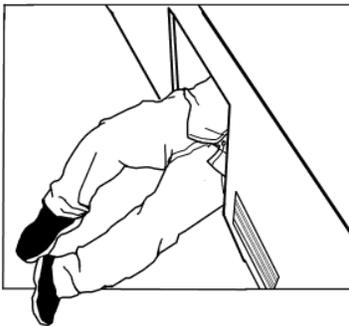
5. Improved efficiency with less exertion. In general, the more exertion it takes to perform a task, the longer it takes. Think of opening a jar of jam; once the jam starts to build up on the lid, it requires more force and it takes longer time. Likewise, a screw that is hard to turn takes longer to insert than one that moves easily. Moreover, muscles under a heavy load are harder to move with precision. Thus accuracy of movement is reduced, which has consequences for both quality and efficiency. As with everything else in this list, the tools of ergonomics can help to identify sources of unnecessary exertion as well as ways to reduce the exertion.

6. Improved efficiency with fewer motions. Repetitive motions are a waste of time . . . literally. The more motions, the longer it takes to perform a task. A good ergonomics analysis seeks to identify the types of motions required for different steps of the job. With such focus, it is possible to identify instances where it is possible to improve the type of motion being used or reduce the number of motions, if not eliminate them entirely. Repetitive motions should be viewed both as a source of injuries and as a red flag for wasteful work.

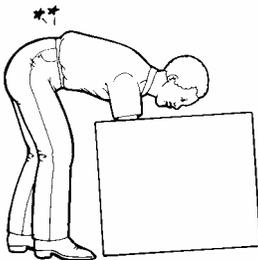


Before: inefficient

After: efficient



Poor ergonomics increases maintenance and changeover downtime.



Searching for activities that are hard on people often leads directly to sources of waste.

- 7. Improved efficiency with better heights and reaches.** Poor heights and reaches can affect productivity in a couple of different ways. If you can't reach an object at all, you may need to stop productive work and fetch a step stool or take time to remove an obstruction. If the inappropriate height or the long reach causes you to work in an awkward posture, you end up losing productivity for that reason.
- 8. Less fatigue.** The efficiency experts of a century ago understood that there is a direct link between fatigue and lost productivity, but the concept needs to be re-emphasized today. One of the core areas of ergonomics is understanding the causes of excessive fatigue and ways to effectively reduce or eliminate these causes. An example is fatigue caused by working in static positions, a problem that has increased in recent decades.
- 9. Reduced maintenance downtime.** All the tools and techniques of workplace ergonomics can be applied to maintenance tasks. You can eliminate barriers and thus speed the time in which operations can be brought back on line. It's about providing clearance, reducing exertion, and reducing motions.
- 10. Protecting your human resources.** The smaller your organization, the greater risk you have of disruption due to the loss of a key person — even if this loss is just a few days because of back pain. Furthermore, you may not be able to replace that person, even temporarily. Even if a replacement is found, skill levels may not be the same or the learning curve may be extended.
- 11. Identifying waste.** A good ergonomics task analysis penetrates into operations step by step, very similar to old-fashioned Time and Motion analysis. By evaluating items such as fatigue, motions, and exertion through a task step by step, it is possible to identify wasted activities.
- 12. Fresh insights on your operations.** Almost any new perspective on your workplace can help you identify ways to improve. But the tools of ergonomics are especially useful because they focus on ways to eliminate problems like fatigue, awkward working positions, and excessive motions.



Ergonomics can enable an aging, but productive workforce



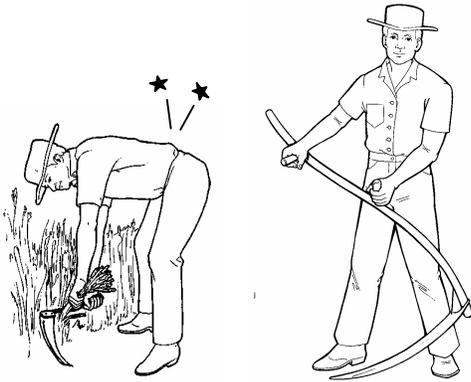
Ergonomics can eliminate sources of dissatisfaction



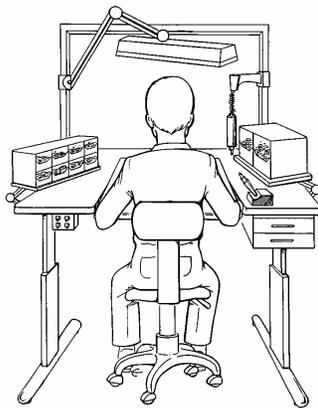
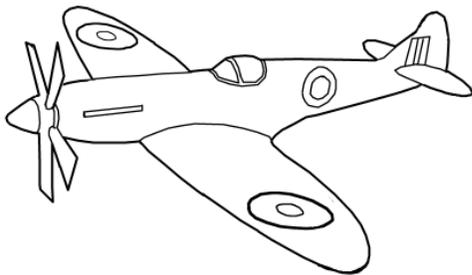
Ergonomics provides a good way to involve people

**Methods Engineering:
New and improved!**

- 13. Ergonomics can offset the limitations an aging workforce.** Older employees have more experience, tend to be more reliable, and are already trained and educated. When ergonomic adaptations are made, older workers can be as productive as younger workers, if not more so.
- 14. Reduced turnover.** Dissatisfaction caused by fatigue, working in uncomfortable postures, and the pain and discomfort created by overexertion injuries may easily lead to increased employee turnover.
- 15. Reduced absenteeism.** One reason why workers are absent is that they are experiencing early stages of a musculoskeletal disorder. Work that hurts doesn't exactly encourage people to come ever day.
- 16. Improved morale.** Frustration, aches, and pains, caused by inadequately designed equipment can easily affect morale. Often it is the little things that create dissatisfaction, for example the hard edge on a piece of equipment that the employee continually bumps into and no one will fix. These are the kinds of issues that can emerge with a focus on ergonomics and can often be resolved relatively cheaply.
- 17. Promoting employee involvement.** Ergonomics fits well into current efforts to involve and empower people. If you have never established formal mechanisms to involve employees, focusing on ergonomics is a good place to start. The concepts are relatively simple and result in direct benefit to the employees themselves, which both serves as positive reinforcement for contributing ideas and provides a base for expanding to other issues.
- 18. Improved labor relations.** Ergonomics issues are often good ones for joint problem-solving between management and labor. Redesigning the workplace using the principles of ergonomics is a "win-win" situation for management and labor.
- 19. The rebirth of Methods Engineering.** Much of industrial ergonomics is similar to old-fashioned Methods Engineering, a practice neglected in recent decades. Perhaps because of our fascination with high tech developments we have forgotten some of the basics. Ergonomics brings these techniques back into the workplace in a new and improved format.



Old-fashioned ergonomics



Good ergonomics is good economics

20. Ergonomics can optimize the Lean Process. Whenever humans are involved, using the tools of ergonomics is a prerequisite for lean operations.

21. 40,000 years of progress. In a certain way, ergonomics is nothing new. Humans have been doing “ergonomics” (that is, reducing the physical demands of jobs) for a long time. We can say, tongue-in-cheek, that good ergonomic improvements include the stone ax, the wheel, and even sliced bread.

22. The goal of ergonomics is to make things more human compatible, which can bring about multiple ways of saving money. In the workplace, the focus is on improving tools, equipment, and work methods. The formal definition of the field is “optimizing the interface between humans and systems.” People who work in awkward and uncomfortable positions are hindered from working efficiently.

23. Improving the human-system interface. The term *ergonomics* was coined by aircraft designers for the British Royal Air Force in the Second World War. Their goal was to create a cockpit that was more human compatible, so that the pilots could physically reach all the knobs and switches as well as understand the increasingly complex array of dials and indicators. Their objectives had nothing to do with preventing back injuries or Carpal Tunnel Syndrome. It was all about efficiency, using the special focus of studying the interface between humans and systems (or, to use the jargon of the time, “man-machine” systems).

24. Everyone benefits from knowing the “rules of work.” The term ergonomics was coined from the Greek words *ergon* (meaning “work”) and *nomos* (meaning “rules”). So the literal meaning is “the rules of work.” We all need to know the “rules” for optimizing work.

25. Saving yourself from OSHA. Some of the largest fines ever issued by OSHA have been related to musculo-skeletal disorders and the absence of any effort to reduce the risk factors for these disorders. This item is last on the list because in the author’s view, OSHA is the least important motivation for investing in good ergonomics.