

25 Ways Ergonomics Can Save You Money*

by Dan MacLeod

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

- 1. 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.” Businesses are all about people — how best to use people to make products and services that help the customers who use them. At every juncture there are people interacting with products and systems. And at every point, we can use ergonomics in a way that is good for business.
- 2. The rebirth of Methods Engineering.** Much of industrial ergonomics is similar to old-fashioned Methods Engineering, a practice that has been neglected in recent decades. Perhaps because of our fascination with computer chips and high tech developments we have forgotten some of the basics. Ergonomics brings these techniques back into the workplace in a new and improved format.
- 3. Improved productivity.** It is common for ergonomic task improvements in manufacturing to increase productivity 10 – 15%. One of the more rigorous studies showed a 25% increase in output at computer workstations when using ergonomic furniture, while simultaneously improving employee feelings of well-being. The book on which this summary is based contains an example from a printing facility where productivity increased 300%, in conjunction with reducing physical demands on employees.
- 4. 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. Again, the book contains 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.
- 5. 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.
- 6. Improved efficiency with less exertion.** In general, the more exertion it takes to perform a task, the longer it takes. Think of opening a

*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.

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.

7. 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.

8. 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.

9. There is a direct link between fatigue and lost productivity. The efficiency experts of a century ago understood this, 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.

10. 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.

11. 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.

12. 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.

13. Ergonomics can optimize the Lean Process. Whenever humans are involved, using the tools of ergonomics may in fact be a prerequisite for lean operations.

14. 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).

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- 15. 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.
- 16. 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.
- 17. 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.
- 18. 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.
- 19. Improved morale.** Discomfort, aches, pains, and frustration caused by inadequately designed equipment and workstations can easily affect morale. Often it is the little things that frustrate employees and 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.
- 20. Reduced turnover.** Dissatisfaction caused by fatigue, working in uncomfortable postures, and the pain and discomfort created by over-exertion injuries may easily lead to increased employee turnover.
- 21. Reduced absenteeism.** A common 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.
- 22. 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.
- 23. Promoting employee involvement.** Ergonomics fits well into current efforts to involve and empower people at work. If you have never established formal mechanisms to involve employees, focusing on ergonomics issues 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.
- 24. 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.
- 25. Saving yourself from OSHA.** Some of the largest fines ever issued by OSHA have been related to musculoskeletal 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.
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What managers should know about “wear-and-tear” injuries

- Musculoskeletal Disorders (MSDs) are very common. You yourself may have experienced lower back pain from time to time or have had a sore elbow or shoulder from tendonitis. MSDs can be thought of as the effects of everyday wear-and-tear.
- Many MSDs are sports-related. We use the term tennis elbow for swelling of the tendons in the elbow from overuse. Almost every long distance runner suffers from MSDs in the legs: shin splints, sore knees and ankles, etc. One of the occupations with the highest rates of these types of injuries is professional baseball.
- These occurrences in sports help us understand the nature of the injuries. First of all, athletes tend to be in excellent condition, but still have problems. So these disorders are not simply caused by being out of shape. Additionally, athletes have no incentive to fake injuries to get out of work. So the underlying problem is deeper than just malingering (although clearly some employees take advantage of the system).
- Most of the time, these ailments heal themselves with a bit of rest. But sometimes they can escalate into disabling injuries, especially when continually aggravated.
- Although we may not be able to prevent all the minor ailments that come with everyday life, we *can* keep the little problems from becoming big ones.
- MSDs can be easily treated when identified in their early stages. When recognized early, these disorders can be treated cheaply with ibuprofen, ice packs, and rest. Moreover, the likelihood of fully returning to normal is increased. But if you wait too long, permanent damage may occur, which may then require surgery, which is expensive and sometimes painful. Worse, the likelihood of full recovery is less.
- MSDs typically account for about one-third of workplace reports of injury. But more importantly, they often account for about 75% of workers’ compensation costs.
- The costs of various types of MSDs that require surgery approximate the following:
 - Wrist Disorder: \$15,000
 - Shoulder Injury: \$20,000
 - Back Injury: \$40,000Although these figures are rough averages, they give an indication of how quickly costs can add up.
- Good ergonomics can be effective in preventing MSDs. Also, recognizing employees with problems at early stages and providing conservative treatment is important.
- The risk factors for MSDs are the same issues that can reduce productivity — primarily awkward postures, excessive force, excessive motions, and static working positions.

Detailed guidance on workplace ergonomics is available from Dan MacLeod and Taylor & Francis: *The Ergonomics Kit for General Industry*, a manual on how to set up an ergonomics process, complete with forms and worksheets.
The Rules of Work — A Practical Engineering Guide, a down-to-earth text on principles, techniques, and quantitative methods of workplace ergonomics.