

## **ROI of Ergonomic Improvements: Demonstrating Value to the Business**

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### **Introduction**

Demonstrating payback on safety programs is an ongoing challenge for many safety professionals. Showing the value of an ergonomics program and individual workplace improvements is a part of that challenge, especially when only the traditional lagging measures are used.

### **Typical Cost Justification Methods**

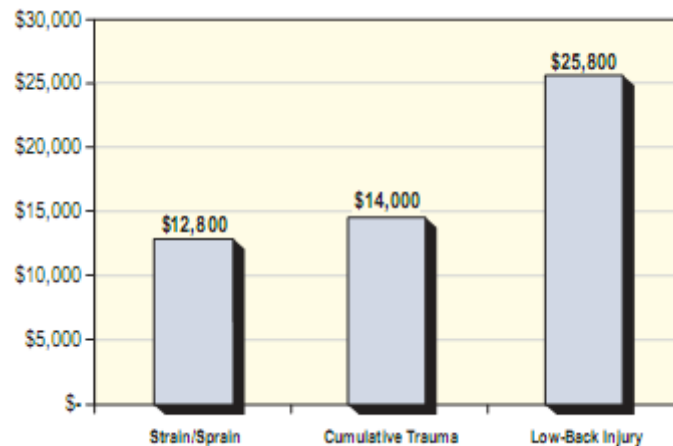
There are many business reasons to support an ergonomics initiative. Three typical primary justification drivers include regulatory compliance, health and safety performance, and production enhancement.

#### **Regulatory Compliance**

Although there is currently no federal ergonomics standard, ergonomics still falls under OSHA's General Duty Clause, which states that every employer must provide "a safe working environment for their employees." There are also some states that have state plans specific to ergonomics, such as California. In addition, other states are currently in the process of looking to establish state plans, like the Michigan Ergonomics Standard. Still others have taken voluntary action, such as Minnesota's Ergonomics Task Force and Oregon's Ergonomics Stakeholder Group. OSHA has also issued guidelines for certain industries (e.g., poultry processing and patient handling), but these are voluntary guidelines, not regulatory guidelines. Outside of the U.S., there are European and Non-European Union guidelines and standards, such as the EN ISO 12100, an ergonomic design standard for machinery, and the ISO standards 5349: 1:2001 and 2:2001, which address vibration exposure.

#### **Health and Safety Performance**

Business managers know that health and safety performance is an important element in maintaining a well trained, motivated workforce. The financial benefit of reduced workers' compensation costs related to WMSDs can be substantial. The figure below shows approximate averages for three types of WMSDs as reported by various data sources in the U.S. (Bureau of Labor Statistics, 2002; National Safety Council, 2001; Health and Safety Executive, 2001).



**Approximate average costs of WMSDs.**

Historically, ergonomics has always had a positive impact on health and safety. We know this by looking at the savings in terms of direct and indirect costs. It is estimated that the ratio of indirect to direct costs is 4:1 (MacLeod, 1995), and this is often visualized using the “Iceberg” analogy (for every \$1 of direct costs above the water, there are at least \$4 of indirect costs below the water). Direct costs are those that can be tracked to a WMSD incident. Examples include:

- medical costs
- workers' compensation payments
- insurance premiums

Indirect costs are often hidden, and increase when WMSDs occur. Examples include:

- time to manage and treat WMSDs
- costs to recruit and train replacement workers
- overtime or lost productivity

The limitation of using regulatory compliance and health and safety performance as the principle drivers of justifying return on investment is that these models are typically founded on lagging metrics. Compliance and safety performance are visible but lack reliability.

### Production Enhancement

Productivity and value-added improvements have proven to be the most straightforward means of cost justifying ergonomic improvements. Productivity is measured at the workstation level, so it fits easily into typical cost justification processes. Also, it is simple to predict and quantify the productivity impact of ergonomic improvements that leads to cost savings in many areas including:

- quality
- delivery
- production (measured at the workstation level)

For these reasons, the production enhancement model is the least visible but most reliable in justifying ergonomic improvements.

## Creating Business Value through Ergonomics

In today's business climate, any initiative that does not deliver measurable (short- to medium-term) value is considered an option, rather than a requirement. Ergonomic improvements are more likely to be supported and accelerated if they fit into a cost justification process.

Cost justification is a normal business process used by managers and executives to weigh the costs and benefits of various improvement initiatives. Managers are challenged every day to do more with less and are often measured on how quickly they can improve productivity and quality. Cost justification:

- enables communication between safety, engineering, and management
- takes the focus away from injuries (reactive)
- focuses on taking action before an injury occurs (proactive)
- enables you to prioritize countermeasures (compare payback periods)
- makes good business sense and affects the bottom line

Management must often weigh the merits of ergonomic improvements against other potential projects. Ergonomic projects that result in return on investment (ROI) are both effective *and* efficient in reducing hazard exposures.

## Calculating Return on Investment

In the manufacturing environment, time is the dominant currency, and we know that awkward postures, high forces, and repetitive movements take more time to complete. The challenge is quantifying the financial benefits of reducing force, frequency, and posture. Motion time can be converted to money.

Ergonomics can affect productivity in two main ways: elimination of non-value-added tasks and reduction in motion waste. Motion time is often related to ergonomic risk and, conveniently, there are methods for identifying and quantifying time savings as a result of eliminating or reducing non-value-added motions.

Motion study has long been used by industrial and operations engineers to improve processes and determine appropriate workloads. It is a technique used to predict the time required to perform a task and/or operation. This analysis method requires operations to be broken down into tasks, task elements, and basic motions. Many tasks that involve excess motion often require more time to perform the job and are often a source of ergonomic risk to the employee. For example, tasks that require extended reaching can be improved from a motion time standpoint by moving the objects closer. Reducing the reaching in this way will also reduce ergonomic risk, back bending, raised shoulders, and extended elbows. Therefore, motion time analysis can be used to calculate time savings resulting from ergonomic improvements.

Motion time analysis can also be used as a supplemental resource when requesting financial buy-in from management/engineering.

### Productivity Impact

Cost justification is based on the ability to choose the best ergonomic improvements for the available resources. For each ergonomic improvement, the benefit should outweigh the cost (this is the "benefit-to-cost ratio"). The easiest and most effective way to estimate benefits of

ergonomic improvements is to focus on productivity impact. Time savings from eliminating non-value-added tasks and reducing motion times can be used to project effects on productivity. A “conservative productivity impact” is calculated by multiplying the “projected productivity impact” by 65%; this accounts for the inefficiency of directly translating time savings into productivity gains.

$$\text{Projected Productivity Impact} = \frac{\text{Total Time Savings}}{\text{Total Operation Time}} \times 100\%$$

### Payback Period

To cost justify ergonomic improvements, you can calculate the payback period; this is the amount of time that savings must accumulate to “pay back” the initial investment cost. Payback period is typically expressed in years or months.

To calculate a payback period, an annual savings calculation is required as well as the cost of the investment. Calculate annual savings by multiplying the productivity impact by the fully burdened direct labor cost of the operation. The benefits burden typically ranges from 25% to 33% of the hourly wage; a conservative measure is recommended.

$$\text{Annual Savings} = \text{Productivity Impact} \times \text{Annual Direct Cost}$$

$$\text{Payback Period (Years)} = \frac{\text{Cost of Improvement}}{\text{Annual Savings}}$$

Finally, to calculate the Return on Investment (ROI), subtract the initial investment from the annual savings and divide by the initial investment. Typically, an ROI of fewer than three (3) years is desirable.

$$\text{Return on Investment} = \frac{\text{Annual Savings} - \text{Initial Investment}}{\text{Initial Investment}}$$

## **Summary**

For your ergonomics process or safety program to be successful, you must be able to demonstrate their value to the business. And value is measured as money. To demonstrate value of ergonomic improvements:

- Focus on proactive goals and measures people can act on
- Use objective, real-time methods
- Demonstrate value to other initiatives (quality, cost, time, etc.)
- Calculate and communicate the cost-benefit of improvements (ROI)
- Achieve tangible results

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