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Return on Investment: The Economics of Ergonomics

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Providing the tools and equipment necessary for employees to safely complete their daily work tasks saves time and money through work efficiency and injury avoidance. The most common reasons managers invest in workplace improvements are to:

1. Improve worker safety and health.
2. Reduce costs.
3. Improve productivity.
4. Comply with regulatory requirements.

Whether you call it return on investment (ROI), rate of return (ROR), or just return, it all adds up to how much money you gain or lose on an investment. ***When you invest in ergonomic solutions, what is the bottom line?***

Using ergonomics to control work-related musculoskeletal disorders (WMSDs) improves worker safety and health, reduces costs, and improves productivity and mission readiness. However, managers are hesitant to fund ergonomics projects until savings are proven. Therefore, you need to speak their language—talk "productivity" and "cost savings." Show the managers the ROI projected by implementing an ergonomics improvement.

The following pages show how to perform an ROI calculation using productivity improvements and injury aversion.

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ROI CALCULATION USING PRODUCTIVITY SAVINGS: A NAVY SUCCESS STORY

ROI calculations using productivity savings justifies the investment by showing cost savings due to worker efficiency—getting the job done using less man-hours than before the improvement.

Process

Workers maneuver on the side rails of roll off dumpsters while manhandling heavy tarps to cover their load. Five trucks make 10 stops per day, averaging 25 minutes per stop. There is one worker operating each truck (five trucks, five workers).

Problem/Hazards

Workers risked back and shoulder injury from repeatedly pulling the heavy tarp to cover the load and knee injury from crawling along the metal side rails. Knee injuries were a particular concern due to contact with the truck body and twisting to pull the tarp cover. Other injuries included cuts, puncture wounds, sprains, and strains. Additionally, a worker could easily fall due to the unsure footings. Six lost workday cases occurred over the year from performing this task.

Proposed Solution/Benefits

A semi-automatic tarp covering system, operated from the ground, virtually eliminates risk of injury. The semi-automatic system lifts the tarp, then the worker pulls the tarp over the frame and load from the rear of the truck. The cost of this system installed for five trucks was $17,000.

Step 1: Pre-Intervention Costs

Labor = 25 minutes/stop = 0.4167 hours/stop

0.4167 hours/stop X 10 stops/day = 4.16 hours/day
4.16 hours/day X 5 workers = 20.835 worker hours/day
20.835 worker hours/day X 240 days/year* = 50,004 worker hours/year for this task

50,004 worker hours/year X $25/worker hour = $125,010 per year

*Allowing for weekends, holidays, and annual leave, there are approximately 240 workdays/year

Total annual labor cost for this task = $125,010 (pre-intervention)

Step 2: Post-Intervention Costs

The semi-automatic tarp covering system reduces the time per stop to 10 minutes. This is a 15-minute time savings per stop!

Labor = 10 minutes/stop = 0.1667 hours/stop (efficiency improved due to intervention)

0.1667 hours/stop X 10 stops/day = 1.667 hours/day
1.667 hours/day X 5 workers = 8.335 worker hours/day
8.335 worker hours/day X 240 workdays/year* = 2,000.4 worker hours/year for this task

2,000.4 worker hours/year X $25/worker hour = $50,010 per year

*Allowing for weekends, holidays, and annual leave, there are approximately 240 workdays/year

Improved total annual labor cost for this task = $50,010 (post-intervention)

Step 3: Annual Cost Difference or Savings

This is the annual cost saved *per year* by implementing the intervention.

Pre-Intervention Costs – Post-Intervention Costs =
$125,010 per year - $50,010 per year = **$75,000**

Step 4: Expected Intervention Service Life (Expected Tool Service Life)

To account for equipment maintenance costs and to plan for tool replacement, you need to know the useful life of your tool (how long it will last). The useful life of the tarp system is **10 years**.

Step 5: Improvement Cost (Tool Purchase Price and Maintenance)

Tool Purchase Price (5 units) = $14,500
Installation (5 units) = $2,500
Expected Maintenance over 10 years = $5,000
Total Improvement Cost = $22,000

Step 6: 10-Year Cost Savings (Useful Life of the Intervention)

Pre-Intervention Costs for 10 years – Post Intervention Cost for the 10-Year life – Improvement Cost = 10-Year Cost Savings

10 years X (annual labor cost of pre-intervention) – 10 years X (annual labor cost of post-intervention) - (improvement cost) = 10 year cost savings

10 years X $125,010/year – 10 years X $50,010/year - $22,000 **= $728,000**

Step 7: Break Even or Payback Period

This is the amount of time needed to break even on your project investment.

$$\frac{\text{Improvement Cost}}{\text{Annual Cost Savings}} = \text{payback period in years}$$

$$\frac{\$22{,}000}{\$75{,}000} = 0.20 \text{ years or 107 work days}$$

After 107 work days, the project has paid for itself in productivity savings. From this point forward, the useful life of the improvement is profit!

Now let's use the same project to calculate the ROI based on injury aversion.

ROI CALCULATION BASED ON INJURY AVERSION

This method assumes the intervention would eliminate risk and avert potential injuries and lost workday cases.

Step 1: Cost of Potential Injuries (Annual Cost Savings Post-Intervention)

From the Bureau of Labor Statistics cost factors, a lost workday injury costs $8,413. This process had six lost workday cases over a year's time. You could use actual costs from your records.

6 lost workday cases X $8,413 per case = $50,478

This would be our annual cost savings if we eliminated the risk and averted these injuries by implementing the improvement.

Step 2: Break Even or Payback Period

This is the amount of time needed to break even on your project investment.

<u>Improvement Cost</u> = payback period in years
Annual Cost Savings

<u>$22,000</u> = 0.44 years or 159 work days
$50,478

After 159 work days the project has paid for itself by reducing the risk of injury and averting 6 lost work day cases.

If you don't already, track and report workdays lost due to WMSDs. Also report and track alternative productive workdays where skilled craftsmen are missing from the mission to help out in indirect tasks. This information can be used to back up an assumption of averting an injury in a return on investment calculation.

Now you determine the break even point or payback period if productivity savings and injury aversion are combined. Did you get 64 days?