Summary of Benchmarking Study Results: Cost and Return on Investment of Ergonomics Programs

A White Paper by Humantech, Inc.

Humantech, Inc., July, 2014
Introduction

Humantech conducted a benchmarking study as part of an ongoing process to better understand the current status and practices of managing occupational ergonomics in today’s workplace. Occupational ergonomics, as defined by the National Institute of Occupational Safety and Health (NIOSH), is “the science of fitting workplace conditions and job demands to the capabilities of the working population. Ergonomics is an approach or solution to deal with a number of problems—among them are work-related musculoskeletal disorders.”

This study was the fifth in a series of benchmarking studies on management practices. Our goal was to build on the information gathered in the 2010 and 2011 benchmarking studies on “world-class” programs by digging deeper into specific elements of ergonomics programs, resources invested, and return on investment. We tested the hypothesis that the return on an ergonomics program should be two to three times the investment.

This white paper was derived from the full report of the benchmarking study findings and summarizes the general trends and high-level findings of the study.

Scope

The scope of the benchmarking study was to:

- Identify survey participants (U.S. sites with established ergonomics programs).
- Contact the process owner or most senior person responsible for ergonomics (ergonomics process manager or equivalent) and obtain key measures of improvement and critical program elements to which he or she attributes the program’s success.
- Ask participants to complete an online survey describing their current programs and measures in the three areas of focus.
- As needed, conduct a follow-up phone interview with participants to clarify their responses or request missing information.
- Summarize the findings to share with the participating companies and extract a list of critical program elements.

To ensure consistency in communication, discussions were conducted by a team of three Humantech consultants. All information was collected through an online survey.
Participation in the Study

The benchmarking study focused on U.S.-based sites with established ergonomics programs. Since the survey asked for detailed measures of ergonomics program investment and results, we realized that not all companies would be able to provide the information. Forty-four companies were contacted directly and invited to participate. In addition, six other companies contacted us regarding participation in response to a press release about the study. Of these 50 companies:

- 36% (18) did not respond to invitation.
- 12% (6) considered participation and stated they were not interested.
- 52% (26) stated that they were interested in participating.

A Humantech representative contacted each of the 26 interested companies to explain the study and to provide a worksheet detailing the program data requested and a link to the online survey. Of these 26 companies:

- 42% (11) chose not to complete the survey. Nine of these invitees stated that, after reviewing the checklist, they determined that they did not have the information available to complete the survey.
- 35% (9) partially completed the survey.
- 23% (6) fully completed the survey.

Participant Characteristics

Participants represented a wide variety of industries, primarily from manufacturing, with one utility industry. Characteristics of the site ergonomics programs varied widely and are summarized in Table 1. The length of time the ergonomics program had been in place varied from young (1 to 3 years) to established (10 to 15) years. MSDs accounted for 21% to 82% of recordable injuries/illnesses (average 42%).

Table 1: Characteristics of participant ergonomics programs

<table>
<thead>
<tr>
<th>Site</th>
<th>Length of Time of Ergonomics Program (Yrs.)</th>
<th>% Injuries Attributed to MSDs</th>
<th>Injury/Illness Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>In Year Ergo Program Began</td>
</tr>
<tr>
<td>Company A</td>
<td>1 to 3</td>
<td>36</td>
<td>7</td>
</tr>
<tr>
<td>Company B</td>
<td>3 to 5</td>
<td>82</td>
<td>4</td>
</tr>
<tr>
<td>Company C</td>
<td>1 to 3</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>Company D</td>
<td>5 to 7</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>Company E</td>
<td>5 to 7</td>
<td>33</td>
<td>1</td>
</tr>
<tr>
<td>Company F</td>
<td>10 to 15</td>
<td>30</td>
<td>9</td>
</tr>
</tbody>
</table>
Findings

Due to the low sample size, the statistical significance of the data provided by participants is low, but as a first attempt to study the return on investment (ROI) of ergonomics program management, the results did provide some good insight.

We collected information about the **investments** of time, resources, and cost, and also about **results** achieved by the program. These two categories of variables were used to calculate the ROI of each site program.

Investment

Survey questions collected information about the people, their time, and the costs invested in site ergonomics programs.

**People**

All participants had established a support structure of designated people to maintain the site ergonomics process. The size and makeup of each team varied according to the site culture, need, and available resources. Some teams represent cross-functions of the organizations, while others rely primarily on one or a few departments. The roles of people on each team are summarized in Figure 1.

![Figure 1: Roles represented on ergonomic support teams](image)

All participants had a designated person serving as the ergonomics process lead or manager.

- 67% had one or more people from the safety staff on the team.
- 50% had one or more senior managers on the team.
- 67% had one or more line employees on the team.

Only two sites had engineers identified on their ergonomics teams; the engineers accounted for 27% to 60% of the people supporting the ergonomics process. This heavy reliance on engineers in managing ergonomics is a best practice identified in previous benchmarking studies.
One site has aligned its process for managing and improving ergonomics with the continuous improvement team; the entire team supporting ergonomics is comprised of people responsible for continuous improvement. This approach has been identified as an effective process in previous benchmarking studies.

When comparing the number of ergonomics program support team members to the number of employees at the site, the ratio average ranged from one (1) support team member for every 65 to 120 employees. Note that a range is provided because the number of support team members was determined based on a range selected as the response in the survey.

**Time**

Having people resources with the right skills and roles is important for any ergonomics program. Having those people available to work on the job improvement process is critical.

When asked about the time available for ergonomics process leads to manage the program, half (50%) had 4 to 8 hours allocated each month.

![Figure 2: Time available for ergonomics process leads](image)

When asked about the time dedicated for ergonomics team members and designated support people to conduct assessments, lead improvements, and attend meetings, most participants (83%) indicated fewer than 4 hours each month per person.

![Figure 3: Time dedicated for people to complete ergonomic improvement activities](image)
Similarly, when asked about the time spent each month by engineers to address ergonomic designs of new and existing equipment, most (83%) participants responded with fewer than 4 hours each month.

![Figure 4: Time spent by engineers addressing ergonomic design in new and existing equipment](image)

**Money**

**People Costs**

In calculating the ROI of any program, the investment of people involved and their time must be expressed in terms of cost. In the online survey, participants were asked for the hourly burdened cost for people in each role supporting the ergonomics program (the ergonomics process lead, senior management, engineer, etc.).

**Training Costs**

For any program or process, there must be investment in developing the skills and abilities of people serving in their respective roles. The same is true for an ergonomics program. Typically, training is provided for people with specific roles. Table 2 summarizes the types of training and costs identified for each.

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibility</th>
<th>Training</th>
<th>Annual Training Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ergonomics Program Lead</td>
<td>Manage the site program</td>
<td>Skills training in program management</td>
<td>$200 to $1,000/person (Average = $475)</td>
</tr>
<tr>
<td>Site Leadership</td>
<td>Provide resources, leadership and sponsorship</td>
<td>Awareness of ergonomics program and regular review of metrics</td>
<td>N/A</td>
</tr>
<tr>
<td>Ergonomics Team Member</td>
<td>Conduct workstation assessments and lead improvement projects</td>
<td>Skills training in assessment and solution tools and process</td>
<td>$100 to $1,000/person (Average = $533)</td>
</tr>
<tr>
<td>Engineers and Maintenance</td>
<td>Ensure new and modified workstations and tools are designed at low MSD risk</td>
<td>Skills training to apply ergonomic design criteria</td>
<td>$100 to $200/person (Average = $150)</td>
</tr>
<tr>
<td>Supervisors and Managers</td>
<td>Address poor ergonomic conditions in their areas</td>
<td>Awareness of site program and use of observation-based tools</td>
<td>$100 to $4,000/site (Average = $1,875)</td>
</tr>
<tr>
<td>Employees</td>
<td>Use equipment and tools correctly, adjust workplace to reduce risk, report symptoms of discomfort</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cost of Engineering Controls

The primary and most effective way to reduce the causes of MSDs is through engineering controls. These are changes to the design, geometry, and adjustability of the workstation and tools to fit the workplace to the person. Engineering controls were organized into two categories based on the cost and the requirements for funding approval.

The thresholds of expensed and capital purchases vary with each organization based on their own financial policies. Typically, capital purchases cost more, require planned budgeting and justification, and depreciate over time. Expensed improvements have a lower cost associated with them. The results are summarized in below.

![Figure 5: Cost of expensed improvements](image1)

![Figure 6: Cost of capital improvements](image2)
Results

Injury and Illness Cost Reduction

Effective ergonomics programs focus on identifying and reducing the risk factors that cause musculoskeletal disorders. These MSD risk factors include awkward posture, high force, and time (long duration, high frequency). Using these leading measures of cause, the incidence of MSD injuries and the resulting workers’ compensation costs can be reduced.

When participants were asked for information about change in the injury and illness (I/I) rate since starting their ergonomics program, the results were as shown:

Figure 7: Change in I/I rate since launching ergonomics program

Of the participants reporting a reduction in their I/I rate, the average annual reduction was 4.9% to 9.0%. Note that a range is provided because the length of the site program was derived from a response based on a range of years.

Based on participant reports of injury cost management, only a few participants provided complete data from which to calculate the value of the impact of improved ergonomics on injury reduction. This was calculated to fall between $2,977 and $4,854 per year (based on the incidence of MSDs and workers’ compensation costs of each site).
**Productivity Improvement**

Removing MSD risk factors from a task typically reduces non-value-added motions and is measured as an improvement in throughput or productivity. When asked for annual rate of throughput improvement, all participants tracked this measure. Responses are summarized in Figure 8.

![Figure 8: Productivity improvement](image)

Based on participant reports of productivity improvement, the value of the impact of improved ergonomics was calculated to fall between $42,538 and $305,833 per year (based on the ergonomic improvement having a 5% impact on productivity).

**Quality Improvement**

Ergonomic improvements can also help remove barriers to quality and improve employee performance. When asked for the annual rate of scrap/rework, 86% of the survey participants tracked this measure. Of these, half did not see an improvement. Only a few sites identified improvement in quality.

![Figure 9: Quality improvement](image)

Of the sites reporting improved quality, the value of the impact of improved ergonomics was calculated to fall between $12,500 and $25,000 per year (based on the ergonomic improvement having a 5% impact on quality).
**Employee Retention**

Improved workplace ergonomics has been identified as a contributor to improving employee retention. When asked for annual rate of employee turnover, 86% of the survey participants measured this. The responses are summarized in Figure 10.

![Figure 10: Employee turnover](image)

Participants reported that the average cost to manage the turnover of one employee ranges from $3,000 to $30,000 (average = $14,625). The average value of the impact of ergonomics on improving employee retention was calculated to fall between $12,469 and $52,500 per year (based on the ergonomic improvement having a 5% impact on employee retention).

**Employee Engagement**

Employee engagement has been recognized as a potential value supported by a participative ergonomics management program, but it is rarely quantified. In this study, we explored if participants measured employee engagement, and the results realized.

Employee engagement is not a common measure used by safety programs and staff, but some Human Resources departments do track it. The most common tool for measuring employee engagement, by U.S. employers, is the Gallup Q12 survey.

In this study, participants were asked: “Based on an Employee Engagement survey, how have the site scores changed since the ergonomics program was started? This is based on the Gallup Q12 survey or another common measure of employee engagement.” Responses are summarized in Figure 11.

![Figure 11: Change in employee engagement](image)
Return On Investment

As stated in the introduction, the sample size for this study was smaller than desired, and the survey was designed with some responses as a range of numbers (rather than a single value). This was done to make it easier for participants to complete the survey and to protect sensitive participant company information. Since a range was used for several responses, an ROI range was calculated for most participants based on the investment and return data they provided.

This equation was used to calculate ROI for this study:

\[
\text{ROI} = \frac{P + Q + E + I - \text{Cost}}{\text{Cost of People, Equipment and Program}}
\]

The components of the equation are as follows:

- **Performance (P)** = % change in cycle time x annual revenue x % of jobs improved through ergonomics
- **Quality (Q)** = % change in scrap/rework x annual revenue x % of jobs improved through ergonomics
- **Engagement (E)** = % change in employee turnover/absenteeism x cost of employee turnover x % of jobs improved through ergonomics
- **Injury/Illness (I)** = % change in injury/illness rate x total workers’ compensation costs x % of injuries attributed to poor ergonomics
- **Cost** = Total cost of people’s time supporting the ergonomics program, training, capital and expensed improvements, plus any additional costs

Of the survey participants, four (4) provided complete data, which enabled us to complete the ROI calculation for each site. Based on these four sets of data, the ROI of the site ergonomics programs ranged from 77% to 1,513% per year. The average for the group was 378% annual ROI.
Conclusions

Calculation of ROI of individual ergonomic improvements has been demonstrated for many distinct engineering projects (Mallon, 2014; Goggins et. al., 2008). Calculating ROI requires good planning and discipline to capture key measures before and after the project. However, calculating the ROI of a site ergonomics program requires a bit more work.

This benchmarking project was a first attempt to measure and calculate the ROI of a full site ergonomics process. Our hypothesis was that the return of an ergonomics program should be 2 to 3 times the investment. Despite the low number of participants, incomplete data, and design of some of the survey questions, we were able to complete calculations for four sites, which indicate this hypothesis is true.

In hindsight, our decision to ask for ranges of data instead of a unique number complicated the ROI calculation and reduced the accuracy of each calculation.

Other conclusions from this study are as follows:

- Determining the ROI of an ergonomics program is of interest to many EHS professionals. However, they lack a clear understanding of the process and variables involved in making the calculations.
- Many organizations are not collecting, or do not have access to, the data required to measure all investments and returns on ergonomic improvements, and to calculate ROI.
  - The investment of resources in an ergonomics program is not well documented or tracked.
  - Assigning a dollar value of the resources invested and benefits returned by ergonomic improvements (and other safety programs) is not clearly understood or practiced.
  - Other than the traditional safety measures of injury/illness rate and workers’ compensation cost, many sites do not track other values of improved ergonomics (e.g., quality, productivity, and employee retention).
- The simple formula for ROI allows safety/ergonomics program managers to demonstrate and link the value of their program to the organization's bottom line.
References


About Humantech

For over 30 years, global companies have relied on Humantech for workplace improvements. By combining the science of ergonomics and our unique 30-Inch View®—where people, work, and environment intersect—we deliver practical solutions that impact safety, quality, and productivity. At Humantech, we know people make productivity happen.

Our clients look to us for the tools and knowledge necessary to create a bridge between humans and their work environments. By furthering an understanding of the capabilities and limitations that people have, Humantech strives to improve the safety and productivity of workers in all environments while, at the same time, enabling these workers to produce the highest quality products and services.

Companies that make the move from a reactive approach to injuries to a proactive and/or advanced approach to workplace design, find that ergonomics is central to executing at the highest levels. Humantech helps companies identify and quantify injury risk in the workplace, provides training and consulting aimed at removing that risk, and delivers management systems that embed these processes into a corporate culture.

To learn more about how Humantech can optimize the capabilities of your workforce, please contact us:

Humantech Corporate Office
1161 Oak Valley Drive
Ann Arbor, Michigan 48108
Tel. 734-663-6707
Fax. 734-663-7747
www.humantech.com