Preventive ergonomic strategies demonstrate substantial cost benefit for small to mid-size employers

Alison Heller-Ono, MS, PT, CDA, CIE, CMC

Worksite International, 887 Abrego Street, Monterey, CA 93940, USA

Abstract

Historically, employers base business decisions on the financial profile of their company. When the company is on hard times, investments in improving the quality of the business are often put on hold. Ergonomics is a business strategy that falls into the optional investment category, even if it is something that needs to be done as an intervention to reduce work-related musculoskeletal disorders (WMSDs) and stem rising workers' compensation costs and other related losses. In the USA, employers pay a premium for workers' compensation insurance but only if they are self-insured, do they truly pay the direct cost for injuries. As a result, work-injuries are perceived as a cost of doing business as there is often no line item budget to demonstrate the true cost required to pay for medical and lost time expenses. Employers that look beyond the financial profile of their company to understand the value of investing in the human asset will recognize and invest in preventing work injuries using ergonomic strategies. This session will demonstrate how small to mid-size companies choose to invest in preventing work injuries through ergonomic strategies. The financial implications of a variety of ergonomic interventions will be discussed to show the cost benefit of each method. Methods include using an ergonomics task force for in-house expertise, using an outside consultant to conduct ergonomic analysis for early symptom management, training employees and purchasing ergonomic products and accessories to invest in facility assets. A financial model will be presented to show the cost benefit these companies have experienced.

Keywords: investment, human asset, cost-benefit, prevention, ergonomics task force

1. Introduction

Employers in the United States are under no specific Federal or State mandate to utilize ergonomics in the workplace as a preventive or management strategy to reduce the risk of injury and illness at the workplace. There is one exception; the State of California has a state OSHA (Occupational Safety and Health Administration) Regulation known as Title 8 of the General Industry Safety Orders, Article 106, Ergonomics, Section 5110, Repetitive Motion Injuries. [1] The regulation went into effect on July 3, 1997 and requires that all employers implement an ergonomics program if they meet the scope of the regulation. This regulation, while reactive, requires employers to respond when more than one repetitive motion injury (RMI) occurs in the workplace that is predominantly due to an identical work task that has been diagnosed by a physician within a twelve month period of time. The California regulation requires employers that meet the scope to implement the following program:

1. Worksite Evaluation.
2. Hazard Prevention and Control Measures.
3. Training (for high-risk individuals).

With or without regulations, employers are realizing the multiple benefits of using ergonomics in

the workplace. This is evident by the decline in cumulative trauma disorders and repetitive motion injuries since the mid-1990.

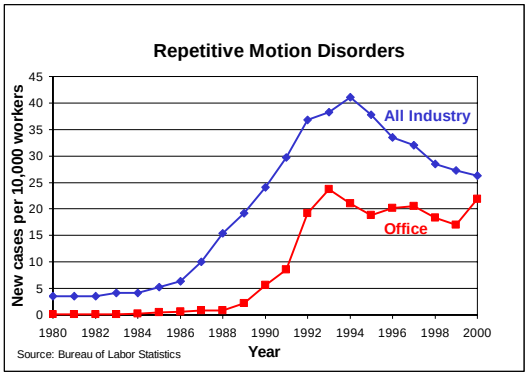

Fig. 1: Bureau of Labor Statistics, 2001

While the Bureau of Labor Statistics is no longer specifically monitoring RMIs since 2003, all are now clustered together under musculoskeletal disorders, these injuries continue to decline. With this in mind, more employers are using ergonomics as a strategy to improve productivity, increase efficiency at work and increase comfort at the workplace and they are doing it because they have chosen to make the investment, not because they have to do it to comply. This in turn, results in a downward trend in recordables as seen in Figure1.

Employers choose to invest in ergonomics when they value the human asset, their employees. Despite desire to want to invest in ergonomics, the investment must be justified. Managers need methods and tools to demonstrate the financial viability of funding ergonomics proposals. Using cost benefit analysis to convince otherwise skeptical administrators that the value of people must not be underestimated and that the workers are their key to profit is the best way. [2]

1.1. Types of economic analysis

Over the past decade many models were developed to evaluate cost effectiveness of ergonomic interventions and health and safety measures. Many of these models are complex with data that must meet specifications defined by the model. As a result, in many cases data needs to be collected or processed by different departments in a company resulting in a sometimes limited application. [3] The literature shows that cost benefit analysis when used by management can substantiate the benefits of ergonomic improvements over time. Some noted Ergonomists to utilize various types of formulas include Dr. Paula Liukkonen of Stockholm University., Dr. Arne Aaras, Professor Guy Ahonen, Dr. Per Dahlen, Dr. Hal Hendrick and this author. While each has published their models, each is tied to a specific set of conditions that demonstrate positive financial results from ergonomic interventions that cannot necessarily be generalized. [2]

In Oxenburgh's latest book, he notes three fundamental types of economic analyses that can be used to justify an ergonomic proposal. They are financial appraisal, cost effectiveness analysis, and cost benefit analysis. He also states that a worthwhile investment is when the benefits outweigh the costs and each of type of economic analysis can assist in the justification. [2]

Financial appraisal is the simplest model that considers costs and benefits that affect the organization itself. It is considered a micro-economic model using the cost of the proposal and then calculates the benefits from the proposal over time to account for return on investment (ROI). The cost-effectiveness analysis compares the cost and benefits of a proposal to the organization including the social and cultural impact and is considered a macro-economic model. The third is cost-benefit analysis which can be applied to any economic analysis and places a dollar value on all factors. [2]

Koningsveld notes that cost effectiveness evaluations can be done for several reasons:

1. To convince people that investments in health and safety are useful.
2. To evaluate a proposed investment or to evaluate the decision afterwards.
3. To benchmark to other companies.
4. To follow a trend in time.
5. To sell products or systems.

He also reports that management often makes decisions based on several considerations that often do not include financial information (expected ROI). Interviews with employers reveal that a decision to invest or not is sometimes made emotionally rather than rationally, often using a "gut feeling". This might be added as the 4th type of analysis, the "abdominal analysis". Konsingveld notes, like Oxenburgh, that after studying much work by other experts and his own, Konsingveld finds that it is impossible to draft a general model that can easily be

filled out by anyone and that answers all questions about all kinds of interventions or policies in the field of occupational health and safety. [3]

2. Methods

A benchmarking study by this author was published in 2001 and utilized a financial appraisal formula to determine cost benefit of a proposal. [4] The study focused on ROI as a critical monitoring factor to determine success of utilizing an ergonomics task force as part of a participatory ergonomics process.

This formula is based on a company's tracking of the medical costs associated with their own musculoskeletal injuries, in particular, repetitive motion or cumulative trauma type injuries over time or annually. This dollar cost is compared to the money invested in the proposal annually and includes costs associated with consulting, training, product purchases and other ergonomics process expenses. To determine the annual ROI, the following model is used:

$$\frac{\text{Net annual change in all CTD injury/illness costs}}{\text{Annual investment in the process}}$$

The formula can be generalized to account for all workers' compensation medical costs due to MSDs or CTDs divided by the annual investment in the process. [4]

Modifications to the model may be necessary if a company does not effectively track their workers' compensation costs or is unwilling to provide the data to the requesting party. Modifications to the formula would require a more general approach seeking cost average from state or other insurance databases. For example, a modified version of the formula is provided below:

$$\frac{\text{Average State or Company Workers' Compensation Costs per claim x \# Claims Prevented}}{\text{Annual investment in the process}}$$

In this report, the model is applied to three distinctly different scenarios. Each presents with various challenges and limitations based on the available client data. Case 1 allowed for the financial analysis with true cost data comparison year to year. Case 2 and 3 utilized the modified formula to determine ROI.

3. Results and Discussion

3.1: Case 1: Using an Ergonomics Task Force as part of an ergonomics process to prevent and manage injuries

A long term study spanning from 1993-2001 tracked six different organizations as they implemented an ergonomics task force (ETF). The ETF is generally composed of the following designations; Program director, Chairperson, Surveyors [2], Purchasing Coordinator, Training Coordinator, Secretary and Maintenance. The task force becomes the in-house experts for preventing and managing work injuries for the organization. The responsibilities and activities varied from team to team and include many different types of tasks. They are the selection of ergonomics products, providing group and individual training, performing office worksite evaluations, conducting regular team meetings, selection of training materials, and developing an ergonomics product library. Companies were encouraged to identify their workers' compensation injury costs during the course of the study to benchmark and compare their outcomes annually, but unfortunately only one organization, the Monterey County Sheriff's Office, was able to track that data over time allowing an effective use of the model presented above. The results demonstrated a significant ROI annually for the first four years studied. In particular, the financial return for every dollar invested in the ergonomics process for the Monterey County Sheriff's office demonstrated a $2.14 payoff for the second year of the program compared to the first year, $13.00 for year three and $5.50 for year four of the program. Furthermore, substantial reduction in repetitive motion and cumulative trauma injuries were also noted over the same time period for the Sheriff's agency. [4]

The other participating agencies did not have regular access to their workers' compensation medical records over time and primarily failed to benchmark at the start of the process. As a result, they were not able to demonstrate any ROI simply because there was no means of comparison. In regards to measuring outcomes, managers simply shared feedback about the results they obtained or went by a "seat of the pants" judgment or "abdominal analysis"

as discussed earlier, regarding the program benefits. [4]

3.2: Case 2: Using ergonomic analysis to prevent and manage injuries.

In this second scenario, a small publishing company with 75 employees took an aggressive preventive approach to managing early signs and symptoms reported by employees. The employer would contact the consulting ergonomist to conduct ergonomic worksite analysis within a few days of notice. The protocol involved interviewing the employee on essential work practices and noted concerns regarding work tasks, workstation set-up and associating symptoms that the employee may experience during the course of the work day. Anthropometric measurements along with employee education on how to adjust and utilize any ergonomic accessories including chairs, keyboard trays or other items were provided during the analysis. Quick fixes were performed whenever possible to change or modify the existing set up so that better ergonomics could be achieved. Employees also received information on self-care, early symptom management and onsite stretching that they could do at the workplace. A report of findings and recommendations was presented to management shortly after that suggested various facility changes, administrative actions and product purchases to remedy the identified problems.

During 2004, eight employees were seen with early symptoms resulting in no claims filed. Based on the investment made by the employer in consulting, analysis and product purchases and their average workers' compensation costs per claim, a return on investment was determined. In this case the modified formula was used to determine ROI. Their average claim costs per case from insurance records were approximately $7,691.00. This cost was multiplied by the eight claims prevented to identify the numerator. An average cost per ergonomic analysis of $421.00 combined with an approximate equipment investment of $300.00 per employee determined the denominator.

Return on investment = $\frac{\$61,528.00}{\$5770.40}$

Based on the average costs per claim and the investments made in the program, the employer demonstrated an RO I of $10.66 for every dollar invested by using the preventive services described above. This figure does not represent the productivity gains made by avoiding lost time and modified duty that would have resulted with additional claim filing. With this in mind, the gains are even more substantial.

3.3: Case 3: Using ergonomic analysis and training to prevent and manage injuries.

The third case occurs in a biotechnology company in 2004 also that has two separate locations with approximately 150 employees. The priority for this employer was also to prevent work injuries and selected consulting, office and laboratory ergonomics training and ergonomic worksite analysis for office and laboratory to address their concerns. For this case, the client was not willing to provide their workers' compensation cost data for use in doing a more accurate financial appraisal of the services provided. As a result, in order to determine the ROI for this client, the average cost per workers' compensation claims (indemnity) for RMIs in California was used ($34,627.00).[5] This cost was multiplied by the number of ergonomic evaluations conducted (20) anticipating that without the interventions that these would likely have gone to the insurance company as workers' compensation claims. The employer also held a number of training programs focusing on office and laboratory ergonomics which impacted approximately 75 employees in the workplace. For this employer, the total invested in their 2004 ergonomics process which included consulting, training, ergonomic analysis and products purchased was $20,214.34. Using the modified formula:

Return on investment=$\frac{\$692,540.00}{\$20,214.34}$

Based on the average costs per claim and the investments made in the program, the employer demonstrated an ROI of $34.26 for every dollar invested by using ergonomic analysis, employee training and consultation in work injury prevention and management. By avoiding lost time and keeping employees at work, additional gains in productivity are also likely.

4. Limitations of Study

A critical aspect in determining realized benefits of return on investment using the formulas

presented in this paper is based on the claims cost information that the employer provides to the consulting ergonomist. Without this data, the financial appraisal can not happen or is likely to be less accurate than if real data is used. In both Case 1 and 2 real data is provided for the consultant to compare over time the investments of the ergonomics process relative to claims prevented and associating costs.

In Case 3 however, the average cost per claim was taken from state insurance reports and is high as it is based on those cases in California that result in lost work time and temporary disability. A more accurate representation would be based on those cases that resulted in medical only care. These costs are more like those found in Case 2.

As noted earlier by both Oxenburgh and Koningsveld, and as this study shows, it is difficult to draft a general model that can easily be filled out by anyone and that answers all questions about the interventions provided. Consistency in data seems virtually impossible to achieve.

5. Conclusion

It is important to note that an active role by management and employees along with the ergonomist is crucial in implementing a well structured program so that a return on investment can be achieved and injuries prevented. The more involved management and employees are in a participatory approach, the more robust the financial benefits will be. [6] Furthermore, the role of the workforce as well as management is essential when collecting relevant information for a cost benefit study. [2] This study demonstrates how important utilizing existing workers' compensation claims cost data is in realizing significant financial benefits for injuries prevented relative to the investment made in the ergonomics process. The more real the actual cost figures provided, the more accurate the financial analysis is for the employer further demonstrating that the investment is well worth the outcomes achieved.

6. Acknowledgements

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7. References

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