Workers Health & Safety Centre

Making the case for MSD prevention

The economics of ergonomics

The most common response to suggestions for ergonomic change in the workplace is: "It's too expensive". [1] With the economic burden of musculoskeletal disorders (MSDs) in Canada estimated to be in the range of $40 to $67 billion annually (U.S. dollars), and a significant number of these disorders attributed to related workplace hazards, nothing could be further from the truth. [2]

In fact, both anecdotal reports and the published research show the exact opposite – most ergonomic interventions are "low in cost and high in value" with many yielding "significant and sustained cost savings" both immediately and in the long-term. These savings can include reduced workers compensation premiums. However, with these interventions often come benefits such as enhanced labour productivity and improved product quality.

The real cost of musculoskeletal disorders

All MSDs have direct and indirect costs as well as intangible costs. Costs vary, however, depending on the condition, the severity and frequency of symptoms and whether, or not, these symptoms will result in short- or long-term disability. The direct costs are relatively easy to quantify. They range from the costs of health care products and services related to assessing and treating these disorders, to the costs of retraining should the injury lead to permanent disability. Costs can also be indirect – the two most common being absenteeism and presenteeism (though neither are considered accurate or reliable measures). Intangible costs include the human costs associated with a decreased quality of life associated with pain or disability. Shamefully, the latter are rarely included in the total costs associated with MSDs, as they cannot be properly assessed in monetary terms.

Using an ergonomic "return on investment" calculator

In response to the assertion ergonomic solutions are "too costly", workers and workplace representatives are often left scrambling to provide proof such changes would, or could, result in financial savings. While the benefits of ergonomics are relatively easy to quantify following implementation, they are exceptionally difficult to estimate when attempting to justify an investment. In these circumstances, an ergonomic "return on investment" (ROI) calculator may be helpful. ROI calculators measure the rate of return on money invested in order to decide whether, or not, to undertake the investment.

The two most commonly employed tools in this regard are the ROI Estimator (from Cornell University in Ithaca, New York State) [3] and the

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Ergonomic Cost Benefit Calculator (from the Puget Sound Chapter of the Human Factors and Ergonomic Society in the USA). [4] Both are publically available and accessible online. Based on a number of inputted variables, they calculate the financial returns of a specific intervention. And while they may sound complicated, they are surprisingly easy to use. The presentation of cost savings estimates can make the argument for implementing interventions much more compelling.

Reported cost savings associated with ergonomics

The peer reviewed published literature also provides examples of the cost savings associated with different workplace ergonomic interventions. The research reports greatest savings can be had with a multi-dimensional ergonomics program comprised of several key elements, though simple and specific changes to a work task or process have also proven financially beneficial.

In one case, the purchase of a robotic palletizer – replacing a manual handling task at a warehouse – a cost of $300,000.00, reduced both labour and back injury claims, yielding a return on investment of six per cent in just three years. [5] The implementation of a battery-operated press and a similarly engineered cutter at a large electrical utility in the USA were paid in full through the savings realized by reduced injuries in a mere four months. [6]

The redesign of production lines are some of the more stunning examples of the cost benefits associated with ergonomics. These interventions have resulted in substantial improvements in labour productivity and product quality and significantly reduced workers compensation claims. The annual return on investment resulting from changes in the assembly line at a printed circuit manufacturer was a whopping 73 per cent. [7] In another case, where a new production line was introduced at an emergency lighting manufacturer, a one-time investment of $140,000.00 Euros translated into a total return on investment in less than a year. [8]

The first systematic review of evidence of the financial merits of ergonomic changes at the workplace across several different sectors was completed by Tompa, et. al., and published in the Journal of Occupational Rehabilitation in 2010. [9]

Changes assessed ranged from worker training on identifying ergonomic hazards to redesign of equipment and reorganization of work. Interventions reported in the administrative and support sector focused on work station equipment and training for office workers. In health care, mechanical patient lifts were the prominent intervention, followed by participatory ergonomic teams. In the manufacturing and warehouse sectors, interventions were more broadly based, from engineering controls to educational programs. Regardless of the specific changes, in all sectors, strong evidence was found that "ergonomic changes result in financial returns to firms".

Research by Humantech Incorporated, a privately owned and operated ergonomic consulting firm in the USA goes even further, sharing specific cost savings experienced by many of their clients. The average rate of return on investment: three times that originally spent, or a ratio of three to one.

In their experience, comprehensive, focused ergonomic programs deliver several gains, all of which can be measured monetarily. These include enhanced:

1. safety performance (measured in worker's compensation costs associated with lost time and increased premiums) of 35 to 98 per cent;
2. employee morale and engagement (measured through lower employee turnover and increased employee satisfaction in the range of 13 to 110 per cent;
3. product quality, measured by scrap rate or re-work rate, with a benefit range of 30 to 83 per cent;
4. productivity, measured through cycle time or production time. The benefit here can be from 3 to 73 per cent. [10]

Humantech has also recently published what may be the first attempt to study the return on investment for ergonomics. Firms responding to their survey were predominately involved in manufacturing and had ergonomic programs in place from one to three to 15 years. MSDs accounted for 21 to 82 per cent of reportable injuries and illnesses. Of the more interesting findings, firms reported a reduction of between 4.9 to nine per cent in illness and injury rates and increased employee retention and engagement of between 25 and 50 per cent as a result of specific ergonomic interventions. Return on investment ranged from 77 to 1,513 per cent, depending on the change, with an average 378 percent return on the initial investment. [11]

Elements of a successful "cost saving" ergonomics program

Regardless of whether the cost savings are associated with personnel, materials and/or equipment, and/or increased sales, ergonomic programs with the potential to reap the greatest savings have several elements in common. They are:

- worker involvement;
- management commitment;
- professional ergonomic expertise;
- implementation of low cost and easy interventions first; and
- a focus on human-centered rather than technology-centered design.[12]

It is also now well understood the earlier ergonomics is considered, for example, at the design stage, the lower the implementation costs will be, yet another opportunity for "cost savings". [13]

With overwhelming evidence of the human and financial benefits of both general and specific ergonomic interventions, the focus of any MSD prevention initiative should shift from how much needs to be spent, to how much can be saved. Faced with a significant "business case" for ergonomics there really is no reason for inaction.

(see Endnotes over...)

Endnotes

1 Heller-Ono, A., A Prospective Study of a Macroergonomics Process over Five Years Demonstrates Significant Prevention of Work- ers Compensation Claims Resulting in Projected Savings, 2014, Evaluation, 30:90.

2 Coyte PC, Asche CV, Croxford R, Chan B. The economic cost of musculoskeletal disorders in Canada. Arthritis Care and Research: the Official Journal of the Arthritis Health Professions Association. Vol. 11, Issue 5, October 1998, pages 315-325.

& Beven, Stephen. Economic impact of musculoskeletal disorders (MSDs) on work in Europe. Best Practice & Research Clinical Rheumatology. Vol. 29, Issue 3, June 2015, pages 356-373

3 See http://ergo.human.cornell.edu/CUROIEstimator.htm.

4 See http://www.pshfes.org/cost-calculator.

5 Rodrigues, Clarence C., Ergonomics to the Rescue – A Cost-Justification Case Study, Professional Safety, American Society of Safety Engineers, 2001.

6 Seeley, Patricia, A. and Richard W. Markin, Business case for implementing two ergonomic interventions at an electrical utility, Applied Ergonomics, 2003 (34): 429-439.

7 Yeow, P.H. P. and R. N. Sen, Productivity and quality improvements, revenue increment and rejection cost reduction in the manual component insertion lines through the application of ergonomics, International Journal of Industrial Ergonomics, 2006, 36:367-377.

8 deLooze, Michiel P., et. al., Cost-Effectiveness of Ergonomic Interventions in Production, Human Factors and Ergonomics in Manufacturing and Service Industries, 2010, 20 (4): 316-323.

9 Tompa, Emilie, et. al., A Systematic Review of Workplace Ergonomic Interventions with Ergonomic Analysis, Journal of Occupational Rehabilitation, 2010, 20:220-234.

10 Mallon, James, Five Steps to Getting Buy-In for Your Ergonomic Process, Humantech Incorporated, Ann Arbor, Michigan, 2015 at http://ehstoday.com/site-files/ehstoday.com/files/uploads/2015/12/Five_Steps_to_Get_Buy-In_EBOOK_Mar23.pdf.

11 Summary of Benchmarking Study Results: Cost and Return on Investment of Ergonomic Programs, Humantech Incorporated, Ann Arbor, Michigan, 2014.

12 Hendrick, Hal W. Determining the cost-benefits of ergonomic projects and factors that lead to their success, Applied Ergonomics, 2003, 34:419-427.

13 Hendrick, H.W., Determining the cost-benefits of ergonomics projects and factors that lead to their success, 2003, Applied Ergonomics, 34 (5): 419-427.

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