

After 25 years of Applied Ergonomics

What Have We Learned in Dollars and Sense

Years ago, industry groups were arguing about the efficacy of ergonomics as a science. No one was discussing costs, but they were fighting over a science that England, Sweden, Australia and other countries have applied and known about for years.

We have learned that in order to do business, it costs money and big money to boot. If you don't control your costs, you lose money and big money. You could actually lose jobs, customers and your business. So, what do you do?

You want to better understand your own costs and where you can derive benefits. A big company might hire a management consultant to find out where the profits are going. A small company can look at their checkbook. One of the things the experts say is "to calculate an incident's impact on your profitability, you should use your profit margin to determine the amount of sales required to pay for the incident."

Wow, that is a hard pill to swallow, understanding that every dollar spent on injuries and illness comes right out of our profits.

Here are the latest published numbers when we are referring to Injury and Illnesses in any workplace.

- Between 1998 and 2000, the direct cost of claims from disabling work-related injuries and illnesses grew 8.3 % (2.5 % after adjusting for inflation) to \$42.5 billion
- Work related injuries cost employers almost \$1 billion per week in 2002 in payments to injured workers and their medical care providers, growing to \$49.6 billion from \$46.1 billion in 2001
- The direct cost of an injury includes the medical and indemnity costs
- Indirect costs of injuries are usually 4 times as much as the direct costs
- Some indicate it is 4 to 11 times the direct costs

- Direct costs comprise 29 % and indirect costs 71 % of total injury costs

And even more...there is a huge mistake in calculating costs because insurance administration costs have frequently been omitted from prior cost studies. These numbers have a tremendous impact on the cost side.

And when we refer to “sales” we must consider the cost of “recalls” and the tarnished reputations of large companies as well as their legal fees.

But take heart, we have also learned a lot more over the past years. We documented the benefits of ergonomics solutions that lead to profitability.

When we create a solution for a work methodology, new product design, new process, new facility or any ergonomics challenge, we consider the previous costs as well as the costs of the solutions. Now there are some very serious case studies involving the cost benefit of an ergonomics/safety process.

One study is from a public utility, Keyspan Energy. Keyspan covers 1 million electric customers 460,000 gas customers over and services 1230 sq. miles. The majority of the work is outdoors covering 4 seasons. Based on the ergonomics process, injuries were reduced by 60%, \$62,000.00 yearly cost reduction and the CFO found the process produced a 9:1 dollar benefit to cost ratio for the process during the first year. There were indirect benefits as well in a noticeable improvement in worker productivity and morale, regulatory compliance and in a deregulated market, provided marketable new tools & equipment for additional profits. One tool was a ¾” impact tool which when redesigned provided a two-fold reduction in vibration which led to a 75% reduction in Vibration White Finger risk. Two different shovel handles were also ergonomically assessed, one was a wooden handle and the other a fiberglass handle. Objectively, the handle of choice provided Lower impact handle response and lower transmission: head-to-handle (55 - 60%). Subjectively, the feed from the workers involved in the testing all stated, “You can feel the difference, the impact or shock felt less.”

Another major tool testing for Keyspan was the 90 lb. jackhammer used to breakup all types of hard surfaces. We developed a “tool assist” that ran off of the hydraulics of the jack hammer and lifted the chuck out of the ground.

The tool mounted lift assist was assessed with low & upper back EMG. The findings decreased average & peak muscle effort up to 70% and decreased muscle efforts by 70%. Considering the average back injury is approximately \$100,000 per employee per year with the direct and indirect costs, this was an enormous cost savings.

There was a tremendous amount of ergonomics processes designed by the automotive industry after 1999. We participated in many of the ergonomics “fixes” for the industry. There are 2 that come to mind.

One was for a major manufacturer with problems on a Chassis assembly line. The challenge was a bolt torquing operation and exhaust system manual material handling issue. The direct costs of ergonomic injuries on chassis line reached \$1,458,000 in 1996 from 54 incidents. This was a very high injury rate with cumulative trauma disorders (CTDs) with an incidence rate 93.9* in 1996. Each injury was \$27,000 without the indirect costs.

The solution was to do an assessment of each job, which lead to the identification of task elements which were responsible for majority of injury potential (manual torque test and exhaust system installation). In 1 year, incidence rate dropped from 93.9 to 58.2. In second year, incidence rate dropped from 58.2 to 38*.

*Incidence rate = incidents / 100 employees / 200,000 man-hours

Solution – We implemented DC torque tools & developed specifications for the redesign of a mechanical exhaust handling system and devised a job enlargement schedule.

Cost: Equipment \$92,000; Services \$25,000

Reduction of 19 CTD injuries, Direct Cost \$513,000 and in the second year an additional reduction of 17 CTD injuries with a direct cost of \$459,000

Another case study in the automotive industry occurred in a metal finish department. There were Quality problems and high injury rates in C-pillar welding & finishing operations. Due to quality problems, excessive manual effort to pound and straighten the seam. In January 1997, CTD incidence rate was 160. We came up with a solution that lead to ergonomic evaluations on the jobs to identify ergonomic stressors and find the source of quality problems. The major quality issue was part warping due to the heat of welding. Our solution was to install new welding equipment (Brass Flux Braze) to eliminate MIG welding. The incidence rate dropped from 160 in Jan. 1997 to 35 in Oct. 1998, a period of 21 months. There were other cost savings that developed from reducing the manual efforts of pounding and

sanding which improved cycle time, improved all of the assembly operations down the line, reduced the required manpower on those jobs, eliminated MIG welding wire, reduction in sanding wheel usage, reduced sanding booth cleaning efforts. All of these reductions provided an estimated savings of \$2.5 million within first year.

For a major computer manufacturer, the company wanted to establish through design, the **“Factory of the Future.”** They found the current process created bottlenecks in assembly work cells due to diversity of product and the physical requirements. The solution was to design a Programmable workstation adjustment to match product/employee needs. This was an expensive solution however the cost benefit was recognized one month after installation with a 30% increase in throughput, significant improvements in employee comfort and health.

The cost benefit of ergonomic and safety process are measurable and invaluable. We are able to maintain employees that we hire and train, keeping them on the job. We are able to maintain our aging workforce with reduced risk of injuries. There is reduced turnover, focused and measurable training results, reduced absenteeism and lost work days, increased productivity, reduced rework and scrap which leads to less waste and cost savings. Overhead costs are reduced, quality is up, and maybe...no recalls. Can you imagine what numbers could be derived with reduced workers' compensation and disability claims costs? What that savings does to any company's profits?

We have learned the profits go right to the bottom line. Management is happy, employees are happy, suppliers are happy, customers are happy, shareholders are happy, we have learned we cannot lose with this philosophy. If you think about it, we have learned a lot.