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Four Components to a Safety Program That Works!

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Introduction

According to the National Safety Council Injury Facts 2010 report, in 2008 $183 billion was paid out specifically for injury-related "direct" costs associated to workers compensation claims.[1] This figure is staggering on its own but that it completely eclipses injury costs from just three years earlier is alarming. A similar report from the National Safety Council stated that in 2005 direct costs for injuries totaled $55.3 billion.[2] Thus in three years direct costs for injuries, those covered by workers compensation insurance, more than tripled. Additionally, there are the "indirect" costs relating to injuries. These include expenditures associated with overtime, worker replacement, decreased productivity, investigations, lower morale, increased absenteeism, administration and claims management. These costs are often difficult to quantify but are often a far greater detriment to companies' bottom lines than direct costs. According to a Liberty Mutual insurance company executive survey of workplace safety, soft costs often exceed hard costs by three to five times .[3] In many industries soft costs can greatly exceed the three to five dollar multiplier referenced here. Indirect costs are especially troublesome because the company absorbs them, typically on the site or local level. Clearly, the cost of workplace injuries is hurting companies' finances.

Work Injuries – Why Do They Happen?

There are two primary types of workplace injuries that tend to occur; macro-traumas and micro-traumas. Macro-traumas are characterized by well defined, obvious mechanisms of onset and include cuts, burns, crush injuries, and fractures among others. Micro-traumas often have slow, less well defined mechanisms of onset and are therefore often more difficult to prevent. Micro-traumas include repetitive stress, over use, tendonitis, and musculo-skeletal disorders (MSDs). One example of a common micro-trauma injury is carpal tunnel syndrome but certainly there are costly, slow onset sprains and strains that arise from repetitive stress and over use scenarios. According to the Bureau of Labor Statistics data for 2010 the primary type of injury and illness across all sectors of industry was sprains and strains.[4] Table 1 details the numbers of claims by nature of injury and total costs for claims by nature of injury. Note the high number of sprains and strains and the total claims costs for these types of injuries when compared to the other types of injuries.

Exhibit 1
Estimated Total Medical Cost by Nature of Injury

	Total Claims	Avg. Cost per Claim	Total
Sprains/Strains/Pain	679,790	$19,508	$13,261,343,320
Bruises/Contusions	120,630	$17,869	$2,155,537,470
Cuts/Lacerations	111,560	$17,240	$1,923,294,400
Fractures	107,100	$32,019	$3,429,234,900
Heat Burns	18,040	$18,412	$332,152,480
Carpal Tunnel	11,950	$19,786	$236,442,700
Tendonitis	4,730	$17,223	$81,464,790
Chemical Burns	6,210	$18,412	$114,338,520
Amputations	6,870	$48,098	$330,433,260
Multiple Traumatic Inj.	59,300	$22,674	$1,344,568,200

Note: These results were obtained by multiplying the costs per claim by nature of injury for 2006-2007 from the National Council of Compensation Insurance times the number of claims by nature of injury for 2008 from the Bureau of Labor Statistics.

Exhibit 1. This table details claims costs by nature of injury.

No matter the type of injury being discussed, all injuries occur for a reason. It is this authors' experience that all injuries are the direct result of a breakdown or inconsistency in one or more of the following four key areas: **B**iophysics, **E**rgonomics, **E**ducation and **A**wareness. It is on these four components that the "BEEA+ Injury Prevention Strategy" is based. To better understand these principles we will look at each of them closely. We will discover why these four pillars must all be present for a safety program to be effective.

BEEA+: Four Key Barriers to Risk

Biophysics

To reduce risk every employee must have the biophysical capacity to do the job tasks safely. Specifically, biophysics relates to employees' strength, flexibility and endurance. Employees are often "tested" upon joining a company to ensure they can perform their job tasks safely. But what safeguards are in place to ensure they can continue to safely tolerate the physical stresses of their jobs throughout their terms of employment at the company? Are mechanisms, support and recognition in place to ensure that employees are, and remain "fit-for-duty?"

A focus on biophysics and on the workforce being fit-for-duty is especially important when considering our aging workforce. As the first of 76 million Baby Boomers turns sixty-five in 2011, American employers will be faced with a glut of aging workers for the next twenty-four years. Among the many factors that affect the aging worker is the loss of muscle mass and strength. This phenomenon, along with a gradual loss of physical function, is called "sarcopenia." Without active intervention and ongoing strength training, the effects of sarcopenia begin to manifest at approximately age forty-five, at which time muscle mass begins to decline at a rate of 1% per year. If your employees over age forty are losing 10% of their muscle mass every ten years, and they are working until age fifty-five, sixty, sixty-five, or even longer, it is easy to see how this will often affect their ability to perform job tasks safely. The effects of sarcopenia demonstrate the necessity of ensuring that your aging workers maintain the bio-

physical capacity to perform their jobs safely, and that employees are not only encouraged to take on strength training but also equipped with the tools to do so.

Biophysics and the Employee Maintenance Center

As it relates to injury prevention, impacting employees' biophysics is a cutting-edge area of focus. Whereas "wellness" has been a loosely defined strategy for injury prevention, with a return on investment that can be difficult to measure, biophysics is a new concept in reducing workers' risk that is paying dividends.

Employee maintenance is a nascent concept that gives new meaning to workplace wellness. It is increasingly being recognized as a key element in injury prevention because it addresses areas of risk that have not been targeted before. While safety training, orientation programs, education and health screenings are all part of the risk reduction strategy, none of these measures addresses employees' pain before it develops into injuries. None of these measures target the poor biophysical traits that exist in every workforce and that inevitably lead to costly claims. Employees in poor physical condition simply have diminished capacity for tolerating the physical stresses of their jobs. When a job's physical stresses exceed the de-conditioned, out-of-shape worker's capacity to tolerate them, pain is often the result. Employees working in pain are at far greater risk of injury than those not.

An Employee Maintenance Center (EMC) is an at-the-job-site facility that gives workers access to convenient, effective solutions for pain to minimize their risk of injury. It is staffed and equipped with the personnel, tools and technology to target the specific types of pain patterns a company's workforce is experiencing. The EMC is also the mechanism by which employees' biophysical traits can be periodically measured and quantified to identify weaknesses and physical limitations that put them at risk of injury. It is the place where employees ultimately find it easy and rewarding to be proactive about taking personal responsibility for their health. The EMC's joint-specific and job-task-specific strengthening, flexibility and conditioning programs ensure that workers are fit for duty, and that they possess the necessary biophysical characteristics to do their jobs safely.

While the Employee Maintenance Center and its impact on workers' biophysics are key pieces of a comprehensive injury prevention strategy, they must be complimented by the other pillars of the BEEA+ prevention model.

Ergonomics

In some respects, ergonomics has become a hackneyed safety buzzword. Basically, ergonomics is the science of matching job tasks to employees, not employees to job tasks. It examines how the human being interacts with and functions in the work environment such that the environment is designed and engineered to allow for safety and efficiency in the workplace. This is a simple concept with what is often a difficult execution.

First, many ergonomic changes, especially in the industrial setting, have major costs associated with them. In an industrial setting there may, for instance, be a large machine present that was built many years ago, at a time when ergonomics were not a consideration. If employees are now being injured due to the poor ergonomics of this piece of equipment, it is a significant challenge to make the necessary environmental fixes given the size of the machine alone. Simple redesigns can be done to improve the ergonomics of this equipment and decrease risk of injury associated with it. However, this "simple" redesign can have huge costs. Consequently, the redesign does not happen. In these instances, the ability to impact workers' biophysics becomes very important to compensate for an inability to manipulate the physical environment. In the

office setting as well, ergonomic changes can be expensive and even if implemented, may not result in the desired outcome.

Ergonomics is an integral part of an overall risk reduction strategy when understood and applied skillfully. A significant challenge to ergonomic solutions being successful is that people are all very different. Some workers may be six feet tall; others may be four feet tall. Some may be very lean while others may be large. Some have long arms while others have shorter arms. The most effective ergonomic solutions often involve building workstations to be highly adjustable but this is not always possible.

Having identified some of the challenges in ergonomics, it is still imperative that a workplace injury prevention program involves ergonomics. There must be some understanding of ergonomic principles and how to apply them to reduce risk and prevent injuries. Although not all equipment and machinery may be 100% ergonomically correct for 100% of a workforce, there is still a lot than can be done to decrease the wear and tear on employees by implementing even basic ergonomic principles.

Every workplace must have an ergonomic team in place. It is very often that the best ergonomic teams consist of members that best know the specific work tasks, the culture, the other employees on site, and the risks of individual work areas and job tasks. These members tend to be the employees themselves. Once trained, this team can offer proactive ergonomic intervention, and can solve the more common ergonomic issues. In addition, every worker trained in ergonomics represents one more educated employee that will advocate for the use of workplace-specific ergonomic best practices.

Ergonomic processes must also be well documented. The documentation of these processes should record identification of ergonomic risks (photos are recommended), solutions implemented to address these issues, and reassessment to determine if the solutions implemented actually worked. By documenting the process, you will not only be able to demonstrate compliance and show outcomes of solutions, but also be able to quickly determine if the solution caused new, unexpected ergonomic concerns.

A sound ergonomics program that addresses risk in employees' physical work environments is a great compliment to an Employee Maintenance Center that addresses workers' biophysical risk. However, there are still holes in a safety program's barriers against injury if the other two pillars of the BEEA+ model, education and awareness, are not part of the prevention puzzle.

Education

Education is the process by which your employees are given the know-how to do their jobs and identify the hazards that may exist in performing them. Education should be an ongoing process that evolves over time as best practices in safety are identified and implemented.

One of the most common areas needing improvement is within the Standard Operating Procedure or SOPs. Too often a company's SOPs are outdated and do not apply to current job tasks and procedures. The SOPs offer a great place to begin investigating work related injury and illness. In order to reduce risk in this area, review the SOPs for different jobs with an employee or two that currently perform these tasks. Find out if the SOPs truly reflect the systems and procedures in place. Find out if alternative procedures are used. If the SOP is outdated, identify the reason why. Perhaps an old SOP had valuable information included for safety, and should be reinstated. Perhaps the "new way" is better. If so, make sure to update the SOPs with the new

information. This ensures that training for new employees occurs based on the most current job tasks and functions being performed in your work place.

Education should also include hazard training. According to OSHA, companies must train their employees on any hazards that they will come in contact with, and do so in a language that is understood. That means if your employees only speak Latin, you must perform the training in Latin to be compliant. Hazard training should include educating employees to work safely around hazards, and how to use required Personal Protection Equipment (PPE).

It is also very important to document training. Make sure to document training topics and objectives, employee attendance lists, and completed training time (hours spent in training). This will demonstrate compliance, and will prove employees were present for the training.

As a compliment to the biophysics component of the BEEA+ prevention model, there is a growing emphasis on educating workers in early symptom recognition. All too often there is a tendency for workers to discount the impact that emerging aches and pains can have if left unchecked. Additionally, there is often stoicism and resignation about pain that has workers simply assume that aches and pains are part of the job, part of getting older, or that they will "probably just go away on their own eventually." Educating employees about early symptom recognition fosters their ability to identify the characteristic signs and symptoms, as they emerge, of what are common but troublesome muscular-skeletal disorders (MSDs). With a greater understanding of what the aches and pains they're experiencing can be indicative of, employees become more proactive in seeking solutions to these problems before they develop into costly, more difficult to treat injuries. The onsite convenience of the Employee Maintenance Center, and the solutions it provides for pain, make it easy for employees to be proactive about addressing their aches and pains as they recognize their emergence.

Having discussed biophysics, ergonomics and education, the remaining risk barrier in the BEEA+ model to be examined is awareness.

Awareness

The "awareness barrier" to risk is a function of every individual's commitment to safety. The sum total of commitment from every worker is a culture that is focused on working injury-free. Awareness shapes culture, and culture drives a collective consciousness of awareness. It manifests in every employee habitually taking personal responsibility for doing his or her job safely. Safety-minded workers are those that consistently wear required personal protective equipment (PPE) and use it properly, that follow the most up-to-date standard operating procedures (SOPs), and that utilize the education given to them in training. How is awareness created?

Among the most effective means to generate awareness amongst a workforce is through the use of "observation inspections." Observation inspections involve workers, their work stations and work environments in general being evaluated. The purpose of these inspections is to identify potential risks relating to human factors, ergonomics, and environmental hazards. Once identified, environmental risks can often be addressed without much difficulty. For risks relating to the workers themselves, coaching is delivered to ensure workers have a sound understanding of what constitutes working safely in their respective workplaces.

For observation inspections to achieve maximum effectiveness they ultimately need to be done on a company-wide basis, and at a frequency that is consistent with a solid commitment to catching breakdowns on an ongoing basis. Safety awareness amongst a workforce is developed

and maintained when workers know they, along with their work environments, are being observed and evaluated frequently.

BEEA+ --Does it Work?

The BEEA+ model is already in use in manufacturing centers nationally. In November of 2004, Kimberly-Clark (K-C), a Fortune 200 company operating in North America and internationally, contracted with a vendor that specializes in workplace risk reduction and injury prevention. The initial focus of the BEEA+ model for this location was centered on impacting employees' biophysics via installation of an Employee Maintenance Center (EMC). The primary reason the EMC was implemented was that this K-C location had been experiencing an alarming increase in work injuries, micro-traumas in particular. In the summer of 2008 the article, "Breaking Through the Musculoskeletal Injury Plateau," published in the Journal of Workers Compensation indicated that by the end of the first year 297 of the 480 employees, 62%, had utilized the EMC. Claims costs for both macro and micro-traumas were substantially reduced. For micro-traumas alone claims costs were reduced from more than $296,000 in 2004 to just under $98,000 in 2005, and total injury-related incurred costs decreased from nearly $350,000 to just over 180,000 in the same period. [5]

At the end of the second year, 70% of the facility's employees had accessed the EMC, and there were even greater reductions in injury-related claims. Claims costs for micro-traumas were effectively eliminated in 2006, and total injury-related medical costs were reduced to approximately $125,000. Thus in two years, between 2004 and 2006, total medical claims costs decreased by 64%. By the end of 2008, 88% of the plant's population had accessed the EMC. Exhibit 2 shows the six-year EMC participation trend. In looking at this graph, consider that the number of employees "enrolled in the EMC" includes all employees that had ever accessed it and that from 2008 to 2010 this number exceeded the number of workers at the facility. Exhibit 3 illustrates the cost-for-injuries-trend at this location before and after implementation of the EMC.

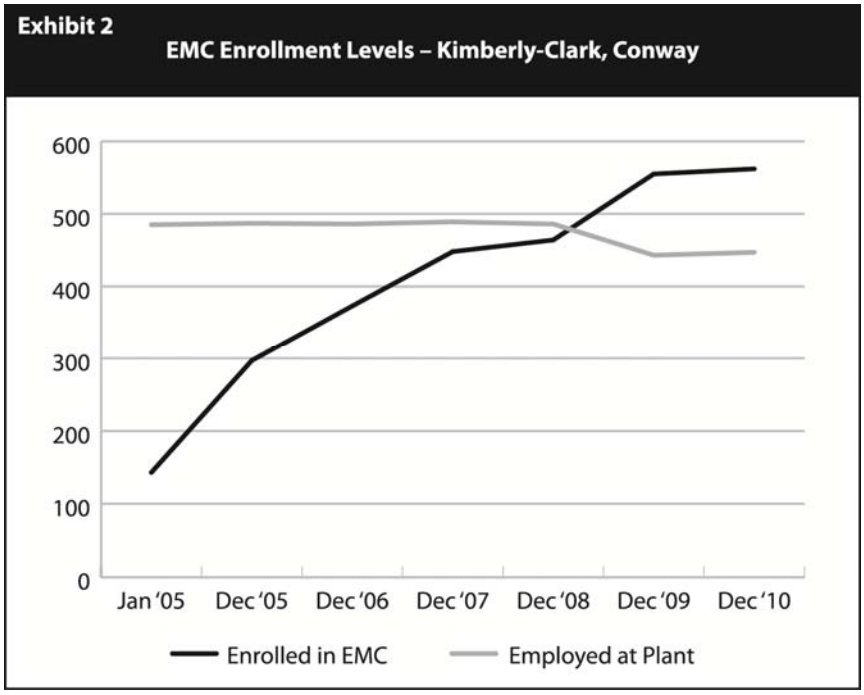

Exhibit 2. This graph shows a six year participation rate of an EMC.

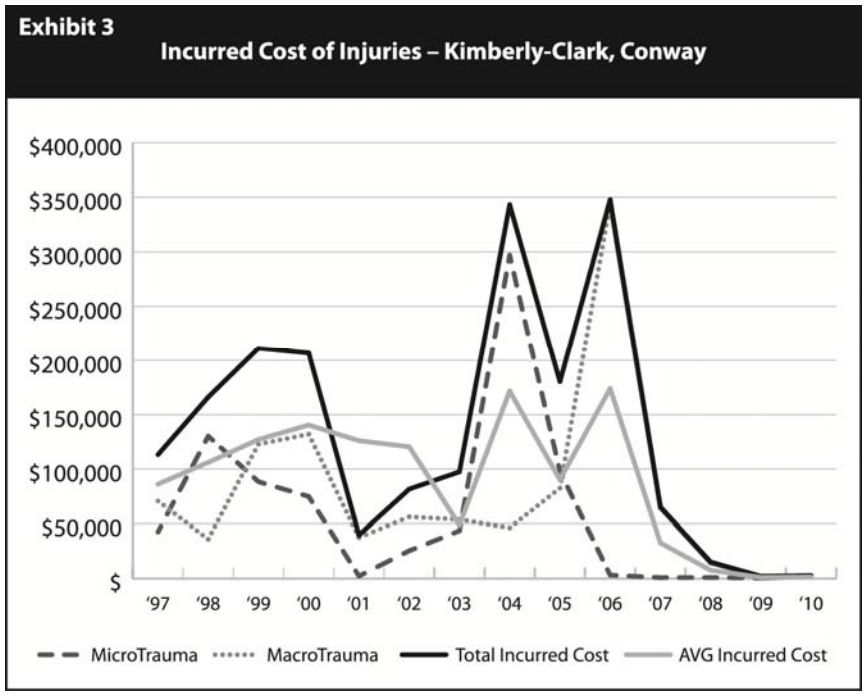

Exhibit 3. This graph shows a claims cost trend at a manufacturing plant that installed an EMC in 2005.

The successes at the Conway, Arkansas, Kimberly-Clark plant continued. In the summer of 2009 this facility achieved two major safety milestones and received two prestigious Kimberly-Clark corporate awards. For achieving one million safe hours without incurring an injury, the plant received the Crystal Globe award, and for achieving one full year without an injury, it received the Crystal Eagle award. In 2010, two additional K-C facilities that had implemented the BEEA+ model and that had also implemented EMCs achieved similar safety milestones. In the spring of 2010, the Maumelle, Arkansas, plant also received a Crystal Eagle award, and on August 26th the Everett, Washington, plant achieved one million safe hours. At the end of September, 2010 the Everett facility was enjoying a rolling-twelve-months-return-on investment in the BEEA+ model and two on-site EMCs of $501,181. These successes have been seen outside the Kimberly-Clark Corporation as well. Among the newest users of the EMC and BEEA+ model, Grays Harbor Paper in Hoquiam, Washington, enjoyed an 85% reduction in repetitive overuse injury claims costs and a 95% decrease in days away from work due to time loss injuries.[6] These results, achieved between August 2009 and August 2010, occurred in the first twelve months after implementing an on-site EMC and the BEEA+ model of injury prevention. Finally, at the time of submission of this paper, in the first week of March 2011, the K-C location in Conway, Arkansas was three weeks away from achieving another twelve month period without an injury, and from receiving another Crystal Eagle award.

Conclusion

Workplace injuries are costing companies billions of dollars per year and are a tremendous detriment to their ability to compete and survive. There are many areas of risk that ultimately need to be addressed to stem the tide of injuries and their escalating costs. With a substantial portion of our workforce rapidly approaching retirement age and a generation of younger workers entering employment in poor physical condition, businesses in all sectors need a comprehensive risk reduction strategy. The BEEA+ injury prevention model is proving itself to be an effective solution that puts barriers in front of risk in four key areas; biophysics, ergonomics, education and awareness.

Endnotes

[1]National Safety Council (NSC). 2010. *Injury Facts, 2010 edition*. Itasca, IL: National Safety Council

[2]National Safety Council (NSC). 2008. *Injury Facts, 2008 edition*. Itasca, IL: National Safety Council, 53.

[3]Michael, Rachel. 2001. “More Liberty Mutual Data On Workplace Safety.” *ErgoWeb* (September 26) (http://www.ergoweb.com/news/detail.cfm?id=413)

[4]United States Department of Labor—Bureau of Labor Statistics. 2010. “Nonfatal Occupational Injuries and Illnesses Requiring Days Away From Work.” (http://www.bls.gov/news.release/osh2.nr0.htm)

[5]Shuford, T., D. Nelson and J. Siegel. 2008.“Breaking Through the Musculoskeletal Injury Plateau: A Report.” *The Journal of Workers Compensation* 17: 9-28.

[6]PR Log. 2010. *Pulp and Paper Facility Sees 85% Reduction in Repetitive and Overuse Injury Claims Costs.* (retrieved December 14, 2010) (http://www.prlog.org/11023772-pulp-and-paper-facility-sees-85-reduction-in-repetitive-and-overuse-injury-claims-costs.html).