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Reducing Employee Injuries Through Behavior Based Safety

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ABSTRACT

Because employee injuries can significantly impact the entire organization, workplace safety is a major concern for employers and employees in all industries. The costs associated with workplace injuries, including medical and rehabilitative expenses, lost productivity, personal injury lawsuits, OSHA violations, and the time required for accident investigation, provide companies with the incentive to identify ways to reduce these injuries. Traditionally, most company safety programs placed the principal responsibility on management to ensure safety in the workplace. An alternative and progressive approach that is currently being used in industry is Behavior Based Safety.

Behavior Based Safety refers to safety programs that use positive reinforcement to change employee behavior in order to prevent work related injuries and illnesses. By implementing a Behavior Based Safety program, organizations can directly involve employees in injury prevention and encourage them to assume more responsibility for workplace safety. As future safety managers and leaders in industry, it's important for engineering and engineering technology programs to provide safety management training for their students.

This paper will demonstrate how Behavior Based Safety is currently being applied in progressive manufacturing companies. The paper will identify the benefits and major components of this technique in order enable engineering and engineering technology instructors to better prepare their students for future leadership and safety management career.

Keywords: Behavior Based Safety, shaping

1. INTRODUCTION

Globalization is forcing companies in the manufacturing industry to identify ways to minimize costs in order to remain competitive. Reducing workplace injuries can significantly reduce overall organizational costs, and thereby improving the company's competitive position. Consequently, as future safety managers and business leaders, it's important for engineering and technology programs to provide their students with safety management training.

To promote workplace safety, a variety of safety programs with various results are being used. With most traditional safety programs, management assumes the principal responsibility to ensure safety in the workplace. Also, many traditional safety programs tend to focus on what employees are doing wrong, instead of encouraging them by reinforcing positive work behavior. A progressive and effective approach currently being used to promote workplace safety is Behavior Based Safety. Behavior Based Safety programs use positive reinforcement to change employee behavior in order to prevent work related injuries and illnesses. By implementing a Behavior

Based Safety program, organizations can directly involve employees in injury prevention and provide them with the incentive to assume more responsibility for their safety.

Research has demonstrated that employers who give employees and managers a method to exercise their natural concern for safety reap many rewards: fewer incidents and injuries, reduced costs, and a more positive and productive workplace where managers can focus on improvement rather than policing employees. A Behavioral Safety process is the only method proven to improve safe practices through a positive, employee driven, and continuously improving process. A behavioral process also allows companies to harness the power of company and individual values for safety. This creates a culture where managers and employees work safely for the right reasons rather than one where employees simply follow procedures to avoid punishment (McSween, 2003).
A behavior-based approach to safety empowers workers to be more actively involved in specifying, defining and assessing correct safety practices. Behaviors should be defined and objectively described so that it is clear to everyone involved exactly what is required. The requirements for its successful implementation are management commitment and leadership, support from supervisors, and an open and trusting culture.

2. POSITIVE REINFORCEMENT

Modifying employee behavior to prevent workplace injuries can be achieved through the application of Positive Reinforcement theory. Using positive reinforcement to promote safe work behavior is based on the following premises underlying human behavior (Skinner, 1953):
1. Behavior produces consequences.
2. The type of consequence produced by a given behavior will determine whether that behavior will be repeated or avoided.
3. Positive consequences increase the probability of behavior being repeated or learned, and negative consequences increase the probability of behavior being avoided.

As a safety management technique, organizations can use positive reinforcement to provide workers with the incentive to work safely. Behavior Based Safety programs focus on what the employee is doing right and administer positive reinforcement to encourage the learning of positive work behavior. Therefore, positive reinforcement can reduce workplace injuries by directly involving employees in injury prevention and encourage them to assume more responsibility for workplace safety.

3. COMPONENTS OF BEHAVIOR BASED SAFETY

Working safely requires that employees learn new behavior. Because learning is a gradual process, the continuous reinforcement of positive behavior is required until the desired behavior is achieved. Organizations using Behavior Based Safety programs commonly use the technique known as "shaping" as the preferred method to modify behavior. With shaping, gradual improvements in safe working behavior are reinforced or rewarded while the employee is learning to work safely (Reece and Brandt, 2005). Overtime, the employee learns how to work safely and assumes the principal responsibility for his/her behavior, resulting in fewer workplace injuries. At the same time, Behavior Based Safety relieves management of the major responsibility for ensuring safety in the workplace. Focusing on actual safe behavior is proactive and allows other relevant issues to be identified and corrected before an accident can occur. This approach helps to foster a collaborative, problem-solving team involving management and employees to identify critical sets of safe and unsafe behaviors. Once the behaviors are identified, shaping can be used to help employees learn to work safely. Shaping requires that certain steps be followed. The steps for shaping an employees behavior are listed in Table 1.

Table 1: The Steps for Shaping an Employees Behavior

- Identify the specific change in behavior that is desired
- Identify business related reasons for the employee to change his/her behavior
- Get the worker to agree to change his/her behavior
- Establish timetables to learn new behavior and monitor the worker's behavior
- As the worker's behavior improves, administer positive reinforcement
- Continue to monitor and reinforce the worker's positive behavior

Reducing accidents over the long term requires commitment, not only from employees but also from management (Geller, 2001).

- Past performance needs to be evaluated, and accidents and incident records reviewed.
- Ask questions that lead to clear goals and long-term follow-through.
- Encourage appropriate behaviors through rewards.
- Rewards must be tied to specific behaviors or results, and must be timely and appropriate to the level of accomplishment.

A one size fits all approach is not recommended. People and company culture differ so the rewards and methodology adapted has to be different. Before choosing rewards, consider employees age, geographic location, racial and ethnic diversity. Spigener of Behavioral Science Technology Inc. identified the following as critical for the success of the program:

1. The financial support, leadership of management, and employee involvement at all levels.
2. Develop the components, identify implementation steps, gather resources, and be prepared to deal with obstacles that arise.
3. Each person involved needs to understand their role and accountabilities.
4. Provide required training so employees know how to identify at-risk behaviors and how to give feedback that will lead to safer performance.
5. Ensure that all departments and divisions are involved in the safety program.

A critical and often overlooked component is the individual employee. Workers have to buy into the program. When the management team, without employee consultation, imposes a system on the workforce, workers are usually resistant to the new program. It is vital that the workforce participates in the decision-making processes, be informed as the program develops and on how the program will affect them, and what they can due prior to its implementation.

4. IMPLEMENTATION

Before starting a Behavioral Safety process, the company first needs to have a clear picture of the organization's current safety program. Identify strengths and build on those and work on areas that need improvement. An assessment will help to develop a preliminary design for the program. Recruit representatives from all areas of the company and enlist as much support and involvement as possible. Create ownership by ensuring there is wide organizational support through the involvement of management and employees.

5. LIMITATIONS OF BEHAVIOR BASED SAFETY

Recognizing the benefits associated with Behavior Based Safety, certain limitations need to be understood and addressed for the program to continue to be successful. Table 2 listed the major limitations of Behavior Based Safety.

Table 2: The Major Limitations of Behavior Based Safety

- The need for continuous monitoring and reinforcement of safe work behavior
- The need to develop different types of reinforcement for different employees
- Need to develop a timeframe for the continuous administration of reinforcement
- Difficult to implement if employees don't work with the same people on a regular basis
- Difficult to change ingrained attitudes and behaviors
- Limited success if there is high turnover

6. THE ABC'S OF BEHAVIOR BASED SAFETY

1. First define the target behavior since it must be observable and recordable
2. Record the occurrences of this behavior
3. Once the target behavior is identified, interventions can begin to modify the behavior

Interventions involve modifying the consequences for the behavior. This is the ABC model of behavior change: Activator---Behavior----Consequence—Person. Activators include safety signs, training, and rules and policies that direct behavior and are only useful when it is determined that safety problems are a result of employees not knowing what to do. These are useful in starting to learn new behavior, but not in keeping the behavior going (McSween, 2003). Consequences should be a result of the behavior, whether in the form of praise, discipline or feedback. Consequences are only to be used when people know what to do but don't do so on a regular basis as these are the motivators of behavior. People will behave in a manner consistent with past experiences since this is the personal component. Past behaviors that produced positive consequences will be repeated. Past behaviors that produced negative consequences or no consequence will not likely be repeated

In a behavior based process, positive and immediate consequences are paired with the desirable behavior as a continous motivator for change. When done correctly, behaviors can be identified, feedback given, and a vehicle for change provided (Geller, 2001).

Companies sometimes give up on the process because they do not see immediate results. Behavior Based Safety is not a quick fix. It takes a long term management commitment. It involves the control of hazards by engineering methods in processes and equipment, gathering feedback from employees about obstacles, and the state of the program. Also, the allocation of adequate time and resources as needed.

7. COMMUNICATING SAFETY INFORMATION

Effective communication is the cornerstone of a healthy organizational safety culture. Research has shown that organizations with better safety cultures and performances tend to have employees who regularly communicate with each other in an open, respectful manner. Safe operations require that employees have all the information they need to work within the safety program. It is important to test how well information is communicated to the employees and how well they are able to apply it. Questions to assess safety communications and training include:

- Are employees performing according to formal and informal communications programs?
- Is there a formal and informal communications programs?

8. BENEFITS OF BEHAVIOR BASED SAFETY

Many progressive companies are currently using Behavior Based Safety programs with positive results. Table 3 listed the major benefits resulting from Behavior Based Safety:

Table 3: The Major Benefits Resulting From Behavior Based Safety

- Reduction in workplace injuries
- Reduction in medical related costs, including rehabilitative costs
- Allowing the employee to assume the principal responsibility for safety
- Focus on positive reinforcement, which tends to promote permanent learning
- Fewer work related injury lawsuits
- Fewer company and governmental accident investigations
- Increased productivity due to reduced injury related to absenteeism and illnesses

9. EXAMPLES OF SUCCESSFUL BEHAVIOR BASED SAFETY PROGRAMS

There are many examples of how manufacturing companies are currently using Behavior Based Safety. The authors selected the following examples of how this technique is being used.

At Los Alamos National Laboratory, Los Alamos, New Mexico, desired safe behaviors were encouraged using positive reinforcing consequences. During implementation, the workforce created their own safety initiatives to make the process employee driven. Workers observed each other for about 10 to 15 minutes and provided feedback identifying safe and at risk behaviors. The steps included:
- Observing workers, and identifying safe and at risk behaviors.
- Providing feedback to the workers and allowing feedback.
- Compiling the data for analysis and problem solving.

Part of their success was attributed to the fact that workers were not made to feel that they were the problem but instead, that they were the solution. They concluded that workers typically perform at-risk behaviors because barriers to safe work often force workers in conflicting directions. Some examples included:
- Lack of adequate skills or knowledge to recognize hazards and respond appropriately.
- Employees found ways around inefficient organizational systems.
- The absence of rewards for following safe procedures.
- Lack of accountability for following unsafe practices.
- Poor design of workstation.
- Lack of maintenance or unavailable tools and equipment.
- No consensus on standard work procedures.
- Personal factors affecting the employee such as fatigue, medication, stress, or illness.
- Past established practices.
- Worker deliberately exposes themselves to risks.

An important aspect of the program was the feedback process. Feedback is critical because it provides a method for hazard recognition and reporting that remained anonymous. For the calendar year 2001 all of the categories combined indicated an increase in the safe behaviors from 90% to 95% in four months. This included illnesses, repetitive trauma, strains, lacerations, punctures and contusions.
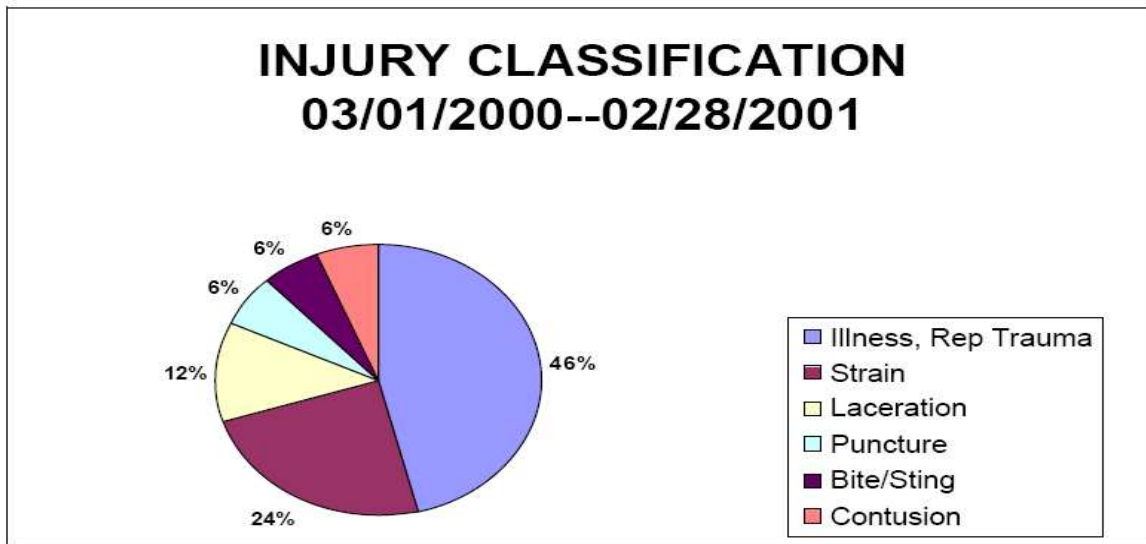
INJURY CLASSIFICATION
03/01/2000--02/28/2001

Figure 1. NMT injuries by category.

The program continues to grow and has been implemented in other divisions with equal success (Wieneke, et al). The Behavior Based Safety Process implemented at Korbel Sawmill included the following steps:

- Observations, interviews and analyses of jobs to determine the risks associated with each.
- Written procedures developed based on associated risks.
- Safety observers trained to be able to analyze behaviors compared to written procedures.
- Feedback on deviations from written procedures.
- Improve procedures as needed based on suggestions.

To successfully implement the program the company had to be fully committed to training employees to observe behaviors and repeating the training every year for three years. Nearly 100 of their 240 employees have successfully completed observer training program. Korbel wanted employees to willingly participate in the program. In order to do this the company felt employees needed to be able to communicate and read. Therefore, the company offered a reading program to all its employees before attempting to implement the Behavior Based Safety process. Korbel was awarded the first place award for large sawmills with over 500,000 man hours worked per year at the Forest Products Safety Conference awards banquet in Portland, Oregon on May 16, 1997. There were no lost time injuries in four consecutive years.

Another example of a successful program is Pool California Energy Services. They implemented a Behavior Based Safety approach that led to a 52 percent drop in the number of injuries to hands, wrists, and fingers over a 12-month period. Behavior Based Safety programs have been used to motivate drivers to wear safety belts (buckle up!) and reduce risky driving practices. On average, one year after implementing a Behavior Based Safety program, the average recorded injury rate at such sites decreased by 29 percent. After five years, the reduction rate averaged at 72 percent; after seven or more years, the average recorded injury rate has dropped by 79 percent.

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10. ASSESSMENT

Various assessment tools have been used to evaluate the success of Behavior Based Safety programs. Traditional safety systems typically focus on tracking injury-related incidents (e.g., recordables, lost-time accidents) to

evaluate the success of the program. These are outcomes of behavior and to be successful in preventing injuries it is important to focus on the potential for an accident. This will allow the company to take action before someone gets hurt. Using information about past incidents, companies can be proactive in terms of ongoing behaviors and see how often employees are doing the safe versus at risk behaviors.

For example, one company identified through injury records that they had a problem with burns during the summer months. The company knew that with the proper use of gloves these injuries should be prevented. They used their behavior-based safety process to measure how often employees were using hot burning gloves in situations where it was warranted. They determined that levels of use of gloves were lower than expected, but only under certain conditions. With this new information, they made the adjustments necessary to increase the occurrence of the safe behavior by ensuring that employees knew when they should be using hot burning gloves, making the gloves more available (the primary source of the problem), and recognizing the appropriate use of hot burning gloves with positive feedback when it was observed. The result was a decrease in burns. By taking steps to implement a safety system that allowed them to measure behavior and involve employees in the process of observation and feedback, the company was able to save thousands of dollars and reduce the occurrence of burn injuries.

The Korbel Sawmill team has cut safety costs 93% since moving to a Behavior Based Safety Process. This safety performance record is considered among the very best in the industry. In a assessing their Behavior Based Safety program they found it important to define and measure safety in terms of observable, measurable behaviors. For example, they:

- Defined and categorized all the elements that should be present in a comprehensive safety program.
- Created questions that test for the presence or absence of all elements, including administrative structure and audits, safety program components, communications, training and compliance.
- Assigned values to the relative importance of each element based on its potential impact on personnel, operations, financial impact and regulatory compliance.
- Recorded deficiencies and improvement opportunities.
- Created corrective plans and budgets which prioritized activities based on item-value.
- Measured the actions and results, not the activities.

Korbel found that this assessment approach provided more meaningful definitions of problems and opportunities. It provided direct diagnostic information that managers could use to guide improvements.

The first goal of the management team was to ensure that these elements were clearly defined in procedures and specifications. To test the adequacy of the safety management structure and appraise their current program they asked questions:

- Are current procedures adequate?
- Are there engineering safety reviews and procedures?
- Is there a planning and review structure for ongoing safety activities?
- Is there a record-keeping system used to track components of the program?

Koch Pipeline has reduced its OSHA-reportable accidents by 86 percent since 1995. In 3½ years, the company has had only one vehicle accident and in the past four years, it has had zero lost-time incidents. Koch is proud of this record and recently the Minnesota division of Koch Pipeline received the award for Meritorious Achievement in Occupational Safety from the Minnesota Safety Council.

Koch made a calculated effort to develop world-class safety performance. It has adopted a program called Total Safety Culture that concentrates on stopping unsafe behaviors before an incident occurs.

- Near-miss reports including at-home/driving incidents – Safety cannot be turned on and off since it has to be ingrained into each person's culture.
- Pre-job safety meetings -Identify the potential safety and environmental hazards and discusses how to manage those hazards.
- Behavior observations - Every employee is empowered to shut down any activity deemed unsafe.
- Root-cause investigations - Dissects the incident by asking a series of "How come?" questions.

Using various approaches tailor made for their environment, organizations such as Hewlett-Packard, Exxon Mobile Chemical, Estée Lauder, Pfizer Pharmaceuticals, L.L. Bean, and Johnson & Johnson have successfully implemented Behavior Based Safety at their companies.

11. WHY FOCUS ON BEHAVIOR BASED SAFETY

Employees sometimes fail to conform to safety procedures even when they have the necessary knowledge and tools, because of other factors influencing them. People are more aware of those factors that have the potential to cause harm because behavioral safety approaches identify and focus on these negative factors. An accident is the end result of a sequence, usually triggered by an unsafe behavior. When programs are measured by incident and accident rates to measure performance, they tend to be reactive rather than being proactive. Safety managers need to continue:

- Observations of employee actions
- Equipment checks
- facility walk-through checklists
- Housekeeping

12. CONCLUSION

As future safety managers and business leaders, it's important that engineering and engineering technology programs provide their students have an understanding of safety and safety management. Because employee injuries can significantly impact the entire organization, reducing workplace injuries is a major concern for companies in the manufacturing industry. Behavior Based Safety programs are currently being used as an effective alternative to traditional company safety programs. Whereas traditional safety programs place the principal responsibility for workplace safety on management, Behavior Based Safety programs use positive reinforcement to prevent work related injuries and illness. At the same time, Behavior Based Safety program directly involve employees in injury prevention by encouraging them to assume more responsibility for workplace safety.

The necessary steps for implementing Behavior Based Safety include: management support, employee trust, financial commitment and time. It must be remembered that Behavior Based Safety is not a quick fix and there will be obstacles that need to be overcome. The absence of instant results can be frustrating. Also, there will be times when employees don't follow the rules. In these situations the best thing to do is to sit down with the employee and refresh and re-emphasize the company philosophy, rules, policies and procedures.

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