An Analysis of the Behavior-Based Safety Program at Company XYZ

By

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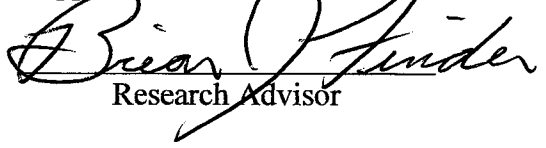

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ABSTRACT

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Company XYZ is a food processor/packaging firm that introduced a behavior-based safety program approximately three years ago. Currently, three behavior-based surveys are filled out each day from each of the nine departments. They are collected and the results are entered into a spreadsheet which tabulates the number of safe and unsafe acts observed. The results of the survey are simply counted as safe or unsafe per department. There is no distinction between the shifts, time of day, or other potentially identifying factors.

The purpose of this study was to examine the extent that employees from Company XYZ are reporting behavior-based safety data correctly and determine if the information collected from this process is being used effectively. To accurately measure the problem, several different behavior-based safety programs were identified and evaluated: The DO IT Process, The Values

Based Safety Process™, and the STOP™ Program. In addition, software options available for companies to organize their behavior-based safety data were analyzed.

Employees at Company XYZ completed a survey regarding their safety beliefs. Two limitations encountered in this study were a limited number of responses received from the employees as well as the possibility that not all of the completed surveys were filled out truthfully. While the results of this study were mainly positive, Company XYZ does not seem to be excelling in the behavior-based safety process as compared to similar programs in effect at other organizations. As a result of performing this study, the researcher recommends that Company XYZ reevaluates the checklists, provide more frequent and in depth training, and considers a more complete data organization system.

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CHAPTER ONE

INTRODUCTION

In the 1930s, a man by the name of H. W. Heinrich reviewed 12,000 insurance company accident claims and 63,000 injury and illness records submitted by plant owners in order to identify the most common causes of accidents (Howe, 2000). Heinrich concluded that 88% of these industrial accidents were the result of unsafe acts by people and, in order to minimize accidents, focus must be on changing behavior (Petersen, 2001). In that same period, the National Safety Council (NSC) performed a similar study with comparable results; 87% of industrial accidents were caused by unsafe acts (Howe, 2000). An incorrect conclusion from this data would be that employees are directly to blame for most of their injuries. The truth of the matter, as explained by behavior psychologists, is all behaviors are a function of the environment in which the behavior occurs (McSween, 2003). Therefore, unsafe behavior is directly related to the physical environment, the social environment, and the workers experience within these environments (McSween, 2003).

In general, safety practitioners acknowledged the validity of these studies but did little to change behavior of employees except in regards to training (Petersen, 2001). When attempts were made to modify behavior in an industrial setting, it had the potential to yield excellent results but never gained popularity, primarily because of difficulties in implementation (Krause, 1997). Attempts were made in which employees were not adequately involved in the process and so it became manipulative and caused the process to earn a poor reputation (Krause, 1997).

DuPont was one of the first companies to overcome the difficulties of implementation and used the data of Heinrich and the NSC in the development of their safety program. DuPont performed a formal study in the 1980s which analyzed all of the accidents experienced by the

company over a ten-year span (McSween, 1995). Their results, released in 1986, coincided with those of Heinrich and the NSC; 96% of DuPont's accidents were caused by unsafe acts (McSween, 1995). Using this research, DuPont modified its approach to safety and created its Safety Training Observation Program™ or STOP™ (McSween, 1995). This program includes regular safety audits based on the observation of employee behavior (McSween, 1995). Feedback is immediately provided to the employee and a STOP™ card is completed to document any unsafe acts observed (McSween, 1995). Since the implementation of STOP™, DuPont's accident rates have decreased dramatically (McSween, 1995). It is likely that DuPont's research and development of STOP™ created one of the first successful safety programs based on changing behavior rather than traditional methods.

While DuPont was one of the first companies to successfully implement a safety program based on behavior, they are no longer alone. There are hundreds of companies currently operating with a behavior-based safety program in place (BST Clients, n.d.). A study published in 1993, summarized evaluation data from fifty-three different research reports of safety programs and included the top ten safety approaches, the number of studies performed based on each approach, the number of subjects involved in the studies, and the average reduction in injury rates based on each approach (Geller, 1998). The behavior-based approach caused the most reductions in injury rates with an average reduction of 59.6% while the most popular approach, personnel selection, only had an average reduction of 3.7% (Geller, 1998). It is likely the continued success of behavior-based safety programs and the documented reductions in injury rates are encouraging more companies to implement their own version of this program.

Company XYZ is a food processor/packaging firm that introduced a behavior-based safety program approximately three years ago. Using the corporate version of a behavior-based

safety program as a model, the safety director at Company XYZ developed an initial behavior-based safety survey to meet the specific needs of the organization. Use of this survey prompted suggestions for its improvement, thus the current survey is slightly different from its inception state. Supervisors and line workers both received training in the use of the survey. Initially the supervisors were responsible for filling out the surveys and most likely they received more extensive training than the line workers did. The level of training received is significant because it is the company's goal to have the line workers complete the surveys rather than the supervisors who mostly complete them now. Once per eight-hour shift (one department works twelve hour shifts), an employee from every department is required to observe one of their fellow employees performing a task and complete the survey in relation to what they observe.

In total, three behavior-based surveys (two from the one department) are filled out each day from each of the nine departments. They are collected and the results are entered into a spreadsheet. The spreadsheet simply tabulates the number of safe and unsafe acts observed as indicated by the completed surveys and thus it is possible this collection of data is not used as effectively as it could be. The results of the survey are simply counted as safe or unsafe per department there is no distinction between the shifts, time of day, or other potentially identifying factors. Consequently, it is quite possible that inaccuracies exist in the reporting of behavior-based data collected at Company XYZ and that the final use of this information is not as effective as it could be.

Purpose of the Study

The purpose of this study is to identify the extent that employees at Company XYZ are reporting the behavior-based data correctly during the spring of 2004 and to analyze the effectiveness in use of the collected behavior-based data.

Goals of the Study

The goals of this study are to:

- Identify the perception and practices of employees as it relates to the self-reporting process
- Ascertain the validity and usefulness of the current analysis process vs. commonly accepted methodologies

Background and Significance

Since the enactment of the Occupational Safety and Health Act (OSHA) in 1971, workplace fatalities have decreased by more than 60% and occupational injury and illness rates by 40% (OSHA, n.d.). During the same time frame, employment has increased 100% from 56 million workers at 3.5 million worksites to more than 115 million workers at 7.1 million sites (OSHA, n.d.). While injury and illness rates are much lower than they were prior to the enactment of OSHA, many companies have reached a safety plateau where no matter what they do their accident levels will not decrease (Geller, 1998). Through the implementation of a continuous improvement, behavior-based safety program a number of companies have been able to break out of this plateau including DuPont, an industry leader in safety (Geller, 1998). Company XYZ also has also sought to use a behavior-based program in the improvement of their safety process. However, since it's implementation three years ago, the company has not seen the results they were expecting. Analysis is necessary to identify the failures of the program and to recommend improvements.

Assumptions and Limitations of the Study

This study assumes that employees at Company XYZ will accurately and truthfully complete each survey. A potential limitation would be that the employees at Company XYZ

might be unwilling to participate in the surveys.

Definition of Terms

Behavior – "observable actions" (Krause, 1997, p. 15)

Behavior-based safety program – "a program that defines the behaviors needed at each level of the organization… ensures each person clearly understand the required behaviors, measures whether the behaviors are there, and rewards (reinforces) for the behaviors on a regular (daily, hourly) basis" (Petersen, 2001, p.38)

Critical behaviors – "behaviors which are critical to safety. When performed safely, critical behaviors prevent injury. When performed in an at-risk manner, critical behaviors constitute exposure to injury" (Krause, 1997, p. 15)

CHAPTER TWO

LITERATURE REVIEW

The purpose of this study is to examine the extent that employees from Company XYZ are reporting behavior-based safety data correctly and determine if the information collected from this process is being used effectively. To accurately measure the problem, one must first understand the variety of behavior-based safety programs available, their differences, and how companies are making them fit their safety culture. This section will review several different behavior-based safety programs: The DO IT Process, The Values Based Safety Process™, and the STOP™ Program. Furthermore, various companies will be examined in regards to how they have implemented and maintained a behavior-based safety program while making it unique to their establishment. Lastly, this chapter will discuss some of the software options available for companies to organize their behavior-based safety data.

The Values-Based Safety Process™

One popular behavior-based program is the Values-Based Safety Process™, which is provided by Quality Safety Edge (QSE). QSE guarantees the success of their process and explains that an average company can expect "a 20 to 50 percent reduction in injury accidents" (QSE, n.d.). This process, as explained by Terry E. McSween in his book entitled The Values-Based Safety Process, includes five steps, the third having six sub-steps (2003). The steps are as follows:

1. The Safety Assessment
2. Executive Overview and Design Team Workshop
3. Final Design
    a. Establish Mission, Values, and Milestone Targets

b. Create Safety Observation Process

c. Develop Feedback and Involvement Procedures

d. Establish Safety Incentives

e. Plan Training and Kickoff Meetings

f. Conduct Management Review

4. Implement Behavioral Safety Process

5. Maintain Behavioral Safety Process (McSween, 2003)

Once a company has decided to implement the Values-Based Safety Process™, their first task is to perform a safety assessment. The safety assessment is a formal study which determines the companies "current level of safety performance and the practices that impact safety" (McSween, 2003, pg. 34). Usually led by a team of employees, this assessment serves two functions: it gives the team "an accurate and complete understanding of the organization's current safety efforts [which] will result in better recommendations" and "the interviews, presentations, and discussions resulting from the assessment will help… build support for initiating improvement efforts" (McSween, 2003, p. 34). Safety assessments also provide an ideal opportunity to identify high-risk areas, activities, training needs, and potential design team members (McSween, 2003). With the completion of the safety assessment, the team will have identified the target areas for implementation and the members of the design team who will lead the process. The company is then ready to proceed to the next step of the process.

Step two of the Values-Based Safety Process™ encourages the team to meet with the various leaders of the process. During the Executive Overview, the assessment team meets with management and supervisory personnel (especially those unfamiliar with the safety assessment but targeted for change) to review the results of the assessment and introduce them to the safety

improvements planned for the organization (McSween, 2003). This is the team's opportunity to provide the Executives with an overview of the elements of the behavioral safety process, explain why it is being implemented, ensure that line management knows how to support the implementation process at this stage, and to inform people of how to influence the process. The Design Team Workshop is similar to the Executive Overview but generally includes "formal training for those who will participate in the design team" (McSween, 2003, p. 53). The assessment team must provide the design team with the necessary skills to participate in the design process. These workshops are also a chance to "build better understanding and support from key managers and employees" and to gather "initial input from participants as a basis for later development" (McSween, 2003, p. 53). Once the essential people have been briefed, the design team can begin developing the components of the behavior-based process.

The Final Design stage occurs in six sub-steps beginning with establishing a mission, values, and milestone targets that meet the company's safety culture and needs (McSween, 2003). Secondly, the design team develops the safety observation process by analyzing past incidents and injuries in order to develop a checklist of critical safe practices. Once the checklist has been developed and revised, the design team will create observation procedures to go with it. Complementing this process is the third sub-step; Designing Feedback and Involvement Procedures. During this sub-step, the design team will decide how they will report the results of the behavioral safety process to the entire workforce (e.g. graphs, charts, etc.). Continuing from there, the design team will then develop recognition and celebration plans to recognize employees performing activities safely. However, the design team needs to ensure these recognition/celebration plans do not encourage non-reporting. This can often be accomplished by rewarding behaviors that promote safety. The fifth sub-step is to plan training for observers

and kickoff meetings. Even if the company has chosen to have a voluntary participation program, McSween recommends that all employees be trained as observers. In this manner, the employees are making an informed choice to either be an observer or not. Finally, it is time for the design team to conduct a management review. This is an opportunity for management to "provide input to the safety process, approve implementation of the new process, commit to its personal involvement, approve the budget for recognition and celebrations, and provide recognition of the efforts of the design team" (McSween, 2003, p. 126). This review also serves to ensure that management will continue to support the behavior-based safety process (McSween, 2003). With the completion of these six sub-steps, the foundation has been laid for the implementation of the values-based safety process.

Following the plans and timelines determined by the Design team in the last step, implementation of the Values-Based Safety Process™ takes place (McSween, 2003). After implementing the process, the remaining step is to Maintain the Behavioral Process which is accomplished by addressing employee concerns, communicating relevant safety information, coordinating recognition, analyzing safety data, and problem solving the results of the safety data McSween, 2003). Overall, this version of a behavior-based safety program is very comprehensive. It includes the fundamental elements of a behavior-based safety program; analyzing accident and injury records to identify critical behaviors, developing a behavior checklist, collecting data, and using the data to improve the process. The Values-Based Safety Process™ is unlike some of the other programs examined later in this chapter because it is very specific in the involvement of management throughout the endeavor. This involvement of management is probably one of the significant reasons why the Values-Based Safety Process is in use by so many companies.

CITGO's Success with the Values-Based Safety Process™

CITGO's refinery in Lake Charles, LA had operated with a "traditional safety program consisting of safety meetings, training, awards, audits, and the usual safety practices and procedures" for many years and experienced enough success with it to have one of the best records among refineries in the National Petroleum Refiners Association (CITGO, n.d.). However, the company was not satisfied with this achievement because they were not "showing any improvement and had a consistent incident rate of about 1.5" (CITGO, n.d.). A search for a new safety process led them to the Values-Based Safety Process™ that was then implemented in the early 1990s. There was initial concern among the employees regarding the new process, but CITGO assured them that the following guidelines would be adhered to:

- No names would be recorded during observations.
- Information recorded would not be used as a basis for disciplinary action.
- Supervisors and managers would not be evaluated on the bas of the observation data but on the basis of how well they maintained the process.
- The Values-Based Safety Process™ is part of the job of all employees and everyone would receive training on the process.
- Employees would receive immediate feedback on the observations and would be allowed to see and ask questions about the observation checklist (CITGO, n.d.).

As a result of CITGO's implementation of the Values-Based Safety Process™, the company's OSHA incident rates have been reduced by more than 30% (CITGO, n.d.). The initial employee resistance to the Values-Based Safety Process™ could have doomed the program to failure but CITGO recognized and addressed their concerns. As a result of CITGO's proactive management approach, the company experienced great success with the process.

Quebecor World's Success with the Values-Based Safety Process

When the Quebecor plant in Hazelton, Pennsylvania first opened in 1987, it had a weak overall safety program, lacking both written safety procedures and case management for injured associates (Butler, 2001). In the early 1990s, they implemented various safety programs, policies, and procedures with great success. Their OSHA recordable incident rates decreased from 27.0 in 1991 to 6.1 in 2000 – lower than the industry average of 6.6. However, in 1998, Quebecor reached a plateau and had little success decreasing their incident rates below 6.1. In 2000, the company learned about behavioral safety, attended a behavior-oriented conference, and consulted with Quality Safety Edge regarding the process. Quebecor then began implementation of the Values-Based Safety Process™ in January of 2001 by analyzing all of their injuries for the previous five years. Since the execution of the process, their total number of injuries has "decreased from 58 in the year prior to implementation to 42 in the year following". Company data also indicates that as the number of observations increase, the number of injuries decrease. It should be mentioned that this article was written within a year of Quebecor implementing the Values-Based Safety Process™ and while they showed a 28% reduction in their number of injuries, the data could be misleading because it could not have compared injury rates for a full year under the Values-Based Safety Process™ (Butler, 2001). On the other hand, behavior-based safety programs are not a quick fix solution – they take time to realize full results (Geller, 2001). Consequently, Quebecor is likely to see the results they are seeking because they are consulting with Quality Safety Edge, they have identified their critical safe practices, and have already developed a relationship between their observations and injuries.

The DO IT Process

The core of any behavior-based safety program can be described by E. Scott Geller's DO

IT process. Each letter of the phrase DO IT describes one step of this continuous improvement, behavior-based safety process (Geller, 2001, p.13). The acronym DO IT stands for:

- Define target behaviors
- Observe target behaviors
- Intervene to improve behaviors
- Test the impact of intervention (Geller, 2001, p. 13)

The first step of the DO IT process is perhaps the most time consuming, but also the most essential simply because the overall results of the process are based heavily upon the defined behaviors. Target (critical) behaviors a company should identify are at-risk behaviors that have led or contributed to a number of near hits, injuries, or fatalities in the past and safe behaviors that might have prevented these incidents (Geller, 1998). A company can gather this information from a number of sources such as injury records, near hit reports, job hazard analyses, and the workers. Once the company has defined the behaviors they need to focus on, those that led to loss and those may prevent it, they proceed to the next step of the process; observation (Geller, 1998).

The second step of the DO IT process, observing target behaviors, focuses on employees observing each other carrying out tasks in order to determine if they are performing them safely or in an at-risk manner. A tool frequently used in the observation process is a checklist, but a more descriptive name for it is a critical behavior checklist or CBC (Geller 1998). A CBC lists the critical behaviors an observer should be looking for with a location to mark if the behavior was observed being performed either safely or in an at-risk manner. Most CBCs will also provide a location for the observer to write their name and the date as well as providing space to write comments or provide feedback (Geller, 1998). By observing and completing CBCs, the

company is gathering data regarding where they need to improve and where their strong areas are. Completed CBCs are generally collected and used as the primary source of information for the next step of the DO IT process; intervention.

At this point, the company utilizing this process has defined the critical behaviors necessary to minimizing near hits, injuries, and fatalities. They have also performed audits in the form of safety checklists, which can be used to determine the percentage of times a behavior was performed safely or in an at-risk manner. The next step, intervention, is where the company uses activators and consequences to change behaviors in a manner that will increase safe behaviors and decrease at-risk behaviors (Geller, 1998). Activators are activities that take place before a behavior occurs and either encourage or discourage certain actions. They include activities such as discussions, lectures, films, demonstrations, goal settings, pledges, and incentives. On the other hand, consequences (often in the form of feedback) occur after the behavior and either punish or reinforce the action. Feedback can be either a positive or negative consequence of behavior – one can be praised for a job well done or admonished for performing an activity poorly (Geller, 1998). Once the company has activators and consequences in place to encourage safe behaviors and discourage at-risk behaviors, they progress to the final step of the DO IT process and test the impact of their intervention.

The final step of the DO IT process is the one that makes the process continuous and that is to test the impact of the intervention by performing more observations (Geller, 1998). These observations, of course, will provide additional information for the intervention stage and so the process continues indefinitely (Geller, 1998). This continuous process has the potential to theoretically improve the company to the point where they no longer have any accidents, incidents, or problems.

It appears that the DO IT process is excellent at defining and discussing the essential components of a behavior-based safety program – especially when determining the target behaviors and developing the CBC. However, it seems to ignore the various levels of the organization. There is neither discussion of obtaining support from management nor any assistance in earning and keeping employee buy-in. Even with these few problems, companies have not been hindered from successfully using it. As will be seen, both Koch Petroleum Group and the Pool California Energy Services have achieved significant reductions in accidents and injuries with the DO IT process.

Koch Petroleum Group's Success with the DO IT Process

Koch Petroleum Group in Pine Bend, Minnesota used the DO IT process as a model for their behavior-based safety process which they implemented in the fall of 1997 (Foss, n.d.). The behavior-based safety implementation team designed the behavior observation checklist before introducing the employees to the voluntary process in an 8-hour training class. "Every month, the BBS [behavior-based safety] team analyzes the data from the observation forms, documents trends in at-risk behaviors, and communicates the results to the remaining workforce" (Foss, n.d.). Incentive programs are in place to encourage employees to conduct "behavior observations, safety audits, safe work permit audits, pre-work checklists, near-miss investigations, and safety meetings" (Foss, n.d.). Koch Petroleum Group has since then experienced a 56% decrease in injuries and a 25% improvement in their recordable rates (Foss, n.d.). Overall, Koch Petroleum Group has succeeded in not only involving their employees in the DO IT process, but they have observed significant injury reduction-based results with the program as well. One explanation for their achievement is that their program elaborates the DO IT process – besides looking at safe and at-risk behaviors, Koch Petroleum Group also performs

pre-work checklists and near-miss investigations. These actions "round out" the entire safety process by making employees think through their actions prior to committing them, during the action, and finally after an accident or near-miss.

Pool California Energy Service's Success with the DO IT Process

The Northern and Southern Districts of Pool California Energy Services is another company that used the DO IT process to form their behavior-based safety process. Using a checklist, "employees periodically observe each other using simple but effective observation techniques. Following each observation, the observer gives appropriate one-on-one coaching feedback regarding the safe and at-risk behaviors observed" (Landron, n.d.). The observation data is periodically collected and "analyzed to identify behavioral categories needing special attention. Work teams then develop relevant intervention strategies to reduce the likelihood of the targeted at-risk behaviors" (Landron, n.d.). Use of the DO IT process has significantly influenced the company's safety culture. Employees report that since its implementation, there is an "increased safety awareness, improved housekeeping, more frequent safety communication between co-workers, and an increased respect for safe workers" (Landron, n.d.). Quantifying this influence are the companies incident rates, within one year of implementing the DO IT process, Pool California experienced a 52% reduction in the number of injuries to the hands, wrists, and fingers and a drop in their OSHA recordable rate from 5.47 to 2.86 (Landron, n.d.). It is perhaps significant that this article briefly mentions that there are obstacles to overcome in regards to Pool California using behavior-based safety but does not identify what they are. Overall, Pool California seems to be following the DO IT Process to the letter; they have identified their critical behaviors, used them to observe other employees, provided the observed worker with feedback, and then used the data in safety meetings to improve areas of concern.

While they have achieved safety improvements in this manner, perhaps they should consider expanding on the DO IT Process as Koch Petroleum Group did as a way to possibly overcome their unnamed obstacles.

The STOP™ Program

DuPont performed a formal study in the 1980s which analyzed all of the accidents experienced by the company over a ten-year span (McSween, 1995). Their results, released in 1986, indicated that 96% of DuPont's accidents were caused by unsafe acts. Using this research, DuPont modified its approach to safety and created its Safety Training Observation Program™ or STOP™. This program includes regular safety audits based on the observation of employee behavior. Feedback is immediately provided to the employee and a STOP™ card is completed to document any unsafe acts observed (McSween, 1995). In 1999, DuPont further improved their system by creating the STOP Audit Software System. Also known as SASS, this software is designed to "enhance data collection and communication of results" (CD). DuPont has achieved great success with the program they developed and has since created several more STOP™ programs (STOP for Supervision™, STOP for Employees™, STOP for Each Other™, Advanced STOP™, and STOP for Ergonomics™) which are now available for sale on their website (DuPont, n.d.).

Since DuPont created the various STOP™ programs, they have been used to train "more than 500,000 managers, team leaders and supervisors throughout the world in DuPont and other companies" (CD). The STOP™ programs are designed to compliment a company's existing safety programs, not replace them. They strengthen existing programs through safety auditing and communication. By opening the line of communication between supervisors and employees, they facilitate change from unsafe to safe behaviors. With the STOP™ programs, training

begins with upper management and continues down throughout the organization. The safety department is not the driver of the program but instead serves as support for the program. STOP™ safety observations are anonymous and non-punitive. The program allows "employees to discuss their actions until they realize why a behavior should change" (CD). These programs have proven highly effective in reducing incident rates and accident costs for both DuPont and their customers. Companies who implement DuPont's STOP™ programs experience an average cost savings of 50% (DuPont, n.d.).

Through the years, DuPont has been an industry leader in safety. They were among the first to implement a behavioral based safety program and did so with great success. Now they assist others seeking to develop their own behavioral based safety program. Samples of the DuPont STOP™ programs were available via their website and seem very organized as well as easy to follow. DuPont also hosts several seminars to facilitate the process with tips for implementation. They even have developed software so data can easily be analyzed for safety improvements. This author finds it interesting that training with the STOP™ program begins with upper management. Other behavior based safety programs claim to be an employee driven process but any new process must have the approval and support from upper management. The STOP™ program starts there and then works down to the employee level. A comment, taken from a DuPont promotional CD, explains that the program allows "employees to discuss their actions until they realize why a behavior should change" strikes this author as unrealistic. On one hand, it implies that the employer will continue to wait until the employee changes his or her mind about a behavior. Yet, one has to wonder if the employer can wait for this to occur. If the behavior has the potential to lead to serious injury or loss and the employee flatly refuses to change, the results could be catastrophic. This process should walk a line between extremes

with sufficient checks and balances to prevent potential disasters. With that one exception, the DuPont STOP™ programs seem to be very complete and appear to have assisted a number of companies reduce their losses and injury rates.

Johns Manville Corporation's Success with STOP™

Johns Manville Corporation decided to implement STOP™ in February of 1997 in order to "acquire the tools needed to help the company reach its goal of zero incidents" (Injuries, n.d.). Working with consultants from DuPont, the company made some major changes for the better including elevating safety from a peripheral issue to a business management issue, implementing safety auditing by management and employee teams at all sites, and investigating all safety incidents to determine the root causes and prevent similar incidents from occurring (Injuries, n.d.). By the end of their first year with the process, the company's lost workday and restricted duty rate dropped from 3.9 to approximately 1 (Injuries, n.d.). Just as Koch Petroleum Group expanded on the DO IT Process, Johns Manville Corporation further developed the STOP™ Program by their commitment to investigating every safety incident in order to identify the root causes (Injuries, n.d. site Foss, n.d.?).

Smurfit-Stone Container Corporation's Success with STOP™

Smurfit-Stone implemented DuPont's STOP™ Program in 1994 when their recordable incident and lost time rates became intolerable (Smurfit, n.d.). They worked with consultants from DuPont and created their own version of STOP™ – Smurfit-Stone Accident Free Environment or SAFE (Smurfit, n.d.). While there is little information available regarding the details of their process, the incident rates of the company indicate the success they have achieved; an 85% improvement of their lost time incident rates and a 78% improvement of their recordable incident rates (Smurfit, n.d.). Furthermore, it is probable that their program imitates

that of DuPont and includes procedures for observations, feedback and analysis.

Behavior-Based Safety Software

Use of a behavior-based safety program has the opportunity to collect huge amounts of data that can be used to improve safety issues within the company. Unfortunately, some companies have difficulty organizing this information. This dilemma is easily resolved with the purchase or the development of behavior-based safety software. According to an online survey of behavior-based safety users, entitled Behavioural-Safety.com – User Safety Report, approximately 22% of companies utilize propriety behavioral safety software (Cooper, 2003). Of the remaining 78% who do not use proprietary behavioral safety software, 43% responded that they did not collate and monitor the behavioral data and 36% responded that they have developed their own software for data collection and monitoring. Therefore, of the 510 respondents, 58% of companies are using software they have either purchased or developed to organize their data. Perhaps a more formal survey would yield different results, but given the extensive resources a company puts into the behavior-based safety process, it seems odd that no more than 60% of companies are using software to help them organize and analyze their data (Cooper, 2003). It is probable that those companies using software are more likely to be better organized in their use of collected behavior-based safety data and therefore may see superior results with their program.

Companies who do not wish to invest the resources in creating their own behavioral safety software can instead purchase it from a variety of sources. Two examples of behavioral safety software are ProAct Safety Observation Database from Safety Advantage and B-Safe, which is supported by eSpectat™. ProAct software is in use in over 350 locations and 15 countries (Safety, n.d.). It is able to support an unlimited number of checklists and behaviors and

is fully customizable in terms of terminology, reports, and graphs. Furthermore, users of ProAct are able send reports via Excel, Word, and e-mail (Safety, n.d.). All in all, this program is likely to meet the needs of any company just beginning its behavior-based safety program because of its customization capabilities, ease in sharing information, and support of an unlimited number of checklists.

Another example of safety tracking software is the B-Safe program which is an online behavioral safety tracking software that has "two different modes of usage: Coordinator and Observer" (B-Safe Programme, n.d.). Observers are able to enter their observation scores from completed inventories. Coordinators, on the other hand, have a larger variety of options available to them including: observation data entry, analysis of observation data, tracking the number of completed observations, and printing reports. Security may be an issue with the B-Safe Program as it is an online program which users must connect to via the internet (B-Safe Programme, n.d.). B-Safe seems to provide the basics (analysis, tracking, and reporting) but what has the potential to be extremely useful is the two levels of usage – where the observer can input his or her own data rather than the coordinator spending lots of time doing so.

Both of the software options described above provide the analysis, tracking and reporting services a company utilizing a behavior-based safety program would need. While either of these software options would likely be an excellent tool for a company seeking a means to organize the behavioral data they collect, the potential security issues of B-Safe are a concern and the customizability of ProAct a noteworthy boon. It seems likely that there is more behavioral data software available on the market but based strictly on these two options, ProAct seems to be the better choice.

Summary

In the past, a behavior-based safety program has often been the instrument that leads a company to a decrease in accident and incident rates. The core of the process is relatively simple:

a) Identify critical behaviors that have led to losses in the past
b) Develop a checklist of these behaviors and use it to observe employees performing tasks
c) Provide feedback to the employee and use written data to prevent further occurrences of at risk behavior
d) Observe the process again to determine if the feedback and other intervention strategies have improved the situation or to find other at-risk issues

While straightforward, this process can be difficult to implement and maintain. Problems can occur if management is not fully behind the process or if employees don't believe in it. Fortunately, there is a considerable variety of programs, literature, consultants, and software available to help a company implement and maintain a behavior-based safety program.

CHAPTER THREE

METHODOLOGY

The purpose of this study was to identify the perception and practices of employees as it relates to the self-reporting process, and to ascertain the validity and usefulness of the current analysis process versus commonly accepted methodologies. To accomplish these objectives, on April 26, 2004, the employees at Company XYZ received a survey regarding their safety beliefs. Analysis was performed on all of the completed surveys using SPSS. Two significant limitations encountered in this study were a limited number of responses received from the employees as well as the possibility that not all of the completed surveys were filled out truthfully.

Subject Selection and Description

Survey participation from all areas of Company XYZ was desired from as many of the employees as possible. To that end, each of the nine department managers received surveys and consent forms (see Appendices A and B) for every employee within their respective departments. It was then their responsibility to distribute the survey amongst their employees and promote the timely completion of the instrument.

Instrumentation

Based on the literature review, a survey was developed to sample the beliefs of employees at Company XYZ with regard to the behavior-based safety program (see Appendix B). This survey collected general employee information such as their position with the company, the length of time with the company, the department they work in, the hours they usually work, and how many accidents or near hits they have had during their time with the company. It also examined at four basic categories of safety beliefs. The first section was entitled Safety Procedures and gathered information regarding the employees' general safety beliefs. Next, was

a section that gathered information regarding the employees' beliefs of the behavior-based safety process. The final sections were for observers only, as they gathered information regarding the employees' beliefs about the structure of the behavior observation checklists (Critical Behavior Checklist Structure) and the observer's capabilities to observe and provide feedback (Observer Capabilities). The Safety Director at Company XYZ approved the survey instrument prior to its distribution among the employees.

Data Collection Procedures

On April 26, 2004, each of the nine department managers received surveys and consent forms (see Appendix A and B) for every employee within their respective departments. It was then their responsibility to distribute the forms amongst their employees. Collection boxes were available in three locations; one in each of the two employee lunchrooms and a third outside of the Safety Director's office. Recipients of the survey were instructed in the consent form to return the survey to one of the collection boxes by noon on May 7, 2004.

Data Analysis

Data analysis was performed on the completed surveys using SPSS on May 14, 2004 with the assistance of Amy Gillett. A summary of this analysis is available in Appendix C.

Limitations of the study

One limitation of this study was the number of surveys returned. There are over three hundred employees working at Company XYZ, yet only forty-seven surveys were completed and returned. Therefore, it is possible that the information collected from this study does not provide a valid representation of the organization.

A second limitation is the validity of the surveys returned. This study has assumed that all employees filled out the surveys completely and truthfully. While one would expect an

employee to indicate opposing views regarding items 4 and 5 in the Behavior Observation section, as they are opposite statements, this was not always the case. Fourteen of the forty-seven respondents had similar, non-neutral views regarding the two statements. Another possible explanation for this unexpected response could have been a shortage of time allowed for the survey or the design survey instrument itself.

CHAPTER FOUR

RESULTS

This study had two main purposes: to identify the perception and practices of employees as it relates to the self-reporting process and to ascertain the validity and usefulness of the current analysis process versus commonly accepted methodologies. To fulfill these objectives, a survey was distributed amongst the employees of Company XYZ in order to determine their beliefs regarding safety in general and, more specifically, the behavior observation program. Additional personal communication with the company's safety director was sought in order to learn specific details regarding their behavior-based safety program.

Survey Analysis

Forty-seven surveys were returned and, overall, the results were very positive (a summary of completed surveys is provided in Appendix C). In general, the employees of Company XYZ feel they are receiving adequate safety training and that they understand the results of not following safe behaviors. Nearly 50% of respondents felt following safe behaviors is necessary to minimize the occurrence of losses, accidents, and injuries. Perhaps of greatest importance were the positive remarks regarding the behavior-based safety program itself. Close to 45% of respondents regard behavioral observations to be a useful tool and 40.4% believe they improve behavior, make the workplace safer, should be performed more frequently, and provide useful information.

While positive remarks were made by the employees, it should be noted that 61.7% of those surveyed either agreed or strongly agreed to the statement, "There are people working for this company who do not follow safe behaviors (e.g. not working safely or not wearing required personal protective equipment)". Furthermore, 46.8% either agreed or strongly agreed that they

had performed tasks while not following safe behaviors. Thirty-four percent of respondents believed if unsafe behaviors were observed and reported, someone would be punished. Regarding the behavioral-based safety program, only 27.7%, of respondents indicated their involvement in its development and understanding of its importance. Slightly more, 31.9%, understood how the data collected from the process would be used.

Respondents who completed the observer section of the survey often responded with neutral answers. However, it is encouraging to note that 34% of respondents felt comfortable providing immediate feedback to the person they observed performing a task in a safe manner. Slightly fewer, 29.8%, felt comfortable providing feedback to people they have observed performing in an unsafe manner. What is most disconcerting is the fact that of the thirty-seven respondents, nearly 30% felt important at-risk behaviors are missing from the behavior observation checklists.

Analysis of Personal Communication with Safety Director

Throughout this process, the researcher worked in conjunction with the Safety Director of Company XYZ. By doing so, information regarding the development of the behavior based safety program and the use of collected data was gathered. Rather than being an employee-driven process, the behavior based safety program in use at Company XYZ was implemented under pressure from the corporate office and modeled after their program. The degree to which this program was customized to fit Company XYZ is unknown. Furthermore, data collected from the behavior based checklists is probably not used in the most effective manner. Data is entered into a spreadsheet which tabulates the number of safe versus unsafe acts observed by each category. There is no differentiating amongst departments, time of day, or other distinguishing attributes which would facilitate the identification of trends and therefore assist in

improving the safety of the workplace.

Discussion

According to the research presented in Chapter II, a behavioral based safety program should be employee driven. Additionally, employees should be fully involved throughout all stages of the programs development, thoroughly comprehend the observation process and understand exactly how the collected data will be used. The data gathered from employees at Company XYZ does not overwhelmingly support these requirements. First of all, the development of a behavior based safety program came about because of pressure from the corporate office, not because employees demanded it, and while 27.7% of respondents either agreed or strongly agreed that all employees were involved in the development of the behavior observation process, over half (53.2%) of them were neutral on the issue. The results regarding employee comprehension of the observation process are even more inconclusive. Slightly more than 42% responded with neutral to the statement "I understand the importance of the observation process" and an equal number, 27.7%, either agreed/strongly agreed or disagreed/strongly disagreed. Even though the employees didn't conclusively understand the importance of the observation process, 40.4% believe behavior observations improve behavior, make the workplace safer, should be performed more frequently, and provide useful information. The last major requirement of a behavior based safety process is that employees understand how the collected data will be used. Survey results indicate that most employees do understand how the data is being used, neutral responses decreased to 38.3% and positive responses totaled 31.9%. Unfortunately, 27.7% disagreed or strongly disagreed to understanding how data from behavior observations would be used. In summary, while the results of this study are mainly positive, Company XYZ does not seem to be excelling in the behavior-based safety process as

compared to similar programs in effect at other organizations.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to examine the extent that employees from Company XYZ are reporting behavior-based safety data accurately and determine if the information collected from this process is being used effectively. To accomplish these goals, on April 26, 2004, the employees at Company XYZ received a survey regarding their safety beliefs specifically those relating to the behavior observation program. Additional personal communication with the company's Safety Director was also obtained in order to learn specific details regarding their behavior-based safety program.

Conclusions

In general, the practices in place at Company XYZ correlate with the requirements of a behavior-based safety program discussed in Chapter II.

- The first major requirement is that the process is employee driven and employees are involved in all stages of the behavior-based safety programs development. While the process was implemented under pressure from the corporate office, 27.7% of respondents either agreed or strongly agreed that all employees were involved in the development of the behavior observation process. It should, however, be mentioned that over half (53.2%) of respondents were neutral on the issue.
- Another requirement discussed in Chapter II is employee comprehension of the observation process. These results remain inconclusive. Nearly half of employees (42.6%) responded with neutral to the statement "I understand the importance of the observation process". An equal number, 27.7%, either agreed/strongly agreed or disagreed/strongly disagreed. Nevertheless, without conclusively understanding the

importance of the observation process, 40.4% believe that behavior observations improve behavior, make the workplace safer, should be performed more frequently, and provide useful information.

- Thirdly, employees need to have an understanding of how the collected data will be used. The results of this study indicate the majority of employees do. Almost 32% of respondents either agreed or strongly agreed that they understood how data from behavior observations would be used and neutral responses decreased to 38.3%. However, 27.7% acknowledged not understanding the use of collected data.
- The final major requirement involves the use of collected data to improve the safety of the workplace. Data is entered into a spreadsheet tabulating the number of safe versus unsafe acts observed by each category. Very little information is available with this process because there is no differentiating amongst departments, time of day, or other distinguishing attributes which would facilitate in determining trends and therefore assist in improving the safety of the workplace.

Recommendations

As a result of performing this study, the researcher recommends that Company XYZ performs the following in order to improve their behavior-based process.

- Revaluate the checklists with the employees in order to ensure all at risk behaviors are included.
- Provide more frequent and in depth training regarding the purpose of the behavior based safety program, the observation process, and providing feedback.
- Evaluate their use of data collected via the behavior safety checklists in order to ensure the data is used in the most effective manner to improve the safety of the

workplace.

Areas of Further Research

In order to identify additional areas of improvement, Company XYZ could further expand this study by:

- Evaluating the effectiveness of the survey instrument and redistribute it in hopes of obtaining a greater response and therefore a more accurate representation of the beliefs of employees at Company XYZ. Perhaps management cooperation could be obtained, requiring all employees to complete the survey.
- Gathering additional data regarding the potential items missing from the behavior based safety checklist.
- Researching the variety of programs available for organizing behavioral based safety data in conjunction with identified needs of Company XYZ.

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Appendix A:

Consent Form

The attached survey has been created for the sole purpose of information collection regarding the company's Behavior-Based Safety Program. All data collected from this process will be evaluated and distributed to management as suggested avenues for improvements to the company's existing program.

Participation in this process is voluntary and anonymous. Your choice to participate is greatly appreciated and will enable the researcher to gain a more accurate assessment. Please complete the attached survey and return it to one of the three collection boxes. Collection boxes will be located in each of the lunchrooms and a third outside of the Safety Director's office.

Please return your completed survey to a collection box by noon on May 7, 2004.

Thank You!

DISCLAIMER

I understand that by returning this survey, I am giving my informed consent as a participating volunteer of this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completion of this study. I am aware that the information is being sought in a specific manner so that only minimal identifiers are necessary and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participation at any time during the study will be respected with no coercion or prejudice.

NOTE: Questions or concerns about the research study should be addressed to Devin Wayne, the researcher, at 715-505-8141 or to Brian Finder, the research advisor, at 715-232-1313. Questions about the rights of research subjects can be addressed to Sue Foxwell, Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 11 Harvey Hall, Menomonie, WI, 54751, phone 715-232-1126.

Appendix B:

Behavior Observation Checklist Survey

Behavior Observation Checklist Survey

How would you describe your position?

___ Line/staff worker
___ Supervisor
___ Management
___ Other:_____

How long have you been working for this company? ___

___ Less than 1 year
___ 1 – less than 3 years
___ 3 – less than 5 years
___ 5 – less than 10 years
___ 10 years or longer

Which department(s) do you work in?

___ Dry Packaging
___ Hassia
___ Materials Management
___ Office
___ Plant Maintenance
___ Processing
___ QA
___ Sanitation
___ Stick Pack
___ Other:_____

What hours do you usually work?

___ 7AM – 3PM
___ 3PM – 11PM
___ 11PM – 7AM
___ 6AM – 6PM
___ 6PM – 6AM

How many accidents or near misses have you had during your time at this company?

___ 0
___ 1
___ 2
___ More than 2

	Directions: Indicate your response by circling the number that best reflects your opinion.	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Safety Procedures:						
1	I have received adequate safety training.	1	2	3	4	5
2	I understand the results of not following safe behaviors (e.g. not working safely or not wearing required PPE).	1	2	3	4	5
3	There are people working for this company who do not follow safe behaviors (e.g. not working safely or not wearing required PPE).	1	2	3	4	5
4	I have performed tasks while not following safe behaviors (e.g. not working safely or not wearing required PPE).	1	2	3	4	5
5	Following safe behaviors is necessary to minimize the occurrence of losses, accidents, and injuries.	1	2	3	4	5
6	If unsafe behaviors are observed and reported, someone will be punished.	1	2	3	4	5

Directions: Indicate your response by circling the number that most reflects your opinion.		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7	There is strong pressure to perform tasks safely.	1	2	3	4	5
8	There is strong pressure to have zero (0) unsafe acts reported.	1	2	3	4	5
Behavior Observation:						
1	All employees were involved in the development of the behavior observation process.	1	2	3	4	5
2	I understand the importance of the observation process.	1	2	3	4	5
3	I understand how the data from behavior observations will be used.	1	2	3	4	5
4	Behavior observations are a useful tool.	1	2	3	4	5
5	Behavior observations are a waste of time.	1	2	3	4	5
6	Behavior observations improve behavior.	1	2	3	4	5
7	Behavior observations make the workplace safer.	1	2	3	4	5
8	Behavior observations should be performed more frequently.	1	2	3	4	5
9	The information determined by the completed behavior observations is useful.	1	2	3	4	5
10	Feedback from being observed is useful.	1	2	3	4	5

STOP HERE IF YOU ARE NOT AN OBSERVER!

Critical Behavior Checklist Structure:						
1	The behavior observation checklist is easy to understand.	1	2	3	4	5
2	Behaviors on the checklist are clearly stated.	1	2	3	4	5
3	Behavior observation checklists require too much time to complete.	1	2	3	4	5
4	The behavior observation checklist addresses the important at-risk behaviors.	1	2	3	4	5
5	Important at-risk behaviors are missing from the behavior observation checklists.	1	2	3	4	5
Observer Capabilities:						
1	I have received sufficient training to complete the safety checklists.	1	2	3	4	5
2	I complete the behavioral safety checklists accurately.	1	2	3	4	5
3	I have received sufficient training to provide feedback to people I have observed.	1	2	3	4	5
4	I provide immediate feedback to the person I have observed.	1	2	3	4	5
5	I am comfortable providing immediate feedback to the person I observed performing a task in a *safe* manner.	1	2	3	4	5
6	I am comfortable providing immediate feedback to the person I observed performing a task in an *unsafe* manner.	1	2	3	4	5
7	I am uncomfortable providing feedback to people.	1	2	3	4	5
8	I feel other people always complete the safety checklists accurately.	1	2	3	4	5
9	I feel other people always provide immediate feedback to the person they have observed.	1	2	3	4	5

Appendix C:

Survey Results

		Total Response	Percentage of Response		
			Strongly Disagree or Disagree	Neutral	Strongly Agree or Agree
Safety Procedures:					
1	I have received adequate safety training.	47	31.9%	10.6%	57.4%
2	I understand the results of not following safe behaviors (e.g. not working safely or not wearing required PPE).	47	19.1%	19.1%	61.7%
3	There are people working for this company who do not follow safe behaviors (e.g. not working safely or not wearing required PPE).	46	10.6%	25.5%	61.7%
4	I have performed tasks while not following safe behaviors (e.g. not working safely or not wearing required PPE).	47	12.8%	40.4%	46.8%
5	Following safe behaviors is necessary to minimize the occurrence of losses, accidents, and injuries.	47	12.8%	38.3%	48.9%
6	If unsafe behaviors are observed and reported, someone will be punished.	47	19.1%	46.8%	34.0%
7	There is strong pressure to perform tasks safely.	47	25.5%	44.7%	29.8%
8	There is strong pressure to have zero (0) unsafe acts reported.	45	14.9%	46.8%	34.0%
Behavior Observation:					
1	All employees were involved in the development of the behavior observation process.	47	19.1%	53.2%	27.7%
2	I understand the importance of the observation process.	46	27.7%	42.6%	27.7%
3	I understand how the data from behavior observations will be used.	46	27.7%	38.3%	31.9%
4	Behavior observations are a useful tool.	47	29.8%	25.5%	44.7%
5	Behavior observations are a waste of time.	45	36.2%	34.0%	25.5%
6	Behavior observations improve behavior.	44	21.3%	31.9%	40.4%
7	Behavior observations make the workplace safer.	43	21.3%	29.8%	40.4%
8	Behavior observations should be performed more frequently.	45	19.1%	36.2%	40.4%
9	The information determined by the completed behavior observations is useful.	47	21.3%	38.3%	40.4%
10	Feedback from being observed is useful.	47	21.3%	44.7%	34.0%
Critical Behavior Checklist Structure:					
1	The behavior observation checklist is easy to understand.	37	12.8%	44.7%	21.3%
2	Behaviors on the checklist are clearly stated.	36	10.6%	42.6%	23.4%
3	Behavior observation checklists require too much time to complete.	34	12.8%	34.0%	25.5%
4	The behavior observation checklist addresses the important at-risk behaviors.	37	10.6%	34.0%	34.0%
5	Important at-risk behaviors are missing from the behavior observation checklists.	37	12.8%	36.2%	29.8%

		Total Response	Percentage of Response		
			Strongly Disagree or Disagree	Neutral	Strongly Agree or Agree
Observer Capabilities:					
1	I have received sufficient training to complete the safety checklists.	37	6.4%	42.6%	29.8%
2	I complete the behavioral safety checklists accurately.	37	6.4%	44.7%	27.7%
3	I have received sufficient training to provide feedback to people I have observed.	37	8.5%	51.1%	19.1%
4	I provide immediate feedback to the person I have observed.	36	12.8%	40.4%	23.4%
5	I am comfortable providing immediate feedback to the person I observed performing a task in a *safe* manner.	37	8.5%	36.2%	34.0%
6	I am comfortable providing immediate feedback to the person I observed performing a task in an *unsafe* manner.	36	12.8%	34.0%	29.8%
7	I am uncomfortable providing feedback to people.	36	12.8%	44.7%	19.1%
8	I feel other people always complete the safety checklists accurately.	36	17.0%	36.2%	23.4%
9	I feel other people always provide immediate feedback to the person they have observed.	35	19.1%	29.8%	25.5%