

The identification of critical behaviors: the first step in a behavior-based safety process

Patrick T. Killimett

The behavior-based safety process is similar to the total quality management approach that many companies have recently undertaken to improve overall operation and, ultimately, ensure long-term success. The behavioral approach to safety is similar to total quality management in that this safety process allows companies to make upstream measurements of safety performance. Through upstream measurements and adjustments, companies can be proactive and work toward the prevention of injuries, instead of operating in a reactive manner when someone is injured.

Additionally, a behavior-based safety process requires that everyone in the organization become involved. This is especially true of the hourly employees. Furthermore, problem solving is based upon behavioral data that have been gathered through the measurement system. Due to these similarities between the behavioral accident prevention process and the total quality management philosophy—an upstream focus, employee involvement and participation, and data as the basis of problem solving—many companies find that this safety improvement process fits very well with existing activities and systems in their organizations.

Behavior: the common pathway

In the past, I have initiated and have been involved with several different types of safety programs. Among those were contests, slogans, the implementation of training, new procedures, and discipline. When I look back to the efforts that had any positive impact on reducing accidents, I find that the one common feature among those efforts is that they caused the workers to temporarily change their behavior. The change in behavior reduced the amount of exposure to risk, thereby reducing the number of accidents.

Most companies find that 85–95% of all accidents result from unsafe behavior. This is not to say that the workers are to blame for the accidents. Employees engage in unsafe behavior for many reasons. The unsafe behavior may be the result of a lack of knowledge. Employees may not be aware that the behavior places them at risk. Sometimes employees do not know how to do the task safely.

Cumbersome management systems and ones that fail frequently also promote unsafe behavior. A cutting permit that requires the signatures of three people who are always difficult to locate may cause employees to become frustrated. Instead of spending significant amounts of time in search of the appropriate signature, employees opt to take shortcuts to avoid frustration and get the work done. When gloves are unavailable because stores are consistently out of stock, employees are at risk because they are not wearing the appropriate personal protective equipment. These circumstances represent barriers to safe work and are typical reasons that underlie unsafe behavior. With the recognition that these barriers exist, we need to shift our focus away from placing blame on the employee. We need to concentrate on identifying and understanding the source of unsafe behavior and find ways to remove the barriers to safe work.

A behavior is simply an observable act. Picking up a tool box is a behavior. Wearing hearing protection or using faulty tools are behaviors. Because we can see behavior, we can count it. The ability to count behavior allows us to measure and, in turn, manage it.

What are the unsafe behaviors that we want to manage? If you were to ask six people in any department which injuries occur most often, you would probably get basically the same answers. People tend to be able to identify the injuries. If you ask the same six people what caused those injuries, you may get six different answers.

In industry we typically focus upon the injuries and look for somewhere to place blame. As a result, we do not do a good job of identifying the root causes of the injuries. Even if we discover the root causes, we do not have effective systems in place to communicate this information to the workers. Nor do we have a system that helps workers to actually use these data to reduce their risk in the future. In most cases, our workers have not been asked to investigate injuries in an effort to discover the root causes of those injuries. Without accurate information, people disagree on what the “real” cause of an injury is. Assumptions are made and conclusions are drawn. More often than not, the assumptions and conclusions are incorrect.

Developing a Critical Behaviors Inventory®

The identification of critical behaviors is the first step in the behavior-based safety process. When we say “critical” behaviors, we are referring to those behaviors that increase an

Killimett is a consultant with Behavioral Science Technology, Inc., Ojai, Calif. 93023. This is the second of a series of four articles discussing the behavior-based approach to safety. The first article appeared in the August issue, p. 141.

1. Information regarding critical safety-related behaviors can be extracted from accident reports and condensed into a format where safety performance can be measured objectively and improved.

Accident Reports_{1, 2, 3, ..., n}

As a mechanic was breaking into a steam line, his helper was burned on the face by hot water escaping from the flange that the mechanic was opening.

CRITICAL BEHAVIOR

- "Cheater Bar"
- Open-end wrench
- Not correcting helper's unsafe acts
- Not warning helper of a hazard
- Stepping too high
- Reaching too far
- Excessive force on wrench

GENERIC BEHAVIOR

- Wrong Tool
- Wrong Tool
- Safety Communication
- Safety Communication
- Unstable Body Use
- Unstable Body Use
- Unstable Body Use

Location _____
Date _____

Observer _____
Shift _____

1.0 PERSONAL PROTECTIVE EQUIPMENT	SAFE	UNSAFE
1.1 Hand	_____	_____
1.2 Eye & Face	_____	_____
1.3 Body	_____	_____
2.0 BODY USE		
2.1 Stability	_____	_____
2.2 Vision	_____	_____
2.3 Line of Fire	_____	_____
3.0 TOOLS		
3.1 Right for job	_____	_____
3.2 Condition	_____	_____
4.0 OTHER		
4.1 Communication	_____	_____
4.2 Prejob Inspection	_____	_____
4.3 New CBI Items	_____	_____
Totals:		
%Safe = Safe x 100 / Total =		_____ _____ _____
CAT. ITM COMMENT		

employee's risk of injury if done unsafely and significantly reduce the risk of injury if the behavior is done safely. Critical behaviors can initially be identified through the review of past accident investigations. A careful analysis of approximately 100 accidents or data that span three years will paint a pretty clear picture of which behaviors are causing people to be injured. If accident data are not available, interviewing the workers is another method to identify critical behaviors.

Reviewing accident reports

A cross section of the organization's employees is the best group to do the actual work of developing the Critical Behaviors Inventory®(CBI®). This committee uses various techniques to identify the root causes of past incidents. Those techniques are cause tree analysis, pattern search, brain storming, antecedent-behavior-consequence analysis, and interviewing¹. Despite the method or combination of methods used by the committee, the goal is to identify the unsafe behaviors that preceded the incident and find out what could have been done to avoid the unsafe behavior.

Consider an accident report where an employee used a mushroomed-head chisel, and a piece of the chisel came off and embedded itself in the employee's hand. The employee was not wearing gloves. The unsafe behaviors could be listed as "tool condition" and "lack of personal protective equipment—gloves." Using the mushroomed chisel, instead of repairing it, was an unsafe behavior. Not wearing gloves while doing this particular job was also an unsafe behavior. Had the chisel been in good condition and had the employee worn gloves, the injury might have been prevented. These unsafe behaviors could be indicators of management systems that are not working.

This process continues until all of the designated reports have been reviewed. As the committee identifies critical behaviors, they should keep track of the number of incidents in which the behavior occurred. The committee will be able to determine the relative frequency with which each behavior is a factor leading to the incidents. If a behavior is involved in one incident, it may not be critical. On the other hand, if one behavior is involved in 15% of all incidents, then the behavior is most likely a critical one.

So far, we have discussed the identification of generic critical behaviors. They are generic because these categories of behavior are not limited to a specific job. The category, tool condition (i.e., the use of tools that are in good condition) applies equally well to tools used to change out motors or to replace chairs. Likewise, the use of hearing protection when operating a hammermill or wearing a dust mask during cleanup are two examples of using personal protective equipment, another generic critical behavior.

A second type of critical behavior is job specific. If in the committee's evaluation a single job is responsible for multiple incidents, that job may warrant special attention. Jobs that pose very high hazards or jobs where the frequency of incidents is very high would qualify for the development of job-

specific critical behaviors. Lighting a furnace may warrant special attention because, if there is an incident, it is usually fatal. Many companies find that there are many minor incidents associated with driving a fork truck. In these cases, the activities related to the job itself would be reviewed to identify critical behaviors.

Defining critical behaviors

Each critical behavior must have a definition. The definition points out what types of observable acts would put an employee at risk for injury. For example, the definition for the category "tool condition" might be: Is the tool in good condition? Has it been modified? Are chisel heads mushroomed? Have the screw drivers been sharpened?

If the answers to these questions indicate that the worker is at risk, then the behavior is unsafe. This definition creates a reference point for everyone in the organization and clarifies what is meant when "tool condition" is referred to as an unsafe behavior. The definitions also eliminate confusion later when people are trained to observe and record the occurrence of safe and unsafe critical behaviors.

After critical behaviors have been identified and defined, the definitions must be tested. The committee should go out into the work area and see if the definitions are operational. Are the defined behaviors observable? Do the definitions tell an observer what to look for and how to judge if the behavior is safe or not?

When the committee is satisfied that the definitions are clear, it is time to share previous efforts with all of the employees during crew or shift meetings. Items that should be covered during these meetings are: a short history that outlines where the information on the CBI originated, how the CBI pertains to the employees, how the CBI will be used, and examples of critical behaviors. All employees should know not only what the critical behaviors are, but the definitions as well. There should be no guessing or assuming. The goals of these meetings are to inform everyone about the CBI, the definitions, and to promote employee buy-in into the process. The meetings are a perfect opportunity to determine whether or not CBI definitions are clear by noting the feedback from employees. As a result of the comments, it may be necessary to update and clarify the CBI definitions. The Critical Behaviors Inventory becomes a living document. **Figure 1** summarizes the process by which information from accident reports can be extracted to develop the inventory. As the process changes or new processes are introduced into the workplace, the CBI should be updated.

Conclusion

As I stated earlier, one of the benefits of a behavior-based safety process is that it establishes an upstream measurement system to allow proactive management of safety performance. The Critical Behaviors Inventory provides the foundation for this system. In my next article, I will discuss the second step in the behavior-based safety process: training employees in the techniques of making behavioral observations and giving feedback, as well as the collection of data. □

¹Krause, T., Hidley, J., and Hodson, S., *The Behavior-based Safety Process: Managing Involvement for an Injury-free Culture*, Van Nostrand Reinhold, New York, 1990.

Received for review May 14, 1991.
Accepted May 21, 1991.