Improving Business Outcomes

Behavior-based safety techniques can influence organizational performance

By Treasa M. Turnbeaugh

Abstract: *This article explores the foundation of organizational culture and the concept that behavior-based safety techniques can affect organizational culture change to improve business outcomes. It discusses organizational culture, safety culture, cultural change models such as total quality management, six sigma and behavior-based safety, citing examples of successful change.*

ORGANIZATIONAL CULTURE is an important consideration in managing a firm's overall success. Management can set goals and objectives, assign responsibilities and accountabilities, and monitor business outcomes and processes, but it must also consider the context in which all of these initiatives occur. Organizational culture is difficult to define and cannot be measured in a direct manner as it is a *soft* social science issue rather than a standardized quantitative measure. To confound matters, subcultures often exist within organizations that may or may not be cohesive with the firm's overall goals and values. One such subculture is workplace safety.

Workplace safety is an important factor for organizations as it affects virtually all other elements of an organization, including production, quality, job satisfaction and expenses. One approach to controlling workplace safety is the concept of behavior-based safety (BBS), a process by which all levels of an organization participate in improving specific safety-related issues by addressing actions (behavior). An interesting anecdotal finding pertaining to BBS is that it indirectly affects other business outcomes as well.

Organizational Culture

Organizational culture is a difficult concept to define and to measure, much less to understand and control. Schein (1965; 1985) (as cited in Hopkins, 2006, p. 4) summed up organizational culture as "the way we do things around here." A more formal definition offered by Schein (as cited in Bergersen, 2003, p. 10) is:

> A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems.

Schein touches on several ideas in this formal definition, such as ways of thinking, ways of behaving and integrating new employees. To further understand organizational culture, Schein (1965; 1985) (as cited in Kinicki & Kreitner, 2008, pp. 42-43) breaks it into layers: 1) observable artifacts, such as "manner of dress . . . published list of values . . . and visible behavior"; 2) espoused values, such as "explicitly stated values and norms that are preferred by an organization"; 3) enacted values, such as "the values and norms that actually are exhibited or converted into employee behavior"; and 4) basic assumptions, which are "unobservable and represent the core of organizational culture." These layers of culture again touch on acceptable thinking and acceptable behavior in an organization. Both the informal and formal definitions highlight the importance of behavior at the individual level and collectively at the group level.

While one would think that a strong organizational culture would be good for an organization, this would actually be a dichotomous state. A strong culture may foster sameness in thinking and behaving to accomplish goals. It may be important for the feeling of affiliation, motivation and job satisfaction. However, a strong culture can also be a deterrent to change. Studies have suggested that great companies cannot remain stagnant and still be great; they need to "change culture over the life cycle of the organization" if they want to continue to succeed (Baker, 2008, p. 8).

Changing culture is a far more difficult task than trying to understand culture. Knowing what to aim for is one of the first steps in moving toward a change initiative. Organizational culture evolves over time and can be (and should be) a managed process. Westrum (1993) (as cited in Bergersen, 2003, p. 12) suggests that treatment of information is the catalyst for moving a firm along his cultural maturity continuum of "pathological, bureaucratic or generative." Table 1 (p. 42) represents the characteristics of these organizations and each iteration illustrates a more open and progressive environment.

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Hudson and van der Graaf (2002) (as cited in Bergersen, 2003) took Westrum's model a few steps further to explain the levels of cultural maturity as they relate to occupational safety within an organization. They added two levels to the model and reported that their model could be used to help organizations develop a stronger safety culture, which is a distinct subculture of the overall organizational culture. Figure 1 presents an adaptation of Hudson and van der Graaf's model of safety culture maturity.

Adaptation of this model includes thoughts on accountabilities. Culture and organizational performance strongly depend on support and leadership from the highest levels. The manifestation of this support must cascade down to each successive level of the organization. This can only be accomplished effectively through accountability, not just responsibility (although the subject of accountability versus responsibility is beyond the scope of this article).

Bringing About Organizational Change

Progressing up the levels of cultural maturity requires organized change for most organizations. Many schools of thought exist on how to go about changing an organization, ranging from simplistic views to formalized models of change. Some of these models include total quality management (TQM), management by objectives (MBO) and six sigma. Each model has merit for changing organizations and each has its successes. However, organizations have struggled with each concept as well.

Total Quality Management

TQM originated in the 1950s and reemerged in the 1980s (Hashmi, 2008). TQM is a method of all levels and functions using a combination of management and quality tools to focus on meeting customer needs. TQM is "do the right things, right the first time, every time" (Hashmi). According to Hashmi, TQM includes foundational activities such as "commitment by senior management and all employees, meeting customer requirements . . . ; improvement teams . . . ; systems to facilitate improvement . . . ; line management ownership, employee involvement and empowerment . . . ; specific incorporation in strategic planning." The management commitment aspect centers around a continuous improvement methodology of plan, do, check, act, a methodology that has transcended the use of TQM and has been integrated into other improvement-oriented procedures as well (Hashmi).

Some organizations used TQM successfully, while in others it did not receive full management support. A case in point involves a large metropolitan hospital in the early 1990s. One issue with TQM at this hospital was empowering all levels of the organization to make changes. Control is difficult to share. TQM must be implemented in its entirety rather than in bits and pieces that management is willing to embrace. Many managers find it difficult to allow true employee empowerment.

Management By Objectives

MBO was originated in the 1950s by Peter Drucker and has endured in some forms into current practice. The intent of MBO is to improve organizational performance by "aligning goals and subordinate objectives throughout the organization" (Kotelnikov). This concept appears to be closely related to performance management techniques still in use at many organizations.

Goals are set by top management, objectives are cascaded throughout the organization, managers evaluate how close employees come to achieving the set goals, and rewards are given or withheld based on those results. According to Kotelnikov, MBO sets the objectives, but allows employee empowerment about how to achieve "freedom to challenge everything and anything; continuous training and development on the job; knowledge of, and faith in, the organization's mission; and the ability to achieve and see results."

Again, one issue to success with this model centers on empowering employees. This can be a difficult task for many top managers and is often the downfall to full employee trust and involvement, which will limit organizational culture development.

Six Sigma

Six sigma resembles TQM in that it targets improving customer satisfaction, reducing cycle time, reducing defects and improving employee involvement. Six sigma integrates accountability, measurement of results and regular feedback as key elements. This model is owned by front-line employees with the support of middle and top management, a similarity to the structure of behavior-based safety. The key to six sigma is the dogmatic approach to a continuous improvement cycle (known as DMAIC):

- Define the problem specifically.
- Measure the opportunity for improvement.
- Analyze the details associated with the opportunity.
- Improve methodically once the final solution is chosen.

Information is the catalyst for moving a firm along the cultural maturity continuum. Each iteration illustrates a more open and progressive environment.

Table 1

How Organizations Treat Information

Pathological	Bureaucratic	Generative
•Do not want to know	•May not find out	•Actively seek information
•Messengers are shot	•Listened to if they arrive	•Messengers are trained
•Responsibility is shirked	•Responsibility is compartmentalized	•Responsibility is shared
•Bridging is discouraged	•Allowed but neglected	•Bridging is rewarded
•Failure is punished or covered up	•Organization is just and merciful	•Inquiry and redirection
•New ideas are actively crushed	•New ideas present problems	•New ideas are welcomed

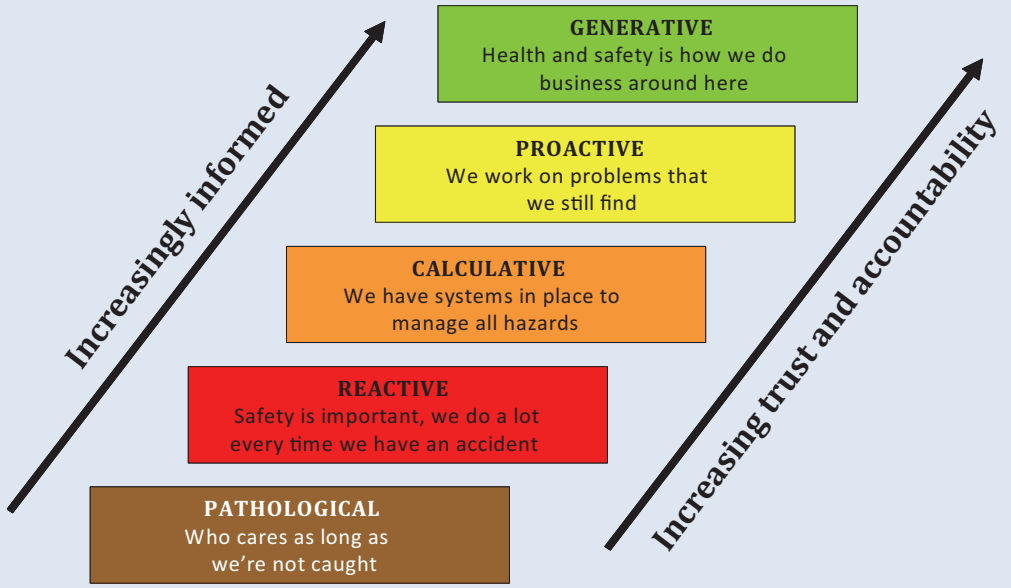
Note. *Adapted from* Tool to Be Used to Survey and Improve Safety Culture in the European Railway Industry *(p. 12), by C.E.B. Bergersen, 2003, unpublished master's thesis, Norwegian University of Science and Technology, Trondheim, Norway.*

•Control the improvements made by monitoring, measuring and reassessing as needed to ensure success (Pande & Holpp, 2002, pp. 31-40).

Many organizations have experienced success using this methodology, especially those in product-oriented businesses; however, the overriding concept of rigorous measurement to the extent prescribed by six sigma may be too scientific and/or intense for some organizations, leaving them searching for a less intense methodology of change.

Figure 1

The Safety Culture Maturity Model



Note. *Adapted from* Hearts and Minds: The Status After 15 Years Research *(SPE 73941), by P. Hudson and G.C. van der Graaf, March 2002, paper presented at Society of Petroleum Engineers International Conference on HSE in Oil and Gas Exploration and Production, Kuala Lumpur, Malaysia.*

Adding two levels to Westrum's model helps explain the levels of cultural maturity as they relate to occupational safety within an organization.

Behavior-Based Safety

Another model for changing culture is a methodology centered on occupational safety in the organization: BBS. This concept for change starts by changing aspects of the organization that management and employees alike can generally agree upon and support: occupational safety and health.

BBS is actually a derivative of the larger study of performance management. Performance management techniques have been used successfully to help organizations address issues such as production, absenteeism, tardiness and quality.

Application of these techniques to occupational safety is an easy transition. The primary difference between performance management and BBS is in the application approach. Performance management is targeted at the individual level while BBS is often targeted at the group behavior level through collective individual behaviors.

Safety Culture & Organizational Culture

Before learning the logistics of BBS, one should understand the relationship between a safe work culture and overall organizational culture. According to Bergersen (2003), the idea of safety culture "first arose in the aftermath of the Chernobyl accident in 1986 and catastrophes like the *Challenger* accident . . . increased the interest for safety culture" (p. 9). Researchers believe that safety culture is a subcomponent of corporate culture that affects the safety and health of the group members and others outside of the group as well (Bergersen, 2003, pp. 12-14). Safety culture affects and is affected by other operational processes and systems. It is inherently coupled to the overall corporate culture. Thus, any dominant subcomponent such as productivity, turnover or quality will influence safety processes and vice versa (Williams, 1991).

Based on this, one could extrapolate that business outcomes are associated with one another at the organizational culture level. This notion demonstrates the importance of promoting a strongly unified and well-managed approach to occupational safety as well as to other business outcomes.

Figure 2 (p. 44) illustrates the relationship between performance effectiveness/productivity and losses/safety. It represents productivity and safety metrics for multiple locations of a grocery warehousing distribution organization. It compares the tons per hour (TPH) or productivity of the locations to the frequency or losses of those locations. Data points were plotted and a regression line was drawn for the best fit of the data: linear regression line for productivity and polynomial regression line for losses.

This chart was developed because supervisors felt that if they were to concentrate on safety via a behavioral process their production would suffer as a result. These data showed them that a cultural association already existed between productivity and safety, and that concentrating on safety was not associated with poor productivity, just the opposite.

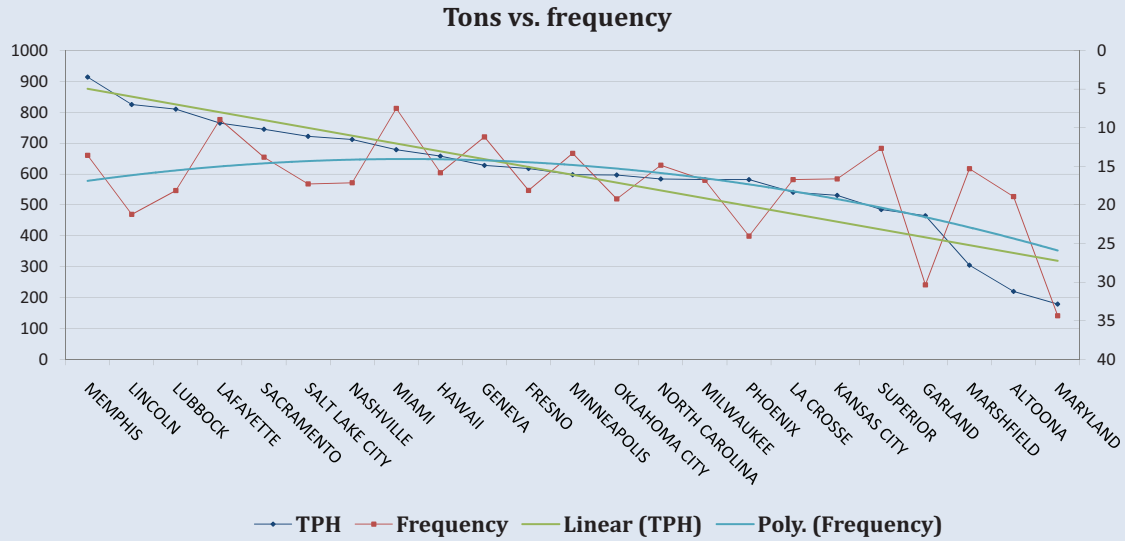
The relationship suggests that an organizational culture connection ties the low productivity to higher losses (worse scores) and higher productivity to lower losses (better scores). This relationship holds until one reaches the upper one-third of high productivity where it appears that a dominant culture of productivity takes precedence over a culture of safety.

This organization initiated a BBS change process to control safety losses and found that in many instances it not only reduced the frequency of safety accidents, but also had an effect of increasing production output

This gap analysis involving a grocery warehousing distribution organization showed that a cultural association already existed between productivity and safety, and that concentrating on safety was not associated with poor productivity, just the opposite.

Figure 2

Cultural Relationship of Productivity to Safety



Note. *Adapted from "On Employee Perception Gap Analysis," by T. Turnbeaugh, Sept. 21, 2006, Aviation Practice Meeting. San Diego, CA: Marsh.*

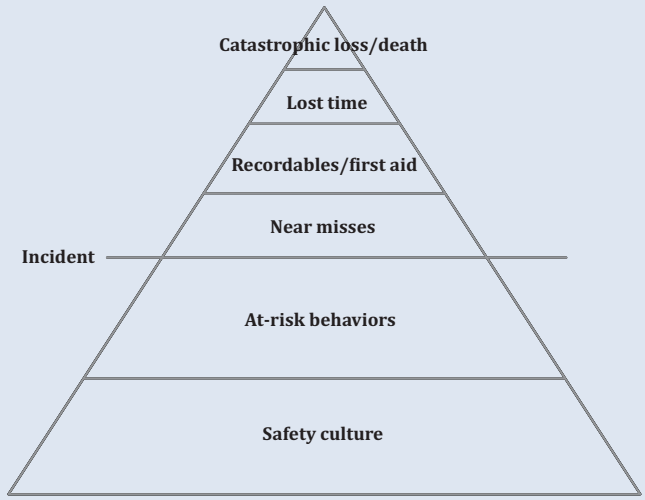
(Turnbeaugh, 2006). This firm had a low profit margin so it considered the increase in production to be a significant and successful outcome in addition to the reduction in losses (Turnbeaugh).

As it appears a link exists between safety and other business outcomes such as productivity at the organizational culture level, it is intuitive that affecting one outcome will affect other outcomes as well. Implementing the BBS concept of change is one way to affect outcomes. If an organization is experiencing high frequency of injuries, it will typically search for mechanisms to reduce those injuries and associated costs. Companies generally approach injury reduction through avenues such as regulatory compliance, workplace exposure control and training. However, many organizations need to take those efforts further, and a BBS initiative that requires heavy involvement of all levels of the organization in designing a system can help them focus on reducing injuries.

Safety professionals often use the accident hierarchy to demonstrate the importance of addressing true root causes of incidents rather than simply proximate causes.

Figure 3

Accident Hierarchy



Note. *Adapted from "The Behavior-Based Approach to Proactive Accident Investigation," by T.R. Krause and L.R. Russell, March 1994,* Professional Safety, *pp. 22-26.*

The Accident Hierarchy

The underlying concept behind BBS is that of the accident hierarchy (Figure 3) often used by safety professionals to demonstrate the importance of addressing true root causes of incidents rather than simply the proximate cause. The hierarchy shows that organizations experience few catastrophic injuries/deaths, more lost-time injuries, even more recordable/first-aid injuries and even more near-hits.

It also shows that significantly more at-risk behaviors occur than do injuries. This is because the at-risk behavior may or may not result in an incident, and employees may perform the at-risk behavior several times with no adverse effects. The accident hierarchy does not stop there, however, because at-risk behaviors are influenced by the overall safety culture/organizational culture and, therefore, there is a need to focus change efforts at this level.

With the fundamental concept that culture and at-risk behavior eventually lead to accidents, SH&E professionals needed a mechanism for affecting those areas. If culture is improved and at-risk behaviors are reduced, it follows that the number of injuries will, in turn, be reduced. This is where the influence of the field of behavior analysis enters the safety process. The work of Skinner, Lindsley and Herrnstein have influenced the modern day approach to addressing occupational safety (Daniels, 1994, p. xv). The influence is that "behavior is a function of its consequence" (Daniels, p. 25).

The ABC Model

The BBS premise comes from the ABC model: antecedent (what sets the occasion for behavior), behavior (the action) and consequences (what happens to the person when s/he engages in the behavior). For example, studies have shown that antecedents such as posters will instruct employees on what to do, but consequences, such as being corrected for performing the task incorrectly or receiving positive reinforcement for doing it correctly, are what really drive the behavior (Daniels, 1994).

It is important to note that antecedents are weak motivators (they only get the behavior started) and that the foundation of a BBS program is focused on consequences, those that occur naturally and those artificially imposed by coworkers, supervisors and management. Unfortunately, many safe work practices are also poor motivators because they typically provide weak natural consequences for performing a task the safe way and often provide stronger natural consequences for choosing at-risk behaviors.

As a result, to help drive consequences, managers and employees need to understand that they must impose social consequences along with the natural consequences; they also must understand that their behavior, providing consequences or not, will in turn drive the behavior of others. In other words, if consequences are strong and immediate, they will have a marked impact on behavior. Thus, if consequences are viewed as positive and they occur soon after the behavior, the employee is likely to perform that behavior again.

However, this can be troublesome because positive reinforcement could exist that would reinforce unsafe actions—for example, taking a shortcut without being corrected, yet receiving praise for completing the job quickly. Managers and employees who are expected to provide consequences must understand that there are several ways to influence behavior and that there is an appropriate time and place to use each method.

Figure 4

Scorecards

Observation Scorecard

Behaviors	Yes	No	Can't Do	Totals
Put on harness and tie off when working above 6 ft.				
Use hand rails when getting on and off equipment.				
Lift with knees bent and load held close to body.				

Supervisor Support Scorecard

Behavior	Weight	Y	N	Score
Conduct three observations weekly	20			
Review Graphs in weekly department meetings	10			
R+ Core Group members for Core Group behaviors two times per week	20			
R+ three employees weekly for a safe act	50			
Total Points	100			

Manager Support Scorecard

Behavior	Weight	Y	N	Score
R+ behaviors on scorecards of managers/supervisors who report to you. (weekly)	40			
Include a statement on the process in meetings with plant personnel.	10			
Look at graphs weekly and discuss progress with your managers	30			
Hold Review & Reinforcement meetings monthly	20			
Total Points	100			

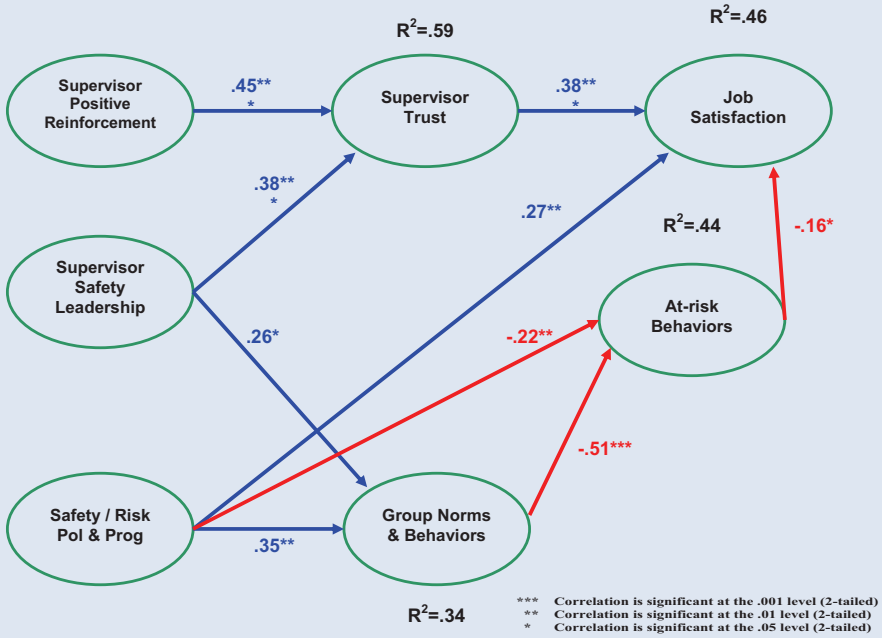
Note. Adapted from "On Employee Perception Gap Analysis," by T. Turnbeaugh, Sept. 21, 2006, Aviation Practice Meeting. San Diego, CA: Marsh.

In a typical BBS process, employees are assigned as observers; supervisors support the observers in visible, meaningful ways prescribed by the observers; and managers support the supervisors and the overall process in visible, meaningful ways prescribed by the observers and supervisors.

The relationship of behavior to safety, trust and other business outcomes is not linear. In fact, it is quite complex.

Figure 5

Path Analysis of Relationship of Behavior to Business Outcomes



Note. Adapted from "On Employee Perception Gap Analysis," by T. Turnbeaugh, Sept. 21, 2006, Aviation Practice Meeting. San Diego, CA: Marsh.

Problem-Solving Techniques

Once the fundamental concepts of the ABC model, and natural and artificial consequences are understood, employees and managers are trained in a targeted method of problem solving. Learning these techniques will allow the teams to transport the model to other business outcomes once they have applied them to safety. The problem-solving process is "pinpoint, measure, feedback, reinforce and evaluate" (Daniels, 1994). Training will cover each issue and tools for performing each step will be provided.

Pinpointing is the process of analyzing past losses and at-risk behaviors in completing a task to determine precisely the correct behavior to performing the tasks that are creating risk. The pinpoints become observation measures that employees use to monitor themselves and others. Many measurements are observed during the day and recorded on a daily feedback chart posted in a prominent area.

This provides positive reinforcement naturally as individuals are encouraged when they see the at-risk behaviors declining and the safe behaviors increasing. Just as importantly, feedback and positive reinforcement are also given verbally at the time of observation. A steering committee then evaluates the results each month to determine whether the pinpoints have reached *habit strength* and whether it is time to change pinpoints or add new ones (Daniels, 1994).

Defining Roles Is Key

The key to BBS is assigning each level of the organization an active role. Employees at every level must be engaged and must contribute. Many change processes have failed because they have not clearly and distinctively defined the expected roles of each level in the change process.

In BBS, roles are clearly defined in the early phases of the process, and they are defined in a facilitated method by employees themselves. In a typical process, employees are assigned as observers; supervisors support the observers in visible, meaningful ways prescribed by the observers; and managers support the supervisors and the overall process in visible, meaningful ways prescribed by the observers and supervisors.

By actively involving every level of the organization, a BBS process begins to change the behavior toward safety as an integral business outcome and will eventually affect the thinking, attitudes and ultimately values and culture of the organization (McSween, 1995, p. 228). Figure 4 (p. 45) presents examples of an observation scorecard as well as supervisor and manager support scorecards that can be used in this process.

What management is ultimately trying to elicit is a culture that fosters discretionary safety effort at each level. This effort typically affects other business outcomes indirectly. Some organizations then shift their pinpoints to drive measurement and the five-step process more into the field of performance management to address these other business outcomes more directly (Daniels, 1994).

To achieve discretionary effort, management and employees need to understand the importance of all four types of consequences and how to use them. Often, negative reinforcement or extinction is needed to get a behavior started. However, negative reinforcement only keeps behavior at a minimum standard. Only positive reinforcement can elicit that discretionary effort.

This discretionary effort and improved commu-

nication lead to improvement not only in safety, but also in productivity, trust of supervisors and, ultimately, in other business areas such as job satisfaction. Through improved communication, improved accountability at all levels and the resultant improved trust, the organization has set the stage to progress to the next step in the safety culture maturity model (Table 1, p. 42).

The relationship of behavior to safety, trust and other business outcomes is not linear. Figure 5 illustrates the complexity of these relationships. The inverse relationships are shown with a negative sign, such as that between group behavior and individual at-risk behavior. All other correlations are direct relationships. The R^2 numbers represent the percentage of those answers influenced by the factors pointing to that variable. This analysis shows that 59% of how workers trust their supervisors is influenced by positive reinforcement provided by the supervisor and how that supervisor demonstrates safety leadership. Both factors are addressed head-on by a BBS process.

Figure 5 also shows that 46% of how employees view their job satisfaction is directly related to how much they trust their supervisors and how they view the effectiveness of safety policies along with an inverse relationship to at-risk behaviors, factors involved in the safety culture maturity model.

Perception Surveys

Soft measures such as these are hard to quantify and are typically measured using a perception survey. Perception surveys are an important step in assessing safety culture, both as a baseline and as a measure of the effectiveness of organizational change efforts. Such surveys typically assess what employees believe, understand or feel about various safety-related variables, as well as some overall cultural variables, such as job satisfaction, organizational trust and intention to quit.

Perception surveys can be performed internally or externally. External surveys such as that described here are typically validated tools and ask a series of questions to draw conclusions about a given variable rather than asking a single question. The danger in asking single questions is that the answer/conclusion may be a result of how the question was asked as opposed to what the variable is intended to represent.

The sidebar on p. 48 shows excerpts from a validated perception survey, demonstrating the multiple questions used for variables. These questions are calculated together to derive a composite score for the variable from which conclusions are drawn. These variables have reliability scores that indicate how "correct" the series of questions represents that variable. It is easy to see how a single question taken out of group context could be misleading.

Cases In Point

Reflecting back to the idea of how organizational culture is shared values and behaviors, and how new members of the group will be socialized into that culture, the new culture of discretionary effort in all aspects of business should result in improvement in the quantitative measures of multiple business outcomes. Chevron provides an example of involving all levels of employees in culture change that is BBS/performance management oriented. The company had tried other change methodologies without full success. It entered into a "7-year total quality initiative" that showed improvements in outcomes but not to the magnitude of improvement that was sought (Callahan & Nolan, 2001, p. 1).

According to Callahan and Nolan (2001), Chevron recognized that the part missing from its culture change efforts was behavior (p. 2). Once the company moved to a behavior-based change model, it reported significant success and even received an award for the changes made. The behavioral approach "fundamentally transform[ed] the culture of the company to one that was positively motivating and one which tapped into the discretionary efforts of employees at all levels" (Callahan & Nolan, p. 2). The outcomes of the change program were "improvements in safety, reliability, lower operating expenses, and happier, more engaged employees" (Callahan & Nolan, p. 4).

Callahan and Nolan now believe that the organization is the summation of all individuals in that organization and the behaviors of each individual. They describe their steps to success:

1) Get the newly desired vision implemented company-wide by using behavioral analysis on the individual to determine the natural and artificial consequences to drive behavior.

2) Train leaders in the skills of coaching and train everyone in terms of what is expected of them at each level.

3) Set up aligned accountability systems, such as "compensation, recognition and promotion" to drive the desired behaviors.

4) Monitor and provide feedback on business outcomes and leadership behaviors (Callahan & Nolan, 2001, p. 9).

Chevron attributed its success in improving business outcomes to using the behavioral methodology, despite years of effort using more complicated systems to elicit change.

Chevron did many things well which led to its success. These include determining vision/pinpointing; training leaders how to be leaders; aligning accountability (consequences); providing regular feedback; and evaluating business outcomes.

One key element to the success of such a process is employee involvement from the beginning. Involving employees and unions from the start engages employees in the process and reduces their resistance to change (Chaudron, 2003). Additionally, the leadership training was crucial because communication is critical to change. Schein (1965; 1985) (as cited in Bergersen, 2003, p. 11) suggests that leaders/managers should be responsible and aware of the message they are communicating. He indicates that leaders/managers can change culture by:

- what they pay attention to, measure and control on a regular basis;

What management is ultimately trying to elicit is a culture that fosters discretionary safety effort at each level. This effort typically affects other business outcomes indirectly.

Excerpts From a Validated Perception Survey

Trust of Supervisor

1) I feel free to discuss accidents with my supervisor without the fear of having it used against me later.
2) My supervisor is friendly and approachable.
3) I trust my supervisor to keep information I share with him or her in confidence.
4) My supervisor *cannot* be trusted (Reversed).

Job Satisfaction

1) I feel like I accomplish a lot on my job.
2) I like working with my coworkers.
3) My supervisor is a great person to work for.
4) My job is *not* very challenging (Reversed).
5) My job offers many opportunities to better myself.
6) I am *dissatisfied* with my job (Reversed).

Note. *Adapted from "On Employee Perception Gap Analysis," by T. Turnbeaugh, Sept. 21, 2006, Aviation Practice Meeting. San Diego, CA: Marsh.*

- how they react to critical incidents;
- how they allocate scarce resources;
- how they role model, teach and coach;
- how they allocate rewards and resources;
- how they recruit and select new members.

Following the leadership at all levels concept, McSween (1995) describes how a gas pipeline company improved its safety outcomes. All levels of the organization completed a series of intensive training sessions covering behavioral methodology and techniques. Company personnel performed observations, provided feedback and reinforcement, and celebrated their pinpoints for a period of 9 months as a pilot study, during which time the company experienced a "35% reduction in lost-time accidents" versus the 8-month period that preceded the study (McSween, pp. 247-248).

Using a model similar to McSween's, a series of Marsh projects have also resulted in success stories that indicate improvement not only in occupational safety, but in other business outcomes as well:

- A large international aircraft services company had an increase in workers' compensation costs and increased damage to aircraft. Additionally, the cost of insurance had become a significant cost issue. One year after implementing a BBS change process, the workers' compensation frequency decreased by 35% and aircraft damage decreased 100% (Marsh, 2004a).
- A chemical company faced tough competition, low margins and rising workers' compensation costs along with low morale and lack of trust between managers and employees. With use of the BBS process, the company reduced recordable rates from 13.7 to 4.5; improved the trust factor; managers were visibly obtaining associate input for improvement; and coaching of managers reduced associate complaints and manager write-ups for associate insubordination (Marsh, 2004b).
- A grocery distribution center experienced increasing injuries and associated workers' compensation costs. A dominant subculture of production existed and employee turnover was high. The 2-year results of implementing BBS showed a reduction in recordable rates from 19.52 to 7.56 in one division and from 23.7 to 12.53 in another division. Turnover was also dramatically reduced in the first division from 48% turnover to 21% and from 40% to 17% in the other division (Marsh, 2004c).
- A large generic pharmaceutical manufacturer had increasing injuries along with increasing workers' compensation costs. Within 9 months of a pilot BBS project, the test group had a 30% reduction in injuries while the rest of the plant experienced a 25% increase in injuries. The test group also reported improvement in quality deviations, improved communications, more active employee participation and a more positive work environment (Marsh, 2006).
- A construction company experienced a rise in incident rates and the additional expense was affecting its ability to bid on new projects. Employees frequently ignored safety programs and excessive manager turnover resulted in the loss of confidence in leadership. Additionally, a recent job fatality reduced employee morale. The result of the BBS change process reduced the company's OSHA recordable rate from 12.83 to 6.11 in one shop and from 6.8 to 0 for another. Safety results improved and the company was eligible to bid for new jobs. Employee morale improved as well (Marsh, 2004d).
- A manufacturing company had an OSHA recordable rate that was twice the industry average. The incident rate dropped from 29.8 to 6.0 by implementing a BBS process. Over 4 years, the company reduced its workers' compensation premium by $1.3 million and had a corresponding drop in injury rates. The company reduced it workers' compensation costs, as measured by payroll, by 86% from $3.50 per $100 of payroll to less than $0.50 per $100 of payroll (Marsh, 2004e).

These examples are a sampling of how BBS can help a company improve not only safety, but other business outcomes as well. One issue is that these additional outcome improvements have been considered a beneficial by-product of BBS, thus most organizations are not measuring the indirect outcomes in the same methodical way they measure the loss frequency improvements.

BBS initiatives range in cost based on the size of the organization, the complexity of the design, and whether the initiative is consultant-driven or conducted internally (with the best result typically from consultants who are well practiced in this area of expertise). If hired out, a base price might start in the

range of $30,000 to $40,000, but could escalate into hundreds of thousands for large organizations. Although these prices are steep at first glance, they can easily be recouped through improvement in safety, even slight improvement in productivity, a reduction in employee turnover and a reduction in insurance premiums.

Saving even one back injury claim could show a significant cost-benefit. This is important for all organizations, but especially for those that might be self-insured or on a large deductible program, which equates to a dollar per dollar savings to the bottom line. The savings would include not only the direct cost of the injury, but also the indirect costs, which can range from 1 to 10 times the direct costs. Using even a 1:1 ratio is a good conservative attempt to include the indirect costs in the savings measure. A quick calculation of total loss ($)/profit margin can show the savings in terms of top-line revenue needed to cover the cost of that loss.

Organizations could show a huge cost-benefit of investing in a BBS program if firms would recognize the full impact that the process can have on overall culture and begin to measure these outcomes methodically as well. Data exist to measure hard business outcomes such as productivity and quality, but departments must work together to consolidate this information before and after the change initiatives. Additionally, organizations need to measure the soft business outcomes through perception analyses to quantify improvement in outcomes such as job satisfaction and reduction in turnover, which could then be translated in financial terms as well.

As noted, the keys to success of a BBS organizational change process are vision, "pinpointing, measurement, feedback, reinforcement and evaluation," which some companies have applied well with appropriate direction and intent (Daniels, 1994). When approached in a methodical, systematic manner, a focus on occupational safety issues through the use of BBS techniques can lead to improvement in additional critical business outcomes.

The examples cited demonstrate that BBS techniques can help improve multiple business outcomes is a result of the outcomes being related at the organizational culture level—the way things are done within the organization and whether subcultures are dominant and leading to unintended results. When all levels of an organization participate in planning and implementing continuous improvement, it develops communication, an understanding of one's role, trust and information sharing, all elements of a progressive organizational culture. BBS outlines an understandable and useable model for organizing the change process and lays a foundation for managing business outcomes improvement and success.

Conclusion

Organizational culture drives safety culture and vice versa. Culture is owned by all levels of the organization. Behavior-based techniques engage and direct desired behavior or actions at each respective level. This planned, directed and managed approach can elicit the desired and planned cultural changes. The changed culture will drive improvement in safety outcomes and will also affect other business outcomes, making these techniques an effective change strategy for improving multiple business outcomes that are bound together by the working culture of the organization. ■

References

Baker, K.A. (2002). Organizational culture. Washington, DC: U.S. Department of Energy, Office of Science.

Bergersen, C.E.B. (2003). *Tool to Be Used to Survey and Improve Safety Culture in the European Railway Industry.* Unpublished master's thesis, Norwegian University of Science and Technology, Trondheim, Norway.

Callahan, D. & Nolan, T.V. (2001). Changing the corporate culture at Chevron. *Behavioral Technology Today, 1,* 1-12.

Chaudron, D. (2003). Building a framework. San Diego: Organized Change Consultancy. Retrieved July 21, 2008, from http://www.organizedchange.com/decide.htm.

Daniels, A.C. (1994). *Bringing out the best in people.* New York: McGraw-Hill.

Hashmi, K. (2008). Introduction and implementation of total quality management (TQM). Bainbridge Island, WA: iSixSigma. Retrieved July 17, 2008, from http://www.isixsigma.com/library/content/c031008a.asp.

Hopkins, A. (2006). On studying organizational cultures and their effects on safety. *Proceedings of the International Conference on Occupational Risk Prevention, Seville, Australia.*

Hudson, P. & van der Graaf, G.C. (2002, March). *Hearts and minds: The status after 15 years research (SPE 73941).* Paper presented at Society of Petroleum Engineers International Conference on HSE in Oil and Gas Exploration and Production, Kuala Lumpur, Malaysia.

Kinicki, A. & Kreitner, R. (2008). *Organizational behavior: Key concepts, skills and best practices.* New York: McGraw-Hill/Irwin.

Kotelnikov, V. Management by objectives (MBO). Retrieved July 17, 2008, from http://www.1000ventures.com/business_guide/mgmt_mbo_main.html.

Krause, T.R. & Russell, L.R. (1994, March). The behavior-based approach to proactive accident investigation. *Professional Safety, 39*(3), 22-26.

Marsh. (2004a). Case in point: Aircraft service company addresses customer satisfaction and profitability. New York: Author.

Marsh. (2004b). Case in point: Building employee-management trust with behavioral programs. New York: Author.

Marsh. (2004c). Case in point: Lowering accident rates with peer-based safety programs. New York: Author.

Marsh. (2004d). Case in point: Pilot behavioral risk improvement program puts company back in business. New York: Author.

Marsh. (2004e). Case in point: Targeting behavior improves safety, reduces workers' comp costs and lowers OSHA incidents. New York: Author.

Marsh. (2006). Case in point: Pharmaceutical company expands BRI process to reduce employee injuries. New York: Author.

McSween, T.E. (1995). *The values-based safety process.* New York: Van Nostrand Reinhold.

Pande, P. & Holpp, L. (2002). *What is six sigma?* New York: McGraw-Hill.

Schein, E.H. (1965). *Organizational psychology.* Englewood Cliffs, NJ: Prentice Hall.

Schein, E.H. (1985). *Organizational culture and leadership: A dynamic view.* San Francisco: Jossey-Bass Publishers.

Turnbeaugh, T. (2006, Sept. 21). On employee perception gap analysis. Presentation at Aviation Practice Meeting, San Diego, USA.

Westrum, R. (1993). Cultures with requisite imagination. In J.A. Wise, V.D. Hopkin & P. Stager (Eds.), *Verification and validation of complex systems: Human factors issues.* NATO ASI Series. New York: Springer.

Williams, J.C. (1991). Safety cultures: Their impact on quality, reliability, competitiveness and profitability. In R.H. Matthews (Ed.), *Reliability '91.* London: Chapman & Hall.