Safety Climate

How Can You Measure It & Why Does It Matter?

By Yueng-Hsiang (Emily) Huang, Susan Jeffries, George D. (Don) Tolbert and Marvin J. Dainoff

IN BRIEF

- **This article discusses a study designed to better understand safety climate in the lone worker environment and its potential impact on safety performance.**
- **The authors developed and tested the validity of a generic safety climate survey geared toward the lone working situation, then developed two safety climate surveys designed for trucking and utility workers.**
- **The article presents the scientific integrity of the survey development process, and discusses the concepts of survey reliability and validity evidence. It also offers practical suggestions on how to implement surveys in the field.**

Jane, a truck driver, is en route to an important customer site and road conditions change—a crash, construction, a detour—resulting in heavy traffic. Unless she speeds, the delivery will be late. The driver knows she should adhere to the speed limit, but the customer is waiting and the boss is expecting results. What does she do?

The pressure is on all utility crews to restore power for an important customer. Despite having already worked a regular shift, Joe, a lineman feels obligated to stay on duty. He knows the company's reputation is at stake and the boss is being pressured, but exhaustion has set in and he cannot think straight. What does he do?

Every day, truck drivers, utility workers and other lone workers encounter situations in which safety conflicts with job demands. Because they work remotely, these individuals must often resolve the conflicts alone, without the direct support or input of supervisors or management. Liberty Mutual Research Institute for Safety (LMRIS) found that even for lone workers a company's safety climate (employees' safety perceptions) is strongly associated with safety behaviors and injury outcomes.

Safety Climate

In recent years, risk managers and safety directors have begun exploring organizational and psychosocial factors in the workplace to complement traditional safety approaches (e.g., engineering design, protective equipment, training). One prominent area being explored is safety climate, which was first introduced by Zohar (1980). Zohar defined safety climate as workers' shared perception of an organization's policies, procedures and practices as they relate to the true/relative value and importance of safety within the organization

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(Zohar, 1980). Safety climate reflects a company's state of safety at a discrete point in time.

The number of scientific studies on the topic has rapidly increased in recent years, with emerging evidence supporting safety climate as a robust predictor of safety outcomes (Christian, Bradley, Wallace, et al., 2009). In 2009, Zohar joined author Huang of LMRIS's Center for Behavioral Sciences to launch an extensive safety climate research initiative that continues today.

Safety Climate vs. Culture

Safety climate is often confused with safety culture. In fact, these terms describe two related but somewhat different phenomena. Safety culture is described as shared norms, values and beliefs that set expectations for acceptable behavior within an organization and are taught to new employees through socialization (i.e., the way we do things around here). On the other hand, safety climate refers to employees' shared perceptions of the true/relative priority of safety (i.e., how employees perceive the company's commitment to safety as it is lived out, or not, every day). Research indicates that safety climate can be used to predict safety behavior and safety-related outcomes (e.g., incidents, injuries) in a wide variety of settings. While safety culture cannot be easily measured directly, safety climate can serve as an indicator/measure of safety culture.

Importance of Safety Climate

Safety climate can serve as a frame of reference for developing clear expectations regarding employees' safety-related actions and the expected reaction from management. Thus, in a company with a high safety climate level, employees might perceive that they are encouraged to maintain good safety practices despite increased production pressure. Consequently, they behave safely. Employees usually develop these perceptions and expectations by observing the actions of supervisors and managers. These perceptions are reinforced by social interaction with coworkers, resulting in a kind of consensus regarding the company's true/relative safety priorities (e.g., safety vs. productivity).

Perceptions at Different Management Levels

The question can then be raised: Who is the company? Is it the executives, my supervisor or my coworkers? Since organizational consistency throughout different levels of managers is a key aspect of climate, safety climate is best measured at different cascading levels. Scientific research suggests that it is important to capture the employee's perceptions of his/her immediate supervisor with regard to safety, as well as his/her perceptions of the overall company or top management with regard to the value placed on safety. Safety climate researchers refer to employees' perceptions of their immediate supervisors as group-level safety climate, while their perceptions of top management are referred to as organization-level safety climate. A comprehensive safety climate study would include questions regarding both levels.

The Safety Climate Lone Worker Study

Safety climate research has typically focused on traditional workplaces in which supervisors and employees share the same physical location. Zohar and Luria (2005) gained industry acclaim with their development of a safety climate survey containing 32 questions, which laid the groundwork for measuring safety in organizations. This survey was generic in the sense that it was intended to apply to different types of industries and work settings. The LMRIS study team sought to expand on this research to examine the safety climate of lone workers. A lone worker is an employee who works alone and who performs an activity intended to be carried out in isolation from other workers, without close or direct supervision (Hughes & Ferrett, 2009).

Given that lone working is becoming increasingly prevalent across various industries (e.g., truck drivers, utility workers, teleworkers), it is important to conceptualize the effect of this work environment on organizational climate emergence. Safety climate can be important for this unique population because it can act as a frame of reference that guides safety behavior. Employees receive cues from others within the company and formulate perceptions that may ultimately impact their own behavior. This was an opportunity to see how lone workers process these cues from afar and how they behave when no one is watching. With this goal

in mind, the LMRIS researchers developed a new safety climate survey with items applicable to all lone workers and two industry-specific surveys with additional content focused on truck drivers and electric utility workers.

Research Objectives

The LMRIS study's primary objective was to better understand safety climate in the lone worker environment and its potential impact on safety performance. To accomplish this goal, the authors first developed and tested the validity of a generic safety climate survey geared toward lone workers. As a first step, researchers adapted 12 of the 32 items from the Zohar and Luria (2005) scale that would apply to lone workers. The second step involved expanding on this knowledge to develop two valid, reliable safety climate surveys designed specifically for truck drivers and for utility workers. These surveys would be more comprehensive, considering the specific attributes of these industries. Each survey gathered information on the two levels noted: top management (organization-level) and immediate supervisors (group-level).

Scientific Integrity of the Surveys

In this case, the survey measures the construct of safety climate and assesses the quality of the measuring process itself. How can one know whether the survey is measuring what it is intended to measure? A person need not be a scientist to create a survey, hand it out to a group of people and analyze the responses. However, the responses may be difficult to interpret and may potentially be ambiguous (i.e., not reliable or valid). Therefore, when a company plans to conduct a survey, either directly or through a consultant, it is important to carefully evaluate the evidence, specifically, the reliability and validity of the scales.

Psychometric measurement is one aspect of the general field of measurement that also includes physical measurement (see "Psychometric Measures" sidebar). For example, consider a familiar physical scale. Imagine that you are standing in front of two bathroom scales. Your true weight is 150 lb. You step on the first scale three times, resulting in the readings 150, 120 and 140 lb. You step on the second scale three times, resulting in the readings 172, 172 and 171 lb. The first scale gives inconsistent readings. Clearly, something is wrong with that scale's mechanism, therefore it is not reliable. The second scale gives consistent readings that do not indicate your true weight. The scale may be incorrectly calibrated, therefore it is not valid. Simply put, a valid scale measures what it is supposed to measure. While the principles of reliability and validity apply to any measurement activity, psychometric methods are sets of scientific best practices that help to ensure that these surveys result in scales that can accurately measure psychological concepts such as safety climate.

Reliability

Reliability, in scientific terms, is usually described as the repeatability and consistency of a test. Various scientific methods assess whether a scale is reliable. For the purpose of safety climate scales, researchers examined the internal consistency reliability, which looks at the patterns of response from a single administration of a survey. This approach estimates what would happen if we split the survey response into two halves multiple times. The estimated average correlation between these halves is called the coefficient alpha, which is a measure of consistency. From a practical perspective, unless a measurement scale has a reasonable degree of reliability (coefficient alpha equal to at least 0.7) it is not useful for interpretation purposes.

Validity

Validity signifies the strength of a test and whether its results are accurate. Many different methods assess whether a scale is actually measuring what we think it should; for this study, researchers used three basic approaches.

1) Content validity indicates whether the content of items actually corresponds to the underlying concept that the survey is supposed to measure (e.g., safety climate), and whether the meaning of each item is clear and intuitive. This is typically attained by careful review of potential items by field-based subject-matter experts.

2) Criterion-related validity is assessed by correlating individual scores on the measurement scale with some corresponding outcome (criterion) measure. Outcome measures can be collected at the same time as the survey (i.e., concurrent validity) or at some time in the future (i.e., predictive validity). For example, if we include a scale of safety

Psychometric Measures

Arising with the advent of psychology as a field of experimental study in the late 19th century, psychometric methods are central to the scientific study of behavior and mental processes. Some of the methods used in this study are (Guilford, 1954; Psychometric Society, 2016):

- **Psychological scaling:** Originating in psychophysics, the measurement of subjective perceptions by examining responses to stimuli using models established empirically.
  1) Reliability: Consistent patterns in the measures obtained.
  2) Validity: Measurement of what is intended.
- **Correlation:** A statistical method to determine the relationship between two variables that results in a correlation coefficient (values ranging from -1 to +1). The further the coefficient is from zero, the stronger the relationship is between variables. A positive correlation means that as the value of one variable increases, so does the value of the second variable. A negative correlation means that as the value of one variable increases, the value of the second variable decreases.
- **Regression:** A statistical technique used to predict criterion performance on the basis of predictor scores. Regression permits the prediction of the score on one variable (the criterion) based on the score changes on another variable (the predictor). Multiple regression allows prediction on the basis of multiple predictors.
- **Factor analysis:** A statistical procedure for describing the interrelationships among a number of scale items. Factor analysis tests these relationships and determines how items cluster into different dimensions/factors.

behaviors when we measure safety climate, these behaviors can be considered outcome measures. In this case, each individual is reporting the likelihood of his/her specific safety-related actions. To the extent that a positive correlation exists between self-reports of carrying out these actions and safety climate, the safety climate scale has some degree of concurrent validity.

If we can collect actual incidents (e.g., injuries, near-hits) 6 months following the initial safety climate survey, then correlate each person's safety climate score with his/her incident score, we have a stronger argument. This is called predictive validity since we can argue that safety climate predicts lagged safety outcomes (i.e., a sustaining predictive relationship between safety climate and safety outcomes). In practice, it is more difficult to collect outcome data 6 months later, so most studies rely on concurrent validity. However, the LMRIS team could collect both participants' self-reported safety behaviors and objective incidences of accidents, injuries and near-hits, one concurrently and the other 6 months after survey implementation (Figure 1).

3) Factorial validity assesses how well the items cluster together into factors, which can relate to the underlying construct we are trying to measure. An advanced statistical procedure called *factor analysis* is used for this purpose. Survey designers generate more items than will appear on the final survey. Factor analysis is an effective method through which good items can be selected and bad items can be excluded, based on factor loadings.

These statistical methods may not be practical or feasible for everyone, but they are excellent tools to help researchers develop a scientific survey. In this case, it helped to ensure that the surveys being developed would result in a trustworthy scale for practitioners. It would benefit anyone considering implementation to inquire about the scientific reliability and validity of a survey being considered.

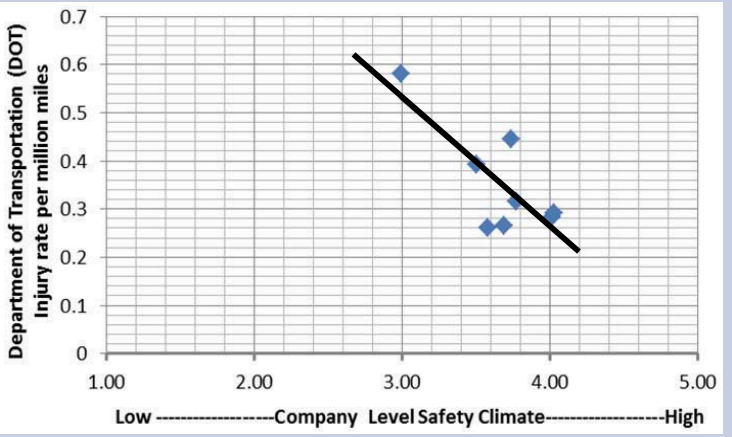
Survey Process

For the lone worker safety climate study, researchers utilized scientific best practices to develop a procedure that was systematic and exhaustive. They wanted to ensure that the content of the surveys would reflect an organization's state of safety, and be relevant to the participants in their respective jobs. The process entailed several steps.

Information Gathering

First, the project team conducted an extensive literature search and review on trucking, utility and lone work for contextual background information. Team members talked with subject-matter experts in each industry to build on this knowledge. The team conducted in-depth interviews with 53 truck drivers and supervisors, and 38 utility workers to learn from lone workers about their jobs and what safety issues are important to them. Team members also spent several days in the field shadowing workers on the job and observing these safety issues in practice.

FIGURE 1
Correlation Table of Safety Climate Scores & DOT Records



Question Development/Item Generation

Raw items were generated to formulate potential survey questions. Items were based on the information gathered from both the available literature and directly from workers and industry experts. Given the large number of participants and various issues that surfaced, a large number of initial items were generated. For example, for the trucking survey, more than 100 initial items were developed; many overlapped in basic content, but it was important to capture everything.

Cognitive Testing & Pilot Testing

Once questions were developed, they had to be tested. Researchers needed to make sure they addressed issues that were meaningful to the workers as related to safety in their jobs. The researchers also wanted to ensure that the wording was clearly understood by respondents, and that the terms and phrasing were applicable to their industry. To accomplish this objective, the team conducted think-aloud cognitive interviews with 38 truck drivers and 45 utility workers. These interviews allowed researchers to examine the meaning of the survey responses (for clarification) and to observe respondents for potential issues (e.g., events such as long pauses, answers that are changed, indications of confusion).

Based on this feedback, researchers revised or deleted some items, resulting in smaller, more refined sets of questions. Researchers pilot-tested the revised surveys with 64 truck drivers for one survey and 139 utility workers for the other to ensure that the instructions and questions were clear and the overall survey administration was practical. The researchers refined the surveys again based on this feedback.

Implementation to Subsample

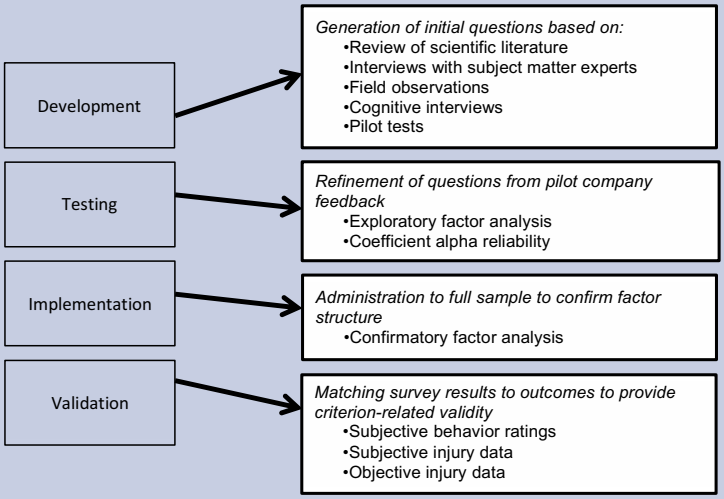
The two revised surveys were then implemented at the pilot companies in both industries, with 1,891 truck driver respondents and 1,560 utility workers. The researchers conducted exploratory factor analysis and coefficient alpha reliability to learn what the responses were, how the items may have grouped into themes, and whether these items made sense within the context of the organization.

The final surveys included 12 items adapted from the original generic safety climate survey appropriate for lone workers, and additional items tailored to jobs in each of the two lone worker industries (28 items for trucking, 36 for utility). Incorporating industry-specific factors provides a stronger value, which makes these surveys a useful tool for the appropriate participants.

Implementation to Full Sample

The final industry-specific safety climate surveys were then implemented at seven additional trucking companies with 6,556 respondents and one additional utility company with 869 respondents. At this point, researchers ran confirmatory factor analysis on each to measure the validity of what was found with the two pilot companies, reinforcing the grouping of potential themes for future analysis. This provided an excellent basis on which to offer these surveys to LMRIS risk control consultants to share with safety professionals and to the public at large for use in the field (Figure 2).

FIGURE 2
Survey Process



Results

Study results showed that safety climate affects safety behavior, even in the context of the lone work environment. It found that safety climate is a predictor of future injuries among these workers, substantiated by objective outcome measures. Researchers validated that the generic safety climate scale/survey was applicable to lone workers. They also found that the industry-specific surveys were even more predictive of future injuries than their generic counterparts (Huang, Zohar, Robertson, et al., 2013a, b).

Table 1 shows items contained in the lone worker survey, and Figure 3 shows mean ratings from workers sampled in the studies by Huang, et al. (2013a, b). The circled items in Figure 3 represent the highest and lowest scoring elements according to the mean score statistic. Users of safety climate survey findings value the insights provided by identifying high and low scoring items. This enables building on strengths to engage opportunities. The highest and lowest mean scores in Figure 3 indicate that participating companies tend to do well, according to workers' perceptions, in the area of safety training (organization-level item 4), but that management may not listen carefully enough to their ideas about safety (organization-level item 5). Regarding supervisors, results showed that in general workers felt that their supervisors do fairly well discussing with them how to improve safety (group-level item 1), but that they may sometimes ignore safety rules when work falls behind schedule (group-level item 5).

TABLE 1
Lone Worker Survey Items

Level	Survey item
My company . . . (organization-level)	1) reacts quickly to solve the problem when told about safety concerns.
	2) is strict about working safely when work falls behind schedule.
	3) uses any available information to improve existing safety rules.
	4) invests a lot in safety training for workers.
	5) listens carefully to our ideas about improving safety.
	6) tries to continually improve safety levels in each department.
My supervisor . . . (group-level)	1) discusses with us how to improve safety.
	2) compliments employees who pay special attention to safety.
	3) is strict about working safely even when we are tired or stressed.
	4) frequently talks about safety issues throughout the work week.
	5) refuses to ignore safety rules when work falls behind schedule.
	6) uses explanations (not just compliance) to get us to act safely.

Note. *From "Development and Validation of Safety Climate Scales for Lone Workers Using Truck Drivers as Exemplar," by Y.H. Huang, D. Zohar, M.M. Robertson, et al., 2013,* Transportation Research Part F: Traffic Psychology and Behavior, 17, *pp. 5-19; and "Development and Validation of Safety Climate Scales for Remote Workers Using Utility/Electric Workers as Exemplar," by Y.H. Huang, D. Zohar, M.M. Robertson, et al., 2013,* Accident Analysis and Prevention, 59, *pp. 76-86.*

Survey Use in the Field

More than ever, stakeholders in safety are interested in sustainable and affordable risk-reduction strategies. In essence, an increased demand exists for safety process initiatives that are smarter, more lasting and produce higher returns. Surveys that combine science with efficient technology can diagnose the current state of an organization's safety climate and identify opportunities for real improvements.

It would be counterproductive for all concerned if a survey designed to measure safety climate were administered and interpreted in such a way that reliability and/or validity were compromised. Certain measures can help to

maintain a survey's scientific integrity when used in the field and strengthen employees' engagement in the process.

- Invite all company employees for equal opportunity to participate.
- Emphasize that participation is voluntary and confidential.
- If possible, utilize a third-party administrator to collect, store and process data.
- Analyze responses in a systematic and objective process.
- Present results to all company representatives.
- Engage all employees in follow-up action steps.

There may be pressure to drop certain items or add others, perhaps for fear of exposing weaknesses. This is not an option; the integrity of the scales is based on keeping them intact.

Adequate Participation

The first requirement for successful application of the safety climate survey is sufficient time and resources to engage in the process. For results to be meaningful, it is important that all employees have an opportunity to take the survey and that the response rate is adequate. For a sample to be representative, more data are ideal. Fewer responses from a group offer less representation and could also lead to a breach of anonymity. Random selection means that each employee has an equal chance of being selected. The more data obtained from a random sample, the more representative it will be of the entire organization.

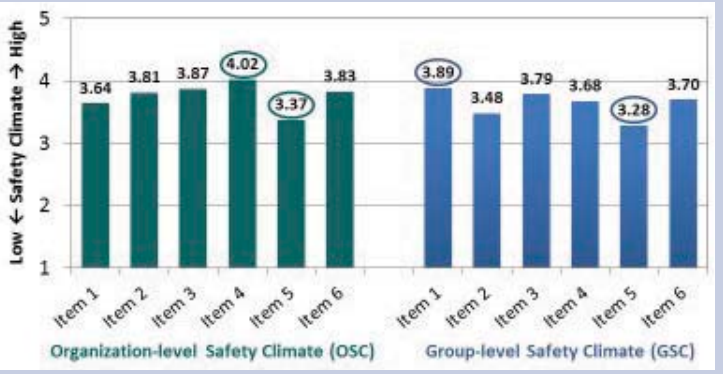
The company should inform employees of the opportunity to participate, explain the confidentiality of individual information and the purpose of the survey, and convey management's commitment to improving safety. A fine line exists between encouraging employees to participate in the survey and pressuring them to do so. Coercion may result in response bias (i.e., respondents giving answers that differ from their true feelings). Response bias can make it difficult, if not impossible, to interpret survey results. It is critical to emphasize that, although encouraged by the company, participation is strictly voluntary and confidential.

Management Commitment & Support

The second and likely most important requirement is management's commitment to act on the results. By definition, safety climate surveys focus on discrepancies between management statements and actions regarding true priorities toward safety. Management must commit to recognize, share and act positively on results.

The behavioral safety community warns against soliciting input from the employee population, then failing to act or change accordingly. In addition to acting on the results, the response must be viewed as timely by the employee base. Management acting too late may be just as problematic as not responding at all. If the organization is not prepared to address possible gaps identified by the evaluation, it may not be ready to participate in a safety climate survey.

FIGURE 3
Mean Scores of Lone Worker Survey Items



Note. n = *9,895 from 10 participating companies. From "Development and Validation of Safety Climate Scales for Lone Workers Using Truck Drivers as Exemplar," by Y.H. Huang, D. Zohar, M.M. Robertson, et al., 2013,* Transportation Research Part F: Traffic Psychology and Behavior, 17, *pp. 5-19; and "Development and Validation of Safety Climate Scales for Remote Workers Using Utility/Electric Workers as Exemplar," by Y.H. Huang, D. Zohar, M.M. Robertson, 2013,* Accident Analysis and Prevention, 59, *pp. 76-86.*

Survey Format

Web-based survey technology makes it easy to collect responses anonymously and to archive them confidentially. While computer access is not universal, access to web-enabled devices has grown. Popular electronic survey platforms provide ease of use on many devices. Paper should be considered a last-resort means for safety climate surveys. In such cases, OSH professionals should develop contingencies to demonstrate that respondent anonymity and response confidentiality are preserved. An example would be to have a transcriptionist input sealed paper responses into a web-based platform, then destroy the paper version after input. Accessibility by illiterate respondents should also be addressed. This can involve recruiting a trusted coworker (not a supervisor) to assist in completing the survey.

Results Analysis & Interpretation

OSH professionals must recognize that measuring safety climate is not an end in itself but a point of departure for discussion. The act of surveying is a diagnostic process, not an intervention. The fact that strong evidence shows that safety climate is a leading indicator of safety outcomes does not mean that measuring it leads to a quick fix or automatic result. Rather, measuring safety climate is a useful tool for focusing examination of safety management systems to reveal actionable insights on how to improve those systems. Organizations should view safety climate findings as opportunities to engage the entire organization in elevating safety as a daily priority, not as performance measures for individuals.

The scientific rigor used to develop valid and reliable survey instruments draws on complex statistical methods, as shown in Figure 2. Companies using these instruments will find value in much simpler analytics and findings. Mean scores derived from aggregated safety climate survey responses have significant value as comparative statistics. As noted, they are used in research to assess and verify reliability and validity. The proliferation of safety climate studies has made possible catego-

Management that demonstrates unflagging commitment to people's well-being can tap into the limitless potential for transformation that resides in the company.

rization of safety climate mean scores. Considering measurement error, a small variance in scores may not represent a significant difference.

Additional statistical analysis is needed to test the difference. When interpreting response data, companies should assess consistency between groups as indicative that shared perception was indeed gauged. It will be valuable to explain during stakeholder discussion of survey findings that what may seem to be higher or lower mean scores between groups (e.g., 4.1 vs. 3.9) are actually not significantly different. Conversely, when statistically significant differences exist between groups, discussion that explores contributing factors can be an excellent source for improvement.

An effective principle of facilitation by safety professionals is to focus on a few critical findings (e.g., significant risks to be reduced, safety management systems to be improved). Safety climate survey results can be informative, particularly through examination of the "% agree" statistic at the survey item level. As the term implies, this statistic reflects the percentage of respondents that indicate they agree or strongly agree with an item statement. Analysts or safety practitioners can readily identify the two or three items that receive the highest and lowest percentage of agreement, and highlight them in findings reports for stakeholder discussion.

As illustrated by an example from one participating company (Table 2), insight on the current state of safety as a daily priority begins to emerge. In this example, at the organization level, survey participants perceive the company's attention to safety improvement and problem solving as strengths, but rate the company slightly lower when faced with pressures for on-time production. Results also indicate an opportunity for the company to listen more to employee ideas about safety. On the group level, supervisors are perceived to be strict about safety as a practice, but less so when work falls behind schedule.

Sharing & Acting on Findings

As noted, leadership must be as committed to following up with employees as it was to engaging them to participate in the survey process. Communicating results and proposing how they might be acted on is critical. This can be viewed as a springboard for fresh ideas to produce impactful, lasting improvement and should incorporate:

- sincere thanks to respondents;
- reiteration of the survey purpose;
- summary of findings, including both strengths and opportunities;
- outline of what will be done to act on the opportunities;
- encouragement for everyone to contribute to the plan;
- commitment to continuous improvement.

Companies that use group-process problem solving will recognize the value and utility of a team approach to sustainable safety climate improvement. OSH professionals have a pivotal role as facilitators of the group process, resources for technical guidance and overseers of adjustments made to safety management systems. Everyone in the organization has a stake in the output of cross-functional teams, but, practically speaking, not all can participate in them. Operational leadership is the investing sponsor of the team's efforts. These individuals should be highly visible through presence in key discussions and responsive to recommendations by the teams, providing periodic progress updates for all.

Reviews of survey findings summaries, such as those illustrated in Table 2, have been put to good use by companies to initiate team discussions. Meeting facilitators find value in establishing that the team's focus is understanding contributing factors to items with both the highest and lowest percentage of agreement, leveraging perceived strengths to act on potential opportunities. Companies using safety climate surveys typically find that this approach produces a flow of ideas from which adjustments can be made. A best practice in one group often can be adopted by another (see "Listening Carefully" sidebar).

Survey Frequency

Safety climate has been widely and consistently shown to be a robust indicator of occupational safety, but the practical question of how frequently these surveys should be conducted must be considered. While no firm evidence exists on this question, most scientific research on the relationship between safety climate and incidents examines events over an extended period, often 6 to 12 months (Neal & Griffin, 2006; Zohar & Luria, 2004). Best practice suggests that once per year may be appropriate.

Bergman, Payne, Taylor, et al. (2014), suggest that surveys should be collected more frequently to effectively predict serious injuries and propose conducting surveys as often as quarterly or monthly. The

TABLE 2
Example Survey Results

Level	Survey item	Mean	% Agree
My company . . . (organization-level)	1) reacts quickly to solve the problem when told about safety concerns.	4.1	81.5
	2) is strict about working safely when work falls behind schedule.	3.8	69.9
	3) uses any available information to improve existing safety rules.	4.0	74.5
	4) invests a lot in safety training for workers.	4.1	79.4
	5) listens carefully to our ideas about improving safety.	3.8	68.6
	6) tries to continually improve safety levels in each department.	4.1	81.5
My supervisor . . . (group-level)	1) discusses with us how to improve safety.	4.1	79.5
	2) compliments employees who pay special attention to safety.	3.8	68.7
	3) is strict about working safely even when we are tired or stressed.	4.2	83.5
	4) frequently talks about safety issues throughout the work week.	4.1	82.6
	5) refuses to ignore safety rules when work falls behind schedule.	3.9	70.7
	6) uses explanations (not just compliance) to get us to act safely.	3.8	68.3

present authors, who are both researchers and consultants, disagree with this recommendation. The Bergman, et al. (2014), study is based on a single company in a specialized industry and uses a unique method of data analysis that has yet to be validated. In addition, giving the same people the same survey too frequently creates some methodological concerns.

In summary, regarding the question of how frequently an organization should conduct safety climate surveys, based on the existing body of literature, the present authors recommend an extended period, 6 to 12 months. Frequency should be determined based on the context, situation and need.

Conclusion

When speaking on education, Robinson (2013) said, "The real role of leadership is climate control: Creating a climate of possibility. And if you do that people will rise to it and achieve things you did not anticipate and couldn't have expected."

This provocative quote is as pertinent to leadership in safety as it is to that in education. In referring to Death Valley, Robinson describes the result of a rare 7-in. rainfall there in late 2004. The following spring, Death Valley was carpeted with wildflowers that germinated from seeds lying just beneath the surface of the desert floor. "Death Valley isn't dead," he said. "It's dormant" (Robinson, 2013).

True commitment from the top is needed for the seeds of a strong safety climate to germinate and flourish. Management that demonstrates unflagging commitment to people's well-being can tap into the limitless potential for transformation that resides in the company. Establishing safety, the continuous examination and reduction of risk, as a daily priority is a perennial challenge for organizations and the individuals who comprise them. As work systems evolve toward higher complexity, the challenge is compounded. Competing urgencies requiring attention are increasingly diverse, as are the issues contributing to them.

Understanding these issues within an organization as predictors of incidents and injuries can open the door to implementing practical solutions. Ability to highlight these issues with scientific backing increases credibility for OSH professionals and can help address concerns that might otherwise be neglected. Safety climate surveys provide this opportunity. Intervention strategy development, including evaluation of administrative programming, implementation of procedures and restructuring of communication channels, can serve as a launching pad for lasting safety improvements. **PS**

Listening Carefully to Our Ideas About Improving Safety

During a team discussion of safety climate survey findings with a cross-functional team, the facilitator was addressing organization-level item 5 ("My company listens carefully to our ideas about improving safety"). This item had one of the lowest percentage of agreement company-wide, with the exception of one remote business unit in which the element had a substantially higher mean score and one of the highest percentage of agreement recorded overall.

The team member from that operation was asked, "What is being done in your area that might be contributing to such strong agreement with that statement?"

The team member responded, "I'm betting that our monthly safety lunches have something to do with that. We come in to the shop/office and discuss incidents, near-hits and ideas on what can be done about them," the team member said. "Managers and supervisors listen and do what they can to implement them. Most times, things are easy to adjust and can be done immediately, but others take a little longer. We started doing this on a quarterly basis, but it seemed to work so well we now do it once per month on a day when the most technicians can make it in. It's very well attended. Everyone gets a lot out of it and it's a great way for us all to stay connected."

The facilitator then said, "So, for the price of a few sandwiches or pizzas, you have this kind of discussion that undoubtedly improves how things are done and reminds people that they are part of the process.

The team member replied, "Oh, the lunch itself is a covered dish, pot luck kind of thing. Everyone brings something like it was a family get-together. It even gets a little competitive sometimes, but folks get a kick out of that, too."

Members of company leadership who were present to listen and support the team took copious notes during this exchange.

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