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## Leadership Skills for Strengthening Jobsite Safety Climate

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### Abstract

**Introduction** —Construction foremen may lack the leadership skills needed to create a strong jobsite safety climate. Many construction companies address this by sending their lead workers to the OSHA 30-hour course; however the course does not include a leadership training module. This paper describes the development and pilot testing of such a module and evaluation surveys designed to address this training gap.

**Methods** —A 17-member Curriculum Development Team, numerous subject matter experts, and an instructional design company helped us develop a comprehensive set of teaching resources and a set of survey instruments for evaluating the materials' effectiveness on improving safety leadership and safety climate. All materials and surveys were pilot tested with representative members of the target population.

**Results** —Pilot surveys showed high reliability and data collected on the resulting Foundations for Safety Leadership (FSL) module indicated that the majority of foremen thought the training was helpful or valuable, particularly the discussion questions. The majority said they intended to use the skills on the jobsite. With the exception of the role-play activities, the trainers rated highly all other components, especially the videos and discussion questions. Modifications were made to the training materials and surveys based on pilot test findings. The most important result of the development and pilot testing efforts is that the OSHA Training Institute (OTI) included the FSL as an elective in the OSHA 30-hour course.

**Conclusions** —The FSL module fills a needed skills gap by providing safety leadership training to all foremen who might otherwise not have access to it through their company or union. The continued success of the FSL training will be ensured by dissemination via the OSHA 30-hour course, an established nationwide safety training program.

## Keywords

Construction; Foremen; Leadership; Safety Climate; OSHA 30-hour course

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## Introduction

Construction company owners and managers create their organization's overarching safety culture (i.e., deeply held attitudes, values, priorities, and behaviors of management regarding safety) (Guldenmund, 2000; Hale, 2000; D Zohar, 1980). However, it is the manner in which the foremen and lead workers interact with their crew that creates the jobsite safety climate (i.e., a snapshot of the safety culture and the perceptions shared by workers about how safety policies, safety procedures, and safety practices are implemented on the jobsite) (Flin, Mearns, Connor, & Bryden, 2000; Schneider, 1975; Schwatka, Hecker, & Goldenhar, 2016; D Zohar, 1980; D Zohar & Luria, 2005). Having a strong safety climate on a construction jobsite is critical because of its' known association with improved safety performance and safety outcomes (Clarke, 2006; Johnson, 2007; Nahrgang, Morgeson, & Hofmann, 2011; D Zohar, 2010). Unfortunately, as in other industry sectors, workers are typically promoted to positions such as foremen or front-line supervisor based on their technical skills, their ability to get the job done, or seniority rather than their leadership abilities. As such, there is concern that many may lack the leadership skills needed to create a strong jobsite safety climate (Gillen, Kools, McCall, Sum, & Moulden, 2004). In fact, construction supervisors themselves acknowledge lacking the skills needed to be effective safety leaders (Conchie, Moon, & Duncan, 2013; Rogers).

In an effort to address this identified need, construction contractors from companies of all sizes report sending their foremen to take OSHA's 30-hour training course ostensibly to learn the requisite leadership skills (Dodge Data & Analytics, 2016; McGraw Hill Construction, 2013). Indeed, each year over a hundred thousand union and non-union workers, many of them newly promoted foremen or lead workers, take the course (OSHA, 2016). However, the OSHA 30-hour is designed and advertised as a safety awareness course, focusing almost exclusively on safety hazard identification, avoidance, control and prevention, and does not cover safety leadership skills. Therefore, it provides necessary but insufficient training for new (or even established) leaders to ensure a safe construction jobsite and a strong jobsite safety climate. While some large construction companies, building trades unions, and insurance companies are addressing this need by supplementing the OSHA 30-hour with their own or an outside agency's leadership training, the reach of these programs is limited because approximately 80% of construction companies have fewer than 10 employees and 85% of construction workers are non-union (CPWR: The Center for Construction Research and Training, 2018).

Training interventions designed to increase leadership skills in general, and transformational leadership behaviors in particular, have been shown to provide leaders with the skills they need to create a positive safety climate on the jobsite and improve safety related outcomes by teaching them to convey, through their words and actions, a genuine interest in and concern for their crews' safety and health (Barling, Loughlin, & Kelloway, 2002; Barling,

Weber, & Kelloway, 1996; Clarke & Taylor, 2018; Lee, Huang, Cheung, Chen, & Shaw, 2018; Mullen & Kelloway, 2009; von Thiele Schwarz, Hasson, & Tafvelin, 2016). Leaders who have and use safety-specific transformational leadership skills such as role modeling and motivational support, help crew members' internalize the mission of the group (Bass, 1985). This in turn can empower their crew to engage in their own and other's safety for reasons that go far beyond compliance (Barling et al., 2002; Barling et al., 1996; Clarke & Taylor, 2018; Lee et al., 2018; Mullen & Kelloway, 2009; Richter et al., 2016; von Thiele Schwarz et al., 2016).

For example, Clark and Taylor (2018) designed and implemented transformational leadership training for a UK based chemical company and found that the training improved follower safety climate over an eight-week period. To begin filling the critical skills gap described above and to help improve safety leadership and safety climate on construction jobsites, we developed and will be evaluating a safety-specific transformational leadership training module designed to be incorporated into the OSHA 30-hour course as an elective. This paper describes the development and pilot testing of the module and evaluation surveys, as well as the next steps of this research and research-to-practice endeavor.

## Materials and Methods

### Developing the safety leadership training module

First, we reviewed the relevant leadership and safety leadership literatures, examined non-proprietary leadership training programs, and became familiar with OSHA 30-hour training and trainer guidelines. Next, we recruited seventeen subject matter experts (SMEs), including OSHA 30-hour trainers, safety and health directors from small and large construction companies, construction workers, and representatives from OSHA Directorate of Construction and the OSHA Training Institute (OTI), to participate on a Curriculum Development Team (CDT). During multiple face-to-face and virtual meetings, we worked with the CDT members to examine and discuss our review findings and ultimately agree on the overarching structure and content of the module and the best teaching approaches to use. Finally, we worked closely with an instructional design firm that used well-established instructional design principles to develop the training module's media assets and ensure that the content aligned with and tied back to the CDT's agreed upon pedagogical approaches and learning objectives (Clark, 2015). At the end of one year of working with these partners as well as other SMEs, we had a final draft module ready for pilot testing. The module and pilot testing process is described in the results section.

### Developing surveys to evaluate training effectiveness

To evaluate the training module's effectiveness at improving safety leadership skills, jobsite safety climate, and a number of other outcome variables, we created survey instruments to administer to the trained foremen/lead workers (called foremen going forward) and their crew prior to (1-week) and after (immediate post-training, 2 and 4 weeks) the training was conducted. For the most part, the instruments were comprised of validated scales. Table 1 presents the names, target respondent, and source of the survey items. In addition to measuring the main outcome variables of interest, we assessed three moderator variables

including learning goal orientation, leader member exchange and prototypical leadership, as research has shown they may influence the degree of training success (Graen & Uhl-Bien, 1995; Hains, Hogg, & Duck, 1997).

Wording in some of the scales had to be adapted slightly to meet the needs of our target populations (e.g., reading level) and study goals. Additional scales were created to measure specific features of the leadership training. In a separate survey, trainers were asked for their perceptions about the module's content, pedagogy, and potential effectiveness for improving leadership skills of the target population.

### **Pilot testing draft materials**

All draft training materials, the training process, the surveys and planned survey administration methods were pilot tested with two types of construction firms located in different geographic locales; a union specialty sub-contractor in Denver and a non-union general contractor in Atlanta. CDT members helped recruit the pilot companies and the trainers. At least one member of the research team was present at each session to observe and collect data on how the training materials and evaluation methods could be improved.

Foremen in Denver and Atlanta were asked to complete an immediate pre- and post-training survey. Due to logistical issues, crew baseline surveys (1 week before training) and foreman plus crew follow-up surveys (2- and 4-weeks after training) were administered only in Denver. The goal of the pilot test was not to assess the effectiveness of the training module but rather to improve its' quality, the results reported below include only scale reliability findings, participant and trainer reaction to the training, and changes made based on pilot test findings.

## **Results**

### **Safety Leadership Training Module - The Foundations for Safety Leadership (FSL)**

Using the OSHA Training Institute's (OTI) elective requirements and the CDT's recommendations as guides, the final draft training module had clear learning objectives, could be conducted in 2.5 to 3 hours, with the first one-third covering foundational material and the remaining two-thirds providing opportunities for students to apply the information (see Figure 1). The first section introduces students to safety leadership topics and engages them in discussions about who the safety leaders are on a jobsite, the actions of ineffective/effective leaders, the costs of poor safety leadership and the benefits of good safety leadership, and the definition of safety leadership used in the FSL. At the end of Section 1 participants are introduced to the five critical leadership skills covered in the module. The title, 'Foundations for Safety Leadership (FSL)', was purposefully chosen because like other OSHA 30-hour course topics, the module is intended to provide students with foundational material and some safety leadership skills, but they won't become expert leaders unless they practice them on the jobsite.

Table 2 presents more detail on the five FSL safety leadership skills. These five were selected in large part because the CDT deemed them to be critical for improving construction jobsite safety climate and because they relate closely to transformational

leadership skills that have been linked to safety behaviors (Barling et al., 2002; Barling et al., 1996; Clarke & Taylor, 2018; Mullen & Kelloway, 2009; Richter et al., 2016; von Thiele Schwarz et al., 2016). Specifically, ‘Lead by Example’ is similar to idealized influence. ‘Engage and Empower Team Members’ is similar to inspirational motivation. ‘DEvelop Team Members Through Teaching, Coaching, and Feedback’ is similar to intellectual stimulation. ‘Recognize Team Members’ for a job well done is related to individualized consideration. The two communication skills, ‘Actively Listen and Practice 3-way Communication’, were identified by the CDT members as critical leadership skills that all construction foremen need to learn, understand, and practice on the jobsite.

In section 2, students have the opportunity to apply and practice the foundational material covered in section 1 by working through 7 real-world construction jobsite scenarios in which foremen, superintendents, workers, and company owners are shown using, or not using the five leadership skills within the context of a specific safety and health situation. All take place on the same jobsite in North Carolina over approximately a 6 month period. The CDT and additional subject matter experts provided guidance for creating scenarios so they would include multiple trades and be realistic and generalizable across jobsites.

Each scenario is divided into three parts: 1. Situation; 2. Outcome A; and Outcome B. The trainer selects one of three teaching formats – watch (video) read (script), or role-play - and uses questions and classroom activities provided in an instructor guide to engage the students in discussions based on their own jobsite experiences. Figure 2 shows the first slide of ‘It’s too hot, too hot, too hot...’ and exemplifies the structure of the introductory slide for all seven scenarios. Briefly, the safety and health situation in this scenario is that it’s extremely hot outside and Franco, the general contractor’s carpentry foreman sees Emilio, an experienced worker, pouring water over his head. Franco suspects heat exhaustion. In Outcome A, Franco doesn’t lead by example or practice 3-way communication which leads to adverse outcomes for Emilio. In Outcome B, Franco is shown using these two leadership skills which results in a much more effective interaction between the two characters and positive health outcome for Emilio.

To increase the likelihood that construction stakeholders such as company owners and safety and health professionals will chose to include the FSL in their on-going training and that OTI will incorporate it into the OSHA 30-hour, we created a comprehensive set of training materials including: 1) a power point slide set with embedded videos, discussion questions, and classroom activities, 2) an instructor guide that mirrors the power point and includes tips for conducting the training including suggestions for time management, 3) a student handout, 4) a short five-question knowledge assessment, 5) hard hat stickers, and 6) a wallet card containing the 5 FSL safety leadership skills. All draft FSL materials were assessed in the pilot study.

### **Pilot test study results**

**Participants**—The pilot study participants were representative of the population that will be recruited for the effectiveness evaluation study (see Table 3). The majority were male, Caucasian, and had a reasonably long tenure working in construction. Group level analysis

indicated that the demographics and response variation in the two locations were similar enough that the data could be combined.

**Survey Reliability and Final Questions**—The pilot survey data indicated that the scales were, for the most part, reliable and could be used in the FSL evaluation study (see Table 4). One exception was Crew Reporting of Safety-Related Conditions. This scale includes the following items: How often do you (crew) or do your crew members (foreman): 1. Solve safety issues that arise? 2. Report near misses when they occur? 3. Report injuries when they occur? The results led us to conclude that in the evaluation study, these should probably be used as individual outcome measures rather than as three dimensions of one crew reporting of safety-related conditions scale. The Learning Goal Orientation alpha was .75 which is on the low end but is above the acceptable level of .70. Survey research experts suggest that most validated psychometric tests fall within the range of .75 to .83 (Nunnally, 1978). The pilot test data led us to make some minor changes to the survey items to increase respondent's understanding of a few of the question (See Figures 3 and 4 for final items).

**Trainer reaction to FSL:** The feedback from the Atlanta and Denver trainers was overall quite positive as reflected by this comment: *“This is an excellent course and a much needed aspect of training that hasn't been met before.”* With the exception of the role-play activity, they rated highly all other components, especially the videos and discussion questions. One trainer provided the following suggestion about the role-plays: *“Would suggest re-working the role-plays to not include dialogue so that it's not as contrived. Suggested examples could be used in instructor notes, but don't actually provide dialogue.”* Their ratings and comments indicated that they thought the words and language should be revised to improve student understanding of the material, as illustrated by this comment: *“Slides could be better. Some had too much information.”* Their feedback on the timing was also helpful for improving the module. One trainer suggested *“the introduction slides be allocated more time - 45 minutes is not enough time to adequately discuss and brainstorm and allow for class dialogue. Both groups seemed like they could have used more time. I would suggest that you don't need to actually do all 7 scenarios.”*

**Foreman reaction to FSL:** The findings presented in Table 5 indicate that the majority of foremen thought that the various components of the FSL training were helpful or valuable, particularly the discussion questions. Similar to the trainer data, foremen rated the role-plays and introductory information lower - although the scores were still above 4.0. Most did not think that too much information was provided or that it felt rushed, although there was a wider range of responses on this compared to most other questions. An important finding was that over 90% of trainees agreed or strongly agreed with the statement about planning to use the leadership skills on their jobsite.

## Conclusion

Frontline leaders play a critical role in creating and maintaining safety on construction sites. However, many, if not most, do not receive the requisite leadership training needed to create the safety norms and expectations that lead to a strong safety climate and reduced adverse



safety outcomes (Barling et al., 2002; Barling et al., 1996; D Zohar, 2011; Dov Zohar & Tenne-Gazit, 2008). The current paper describes the development and pilot testing of a new training course called the Foundations for Safety Leadership (FSL), which was designed to address this training and knowledge gap.

The content of the FSL is grounded in the safety climate and leadership literatures as well as the experiences of construction stakeholders. While many leadership theories have been developed and studied (Day, Fleenor, Atwater, Sturm, & McKee, 2014), we used the transformational leadership model because of the research showing its' relationship to improved safety behaviors, reduced occupational injuries, and stronger safety climate (Barling et al., 2002; Barling et al., 1996; Clarke, 2013; Mullen & Kelloway, 2009). The training process and pedagogical approaches used in the FSL are guided by well-established instructional design principles (Clark, 2015) and theories of adult learning (Knowles, Holton, & Swanson, 2011). The Curriculum Development Team (CDT) and other subject matter experts were critical for helping the research team translate the transformational leadership model into training content relevant to the safety leadership needs of the industry and for providing on-going feedback on all written and visual media assets including helping to create realistic scenarios to which foremen/lead workers could relate and from which they could learn.

Research has shown that pilot testing materials is vital for helping to ensure that a training course meets the needs of the target audience, survey questions are understandable, and both the training and surveys address research goals (Visscher-Voerman & Gustafson, 2004). The FSL pilot test data lead us to make several important changes. With respect to the training, the content covered in the introductory material was reduced and streamlined, although the key learning objectives were still addressed. We simplified the role-play activities and their related slides and provided more recommendations to the instructor on how best to conduct them. We also updated the instructor guide with more detailed guidance on time management.

In terms of the surveys, although the reliability tests (Cronbach, 1951) showed that the scales performed well, the pilot data also indicated that a number of questions needed to be revised and that a few more should be added to ensure that evaluation data collected would be useable. Given these revisions, we chose to not present results from collected pilot survey data in this paper. However, we can report that leaders' understanding of safety leadership skills improved from immediately before to immediately after the training. Leaders also reported greater intentions to use the safety leadership skills on their jobsites immediately after the training. In Denver, this finding was confirmed 2- and 4-weeks after training. Additionally, Denver leaders reported better safety practices and crew reporting of safety-related conditions 2- and 4-weeks after training. The Denver crew members reported a better leader member exchange and prototypical leadership 2- and 4-weeks after training.

Because an additional aim of the research project was to evaluate the final FSL module for the degree to which it improves foremen leadership skills as well as safety climate and safety outcomes on construction jobsites, in summer 2016, we began recruiting 20 large, medium, and small construction sub-contracting companies in diverse geographic locations across the

United States to partner with us on the evaluation activities. Detail on the evaluation study is provided in the partner paper in this journal edition titled *A training intervention to improve frontline construction leaders' safety leadership practices and overall jobsite safety climate*.

In summary, the collaborative effort used to create the FSL resulted in both a useable and useful training module that filled a needed skills gap by providing access to safety leadership training to all construction frontline leaders who might otherwise not have access to it through their company or union. This is evidenced by the fact that since becoming available in mid-2016, we have received hundreds of requests from construction companies across the U.S., Canada, Mexico, and other countries to use the FSL materials and 10,000 power point files and instructor guides have been downloaded from the CPWR website (<https://www.cpwr.com/foundations-safety-leadership-fsl>). On January 1, 2017 the OSHA Training Institute (OTI) announced that the FSL was an official 2.5 hour elective in the OSHA 30-hour course. Since then, thousands of OSHA Authorized outreach trainers have been introduced to the FSL, which means that the FSL has reached tens of thousands of construction workers per year (OSHA, 2016).

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## References

- Barling J, Loughlin C, & Kelloway EK (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology*, 87, 488–496.
- Barling J, Weber T, & Kelloway E (1996). Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment. *Journal of Applied Psychology*, 81(6), 827–832. doi:10.1037/0021-9010.81.6.827
- Bass B (1985). *Leadership and performance beyond expectations*. New York: Free Press.
- Clark D (2015). *Instructional system design: The ADDIE model*. Retrieved from <http://www.nwlink.com/~donclark/hrd/sat.html>
- Clarke S (2006). The relationship between safety climate and safety performance: A meta-analytic review. *Journal of Occupational Health Psychology*, 11, 315–327. [PubMed: 17059296]
- Clarke S (2013). Safety leadership: A meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. *Journal of Occupational and Organizational Psychology*, 86(1), 22–49. doi:10.1111/j.2044-8325.2012.02064.x
- Clarke S, & Taylor I (2018). Reducing workplace accidents through the use of leadership interventions: A quasi-experimental field study. *Accident Analysis & Prevention*, 121, 314–320. [PubMed: 29776583]



- Conchie SM, Moon S, & Duncan M (2013). Supervisors engagement in safety leadership: Factors that help and hinder. *Safety Science*, 51(1), 109–117. doi:10.1016/j.ssci.2012.05.020
- CPWR: The Center for Construction Research and Training. (2018). *The Construction Chart Book: The U.S. construction industry and its workers* (6th ed.). Silver Spring: CPWR.
- Cronbach LJ (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297–334.
- Day DV, Fleenor JW, Atwater LE, Sturm RE, & McKee RA (2014). Advances in leader and leadership development: A review of 25years of research and theory. *The Leadership Quarterly*, 25(1), 63–82. doi:10.1016/j.leaqua.2013.11.004
- Dodge Data & Analytics. (2016). Building a safety culture: Improving safety & health management in the construction industry. Retrieved from <http://www.cpwr.com/publications/reports/special-reports>
- Flin R, Mearns K, Connor P, & Bryden R (2000). Measuring safety climate: Identifying the common features. *Safety Science*, 34, 177–192.
- Gillen M, Kools S, McCall C, Sum J, & Moulden K (2004). Construction managers' perceptions of construction safety practices in small and large firms: A qualitative investigation. *Work*(23), 233–243. [PubMed: 15579932]
- Graen GB, & Uhl-Bien M (1995). Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *The Leadership Quarterly*, 6(2), 219–247.
- Guldenmund F (2000). The nature of safety culture: a review of theory and practice. *Safety Science*, 34, 215–257.
- Hains S, Hogg M, & Duck J (1997). Self-categorization and leadership: Effects of group prototypicality and leader stereotypicality. *Personality and Social Psychology Bulletin*, 23, 1087–1100.
- Hale AR (2000). Culture's confusions. *Safety Science*, 34, 1–14.
- Johnson SE (2007). The predictive validity of safety climate. *Journal of Safety Research*, 38(5), 511–521. doi:10.1016/j.jsr.2007.07.001 [PubMed: 18023636]
- Knowles MS, Holton I, E F, & Swanson RA (2011). *The Adult Learner: The definitive classic in adult education and human resource development* (7th ed.). New York, New York: Routledge.
- Lee J, Huang YH, Cheung JH, Chen Z, & Shaw WS (2018). A systematic review of the safety climate intervention literature: Past trends and future directions. *Journal of Occupational Health Psychology*. doi:10.1037/ocp0000113
- McGraw Hill Construction. (2013). Safety management in the construction industry: Identifying risks and reducing accidents to improve site productivity and project ROI. Retrieved from <http://www.cpwr.com/publications/reports/special-reports>
- Mullen J, & Kelloway E (2009). Safety leadership: A longitudinal study of the effects of transformational leadership on safety outcomes. *Journal of Occupational and Organizational Psychology*, 82(2), 253–272. doi:10.1348/096317908x325313
- Nahrgang JD, Morgeson FP, & Hofmann DA (2011). Safety at work: A meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes. *Journal of Applied Psychology*, 96(1), 71–94. doi:10.1037/a0021484
- Neal A, & Griffin MA (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology*, 91, 946–953. doi:10.1037/0021-9010.91.4.946
- Nunnally J (1978). Assessment of reliability In *Psychometric Theory* (2 ed., pp. 245–246). New York: McGraw-Hill.
- OSHA. (2016). Outreach training program growth. Retrieved from [https://www.osha.gov/dte/outreach/outreach\\_growth.html](https://www.osha.gov/dte/outreach/outreach_growth.html)
- Richter A, von Thiele Schwarz U, Lornudd C, Lundmark R, Mosson R, & Hasson H (2016). iLead-a transformational leadership intervention to train healthcare managers' implementation leadership. *Implement Sci*, 11, 108. doi:10.1186/s13012-016-0475-6 [PubMed: 27473116]
- Rogers R Recruiting the reluctant leader. DePaul University Retrieved from [http://www.mca.org/pdf/cea\\_summary\\_study.pdf](http://www.mca.org/pdf/cea_summary_study.pdf)

- Schneider B (1975). Organizational climates: An essay. *Personnel Psychology*, 28(4), 447–479. doi:10.1111/j.1744-6570.1975.tb01386.x
- Schwatka NV, Hecker S, & Goldenhar LM (2016). Defining and Measuring Safety Climate: A Review of the Construction Industry Literature. *Annals of Occupational Hygiene*, 60(5), 537–550. doi:10.1093/annhyg/mew020
- Vandewalle D (2004). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement*, 57(6), 995–1015.
- Visscher-Voerman I, & Gustafson KL (2004). Paradigms in the theory and practice of education and training design. *Educational Technology Research and Development*, 52(2), 69–89.
- von Thiele Schwarz U, Hasson H, & Tafvelin S (2016). Leadership training as an occupational health intervention: Improved safety and sustained productivity. *Safety Science*, 81, 35–45. doi:10.1016/j.ssci.2015.07.020
- Zohar D (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology*, 65, 96–102.
- Zohar D (2000). A group-level model of safety climate: Testing the effect of group climate on micro-accidents in manufacturing jobs. *Journal of Applied Psychology*, 85, 587–596.
- Zohar D (2010). Thirty years of safety climate research: Reflections and future directions. *Accident Analysis and Prevention*, 42(5), 1517–1522. doi:10.1016/j.aap.2009.12.019 [PubMed: 20538108]
- Zohar D (2011). *Safety climate: Conceptual and measurement issues* (2nd ed.). Washington DC: APA.
- Zohar D, & Luria G (2005). A multilevel model of safety climate: Cross-level relationships between organization and group-level climates. *Journal of Applied Psychology*, 90, 616–628.
- Zohar D, & Tenne-Gazit O (2008). Transformational leadership and group interaction as climate antecedents: A social network analysis. *Journal of Applied Psychology*, 93(4), 744–757. doi:10.1037/0021-9010.93.4.744

**Practical Applications –**

The Foundations for Safety Leadership training module has already been widely accepted by the construction industry as a useful approach to providing construction foremen/lead workers with the knowledge and skills they need to become more effective jobsite safety leaders.

- 1) **Foundational material (50-55 minutes)**
  - a) **FSL Goal-** Introduce foremen to critical safety leadership skills they can use to improve safety climate and safety outcomes on the jobsite.
  - b) **FSL Learning Objectives**
    - i) Explain why safety leadership is important
    - ii) Describe 5 critical safety leadership skills
    - iii) Discuss how an effective leader can apply them on the jobsite.
  - c) **Characteristics of ineffective and effective leaders**
  - d) **Who is a safety leader?**
  - e) **Safety leadership related to safety climate and other outcomes**
  - f) **Costs of poor safety leadership**
  - g) **Benefits of effective leadership**
  - h) **5 critical safety leadership skills**
    - i) Leads by Example
    - ii) Engages and Empowers Team Members
    - iii) Actively Listens and Practices 3-Way Communication
    - iv) DEvelops Team Members through Teaching, Coaching, and Feedback
    - v) Recognizes Team Members for a Job Well Done
- 2) **Application activities (1.5-2.0 hours)**
  - a) **Scenario structure & jobsite description**
  - b) **Scenarios**
    - i) Cover up!
    - ii) It's too hot, too hot, too hot...
    - iii) To check or not to check
    - iv) Gimme some space...
    - v) The right tool for the right job
    - vi) Do we have to??
    - vii) Fritz takes a shortcut
- 3) **Key Takeaways**

**Figure 1.**  
Foundation for Safety Leadership (FSL) Content Outline



**Figure 2.**  
Sample scenario introductory slide

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<p><b>Outcome Variables</b></p> <p><b>A. Understanding safety leadership skills - In terms of safety leadership I have a thorough understanding of what it means to...</b>(Response scale - Strongly disagree (1) to Strongly agree (5))</p> <ol style="list-style-type: none"> <li>1. Lead by example</li> <li>2. Engage my team members in safety</li> <li>3. Actively listen when team members speak to me</li> <li>4. Practice 3-way communication</li> <li>5. Develop my team members through teaching, coaching, and providing feedback</li> <li>6. Recognize team members for a job well done</li> </ol> <p><b>B. Safety leadership behaviors/intentions - On the jobsite I...</b> (Response scale - Strongly disagree (1) to Strongly agree (5))</p> <ol style="list-style-type: none"> <li>1. Establish safety as a core value of my team</li> <li>2. Maintain a positive attitude about safety</li> <li>3. Teach and coach team members in a respectful manner</li> <li>4. Focus on the problem rather than judging the person when I give feedback</li> <li>5. Make sure team members know how to do a task before they actually do it</li> <li>6. Set high safety expectations for team members</li> </ol> <p><b>C. Safety leadership behaviors/intentions - How often do you...</b> (Response scale – Never (1) to Always (5))</p> <ol style="list-style-type: none"> <li>1. Treat team members with respect when communicating with them</li> <li>2. Actively listen to team members when they speak to me</li> <li>3. Practice 3-way communication with team members to ensure your directions are understood</li> <li>4. Engage team members in daily safety meetings</li> <li>5. Request input from team members about safety</li> <li>6. Encourage team members to report safety issues such as hazards, safety concerns, near misses</li> <li>7. Follow safe work procedures and practices</li> <li>8. Communicate with your team that everyone owns safety</li> <li>9. Say <i>“good job”</i> or <i>“thank you”</i> to team members who go above and beyond to create a safe jobsite*</li> <li><b>10. Use positive recognition of team members to encourage jobsite safety*</b></li> <li><b>11. Encourage safe work practices by praising team members who do more than the minimum for safety*</b></li> </ol> <p><b>D. Safety practices - How often do you...</b> (Response scale – Never (1) to Always (5))</p> <ol style="list-style-type: none"> <li>1. Voluntarily carry out tasks to help improve workplace safety</li> <li>2. Use the recommended safety procedures when carrying out your job</li> <li>3. Ensure the highest levels of safety when I carry out my job</li> <li>4. Promote the safety program within the organization</li> <li>5. Put in extra effort to improve the safety of the workplace</li> <li><b>6. Use the necessary equipment when carrying out your job*</b></li> </ol> <p><b>E. Crew reporting of safety-related conditions - How often do your team members...</b> (Response scale – Never (1) to Always (5))</p> <ol style="list-style-type: none"> <li>1. Solve safety issues that arise</li> <li>2. Report near misses when they occur</li> <li>3. Report injuries when they occur</li> </ol> <p><b>Moderator</b></p> <p><b>F. Learning goal orientation - How much do you agree with each statement below?</b> (Response scale - Strongly disagree (1) to Strongly agree (5))</p> <ol style="list-style-type: none"> <li>1. I am willing to select a challenging work assignment that I can learn a lot from</li> <li>2. I often look for opportunities to develop new skills and knowledge</li> <li>3. I enjoy challenging and difficult tasks at work so I can learn new skills</li> <li>4. For me, developing my work ability is important enough to take risks</li> <li>5. I prefer to work in situations that require</li> </ol>
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**Figure 3.**  
Final Foreman Survey

\*Italicized items were revised and bolded items were added after pilot.



Outcomes
<p><b>A. Safety practices - How often do you...</b> (Response scale – Never (1) to Always (5))</p> <ol style="list-style-type: none"> <li>1. Voluntarily carry out tasks to help improve workplace safety</li> <li>2. Use the recommended safety procedures when carrying out your job</li> <li>3. Ensure the highest levels of safety when I carry out my job</li> <li>4. Promote the safety program within the organization</li> <li>5. Put in extra effort to improve the safety of the workplace</li> <li>6. Use the necessary equipment when carrying out your job</li> </ol>
<p><b>B. Self-reporting of safety-related conditions - How often do you...</b> (Response scale – Never (1) to Always (5))</p> <ol style="list-style-type: none"> <li>1. Solve safety issues that arise</li> <li>2. Report near misses when they occur</li> <li>3. Report injuries when they occur</li> </ol>
<p><b>C. Safety climate - My current supervisor/foreman...</b> (Response scale - Strongly disagree (1) to Strongly agree (5))</p> <ol style="list-style-type: none"> <li>1. Says a good word when s/he sees a worker doing a job safely</li> <li>2. Seriously considers worker's suggestions for improving safety</li> <li>3. Approaches workers during work to discuss safety issues</li> <li>4. <i>Gets annoyed at workers when they ignore safety rules, even minor ones*</i></li> <li>5. Pays more attention to safety after a worker violates a rule</li> <li>6. Doesn't care how work is done as long as there are no accidents</li> <li>7. Wants us to work quickly but not always safely when pressure is high</li> <li>8. Pays less attention to safety than most other supervisors do in this company</li> <li>9. Keeps track only of major safety problems and overlooks routine ones</li> <li>10. Doesn't care how work is done as long as we stay on schedule</li> </ol>
<p><b>D. Foreman's safety leadership behaviors - My current supervisor/foreman...</b> (Response scale - Strongly disagree (1) to Strongly agree (5))</p> <ol style="list-style-type: none"> <li>1. Establishes safety as a core value of my team</li> <li>2. Maintains a positive attitude about safety</li> <li>3. Teaches and coaches team members in a respectful manner</li> <li>4. Focuses on the problem rather than judging the person when giving feedback</li> <li>5. Makes sure team members know how to do a new task before actually doing it</li> <li>6. Sets high safety expectations for team members</li> </ol>
<p><b>E. How often does your supervisor/foreman...</b> (Response scale – Never (1) to Always (5))</p> <ol style="list-style-type: none"> <li>1. Treat team members with respect when communicating with them</li> <li>2. Actively listen to team members</li> <li>3. <i>Ask team members to repeat back instructions to make sure they understand what to do</i></li> <li>4. Engage team members in daily safety meetings</li> <li>5. Request input from team members about safety</li> <li>6. Encourage team members to report safety issues</li> <li>7. Follow safe work procedures and practices</li> <li>8. Communicate with the team that everyone owns safety</li> <li>9. Say "good job" or "thank you" to team members who go above and beyond to create a safe jobsite</li> <li>10. <b>Use positive recognition of team members to encourage jobsite safety*</b></li> <li>11. <b>Encourage safe work practices by praising team members who do more than the minimum for safety*</b></li> </ol>
<p><b>Moderators</b></p>
<p><b>F. Prototypical leader - My current supervisor/foreman...</b> (Response scale - Strongly disagree (1) to Strongly agree (5))</p> <ol style="list-style-type: none"> <li>1. Is similar to the other members of our crew</li> <li>2. Is a representative member of our crew</li> <li>3. Stands for the same things as our crew</li> </ol>
<p><b>G. Leader member exchange - My current supervisor/foreman...</b> (Response scale - Strongly disagree (1) to Strongly agree (5))</p> <ol style="list-style-type: none"> <li>1. Lets me know if I have done a good job</li> <li>2. Understands my job problems and needs</li> <li>3. Recognizes my abilities</li> <li>4. Helps me solve problems in my work</li> <li>5. Would help me if I needed it</li> <li>6. Makes decisions that I would be willing to defend</li> <li>7. And I have a good working relationship</li> </ol>

**Figure 4.**  
Final Worker Survey

\*Italicized items were revised and bolded items were added after pilot.

**Table 1**

Evaluation Surveys – Constructs, target respondent, source of items/scales

Construct	Foremen	Crew	Source
Outcome variables to be measured over time			
Understand safety leadership skills	X		Developed for the study
Safety leadership behaviors/intentions	X		Developed for the study
Safety practices	X	X	(Neal & Griffin, 2006)
Crew reporting of safety-related conditions		X	Developed for the study
Safety climate		X	(D Zohar, 2000)
Foreman safety leadership behaviors		X	Developed for the study
Moderator Variables			
Learning goal orientation	X		(Vandewalle, 2004)
Prototypical leader		X	(Hains et al., 1997)
Leader member exchange		X	(Graen & Uhl-Bien, 1995)
Additional Variables			
Reaction to training	X		Developed for the study
Demographics	X	X	Developed for the study

**Table 2**

## Five FSL Leadership Skills

<b>5 Skills and Actions of an Effective Safety LEADER</b>	
<b>Leadership Skills</b>	<b>Good Leadership Actions</b>
<b>Lead by Example:</b> 'Walk the talk.' Make safety a core value and make sure everyone owns safety.	<ul style="list-style-type: none"> <li>• Establishes safety expectations as a core value</li> <li>• Shares safety vision with team members</li> <li>• Demonstrates a positive attitude about safety</li> <li>• 'Walks the Talk'</li> <li>• Leads up</li> </ul>
<b>Engage and Empower Team Members:</b> Encourage and empower your team to identify, report and remove hazards.	<ul style="list-style-type: none"> <li>• Engages, encourages, and empowers team members to identify and act upon unsafe situations by... <ul style="list-style-type: none"> <li>➢ Reporting hazards and safety concerns</li> <li>➢ Providing solutions</li> <li>➢ Reporting near misses</li> <li>➢ Stopping work if necessary</li> </ul> </li> </ul>
<b>Actively Listen and Practice 3-way Communication:</b> Listen to hear what team members say. Ask them to repeat any instructions you give.	<ul style="list-style-type: none"> <li>• Actively listens to <b>hear</b> what team members are saying</li> <li>• Practices 3-way communication by having person repeat the message they heard</li> </ul>
<b>DEvelop Team Members Through Teaching, Coaching, and Feedback:</b> Act as a teacher and coach. Use the FIST principle: Facts, Impact, Suggestions, Timely.	<ul style="list-style-type: none"> <li>• Respectfully teaches and coaches workers</li> <li>• Watches the learner fix the hazardous situation or perform the task to make sure it's done correctly</li> <li>• Focuses on potential consequences rather than on the team member</li> <li>• Uses the FIST principle: Facts, Impact, Suggestions, Timely</li> </ul>
<b>Recognize Team Members for a Job Well Done:</b> Acknowledge your team members for going above and beyond for safety.	<ul style="list-style-type: none"> <li>• Privately and/or publicly acknowledges team members for going above and beyond when it comes to safety</li> </ul>

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**Table 3**

## Pilot Study Participant Demographics

	<b>Foremen Atlanta (n=40) Denver (n=18) Total n=58 Avg (SD) or # (%)</b>	<b>Workers Denver Only Total n=59 Avg (SD) or # (%)</b>
<b>Age in years</b>	41.0 (10.9)	36.1 (13.0)
<b>Gender</b>		
Male	55 (96.5%)	56 (96.5%)
Female	2 (3.5%)	2 (3.5%)
<b>Ethnicity</b>		
White	35 (61.4%)	34 (58.6%)
Hispanic	16 (28.1%)	16 (27.6%)
Black	2 (3.5%)	2 (3.5%)
Asian	2 (3.5%)	0
Mixed	2 (3.5%)	4 (6.9%)
Native American	0	2 (3.5%)
Other	0	0
<b>Current position</b>		
Superintendent/ Project Manager	17 (29.3%)	-
Foreman	28 (48.3%)	-
Journeyman	-	27 (47.4%)
Apprentice/trainee	-	18 (31.6%)
Safety Personnel	6 (10.3%)	
Other: Pre-fabrication		8 (14.04%)
Other: Non-specified	3 (5.17%)	4 (7.14%)
<b>Years in construction</b>	19.8 (10.8)	14.5 (12.1)
<b>Tenure with company</b>		
<1 year	12 (21.8%)	20 (36.4%)
1–3 years	7 (12.7%)	14 (25.5%)
4–6 years	7 (12.7%)	3 (5.5%)
7–10 years	6 (10.9%)	7 (12.7%)
>10 years	23 (41.8%)	11 (20.0%)
<b>Weeks w/current foreman</b>	-	44.70 (102.2)

**Table 4**

Survey Scales - # of items and reliability scores

Construct Label (# items *)	Foremen	Crew	Cronbach's alpha
Outcome variables to be measured over time			
Understand safety leadership skills (6)	X		.94
Safety leadership behaviors/intentions (15)	X		.80
Safety practices (5)	X		.82
Crew reporting of safety-related conditions (3)	X	X	.54 (foreman perception of crew); .62 (crew self-report)
Safety climate (10)		X	.82
Foreman's safety leadership behaviors (15)		X	.96
Moderator Variables			
Learning goal orientation	X		.75
Prototypical leader		X	.85
Leader member exchange		X	.91

\* All scales except demographics used a 1–5 Likert response scale.

**Table 5**

Foreman reaction to training (n=58)

	<b>Avg (SD; range)</b>
<b>Rate how much you agree with each statement (1=Strongly Disagree to 5=Strongly Agree)</b>	
The PowerPoint slides were helpful	4.27 (0.81; range 2–5)
The scenarios were realistic	4.31 (0.72; range 3–5)
The animated videos helped me better understand how the leadership skills could be used	4.43 (0.74; range 3–5)
The role-plays helped me practice applying the leadership skills	4.02 (0.95; range 1–5)
The language used in the training was easy to understand	4.75 (0.48; range 3–5)
The discussion questions were helpful for thinking more about the information we were learning	4.72 (0.50; range 3–5)
The instructor did a good job presenting the material on why safety leadership is important	4.96 (0.19; range 4–5)
The instructor did a good job discussing the scenarios	4.94 (0.23; range 4–5)
The training covered too much material *	2.29 (1.48; range 1–5)
The training felt very rushed *	2.31 (1.45; range 1–5)
The student guide was useful to have during the training	4.15 (0.97; range 1–5)
I will probably use the material in the student guide after the training is over	4.29 (0.96; range 1–5)
I plan to use the safety leadership skills from the training on my jobsites	4.81 (0.44; range 3–5)
<b>How valuable was each part of the training for increasing your understanding of safety leadership? (1=Not at all Valuable to 5=Extremely Valuable)</b>	
The introductory information	4.02 (0.73; range 2–5)
The model illustrating relationship between safety leadership, safety climate & safety outcomes	4.35 (0.64; range 3–5)
The written scenarios	4.18 (0.79; range 2–5)
The role-plays	4.00 (0.95; range 1–5)
The animated videos of the scenarios	4.33 (0.75; range 3–5)
The conversation created by the discussion questions	4.84 (0.37; range 4–5)
The safety leadership checklists	4.65 (0.56; range 3–5)

\* Scale was reverse coded