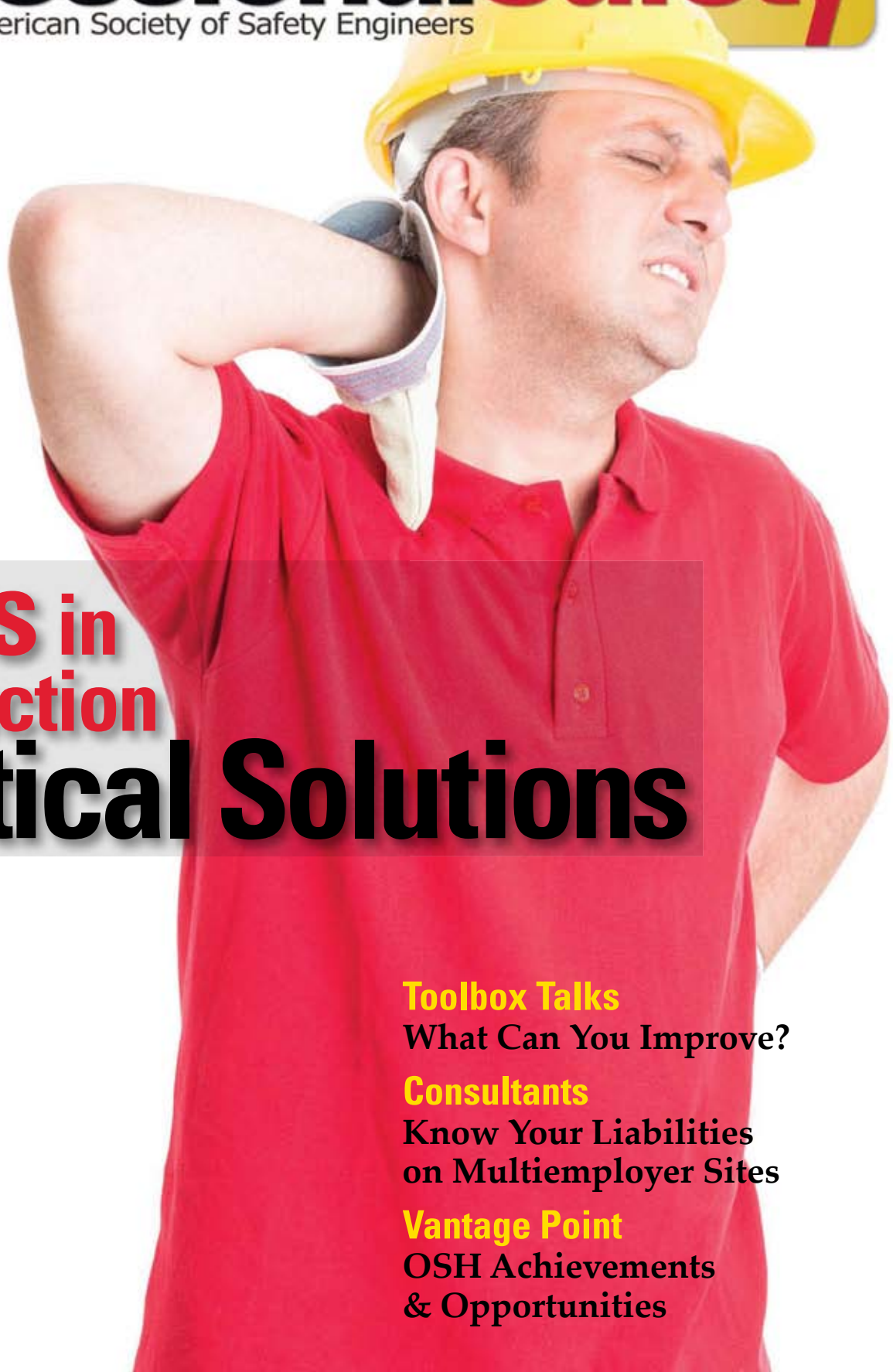


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Toolbox Talks

Insights for Improvement

By Vicki Kaskutas, Lisa Jaegers, Ann Marie Dale
and Bradley Evanoff

Toolbox talks are common in many industries, including construction. Defined as informal work-site training, these talks are designed to deliver safety messages to improve safety and prevent work-related incidents (Varley & Boldt, 2002). Also referred to as tailgate trainings and stand-up meetings, toolbox talks allow an employer to briefly convey critical, time-sensitive safety information to a group of workers, many of whom are transient or temporary (Harrington, Materna, Vannoy, et al., 2009). Done well, these talks can improve communication, empower workers, reduce injuries and improve safety (Gillen, Goldenhar, Hecker, et al., 2013). Often, however, toolbox talks are missed opportunities for providing important safety messages in construction (Harrington, et al., 2009).

Toolbox talks differ widely in content, type, delivery method and level of worker engagement. Discussion topics and general content for canned talks are widely available from agencies funded by state and federal government (CPWR, 2014; eLCOSH, 2014a; Harvard Environmental Health & Safety, 2014; Washington State Department of Labor & Industries, 2014) and from safety organizations, risk management companies and international sources. Although these prepared resources provide useful information, they are more relevant and effective when tailored to each job site,

the work tasks at hand and the construction crew (Harrington, et al., 2009; Varley & Boldt, 2002).

Several delivery methods are more effective than a typical lecture format. For example, narrative approaches involve sharing real-life stories of near-hits and workplace incidents to which employees can relate (Heidotting, 2002; Varley & Boldt, 2002). Participatory approaches engage the crew in discussing a topic that can be applied to their specific situation, and foster site-specific problem solving (Harrington, et al., 2009; Varley & Boldt, 2002).

Research also suggests that workers are more attentive when groups are small (fewer than 20 workers) and the trainer is a senior employee, such as a site supervisor, foreman or safety supervisor, who is perceived as having authority to support any needed changes (Varley & Boldt, 2002). Heidotting (2002) suggests that these talks should occur daily at construction sites. Furthermore, given the rising number of Latinos in the workforce, they should be tailored to the varying needs of the workers and delivered in workers' native language (Har-

IN BRIEF

- **Toolbox talks can improve communication, empower workers, reduce injuries and improve safety. However, they often are missed opportunities to provide important safety messages in construction.**
- **Two research projects—one using contextually driven work site information and one using a participatory problem-solution approach—were conducted to gain insight on ways to improve toolbox talks.**
- **Results indicate that these approaches improved worker participation in site-specific safety communication.**

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rington, et al., 2009; Williams, Ochsner, Marshall, et al., 2010).

Despite the wide availability of prepared toolbox talks and their increasing popularity, few studies have examined their efficacy or effectiveness. In general industry, safety training has shown to be effective in improving worker knowledge and worker behavior (Robson, Stephenson, Schulte, et al., 2012). One study found that after training supervisors on effective delivery of toolbox talks, most contractors said that worker attention to company safety rules increased (Harrington, et al., 2009). This study concluded that these talks are a simple way to raise safety awareness in workers in a hazardous profession who may otherwise receive no training, and that toolbox talks are an effective way to create a safer workforce. Heidotting, et al. (2002), found that toolbox talks in the coal mining industry enhanced worker participation and interest, leading to greater knowledge retention and possibly enhanced worker attitudes toward using safe work practices.

This article reviews two projects designed to improve toolbox talks in construction. Project 1 hypothesized that training residential construction foremen in fall prevention and engaging methods to deliver fall prevention training to their crew would increase toolbox talk frequency; increase discussion of site-specific work methods during the talks; and improve fall prevention behaviors. Project 2 sought to determine the feasibility and usefulness of tailored toolbox talks as a method for delivering ergonomics training. Both projects involved a collaborative effort between researchers at Washington University School of Medicine and construction trade unions in the St. Louis area. The two interventions and their outcomes are described briefly, and a template for designing site-specific toolbox talks is shared along with additional recommendations.

Study Methods

Project 1: Fall Prevention Intervention

In the first project, 86 residential carpentry foremen from eight residential union contractors in the St. Louis region participated in training to increase the frequency, delivery and effectiveness of toolbox talks. This training was a portion of an 8-hour fall prevention and safety communication intervention (Kaskutas, Dale, Lipscomb, et al., 2013). The

fall prevention segment taught foremen to use a site audit to identify tasks and workplace conditions that present fall hazards, and methods to control the hazards for each phase of home construction (Photo 1). The safety communication portion taught participants to develop daily toolbox talks on relevant hazards and the controls in place for each. Since the intervention was delivered to foremen, but the goal was for foremen to train crew members through toolbox talks, both the

foremen participants and their crews were surveyed to measure change.

A carpenter research assistant visited participating sites to administer 10-minute written surveys that assessed toolbox talk frequency, length, delivery method, knowledge of safety requirements when working at heights, and frequency of six fall prevention behaviors as identified in previous research (Kaskutas, Dale, Lipscomb, et al., 2010). These behaviors are climbing a stepladder leaned against a structure; climbing an unsecured extension ladder; using a harness when working more than 6 ft above a lower surface; working from the top plate of exterior walls and floor joists without personal fall arrest systems; and working from ladder jack scaffolds more than 6 ft above the ground without guardrails or personal fall arrest systems. Frequency ratings for these items were always, often, occasionally, rarely and never. Surveys were administered twice before the training and at 6, 12 and 24 weeks after the training.

After reverse scoring items that described unsafe behaviors, the research team calculated a behavior score by computing the mean self-reported frequency for the six target behaviors, then converting the score to a 100-point scale (higher scores indicated safer behavior). Since toolbox talk frequency was of interest, the team dichotomized frequency items by whether talks were delivered weekly or not.

Similarly, the team dichotomized the question about delivery method as to whether the best way to perform hazardous work tasks was the focus of the talk or not. Fall prevention knowledge was scored as correct or incorrect. Changes in behavior scores were analyzed using a *t*-test; frequency, delivery method and fall prevention knowledge were analyzed using chi-square.

The research team compared results from crews working for foremen who participated in the intervention to surveys from a cohort of 273 St. Louis area carpenters who attended routine apprenticeship training. These surveys used the same six-item fall prevention behavior questions and were administered near the time that the pre- and post-intervention surveys were administered. This group served as a concurrent control group.

Project 2: Ergonomics Intervention

In the second project, safer work methods identified by carpenters, floor layers and sheet metal workers in a participatory ergonomics program were integrated into six weekly toolbox talks (eLCOSH, 2014b). Topics included avoiding awkward reaching postures, proper body positioning for work tasks and with equipment, moving materials, and choosing appropriate manual hand tools and power tools (Jaegers, Dale, Weaver, et al., 2014). Each talk included a description for preparing and presenting the training and learning materials to distribute to workers.

To make the talk contextually relevant, the safety representative identified specific training priorities based on site walkthroughs conducted before each session and took photographs to illustrate training points. The representative also distributed laminated training cards that summarized ergonomic con-

Photo 1: Teaching foremen about fall prevention.



Figure 1
Ergonomics Training Card

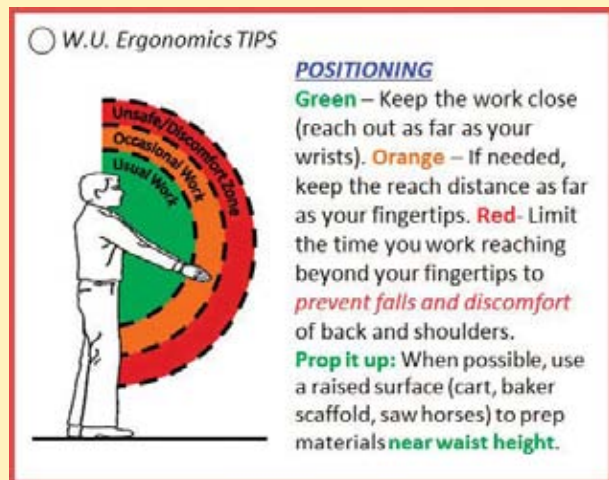
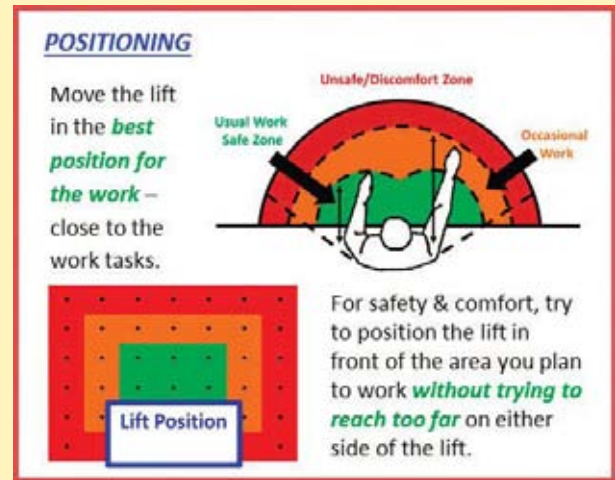


Figure 2
Ergonomics Training Card



cepts and served as reminders of the information presented (Figures 1 and 2). One safety representative delivered the toolbox talks to 36 carpenters and laborers working at a mixed residential building site.

After the series, workers completed a 10-minute written survey to rate their level of agreement with nine statements regarding relevance of the topics, delivery method, similarities to traditional toolbox talks and intention to change based on the talk (Table 1, p. 36). After performing descriptive analysis, the researchers dichotomized the 6-point level of agreement scale into disagree and agree categories. The safety representative who delivered the talks tracked observations of workers demonstrating the methods before, during and after the series. After the training, the research team held a focus group with contractor representatives to gather qualitative data regarding observed changes in workers' behaviors in areas targeted by the toolbox talks.

Study Results

Project 1 Results: Fall Prevention Intervention

Since results between the two baseline measurement time-points were not statistically different, they were combined into a pre-intervention category. Similarly, results between the 6- and 12-week post-training surveys were not statistically different, so they were combined into a post-training category. Table 1 presents these results for the foremen participants and their crews.

Foremen and crew member ratings were similar for most variables within a time-point, which corroborated the foremen's ratings. After the intervention, the frequency of toolbox talks on at least a weekly basis increased to a similar degree according to foremen's and crews' reports. Participants and their crews reported that the delivery method for toolbox talks was more interactive after the intervention and that hazardous work tasks were discussed more often.

In addition, site-specific hazards were identified and addressed more frequently during toolbox talks, which suggests that the talks were more participatory and problem-focused after the intervention. Use of passive delivery methods decreased after the intervention as well, including fewer instances of signing a toolbox talk written on a hand-

out and passively listening as it was read aloud. Importantly, improvements were seen in crew members' safety knowledge and self-reported safety behaviors among their coworkers.

Foremen and crew member baseline survey results were similar to responses collected at the same point in time from 273 carpenter apprentices working for foremen not participating in the intervention. For example, 35% of apprentices said toolbox talks included discussions about how to address hazardous tasks at their work sites, compared to 36% of workers on crews of foremen participating in the intervention.

Since the frequency of responses was similar between these two groups at baseline, the apprentice group was used as a concurrent control group to compare crew members' post-intervention results. There was no change in the apprentice carpenters' reports of toolbox talk frequency and delivery methods at the post-intervention time-point, whereas carpenters working on participating foremen's crews reported increased frequency and improved delivery. Comparison to the concurrent control group suggests that the improvements reported were due to the intervention and were not the result of other influences.

Project 2 Results: Ergonomics Intervention

On follow-up surveys completed after the series of toolbox talks, workers reported that information covered in the talks was applicable to their job; that the format used was better than regular safety talks; that they could make changes to their job; and that they planned to try new tools or change a work technique to reduce the risk of musculoskeletal injury (Table 2, p. 36). Workers reported making various changes due to the toolbox talks, including modified lifting and carrying methods, positioning themselves closer to a work task to avoid reaching, and using the right tool for the task. They also reported having an increased awareness of their work methods.

The safety representative reported that it was quick and easy to personalize the talks to the work group's needs as identified in site walk-throughs and that the information was applicable to the

work. Researcher observations of the sessions confirm that active discussion occurred between workers and company representatives.

Three contractor representatives provided specific examples of changed behavior that they attributed directly to the toolbox talks: workers using the correct equipment to position themselves at the task; and using equipment to perform material handling that had been performed manually. These representatives felt that overall safety focus had increased

as well. The research team compared workers' reports of ergonomic behavior changes to contractor representatives' descriptions and found them to be similar. After hearing the study results, the general contractor shared the toolbox talks and guide company-wide with safety representatives for future use.

Discussion

These two interventions took different approaches but shared some common elements. In both projects, the toolbox talks addressed site-specific hazards to increase relevance as suggested in the peer-reviewed literature (Harrington, et al., 2009; Varley & Boldt, 2002). In both cases, work-site leaders delivered the talks.

In Project 1, the foreman described specific work methods that would be used to address fall hazards in the workplace that day. Foremen are more aware of workplace risks than workers (Hung, Winchester, Smith-Jackson, et al., 2013) and accustomed to mentoring inexperienced workers (Rogers, 2007), so they commonly deliver toolbox talks. In Project 2, a safety representative used a participatory approach to introduce workers to ergonomic principles, such as alternative tools or work methods, that they could apply when performing tasks with high exposures.

Both projects utilized feedback from several sources to evaluate the intervention's success rather than relying solely on workers' feedback. The fall prevention project surveyed foremen participating in the training and workers on these foremen's crews; the researchers in the ergonomics project surveyed toolbox talk participants (workers), gathered the leader's perceptions via interview and gathered company management's perceptions using a focus group.

The metrics tracked varied between the two projects. Improved crew safety behaviors and knowledge were reported after the fall prevention talks. Measurable changes in behaviors were not expected following the ergonomics series; however, participants preferred the revised talk format and more than half felt empowered to make changes after the toolbox talks.

Template: Site-Specific Toolbox Talks

Construction companies can begin the shift toward more participatory, contextually based toolbox talks by involving workers and management and adapting already available resources. For each talk, the topic must address a current concern or condition at the site (e.g., heat stress on hot days, positioning oneself close to the task, scaffolds and ladders when truss setting, nail gun use when building walls).

Table 1
Fall Prevention Toolbox Talk Training Results

	Baseline		6 and 12 weeks post-training		24 weeks post-training	
	Foremen n = 146	Crew n = 232	Foremen n = 144	Crew n = 244	Foremen n = 49	Crew n = 91
Agreed that toolbox talks were held at least once per week	58%	64%	81% (p < .001)	79% (p < .001)	86% (p < .001)	75% (p < .001)
Agreed toolbox talks discussed best way to do risky tasks	40%	36%	61% (p < .001)	51% (p < .002)	53% (p < .069)	48% (p < .019)
Behavior scale (% safe 6 items)	64%	61%	76% (p < .001)	70% (p < .001)	78% (p < .001)	67% (p < .001)
Knowledge (% safe 1 item)	56%	46%	77% (p < .001)	64% (p < .001)	75% (p < .001)	64% (p < .104)

Table 2
Post-Training Worker Agreement for Ergonomics Toolbox Talks

Survey items	Percentage of workers
The toolbox talk information applies to the tasks on my current job.	78%
I felt comfortable participating in the toolbox talks.	81%
The toolbox talk format with group discussion and examples was better than the format of regular safety talks.	75%
I felt the leader of the toolbox talk was the best person to give the talk.	92%
I would recommend the toolbox talk to other workers.	81%
I have read the training cards after attending the toolbox talks.	58%
I will keep my training cards to use as a reminder about ergonomics.	61%
Due to the toolbox talk, I feel like I can make changes to my job.	53%
Due to the toolbox talk, I plan to try new tools or change how I perform work tasks to reduce my risk of pain and discomfort in my job.	44%

An OSH manager can identify site-specific hazards and methods workers can employ to minimize the risk, then add these specific hazards and safety solutions to the prepared talk materials. An OSH professional might prepare questions or share a personal story to discuss during the talk. These questions or story can help the trainer engage workers and get them to share their personal knowledge or experiences related to the topic. One might also invite site representatives who may be helpful in supporting the training and safety-related solutions identified. It is also useful to show photographs that depict specific hazards and identify examples of methods to correct the hazard.

At the end of the toolbox talk, the OSH professional should highlight methods for the crew to practice that day, whether it is taking short breaks in the shade, positioning the scissors lift closer to the task, tying off the top of the extension ladder or switching to a sequential trigger on the nail gun. During the talk, the safety representatives must always address any employee concerns regarding repairs, materials or needed safety equipment, then report on progress with these requests during the next talk.

The OSH trainer should also observe how well the photos, stories and discussion questions engage the crew during the toolbox talk, and use this information to guide development of future talks. Another good practice is to provide the crew with reminders and feedback throughout the day to reinforce concepts discussed in the talk (e.g., training cards like those used in the ergonomics project). Long-term reinforcement and showing workers that toolbox talks are a two-way, continuous process, will help produce a lasting improvement in workers' behaviors.

Conclusion

Toolbox talks are widely used in the construction industry. Their content and delivery varies greatly, possibly due to differing goals or expectations. A talk designed as a record to meet regulatory or insurance requirements that safety is discussed will produce a different result than a talk designed to raise worker awareness of hazards, identify solutions and develop solutions. Contextualizing canned materials and engaging crew members to address workplace hazards and present preferred work methods are simple methods to increase toolbox talk effectiveness.

As construction companies, insurers and government safety agencies mandate more training, the use of toolbox talks is likely to increase. These sessions can improve leading indicators for injury prevention, such as workers' knowledge, skills and behaviors, and may ultimately improve lagging indicators, whether falls from heights, musculoskeletal injuries or illnesses due to exposures. **PS**

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