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Toolbox Talks: Insights for Improvement

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Abstract

Tool box talks (TBTs) have the potential to improve communication, empower workers, reduce injuries and improve safety; however, they can also be “missed opportunities” for providing important safety messages in construction. The goal of this paper is to share the results from two research projects designed to improve the frequency, delivery, participation, and outcomes of TBTs. The results of these projects provide suggestions for planning and delivering TBTs in construction.

Methods: In the first project, 86 residential carpentry foremen from 8 different residential contractors in the St. Louis region participated in training for delivering TBTs as part of an 8-hour fall prevention and safety communication intervention. We compared baseline measures of safety behavior and fall prevention knowledge items to follow-up between participating foremen and their crewmembers. Concurrently, surveys of 300 apprentice carpenters were collected to describe the frequency and delivery methods of TBT and to serve as a comparison group for the TBT intervention. In the second project, we evaluated the utility of ergonomics TBTs delivered by a safety representative to 36 carpenters and laborers. Workers rated their perceptions of topic relevance, delivery method, similarities to traditional TBTs, and intent to change behaviors. The safety representative provided feedback regarding the TBTs and reported their observations of improved worker use of ergonomics in work tasks post-training.

Discussion / Conclusions: Both interventions described in this paper improved workplace safety. The interventions demonstrate how to simply shift from non-collaborative TBTs to participatory, context-driven TBTs by using a pre-printed TBT template, modified to address the hazards present at the worksite. Delivery suggestions relate the information to the workers, and include workers in the identification of problems and safety-related solutions. These participatory methods for preparing and delivering TBTs have the potential to improve construction workplace safety practices.

In Brief

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- Tool box talks (TBTs) are often described as “missed opportunities” for delivering safety messages.
- Two approaches for delivering TBTs in the construction industry are presented: using contextually-driven worksite information and a participatory problem-solution approach.
- These TBT approaches improved worker participation in workplace specific safety communication. These relatively simple and inexpensive approaches can benefit the construction industry.

Purpose / Problem

Tool box talks (TBTs) are becoming commonplace in many industries, including construction. Defined as informal worksite training, TBTs are designed to deliver safety messages to improve safe worker behaviors and prevent work-related incidents (Varley & Boldt, 2002). Tool box talks, also referred to as tailgate trainings and stand-up meetings, allow the contractor to briefly convey critical time-sensitive safety information to a group of workers who may have a high turnover rate (Harrington, Materna, Vannoy, & Scholz, 2009). TBTs have the potential to improve communication, empower workers, reduce injuries and improve safety (Gillen, Goldenhar, Hecker, & Schneider, 2013), but many times TBTs are “missed opportunities” for providing important safety messages in construction (Harrington et al. 2009).

There is a wide variation in content, type, method of delivery, and level of worker engagement for TBTs. Discussion topics and general content for “canned” TBTs are widely available from agencies funded by state and federal government (CPWR, 2014; eLCOSH, 2014a; Washington State Department of Labor and Industries, 2014; Harvard Environmental Health & Safety, 2014) and from safety organizations, risk management companies, and international sources. Although canned TBTs 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 & Blodt, 2002). Several methods for delivering TBTs are more effective than a typical lecture format. Narrative approaches involve telling real-life stories of near misses and workplace incidents that workers can relate to (Heidotting, 2002, Varley & Boldt, 2002). Participatory approaches engage the crew in discussion of a topic that can be applied to their specific situation, and gives opportunity for site-specific problem-solving (Harrington et al., 2009; Varley & Boldt, 2002). Workers are more attentive to TBTs delivered to small groups of workers (less than 20) by a senior employee, such as a site supervisor, foreman or safety supervisor who is perceived as having authority to support any change that is needed (Varley & Boldt, 2002). Heidotting (2002) suggests that TBTs should occur daily at construction worksites. With the rising number of Latinos in the workforce, TBTs should be tailored to the varying needs of the workers and delivered in the workers’ native language (Harrington et al., 2009; Williams, Ochsner, Marshall, Kimmel, & Martino, 2010).

Despite the wide availability of TBTs 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 et al. 2012). One study found that after providing training to supervisors on effective delivery of TBTs, the majority of contractors said that worker attention to company safety rules increased (Harrington et al. 2009). This study concluded that TBTs are a simple way to raise safety awareness in workers in a dangerous profession who may otherwise receive no training, and that TBTs are an effective way of creating a safer workforce. Heidotting and colleagues (2002) found that TBTs in the coal mining industry enhanced worker participation and interest, leading to greater knowledge retention and possibly enhanced worker attitudes towards the use of safe work practices.

This paper presents two projects designed to improve TBTs in construction. Project 1 (fall prevention TBTs) hypothesized that training residential construction foremen in fall prevention and engaging methods to deliver fall prevention training to their crew would increase TBT frequency, increase discussion of site-specific work methods during the TBT, and improve fall prevention behaviors. Project 2 (ergonomics TBTs) sought to determine the feasibility and usefulness of tailored TBTs as a method for delivery 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 are described and the outcomes for each project are briefly presented. A template for designing worksite specific tool box talks is shared and recommendations for TBTs are presented.

Methods

Project 1: Fall Prevention Tool Box Talk Intervention

In the first project, 86 residential carpentry foremen from 8 residential union contractors in the St. Louis region participated in training to increase the frequency, delivery, and effectiveness of TBTs. This training was a portion of an 8-hour fall prevention and safety communication intervention (Kaskutas et al. 2013). The fall prevention portion of the intervention taught foremen to use a worksite audit to identify tasks and workplace conditions presenting fall hazards and methods to control the hazards for each phase of home construction (Figure 1). The safety communication portion taught participants to develop daily TBTs to discuss relevant hazards and the present methods that would be used to control each hazard. Since the intervention was delivered to foremen, but the goal was for the foremen to train their crewmembers through TBTs, both foremen participants and their crewmembers were surveyed to measure change. A carpenter research assistant visited participating foremen’s worksites to administer these 10 minute written surveys assessing frequency, length of TBTs, methods used to present TBTs, knowledge about safety requirements when working at heights, and frequency of six fall prevention behaviors used in our previous research (Kaskutas et al, 2010). Behaviors assessed included climbing a step ladder that is leaned on a structure, climbing an extension ladder that is not secured, using a harness when working over 6’ 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 over 6’ from the ground without guardrails or personal fall arrest systems. Frequency ratings for the behavior 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 behavior items that described unsafe behaviors, we calculated a behavior score by computing the mean self-reported frequency for the 6 fall prevention behaviors and converting the score to a 100-point scale (higher scores indicated safer behavior). We were interested in increasing the frequency of weekly TBTs, so we dichotomized TBT frequency items by whether TBTs were held weekly or not. Similarly, we dichotomized the question regarding TBT delivery method as to whether the best way to perform risky work tasks was the focus of the TBT or not. Fall prevention knowledge was scored as correct or incorrect. Changes in behavior scores were analyzed using t-test; frequency of TBTs, delivery method used for the TBT, and fall prevention knowledge were analyzed using Chi-square. We compared results from crew working for foremen that participated in the intervention to surveys from a cohort of 273 St. Louis area carpenters attending routine apprenticeship training. These surveys used the same 6-item fall prevention behavior questions and were administered near the time as the pre and post-intervention surveys. This group served as a concurrent control group.

Project 2: Ergonomics Tool Box Talk 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 TBTs (eLCOSH, 2014b). The TBT topics included avoiding awkward reaching postures, proper body positioning for work tasks and with equipment, moving materials, choosing appropriate manual hand tools, and choosing appropriate power tools (Jaegers et al. 2014). Each TBT included a description for preparation and presentation of the training and learning materials to distribute to workers. To make the talk contextually relevant, the safety representative identified specific training priorities from worksite walkthroughs prior to each session and took photographs to illustrate training points. He handed out laminated training cards to summarize ergonomic concepts and serve as future reminders of the ergonomics information (Figures 2 and 3). The TBTs were delivered by one safety representative to 36 carpenters and laborers working at a mixed residential building site.

After the TBT series, workers completed a 10-minute written survey to rate their level of agreement with nine statements regarding relevance of the TBT topic, delivery method, similarities to traditional TBTs, and intention to change based upon the TBT (see Table 1 for details). After performing descriptive analysis, we dichotomized the 6-point level of agreement scale into disagree and agree categories. The safety representative who delivered the TBTs tracked observations of methods demonstrated by workers before, during, and after the TBT series. A focus group with contractor representatives was held after the training to provide qualitative data regarding changes in workers' behaviors observed for areas targeted during the TBTs.

Results

Project 1 Results: Fall Prevention Tool Box Talk 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 demonstrates these results for the foremen participants and their crewmembers. Foremen and crewmember ratings were very similar for most variables within a time-point, which corroborated the foremen's ratings. After the intervention, the frequency of TBTs on at least a weekly basis increased to a similar degree per foremen's and crewmembers' reports. Participants and their crewmembers reported that the delivery method for TBTs was more interactive after the intervention and that risky work tasks were discussed more often. The frequency of identifying and addressing specific worksite hazards during TBTs increased, suggesting that the talks were more participatory and problem-focused after the intervention. The frequency of passive methods for delivering the TBTs decreased after the intervention per foremen's and crewmembers' reports, including fewer instances of signing a TBT written on a hand-out and passively listening to a TBT read aloud. Importantly, improvements were seen in the crewmembers' safety knowledge and self-reported safety behaviors of their fellow workers.

Foremen and crewmember baseline survey results were very similar to responses collected at the same point in time from 273 carpenter apprentices working for foremen not participating in the TBT intervention. For example, 35% of apprentices said TBTs included discussions about how to address risky tasks at their worksites, compared to 36% of workers on crews of foremen participating in the TBT intervention. Since the frequency of responses was very similar between these two groups at baseline, the apprentice group was used as a concurrent control group to compare crewmembers' post-intervention results. There was no change in the apprentice carpenters' reports of TBT frequency and delivery methods at the post-intervention time-point, whereas carpenters working on participating foremen's crews reported increased TBT frequency and improved delivery methods. Comparison to the concurrent control group suggests that the improvements reported by the foremen and their crewmembers were due to the TBT intervention, and were not the result of other influences.

Project 2 Results: Ergonomics Tool Box Talk Intervention

On follow-up surveys completed after the series of TBTs, workers reported that information covered in the TBT was applicable to their job, the format used was better than their regular safety talks, that they could make changes to their job, and that they planned to try new tools or change work technique to reduce their risk of musculoskeletal injury (Table 2). Workers reported making a variety of changes due to the TBTs, including modified lifting and carrying methods, positioning themselves closer to the 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 TBTs to the work group's needs identified in worksite walk-through and that the information

was applicable to the work. Researcher observations of the TBT sessions confirm there was active discussion between workers and company representatives. Three contractor representatives provided specific examples of changed worker behavior that they felt were directly related to the TBTs, such as using the correct equipment for positioning themselves at the task and using equipment to perform material handling that had been previously performed manually. The representatives felt there was an overall increased safety focus. We compared workers' reports of ergonomic behavior changes to contractor representatives' descriptions and found them to be similar. After learning the results of the study, the general contractor shared the TBTs and guide company-wide with their safety representatives for future use.

Discussion

This paper presented two TBT interventions for the construction industry that utilized different approaches but had some common elements. The TBTs in both projects addressed the specific hazards identified at the construction site to increase relevance as suggested in peer-reviewed literature (Harrington et al., 2009, Varley & Blodt, 2002). Both interventions used worksite leaders to deliver the TBT. In the Fall Prevention Project 1, the foreman described specific work methods that would be used to address fall hazards in the workplace that day during the TBT. Foremen are more aware of workplace risks than their workers (Hung et al. 2011) and accustomed to mentoring inexperienced workers (Rogers, 2007), so they commonly deliver TBT. In the Ergonomics Project 2, a safety representative used a participatory approach to introduce workers to ergonomic principles they could apply when performing tasks with high exposures, such as alternative tools or work methods. Both projects utilized feedback from several sources to evaluate the success of the intervention rather than relying on only the workers' feedback. The fall prevention project surveyed foremen participating in the training and workers on these foremen's crews; whereas the ergonomics project surveyed TBT participants (i.e. workers) and gathered the TBT leader's perceptions via interview and 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 falls TBTs. Measurable changes in behaviors were not expected following the ergonomics TBT; however the revised TBT format was preferred by participants and over half of the participants felt empowered to make changes after the TBTs.

Template for Designing Worksite Specific Tool Box Talks

Construction companies can begin the shift towards more participatory, contextually-based TBTs by involving workers and management and adapting widely available, pre-printed TBTs, popular in the construction industry. The topic chosen must address a current concern or condition at the worksite; for instance discussing heat stress on very hot days, positioning one's body close to the task, scaffolds and ladders when truss setting, and nail gun use when building walls. Walk through the worksite to identify hazards and methods that can be used to minimize the risk and add these specific hazards and safety solutions to the canned TBT. Prepare questions or a personal story to discuss during the TBT. Invite site representatives who may be helpful in supporting the training and safety-related solutions

identified. Demonstrate and/or show photographs displaying specific hazards and identify examples of methods to correct the hazard. Use the questions or personal story to engage the workers in discussion and ask attendees about their knowledge or experiences about the topic. At the end of the TBT, highlight methods for the crew to practice that day, whether it is taking short breaks in the shade, positioning their scissors lift closer to the task, tying off the top of the extension ladder, or switching to a sequential trigger on the nail gun. Always address the crews' concerns regarding repairs, materials, or needed safety equipment, and note the progress with these requests at the next TBT. Take note on how well the photo examples, stories and discussion questions engaged the crew during the TBT, and use this information to guide the preparation of future talks. Provide the crew with reminders and feedback throughout the day to reinforce concepts discussed in the TBT, such as the training cards used in the ergonomics project. Long-term reinforcement and showing workers that TBTs are a two-way, continuous process, is necessary in order to have a lasting impact on workers' behaviors.

Tool box talks have become widely accepted and utilized in the construction industry. There is wide variation in the content and method of delivering TBTs, possibly due to differing goals or expectations for the TBT. A TBT that serves as a record to meet regulatory or insurance requirements by demonstrating that safety was mentioned will have a different result than a TBT designed to raise workers awareness of workplace hazards, identify solutions, and follow-through with solutions. Contextualizing a canned TBT and engaging the crew to address workplace hazards and present preferred work methods are simple methods to increase the effectiveness of the TBT. As construction companies, insurers, and government safety agencies mandate increased workplace training, the use of TBTs is likely to increase. Tool box talks can improve leading indicators for injury prevention, such as workers' knowledge, skills and behaviors, and help to ultimately improve the lagging indicators, whether it is falls from heights, musculoskeletal injuries, or illnesses due to exposures.

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Figure 1.
Fall prevention training session

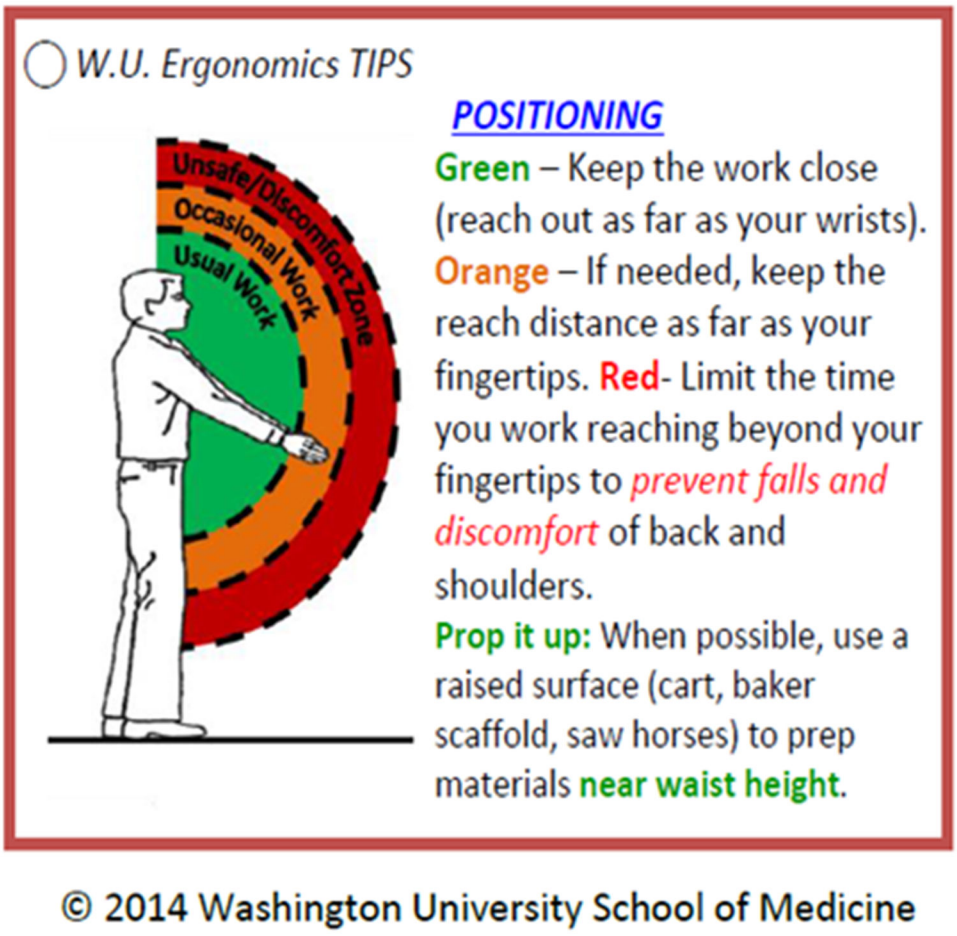

Figure 2:
Sample ergonomics TBT training card (available at http://www.elcosh.org/document/3838/d001307/TBT3%2BPositioning.html)

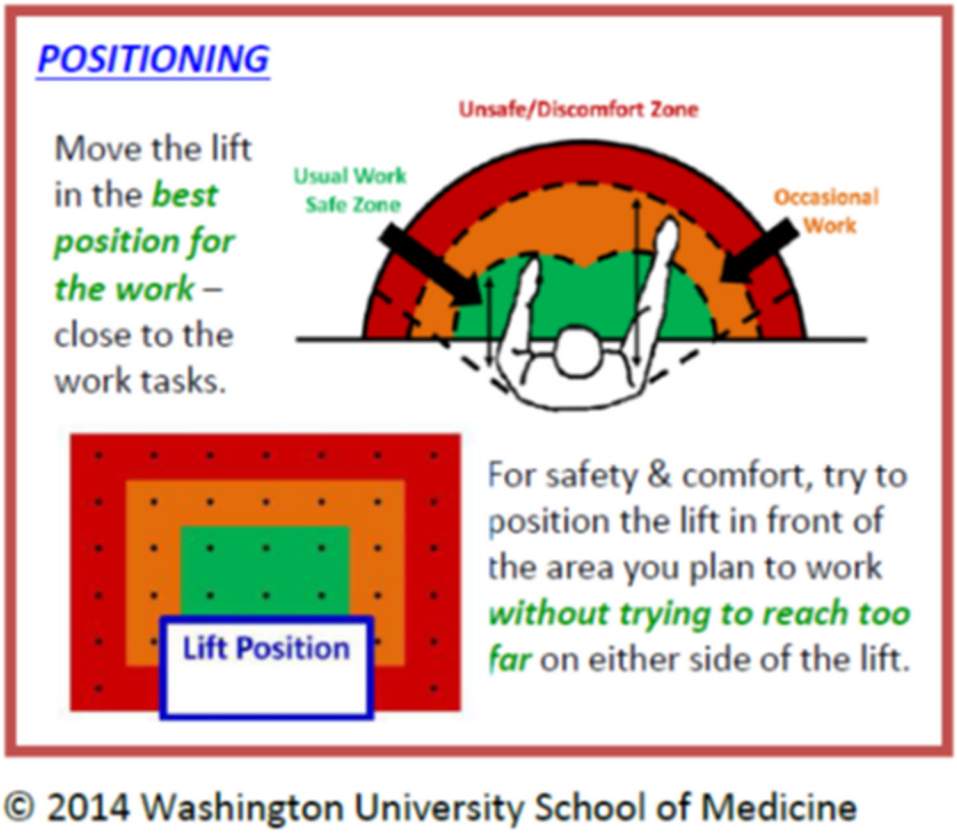

Figure 3:
Ergonomics training card

Table 1.

Fall Prevention Tool Box Talk Training Results

	Baseline		6 & 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 TBTs were held at least once/week	58%	64%	81% (p<.001)	79% (p<.001)	86% (p<.001)	75% (p<.001)
Agreed TBTs 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 Tool Box Talks, n=36

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