
California Underground Facilities Safe Excavation Board

September 9, 2024

Agenda Item No. 8 Information Item – Staff Report

Establish a Framework for Coordinated State Education and Outreach

PRESENTER

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SUMMARY

At the Board’s 2023 Education and Outreach meeting, the Board determined a need for coordinated education and outreach. Staff conducted research on the content, audience, delivery methods, marketing, and evaluation of existing education and outreach programs within the excavation industry. Based on the research, staff recommends conducting workgroups to identify the highest priority safety concerns and develop targeted education and outreach with uniform standards and language to address those concerns.

STRATEGIC PLAN

2020 Strategic Plan Objective: Improve Compliance by Reaching Parties in Effective Ways
Strategic Activity: Establish a Framework for Coordinated State Education and Outreach

BACKGROUND

Government Code § 4216.12(b)(1) requires the Board to coordinate education and outreach activities that encourage safe excavation practices. While statute and regulations exist around policy and enforcement of dig safe practices, there is a lack of unified understanding of standards within education and outreach efforts, which has caused a siloed approach in the development, delivery, and measurement of safety training and engagement. Some partnerships currently exist which create more consistent damage prevention education programs and their increased outreach proves that a coordinated effort throughout the industry could improve information uniformity.

This concept was introduced at the workshop discussion during the Board’s September 2023 Education and Outreach meeting¹ where the Board determined there was a need to develop a universal training program that is accessible to the broadest audience for a uniform

¹ [September 11, 2023, Agenda Item No. 5, Education and Outreach Workshop Discussion](#)

understanding. The Board determined that education needs to be tailored to reach all levels of industry workers and be inclusive of those who work in the field.

In its 2024 Workplan, the board and staff committed to work with stakeholders to conduct a learning needs assessment, identify a learning evaluation model, and begin developing an education and outreach plan consistent with that assessment and model. This coordinated effort aims to enhance the overall effectiveness and impact of education and outreach activities in the state.

DISCUSSION

Staff reached out to industry stakeholders to gain insight into their education and outreach programs and asked a series of questions regarding the content of the training, target audiences, delivery methods, marketing strategies, and methods for evaluating the efficacy of those factors to gain a better understanding of the current landscape of education and outreach initiatives. Staff also analyzed stakeholder's evaluation techniques to identify the type of learning evaluation model being used and the effectiveness of model.

Of the sixteen stakeholders who met with staff, six are utility operators, two are locator companies, two are software design and engineering companies, two are 811 notification centers, two companies deliver training, one is an insurance company, and one company is a locator equipment retailer and surveying company.

Existing Education and Outreach in the Community

The interviews showed that a great deal of time and money has been invested in education and outreach programs. Most of the stakeholders interviewed responded that the content of their training was updated on an as needed basis. The stakeholder interviews revealed they are using the following education and outreach approaches:

- *811 Notification Centers and Utility Operators:* Utility operators and 811 notification centers focus heavily on “call before you dig” campaigns, education on the five steps to safe digging, and Dig Safe laws and regulations. Methods of training include self-paced on-line courses, which award a certificate upon successfully completing a test at the end of the course, webinars, PowerPoint presentations, and classroom training. Classroom training is also delivered by external vendors. Stakeholders also conduct on-site training for contractors, covering pre-construction communications and planning, proper use of delineation, and safe excavation practices. Both notification centers and utility operators promote the 811 notification process at industry and public events, and one notification center partners with professional sports teams for placement of the 811 branding in prominent televised events.
- *Utility Operators:* Typically provide classroom instruction and field training for work crews, on topics such as excavation law and standards, and American Public Works

Association (APWA) color coding and marking². Utility operators also utilize existing training provided by the 811 notification centers. At least two utility operators indicated that they provided on-site field training as a response immediately following subsurface installation damage. In addition, utility operators conduct public awareness campaigns that include flyers or mailers.

- *Locators*: Training is developed in-house and used to on-board new employees. The training targets specific skills related to the vocation, including the 811 process and technical skills. Initial training typically takes between 8 to 12 weeks, consisting of classroom education followed by field training. The content is driven by National Utility Locators Contractors Association (NULCA) Professional Competence Standards for Locating Technicians³. They occasionally market to outside groups such as contractors, trade groups, and associated general contractors. Locators will typically conduct refresher courses for their employees to ensure that their skills are kept up to date.
- *Insurance Companies*: Utilize an online toolkit that includes a collection of resources to help identify, manage, and mitigate risks with excavation and trenching operations. The toolkit is exclusively available to customers.
- *Software and engineering design companies*: Focus their training on due diligence and pre-construction communication. Their training is targeted towards project owners and provides instruction on designing projects around existing infrastructure to reduce the amount of delineation and improve project efficiency. They also build their training around communications, focusing on communications with utility operators to verify subsurface installation with mapping data and to be inclusive of locators and contractors in meetings prior to beginning construction.
- *Training Delivery Companies*: One is primarily contracted by operators to deliver training that revolves around an annual schedule. The training is developed by the operator and any additional instructional material is provided by operators prior to conducting the training. Most of their training revolves around the Code of Federal Regulations Title 49, related to gas and hazardous liquid pipelines. Training is delivered in a classroom setting and they evaluate understanding through interaction with the learners. The second company is a startup and has been in existence for 18 months. Their focus audience is locators, and the intent is to create a path for locators to become designated technicians in subsurface utility engineering (SUE). Their training centers around Common Ground Alliance (CGA) best practices and NULCA standards and is delivered through colleges and universities in full 40-hour courses. They are increasing the scope of their training to include courses in geospatial data collection, global positioning satellites (GPS), field safety principles, and ground penetrating radar (GPR).
- *Locator Equipment Retailer and Surveying Company*: They present at seminars and provide instruction on the effective and accurate use of locating technology, including

² [CGA Best Practices Version 20, Appendix B, APWA ANSI Z535.1 Uniform Color Code and Marking Guide](#)

³ [NULCA Professional Competence Standards for Locate Technicians, 5th Edition, 2017](#)

GPR. They also provide 8-hour NULCA certified locator training courses statewide with 4-hour refresher courses. Learners must pass an exam that is conducted by a third-party vendor to be certified.

Learning Models and Gauging Effectiveness

Staff discovered that most evaluations of training effectiveness focused on learning evaluation models like the Kirkpatrick Four Levels of Evaluation⁴, which emphasizes evaluating the training through post-training feedback forms, pre and post-tests, hands-on assignments, and data interpretation. Nearly everyone interviewed used a method similar to Kirkpatrick, engaging learners with opportunities to provide feedback about the learning experience, and exams to verify that learners understand the material.

However, the Kirkpatrick model faces challenges in assessing long-term effectiveness when trying to interpret collected data. Staff found that most efforts to track effectiveness were through changes in number of damage reports and near-misses. The problems begin when attempting to directly attribute the damage reporting and near-miss data to training because damage reporting and near-miss data may not account for other factors not related to training or education.

Damage reporting data interpretation is not the only measure of the quality of training and outreach. The following methods are also being used:

- *Insurance Companies:* Evaluate the effectiveness of their training by doing field evaluations in which construction risk personnel go to the field and observe actual practices.
- *811 Notification Centers:* Measure effectiveness of outreach by monitoring the volume of 811 tickets and establishing trends. Ticket volume is monitored in counties where training is delivered, and success is determined by increases in new ticket submissions.
- *Utility Operators:* One operator is in the process of having a third-party consultant evaluate their training, conducting a gap analysis, and producing a white paper.

Utility Operators and 811 Notification Centers also track the number of people attending training or workshops, or the number of trainings or workshops being held. While this may not measure the effectiveness of content, it helps with measuring outreach efforts and increases optics of excavation safety.

An alternative method to the Kirkpatrick Four Levels of Evaluation is the Brinkerhoff's Success Case Method⁵, which may offer a more reliable approach to evaluating training effectiveness because it does not solicit immediate feedback, but rather delays the solicitation until after the training has been utilized for a prolonged period. This model identifies success and failure

⁴ [Kirkpatrick's Four Levels of Evaluation Model](#)

⁵ [Brinkerhoff's Success Case Method](#)

cases prior to interviewing learners and helps to gain information on learners' experiences with the training program. This information provides insight as to the aspects that worked well and the challenges they faced.

The strength of this model is the ability to identify the quality of performance and then target the direct relationship of the performance to the quality of the training. The Kirkpatrick model typically solicits feedback at the end of training before the training has been used on the job while the Brinkerhoff Success Case Method evaluates whether the content is retained; gathering feedback from the learner after repeated use of the training, which could provide a more direct correlation of data. These metrics can develop trends in success and failure cases, and asking for feedback after the training is utilized may contribute to specific insight on whether the training was understood, remembered, and effective. While other factors may still exist which impact data, the Brinkerhoff method is more likely to accurately target the quality of the training and education.

The final step to Brinkerhoff's is to develop action plans based on the feedback to make improvements to the training program, such as the content and methods of delivery.

Brinkerhoff's Success Case Method is more cost efficient compared to Kirkpatrick's Four Levels of Evaluation because it focuses on qualitative data rather than quantitative data. Brinkerhoff identifies the results then gathers targeted data to evaluate training whereas Kirkpatrick gathers data at all four stages to gauge effectiveness.

Learner Feedback

Member Bianchini raised concerns about inaccurate locating and the damages caused by mismarks during the Board's 2023 Education and Outreach meeting. Although the discussion revolved around ambiguity in the language found in the Common Ground Alliance Best Practices Guide as well as inaccurate or outdated information in mapping systems, staff research uncovered that some of the errors could be traced to training as well. Based on discussions in a Reddit channel, r/UtilityLocator⁶, which consists of over 2,600 members comprised primarily of locators, contractors, and others in the underground utility industry, staff observed several discussions about training. New locators are frustrated with the training they receive, and their experiences are being validated by experienced locators. Many new locators feel that they are being sent into the field with inadequate training and do not have the knowledge or skills to perform their duties with competency. Much of the training is done in classrooms and they feel like the field training is limiting.

Additionally, some members commented that the material taught is not always helpful with actual locating. An example from two different locators were comments that most of their training was related to maneuvering their work truck. Another locator received three days of field training exclusively on one type of utility and was not challenged with difficult training on

⁶ [Reddit Utility Locator Community](#)

types of assignments they would encounter in the field. Veteran locators gave the common response that most of the learning would be when they alone working in the field, that they would understand the job after a year in the field, and one veteran locator even suggested watching YouTube videos for instruction.

The overall comments expressed dissatisfaction with training from a specific group of learners. Many of comments were made after using the training to perform their job duties, which reinforces the benefits of using Brinkerhoff's Success Case Method as a learning evaluation model.

Takeaways and Goals

Staff identified two key takeaways from the information gathered. There is a need to improve communication and to make a coordinated effort to identify and address safety concerns, and to develop training with consistent language and standards so there is a uniform understanding across different groups of stakeholders. Improving communication and standardization are potential goals to strengthening education and outreach and might be achieved using the following strategies.

Facilitate Open Communication Between Industry Partners

- a. Continuously identify evolving damage prevention issues that necessitate new training or updates to existing training.
- b. Maintain standardized training content and delivery for each stakeholder group to ensure consistent performance across the industry.
- c. Share success stories to highlight the most effective training methods and improve efficiency and cost-effectiveness by focusing on proven strategies.
- d. Establish partnerships that enable training to be consistently delivered by any member within a stakeholder group, thereby increasing training frequency and optimizing resource use.

Standardization

- a. Identify key damage prevention issues within each stakeholder group and develop targeted training to address these problems.
- b. Develop a universally adopted training program for each stakeholder group to ensure consistent processes and procedures across different jobs.
- c. Identify and collect performance data to establish concrete metrics for each training program. Use this data to ensure training consistency and identify areas for improvement. The focus should be on achieving uniformity in training outcomes, even if it reveals areas needing improvement.
- d. Design modular training that can be easily customized for specific audiences while maintaining overall consistency across the stakeholder group.

All training materials should be stored in a centralized repository, ensuring that the latest versions are accessible to everyone who needs them. This approach will prevent the use of outdated or inconsistent training materials by different parties.

Potential Methodology

Research into existing education and outreach, and current measurements of effectiveness, demonstrate that there is a broad level of experience and effort across industry that is limited by available resources. By involving all stakeholder groups, resources could be combined to develop training and outreach initiatives that are consistent and facilitate substantive advancements in education and outreach. While every stakeholder is making progress within their respective industry, there are gaps that could be addressed with fresh perspectives on the same problems from other stakeholder groups.

One potential method to achieve this goal would be to develop a survey that is created and driven by industry and various stakeholders to identify high priority safety concerns, then research and develop targeted education and outreach. Staff would solicit feedback and make a series of revisions to the materials and plans prior to implementation. By focusing the training development on the highest priority concerns, it would reduce the scope of work and increase the likelihood of success. However, this survey-based approach is less engaging with stakeholders and does not provide opportunities for the free exchange of knowledge and expertise which is not conducive to a collaborative process. This approach might also lead to an incorrect interpretation of the problems and result in less effective education and outreach initiatives. Finally, this method would be labor intensive for staff to coordinate, review, and apply stakeholder feedback to develop training.

An alternative approach involves holding a series of workgroups to identify high priority safety concerns, collaboratively develop training, and work together to implement the education and outreach initiatives. This method fosters interactive discussion and enhances stakeholder investment in the development and delivery of the product. This method is also labor intensive for staff, requiring increased logistics to coordinate multiple workgroup meetings, but it would also be more likely to produce significant positive results and successful implementation of initiatives because stakeholders would have an active role throughout the process.

Both processes would require the cooperation of stakeholders and learners to obtain data for learning evaluation.

RECOMMENDATION

Staff recommends the Board's Education and Outreach Committee conduct a series of education and outreach workgroups to collaboratively identify high priority safety concerns, develop training, and implement the training. Staff also recommends to the Board that it have staff use the Brinkerhoff learning evaluation model to determine effectiveness of training.