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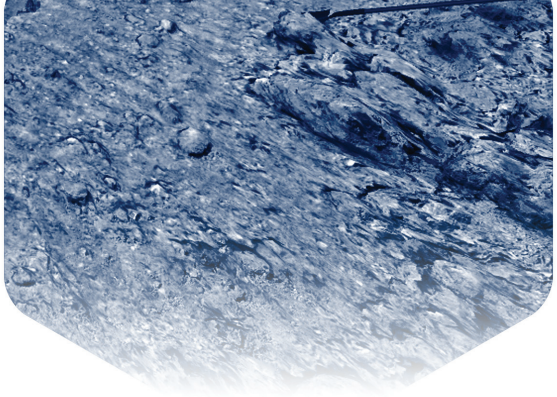
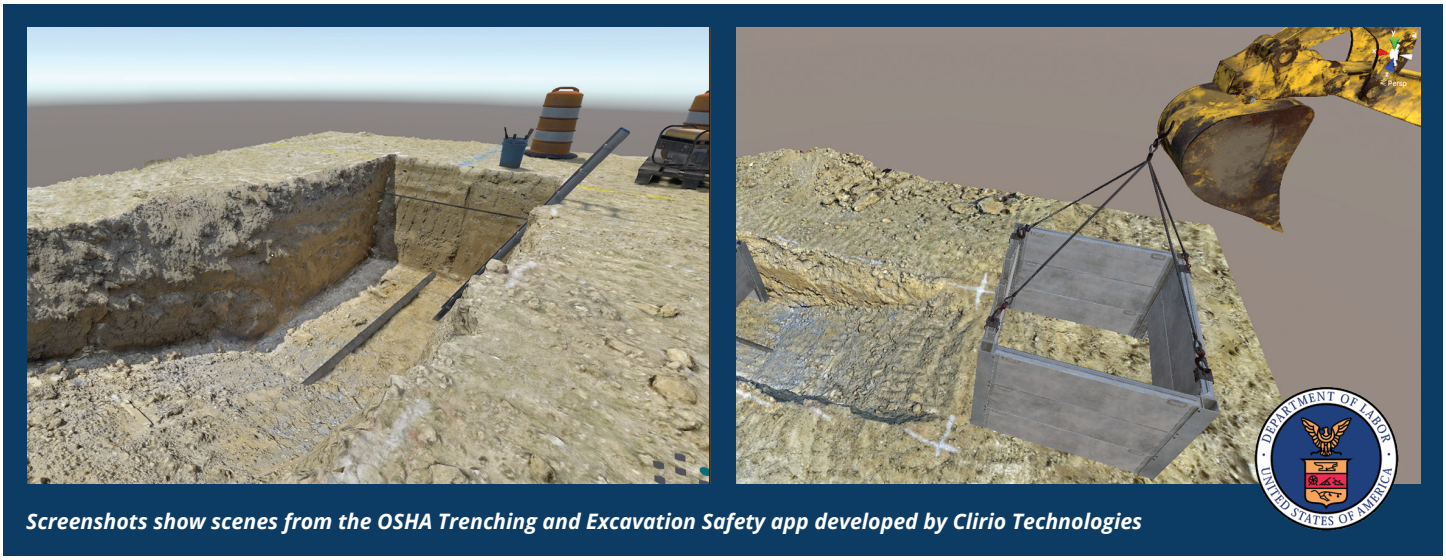


DOL/OSHA Training App

Trenching and Excavation Safety in Mixed Reality

Client: The United States Department of Labor (USDOL) is a cabinet-level department of the U.S. federal government responsible for occupational safety. The Occupational Safety and Health Administration (OSHA) exists to ensure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. OSHA covers most private sector employers and their workers, in addition to some public sector employers and workers under federal authority, with accident prevention and safety training being their key mandates.

Challenge: Excavation and trenching are among the most hazardous construction operations. Cave-ins pose the greatest risk and are much more likely than other excavation related accidents to result in worker fatalities. Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment. Trench collapses cause dozens of fatalities and hundreds of injuries each year. The challenge for OSHA and the USDOL is to find a way to effectively train workers in correct procedures and safety techniques when working in and around trenches and excavations.



Screenshots show scenes from the OSHA Trenching and Excavation Safety app developed by Clirio Technologies

Solution: Clirio Technologies developed a comprehensive, mixed reality application using the Microsoft HoloLens 2 and our own software. This application allows instructors to safely and effectively demonstrate the issues and dangers that are present in a variety of open trench scenarios at a 1:1 scale in training sessions with up to 25 students. Six different scenes using realistic and immersive 3D graphics are employed to show ground conditions, common hazards, safety equipment and best practices. These scenes show the various types of trenches students may encounter, as well as the equipment and techniques used to mitigate against hazards. Audio and animation are employed to create a realistic environment. The application gives the instructors control over the pace and direction of the instruction, and students are able to obtain a real-world feel for these situations without needing to go into the field.

Result: Students are now able to review and learn about trench and excavation safety in a controlled environment while still gaining benefit from on-site experience. By placing them in full-scale, immersive scenarios, this application goes far beyond traditional training materials (such as textbooks or videos) to allow students to learn by seeing and doing. Instructors and administrators can supply this training, secure in the knowledge that they have a consistent and repeatable system that allows for the integrity of the material and useful measurement of the results. There are also the benefits of reducing both unnecessary travel to a dedicated facility and person-to-person contact during this period of concern over COVID-19.

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