

TRENCH SHORING

- Trench shoring is a technique used on excavation projects that prevents trench walls from caving in.
- Traditionally trench shoring has been implemented by building custom reinforcement walls for each unique trench.
- Shore Right, our sponsor company, provides an efficient reusable system for trench shoring.
- Shore Rights system allows for crossing utilities within a trench to easily be reinforced around, something that used be very difficult.

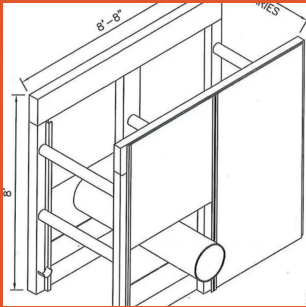


Figure 3: Diagram of ShoreRight's proprietary shoring system



COMPUTER VISION TRENCH SHORING OPTIMIZATION

Purpose: Utilizing ready made Computer Vision API's to more efficiently read excavation blueprints, generate optimized trench shoring configurations, price estimates and important data about each excavation.

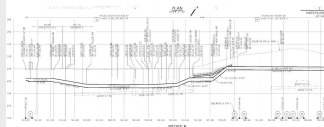


Figure 1: Image of an excavation blueprint

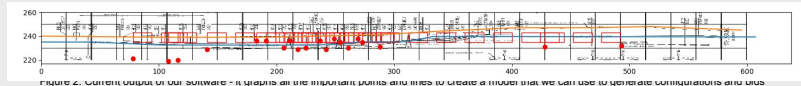


Figure 2: Current output of our software - a graph of all the important points and lines to create a model that we can use to generate configurations and data

Generating Computer Vision Output

- Using Google's Cloud Vision API we can output all the text on a blueprint.
- We then parse through text, pulling out the applicable numerical values and symbols.
- Pairing symbols and values with their location on the blueprint tells us where the trench slope changes and as well as the location of crossing utilities.
- Combining all of this allows us to graph the trench and create a list of objects representing crossing utilities that can later be used to generate trench shoring configurations.

Utilizing Computer Vision Data

- With this data we can generate a graph simulating the trench, that the user can approve and provide user input through.
- With a list of objects representing the type, size, depth, and location of each crossing utility it is easy to graph the points and ask the user for accuracy verification.
- With this data we can generate configurations that require the user to move the shoring system the least number of times while still providing safe shoring for the entire trench
- Using the size of the trench, the number of times the shoring system requires moving, the number of crossing utilities and other data we can generate a bid that provides an accurate estimate of the cost of the project

ACKNOWLEDGEMENTS

- Jason Johnson
- johnsia7@oregonstate.edu
- Sean Cameron
- camerons@oregonstate.edu
- ShoreRight Inc. sponsored project.
- ShoreRight Inc. is the creator of the ShoreRight shoring system.



Figure 4: CS Team 23, Jason Johnson (left), Sean Cameron (right)