**Case Study: White Point Landslide in the San Pedro District of Los Angeles**

CE En 544 - Seepage and Slope Stability

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**Background**

The Palos Verdes peninsula is known for its large landslides and geologic activity. The area of White Point, which sits on a bluff overlooking the ocean, experienced a landslide that swept away the road. In July 2011 the area started showing signs of possible failure. The city began relocating utilities and blocking off the area. Despite the city's best efforts, in November of 2011 approximately 420 feet of the earth slid 53 feet toward the Pacific Ocean. The city expects construction to begin in 2019 and take two years to complete with a total cost of $32 million.

**Analysis**

For our analysis, we created a UTexas model that imitates the same area where the landslide was located. We simulated the dimensions and the material of the soil located in the area. We found the dimensions of the slope and distance of the road from the edge from Google Earth. We added a distributed load for the roadway, which includes weight of pavement and trucks driving over the road. We analyzed the area to find the factor of safety without reinforcement. This returned a value of 1.371 with a side force inclination of 32.39 degrees.

We ran another analysis in UTexas of the same slope and distributed load but with reinforcement. The optimum reinforcement we found was with 7 reinforcement members at 108 feet in length. Shortening the length and number of reinforcements lowered the factor of safety. Whereas increasing the length didn’t increase the factor of safety at all. The factor of safety returned at this optimum situation was 1.465 at a side force inclination of 27.8 degrees. The cost of these reinforcement members was approximately $453,000. This value was calculated using the spreadsheet used in class. We did account for difficulty of access to the location. We increased the cost per foot to account for this. These costs are estimated values but the price could be inflated for work being done in California. The cost per foot might need to be increased again to account for this.

**Conclusion**

With the reinforcements it would raise the factor of safety from 1.371 to 1.465. The cost of reinforcements would be almost a half a million dollars. This would have been more cost effective than paying $32 million to have the road slope rebuilt. This also would have saved the road from being closed for as many years as it will be. Overall it would have been a smarter investment to reinforce the slope and have a higher factor of safety from the beginning.

**References**

Johnson, Christopher F. Shannon & Wilson, Inc., Geotechnical and Environmental Consultants. "White Point Landslide: Project Summary." City of Los Angeles Engineering. City of Los Angeles. Web.

"White Point Landslide: Project Summary." City of Los Angeles Engineering. City of Los Angeles. Web. 6 Apr. 2016. <http://eng.lacity.org/whitepoint/whitepointlandslide.htm>.