Lessons Learned from Retaining Walls Failures

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Abstract: In recent years, retaining walls have proven to be a riskier aspect of our projects than other types of structures. Retaining walls have a far higher failure rate than other structure types with similar complexity, construction cost, and size. Failures modes include excessive movement (vertically or horizontally), construction blunders, and collapse. These failures have raised liability concerns among some engineers, contractors, insurance companies, and project owners. While AASHTO codes and DOT practices have made failures less frequent for transportation projects than on commercial projects, the failure rate has been relatively high even for DOT projects. The author has completed evaluations of retaining wall failures by participating in legal action, completing design peer reviews, providing design and construction engineering services, and providing forensic evaluations. Throughout this experience it has become evident that a large majority of retaining wall failures have resulted from just two causes: poor communication among the project team, and failure to manage water. Inadequate communication occurs among the design team, between designers and contractors, and between office and field staff. Water-related failures occur due to groundwater seepage, poor management of surface water, or leaky water and sewer lines. The presentation will use several real-world examples to show how retaining wall failures occurred; what lessons were learned from those failures; and how those lessons can be simply and practically applied to future projects. Examples will include several types of retaining walls including mechanically stabilized earth, cast-in-place concrete, and sheet piles. Examples include failures during construction, soon after construction, or years later. By applying these lessons, failure rates can be reduced, liability concerns can be eased, and successful projects will result. These lessons learned are sometimes quite basic and apply to other aspects of our projects as well. There will also be a brief discussion for the students in the audience of how litigation (and threats of litigation) impacts consulting engineering.

Bio: Mr. Wendland has 27 years of experience in geotechnical engineering and is Kleinfelder’s Technical Discipline Leader for geotechnical engineering, geological engineering, and engineering geology. In this role, Steve leads all 300+ of Kleinfelder’s geoprofessionals throughout the United States, Canada, and Australia to coordinate high quality, efficient work on all projects. Previously, Steve served as Kleinfelder’s Technical Practice Leader for retaining walls. In that role, Mr. Wendland worked to coordinate engineering work for large retaining wall projects and lead forensic investigations for retaining wall failures.

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