

Improvements in estimating strengths of loose sandy and silty tailings: first results from the TAILLIQ research project.

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Rapid loss of strength of cohesionless sandy or silty tailings is now recognised as being possible not only under seismic loading, but also under loading that is essentially monotonic in nature. This rapid strength loss occurs in tailings that are looser than a critical void ratio. The loading that initiates loss of strength may be due to a range of factors, including a rise in phreatic surface, rapid loading, or excavation at the toe of a slope. Although a good understanding of the phenomenon of rapid strength loss of relatively permeable sandy or silty tailings is possible through the application of well-established theoretical frameworks such as Critical State Soil Mechanics, techniques for establishing relevant strength parameters has proven challenging.

This paper reports on an industry and Australian Research Council funded research project, TAILLIQ, that is a joint initiative between four Australian Universities. The paper focusses on two issues, namely the accuracy with which the critical void ratio can be determined for a given tailings; it does this by presenting the results from a 'round robin' study in which 18 geotechnical laboratories around the world participated, testing the same tailings (sampled from a gold mine in Western Australia). The results were variable, although a reasonable number were very similar, as described in the paper. Reasons for anomalous results are discussed. The second topic of the paper is the interpretation of cone penetration test data for silty tailings, and draws on results from two new calibration chambers that were built as part of the TAILLIQ project.