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Consistency of the Casagrande Liquid Limit Test

Reference

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ABSTRACT

The liquid limit test is one of the most widely used tests in soil mechanics, with the value obtained being correlated against a variety of soil properties such as soil strength. The percussion test for liquid limit originally described by Casagrande [Casagrande, A., 1932, "Research on the Atterberg Limits of Soils," *Public Roads*, Vol. 13, pp. 121–136] is the standard test for liquid limit in much of the world. The apparatus to be used is described in many design codes including ASTM D4318-10e1 [Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils, *Annual Book of ASTM Standards*, ASTM International, West Conshohocken, PA]. While it is well known that two classes of these devices exist, those with hard and soft bases, the true picture is more complex; international design codes contain a great variety of specifications for the devices, some much more prescriptive than others. This paper uses the analysis described by Haigh (2012) to investigate the effects of base hardness and resilience on specific strength at liquid limit. A survey of devices in use worldwide was also carried out, indicating that both the variability in national design standards and potential degradation of bases over time leads to a large variability in the specific strength observed at liquid limit when different devices are used. The paper demonstrates that both base hardness and resilience must be regularly monitored in order to achieve consistency of liquid limit test results and that international standards should be more closely aligned if measured values are to be used within regressions based on liquid limit tests carried out with apparatus based on a different standard.

Keywords

plasticity, identification and classification of soils, texture plasticity, density characteristics of soils

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