

The consistency of current regulations for compacted clay liners

AB Fourie^{1*} and RA Brown²

¹ Department of Civil Engineering, University of the Witwatersrand, Private Bag 3, Wits 2050, South Africa

² Jarrod Ball and Associates, 9A Louis Road, Orchards 2192, Johannesburg, South Africa

Abstract

The current requirements for a liner beneath any municipal, industrial or hazardous waste disposal site to be constructed in South Africa usually include at least one compacted clay layer. The required performance of these compacted clay layers is specified in terms of a maximum allowable hydraulic conductivity. This paper discusses two issues related to achieving this requirement; these are the acceptance criteria for quality control tests and the number of tests that must be carried out to ensure that a required standard of quality is achieved.

The inherent variability of the hydraulic conductivity of a clay must be accounted for when interpreting acceptance criteria. This may best be addressed by invoking the concept of an equivalent hydraulic conductivity, the definition of which requires a statistical evaluation of the field hydraulic conductivity variability. The benefit of using indirect (or surrogate) measurements of hydraulic conductivity, such as *in situ* density, may provide an acceptable method of characterising the clay's variability, provided these surrogate measurements are correlated with *in situ* hydraulic conductivity measurements.

Two techniques are discussed for deciding on the required number of quality control tests. It is shown that a statistical approach provides a quantifiable measure of the level of confidence that may be attached to a particular series of measurements, unlike conventional approaches that merely specify a required number of tests per unit area.

It is argued that the adoption and utilisation of the concepts described in this paper will lead to a more consistent and rational approach to the quality control of compacted clay liners.