Hydraulic Conductivity of Thirteen Compacted Clays

Craig H. Benson[1] and John M. Trast[2]

[1] Dept. of Civil and Environmental Engineering, University of Wisconsin-Madison Madison, Wisconsin 53706
[2] STS Consultants Ltd., Green Bay, Wisconsin 54311

Abstract: Hydraulic conductivity tests were conducted on thirteen compacted clayey soils being used for compacted clay liners at landfills throughout the United States. The soils were prepared to various molding water contents and then compacted and permeated in the laboratory. Results of the tests show that for all of the soils, zones exist in the compaction plane (i.e., dry unit weight vs. water content) where the hydraulic conductivity is similar. These zones fall roughly parallel to contours of constant initial saturation (degree of saturation at compaction), with lower hydraulic conductivities generally occurring for conditions corresponding to higher initial saturation. Wet of the line of optimums, lower hydraulic conductivity is also attained for soils that are more plastic and have a greater quantity of fines. A regression equation was developed from the data to estimate hydraulic conductivity given the initial saturation, compactive effort, plasticity index, and clay content.

Key Words: Clay liners • Compacted clays • Hydraulic conductivity

Clays and Clay Minerals; December 1995 v. 43; no. 6; p. 669-681; DOI: 10.1346/CCMN.1995.0430603

Clay Minerals Society (www.clays.org)