
Effect of pH on the Rheology of Marine Clay from the Site of the South Nation River, Canada, Landslide of 1971

J. Kenneth Torrance and Maria Pirnat

Geotechnical Science Laboratories, Department of Geography, Carleton University, Ottawa, Canada K1S 5B6

Abstract: The pH of Na-saturated, carbonate-containing and carbonate-free Leda clay, at salinities of 2 and 10 g/liter, was decreased from pH 8 to 4 by the addition of HCl. The Bingham yield stress, as determined with a coaxial viscometer, increased in all materials as the pH decreased. Above about pH 7 the 2-g/liter materials had a lower yield stress at any water content than the 10-g/liter materials, whereas, below about pH 6.8 the yield stress of the carbonate-containing soil at a salinity of 10 g/liter was lower. For the carbonate-free material, the change occurred at about pH 6.2. The influence of salinity on the remolded shear strength of these materials was pH-dependent. A yield stress increase with decreasing pH was likely due to a change in ion saturation. The carbonate-free material exhibited a maximum yield stress at about pH 5.5– 6.2, depending on salinity. The isoelectric points for oxides and clay mineral edges most probably account for the existence of the maximum.

Key Words: Isoelectric point • pH • Quick clay • Remolded strength • Rheology • Salinity • Yield stress

Clays and Clay Minerals; October 1984 v. 32; no. 5; p. 384-390; DOI: [10.1346/CCMN.1984.0320506](https://doi.org/10.1346/CCMN.1984.0320506)
© 1984, The Clay Minerals Society
Clay Minerals Society (www.clays.org)
