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Geotechnical Properties of Pedological Soil Groups

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There is a knowledge gap between pedologists (soil scientists) and geotechnical engineers, because of their different interests in soils. The former is concerned with the soil's ability to sustain plant growth, while the latter is interested in the behaviour of the soil for construction purposes. Although the soils are the same material the application of the knowledge with respect to the interpretation of the properties and characteristics differ between the two disciplines.

Identification, sampling and analysing of representative soil forms from different pedological groups was done in order to conclude their probable geotechnical characteristics by utilizing their geotechnical and physical analytical results and data. The materials comprised of 15 representative pedological soil groups. These different soil groups were sampled throughout South Africa seeing as some soils are restricted to certain localities and climatic conditions. The pedological soil data are captured in the Soil Database of the Agricultural Research Council's Land Type maps and Memoirs. After the sampling and soil preparation, which involved drying and sieving, the analysis of the soils was carried out. The analyses include geochemical, chemical, physical and geotechnical characteristics and properties such as soil pH, particle size distribution and plasticity indices. Regrouping of the pedological soil groups of interest into USCS and AASHTO geotechnical classification systems followed. By establishing the general characteristics of the soil groups, their function could be determined as well as proposed implications. If the specific requirements are known in the early stages of site investigations and desktop studies, the geotechnical engineer will have more success in identifying geotechnical implications and integrating the requirements into the entire structure. The proposed geotechnical implications are therefore of vital importance in the early stages of construction as it will lead to better solutions, simpler construction processes and designs as well as lower cost geotechnical involvement.

By integrating pedological soil group data as shown on Land Type maps and Memoirs with geotechnical soil groups, classified according to AASHTO and USCS, a better understanding can be obtained in terms of decision making in both disciplines and will avoid duplication in mapping programmes, analysis and costs. However before the classification systems can be integrated a standard terminology needs to be established between the disciplines.

Keywords: *Geotechnical properties, Pedological classification, USCS classification, AASHTO classification.*

