Proceedings of the

SYMPOSIUM ON RECENT ADVANCES IN GEOTECHNICAL CENTRIFUGE MODELING

A symposium on Recent Advances in Geotechnical Centrifuge Modeling was held on July 18-20, 1984 at the University of California at Davis. The symposium was sponsored by the National Science Foundation's Geotechnical Engineering Program and the Center for Geotechnical Modeling at the University of California at Davis.

The symposium offered an opportunity for a meeting of the International Committee on Centrifuges of the International Society for Soil Mechanics and Foundation Engineering. The U.S. participants also met to discuss the advancement of the centrifuge modeling technique in the U.S. A request is being transmitted to the American Society of Civil Engineers to establish a subcommittee on centrifuges within the Geotechnical Engineering Division.

RELATIONSHIPS FOR MODELLING WATER FLOW IN GEOTECHNICAL CENTRIFUGE MODELS

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ABSTRACT

Appreciation of the importance of water pressures in the behavior of soil was a major turning point of modern soil mechanics, and correct prediction of the pressures and assessment of the effects on soil has remained fundamental to geotechnical design and research. Replication of the pore fluid behavior in saturated and partially saturated soil is therefore critical to effective modelling, although this ideal cannot always be achieved. Furthermore, different pore fluid events will take place at different rates in a reduced scale centrifuge model, influenced by the reduction in scale and by the increase in self-weight, depending on the nature of the flow. For example, seepage will be governed by different laws depending on whether the soil is saturated or partially saturated. Once seepage water emerges and drains away as surface runoff, other laws will govern its runoff behavior, and erosion, governed by still other relationships, may change the soil profile causing slope instability.

This paper will investigate the relationships between centrifuge model and prototype water effects under steady state and transient seepage conditions, in saturated and unsaturated soil, as well as those relationships which dictate erosion and other effects of surface water on soils. In most cases the paper will be based on relationships already existing in the literature, although in areas where this is found tc be incomplete, new analysis will be developed.