DESIGN OF EARTHEN CANALS IN SANDY SOIL USING THE REGIME CONCEPT

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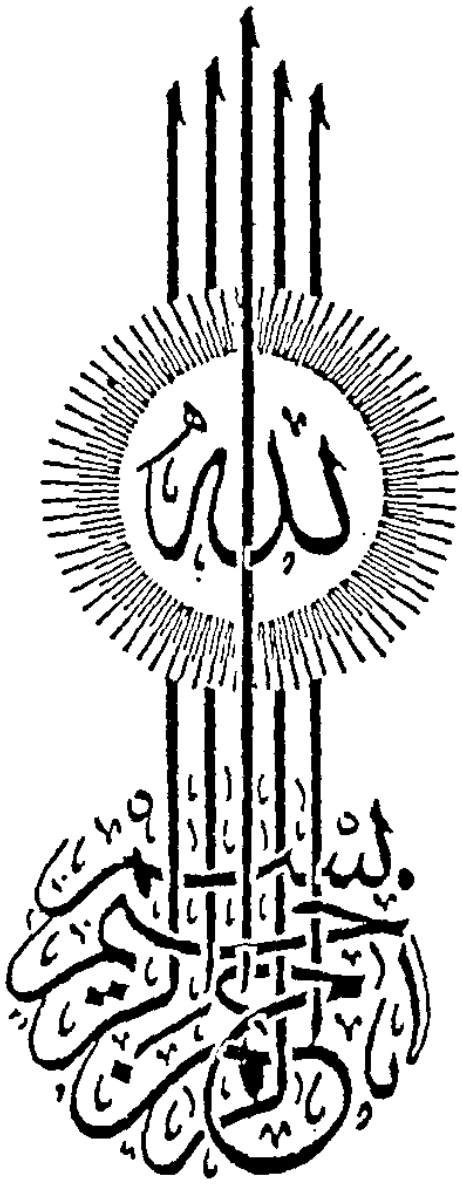

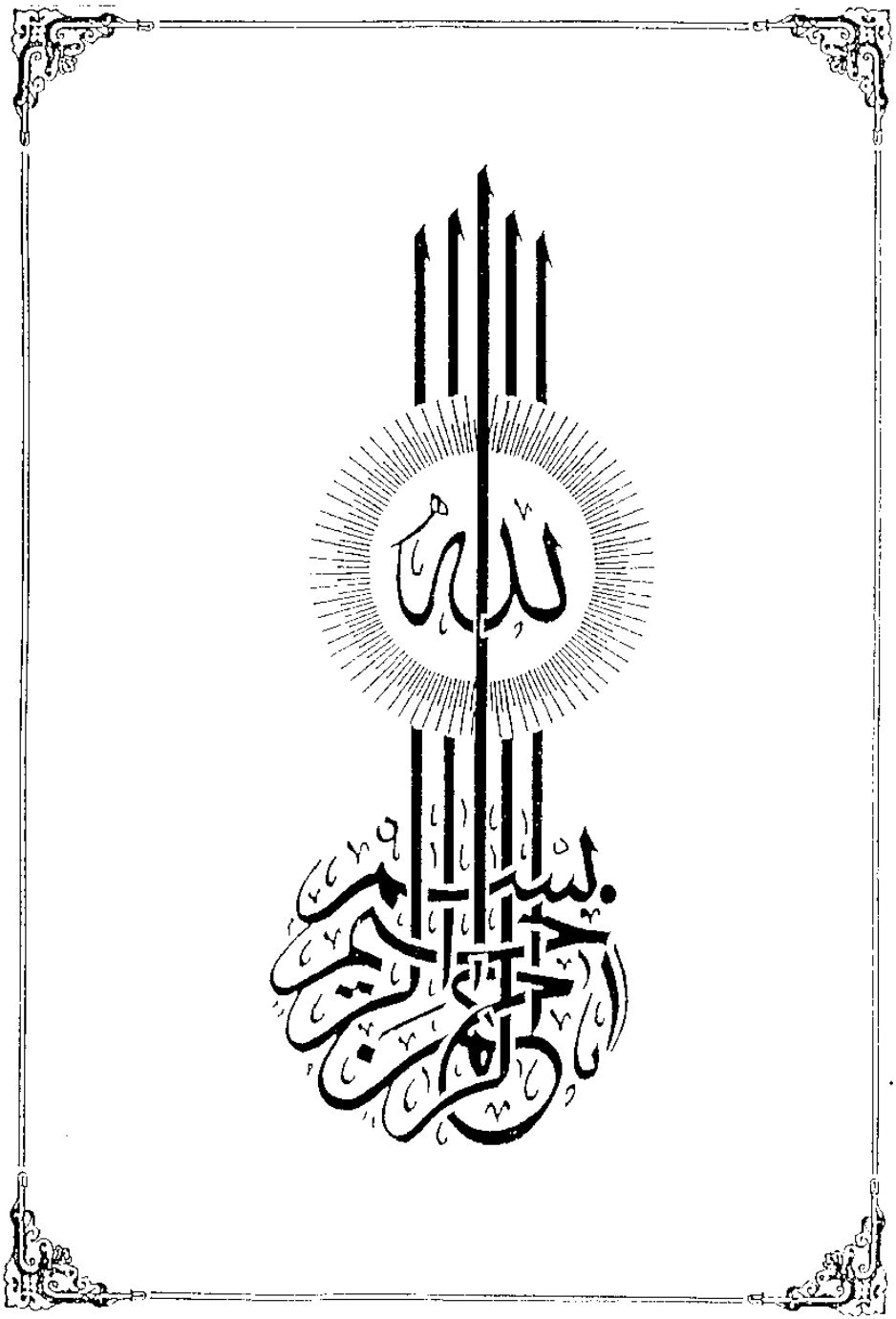

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STATEMENT

This thesis is submitted to Ain Shams University for the degree of Master of Science in Civil Engineering.

The work included in this thesis was carried out by the author in the Department of Irrigation & Hydraulics, Ain Shams University, from September 1992 to September 1994.

No part of this thesis has been submetted for the degree or qualification at any other University or Institution.

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ABSTRACT

During the last 40 years the design practice for earthen canals in Egypt was based on El-Difrawy, Molesworth, and Yenidonia regime equations. El-Difrawy equation was deduced for the regime of irrigation system before the construction of Aswan High Dam (AHD) and is valid for average solid suspension 1600 ppm.

As the regime of canals system in Egypt has substantially changed after the construction of AHD, El-Difrawy equation may not be valid any more and new design concept is needed.

Investigations were carried out in Egypt (Khattab et al. 1984, 1985, 1987) based on measurements on stable canals passing through cohesive soil with discharges from 2 to 200 m^3/sec.,where a series of design regime type equations were deduced. These equations have correlated the relationship between the flow parameters and the canal geometrical elements of water cross-section and the slope.

In a similar way the present study was suggested to investigate the modification of the regime theory to achieve a suitable design equations for canals passing through sandy soil to cover a wide range of discharges from 0.1 to 200 m^3/sec . Field measurements were carried out in four stations on Ismailia, Port Said and Suez fresh water canals. Over 79 experiments were conducted during two years to follow up different water levels at maximum and minimum water requirements. To generalize the work, data of other investigators on sandy canals was also collected. All data

were analysed where four regime type equations were deduced. These equations can be used safely in designing canals in sandy soil conveying discharges from 0.1 to 200 m^3/sec.More useful regime type equations were also deduced. Comparison between the obtained results and those by others investigators took place.

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