THESIS

APPLICATION OF HYDRAULIC DESIGN THEORIES IN THE LIGHT OF GEOTECHNICAL INVESTIGATIONS OF CHASHMA RIGHT BANK CANAL STAGE-III

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ABSTRACT

In the present era, when a danger of global drought is knocking at the day's door, the importance of water resources is unquestionable especially for a country like Pakistan whose national economy basis upon agriculture-rather irrigated agriculture. As we know, water resources project in Pakistan fall short of the agricultural demand so an urgent need of development of new water resources and construction of new irrigation canals is badly felt. Chashma right bank canal is one of the heavily funded irrigation canal project of Pakistan spanning over 15 years of its construction and is about to complete this year, 2002. The quality of construction work is highly appreciable especially in the third stage which is the last portion of the canal. But the author of this thesis, being native of the area and ex-structural engineer of the project, felt that project design requires thorough review based on economy.

Soil investigation is a laborious and expensive task but it is backbone of structural design. After classifying the soil and knowing its texture and properties, Taylor's stability analysis is the simplest way to decide the stability slopes of the canals. The calculations made in this study not only confined the accuracy of CRBC designers, but on the basis of these conclusions, it was also found that a slope of 1:1.4 (instead of 1:1.5 which is given by the Consultants) is also structurally stable for the same discharge, saving approximately Rs. 3.5 million only in one construction item (i.e. 4" R.C.C. lining). Moreover, keeping in view the future developments of this vast fertile unirrigated area, an unlined section is also designed based upon Lacey's silt theory. There has been a

proposal of uplift canal on the Western side of existing CRBC-III canal but this scheme is not yet solidified due to unavailability of funds, especially for concrete lining. So the unlined section is designed because gross national income be not deprived of heavy revenue which can be gained from this fertile land. Of course, the unlined section can be lined later on availability of funds. Different alternatives for lining types are also discussed in this study.