NUMERICAL METHOD FOR ESTIMATING SEEPAGE UNDER CHASHMA JHELUM LINK CANAL CONDITIONS

THESIS BY

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ABSTRACT

Numerous empirical and analytical techniques are available in the literature for measuring or estimating seepage from canals. It was, however, noted that these known methods could't be applied for estimating seepage from Chashma Jhelum Link Canal due to major differences in the conditions prevailing in the area of this canal and those considered for derivation and application of known methods. This study was undertaken to explore the possibility of using known numerical techniques for estimating the seepage from canals with unsymmetric ground water table sloping predominantly in one direction.

For this purpose a sand model was constructed to depict the phreatic surface for known values of inflow into the aquifer and canal seepage. A finite difference numerical model ART1 was formulated to simulate the results of the sand model. The phreatic surface computed by the numerical model was found to be very close to the results observed in the sand model. This showed that the numerical model discussed in this study can be successfully employed for estimating seepage from Chashma Jhelum Link Canal.

Simplification of d/s boundary condition in the numerical model from a varying head boundary to a fixed head boundary would make the application of the numerical model to field problems easier, and it was found that such simplification can be incorporated without affecting the results appreciably. Senstivity analysis (section 3.4) showed that the numerical model can be employed for estimating seepage under field conditions from large canals only. The resulting error shall not exceed -10% if seepage estimation is based on commulative difference parameter AD.