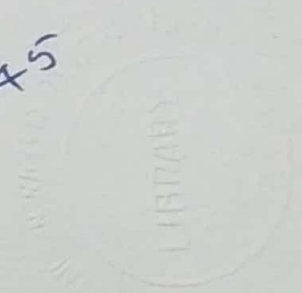


EVALUATION OF DESIGN CRITERIA FOR SURFACE DRAINAGE  
SYSTEM

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THESIS BY

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## ABSTRACT

During the last three decades a network of surface drains has been constructed all over the country to alleviate the detrimental effect of storm water. The main problem faced by the design engineer is to determine the quantity and peak of runoff from a given area and create favourable conditions for crop growth. Historically the amount of surface runoff in the Punjab Province has been determined by empirical formula of the form of  $Q = CA^n$ . Tipton and Kalmbach recommended surface drains to be designed in (ref.31) Punjab for a storm of 24 hours with a recurrence interval of 10 years.

This study was carried out to estimate the probable peak discharge per unit of catchment area for different return periods. Average unit hydrograph was developed from actual observed hydrographs of Marh-Chiniot drainage basin. It was compared with other unit hydrographs such as U.S. SCS, Clark's and modified Snyder (used by T&K) methods. Later peak discharge per unit area were predicted for rainfall of return periods 2,3,4 & 5 years.

The validity of the derived hydrographs was tested by comparing with the observed hydrograph. In spite of the limited available data, the results closely agreed and indicated the reliable application of the derived hydrographs. Therefore, the results obtained by the unit hydrograph technique may be considered as an aid to engineering judgment for the selection of drain design criteria.

Analysis of the available data shows that the existing drainage factors are too low. Consequently the drains overflow their banks every year. The hydrograph and probability methods used in this study, however, indicate a value of 6 Cfs/Sq. mile for a return period of three years against 2 Cfs/sq.mile actually used in the design. This adequately explains the reason for the drains to overspill their banks.

The author hopes that in future the analysis would improve as more reliable field data become available.