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MODELLING RUNOFF CHARACTERISTICS OF THE MINNERIYA AND NACHCHADUWA CATCHMENTS

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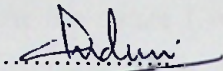
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DECLARATION BY THE CANDIDATE

I declare that the work included in this dissertation in part or whole has not been previously presented for any other academic qualification at any institution for a higher degree.



I.H.Hettiarachchi

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Abstract

There are several methods available for prediction and simulation of floods. Computer aided hydrological modelling is a powerful technique of hydrologic system investigation for both the research hydrologists and the practicing water resource engineers. Computer aided modelling in flood studies is increasingly used in Sri Lanka today. In the present study the HEC-HMS software of the US Army Corps of Engineers has been applied to the Nachchaduwa and Minneriya reservoirs. Accordingly, the US Soil Conservation Service (SCS) method and the Snyder's method were used for studying the rainfall runoff relationship in the dry zone of Sri Lanka.

On December 24th and 25th of 1957, the dry zone received a record rainfall after a dry spell of nearly 20 months. The Anuradhapura area (North Central Sri Lanka) recorded a total precipitation of 435mm for the 24th and 25th of December 1957, which was followed by a devastating flood of unprecedented scale. Being a major agricultural district, all agricultural and irrigation infrastructure of Anuradhapura underwent severe destruction; 10% of the major tanks and 50% of the village tanks were damaged.

This study is an attempt to relive the incidents of December 1957 by computer aided simulation of two major flood events associated with the major irrigation reservoirs Nachchaduwa and Minneriya, where the catchments areas are 650km² and 384km² respectively. In addition, two other flood events which occurred in 2004 have also been analysed.

It is found that the SCS method consistently yields results superior to the Snyder method, and the model parameters can be found with greater ease in the SCS method.