

Determination of the Runoff Coefficient in Urban Regions, an Example from Haifa, Israel

Authors : Ayal Siegel, Moshe Inbar, Amatzya Peled

Abstract : This study examined the characteristic runoff coefficient in different urban areas. The main area studied is located in the city of Haifa, northern Israel. Haifa spreads out eastward from the Mediterranean seacoast to the top of the Carmel Mountain range with an elevation of 300 m. above sea level. For this research project, four watersheds were chosen, each characterizing a different part of the city; 1) Upper Hadar, a spacious suburb on the upper mountain side; 2) Qiryat Eliezer, a crowded suburb on a level plane of the watershed; 3) Technion, a large technical research university which is located halfway between the top of the mountain range and the coast line. 4) Keret, a remote suburb, on the southwestern outskirts of Haifa. In all of the watersheds found suitable, instruments were installed to continuously measure the water level flowing in the channels. Three rainfall gauges scattered in the study area complete the hydrological requirements for this research project. The runoff coefficient C in peak discharge events was determined by the Rational Formula. The main research finding is the significant relationship between the intensity of rainfall, and the impervious area which is connected to the drainage system of the watershed. For less intense rainfall, the full potential of the connected impervious area will not be exploited. As a result, the runoff coefficient value decreases as do the peak discharge rate and the runoff yield from the storm event. The research results will enable application to other areas by means of hydrological model to be set up on GIS software that will make it possible to estimate the runoff coefficient of any given city watershed.

Keywords : runoff coefficient, rational method, time of concentration, connected impervious area.

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