CONCENTRATION TIME AS DURATION OF CRITICAL RAINFALL: IS IT A FALSE PARADIGM?

José Nilson B. Campos

ABSTRACT

In urban drainage it is sometimes found in text books that the critical rainfall duration is equal to the watershed's concentration time. Supposedly, using the rational formula to transform rainfall in run-off, that duration is the one that gives the maximum discharge. This paradigm is supposedly proved under the following assumptions: 1) the runoff process is linear; 2) the hydrograph has triangle shape; 3) the intensity-duration-frequency relationship is i = K.Tm/(t+t0)n where i is the rainfall intensity in mm/h; T is the return period in years; t is the rainfall duration in hours or minutes; K, m, t0 and n are the equation's parameters; 4) the rational formula Q=CiA is valid. In this paper is proved and shown that there are cases where a rainfall with duration less than the basin concentration time gives the maximum values for the discharge at basin outlet.

PALAVRA-CHAVE: critical rainfall, rational formula, urban drainage, small basin, maximum discharge