

ABSTRACT

In the past the construction of the streets, mainly in areas near to a torrent, was intended to lead the water that came from the basins. At present the streets are designed with other function, facilitate the movement of cars, and therefore only are prepared to lead a small quantity of water, which is generated in the same street because of rain, and with the purpose that is intercepted by some drain-hole.

The purpose of this study is to know the hydraulic behavior in a crossing streets. On the basis of an event of rain is a process of transformation of the precipitation in run-off. Therefore, generates a stream that runs through the streets. This situation can reach the point that generated a great runoff of water, caused by the ruling by the drainage system or by the obstruction of the scuppers. Although this limit situation, it will not be subject to this thesis because we assume that all the water will be captured by the scuppers, and the flows will never be very large.

The main objectives of this thesis are: to establish the distribution of flow rates of departure of crossing streets, as well as the angles of hydraulic bounce in the crossing, according to the proportion of power of the flow of entry. It will be study these parameters for different relations flow between streets, different angles between crosses of street (30° , 45° , 60° and 90°), and according to the existence or not pumping(pending cross on the road). Due to the inability by economic issues to build a crossing streets with the characteristics mentioned, it has been studied the behavior of the flow in a crossing streets from the models GID /CARPA. The first is a program developed by the CIMME, which allows us to represent the geometry of a crossing streets. The second is a program developed by the department of hydraulic school of I.C. C. P. B; this program is a tool of numerical analysis of the flow of water in plate free and variable regime. With the purpose of power simulate the different crossing streets proposed, and establish parameters as important as are: the flow, speed and drafts. These parameters will be key to establish the distribution of flow rates of departure and angles of hydraulic bounce in the crossing.

Initially, the methodology to continue was to establish the validity of the programs used (GID /CARPA). For this reason, were compared the results obtained from an experimental device (a crossing streets orthogonal, without pumping) built in the Dept. of hydraulics, Sea and Environmental E. T. S. E. C. C. P. B. of UPC; with the results to simulate numerically, a crossing streets orthogonal, without pumping in GID and CARPA. The excellent performance of these programs, as a result of the comparison of results, was essential to achieve the objectives of this thesis.

Once demonstrated the validity of the programs used. The next step was to study the behavior of the different crosses of street that we have defined above. And in this way, able to establish the distribution of flows out on the basis of the proportion of power of entry for each angle of the crossing streets. In the same way, it was also available to establish the second goal of this thesis. Get the angle formed the hydraulic bounce in the crossings on the street, on the basis of the proportion of power of entry for each angle of the crossing streets.

The result of this work, showed that the flow follows some patterns. These depended of the power proportion from the angle formed in the crossing streets and the combination of slopes from the streets.