DESIGN AND CONSTRUCTION OF AN EXPERIMENTAL CHANNEL OF HYDRAULICS FOR HIGH FROUDE NUMBERS

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Abstract

The idea to design and to construct a channel of high numbers of Froude beginning from a doctoral thesis work about the "three-dimensional hydraulic jump" where initially it was thought that this one single phenomenon happened when the supercritical flow, before the jump, outside high ($\mathbf{F_1} > 12$). Therefore equipment was designed that fulfilled the requirements so that these types of flows appeared. In this work one is to the process of design and construction of an experimental channel of hydraulics where they will be managed to cause flows of high numbers of Fraud ($\mathbf{F_1} > 12$). The channel consists of the following main parts:

1) Cistern
2) System of pumping
3) Constant head tank
4) Box of pressure
5) Channel of tests

These parts connect to each other through pipes of 25.4 cm and 30.48 cm of diameter that is measured commercial of 10 and 12 inches respectively. The equipment allows to obtain an ample range of supercritical flows with numbers of Froude ($\mathbf{F_1}$), from a little beyond the critic ($\mathbf{F_1} = 1$) to $\mathbf{F_1} > 20$.

In this channel, the flows can be observed at floor-level, sides and under the channel

In this channel flows of different Froude numbers can be studied, regulating the floodgate of the pressure box.

Hydraulic models can be studied, as well as the behavior of waterfalls

The following photographs show the channel

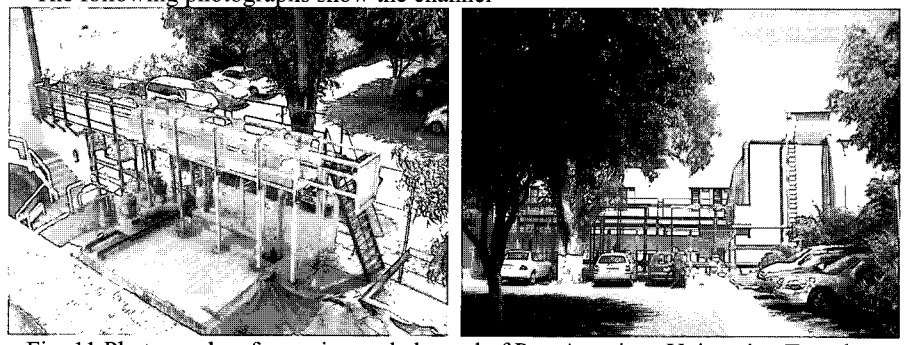

Fig. 11 Photographs of experimental channel of Pan-American University. Test channel (left) and constant head tank (right)

Also some tests that were made in this channel are presented. Finally the work of investigation showed that the three dimensionality of the hydraulic jump does not depend on the high numbers of Froud but of the depth of the supercritical flow.

The investigation showed that the three dimensionality of the hydraulic jump does not depend on the high numbers of Froud ($\mathbf{F}_1$) but of the depth of the supercritical flow (y_1)

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