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VARIATION OF PHYSICAL AND CINEMATIC PARAMETERS OF FLOWS IN STEPPED CHANNEL

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Abstract

The nappe flow regime is divided into three sub-types, characterized by the formation or absence of hydraulic jumps on the bed of the stairs. The skimming flow regime is sub-divided considering the geometry of the steps and the flow conditions that lead to different configurations of the flow fields near the steps. For this, we have made an experimental approach in the laboratory of civil engineering at the University of Laghouat (Algeria), in three (03) models: model A (4cm x 7.5cm 4cmx) and model B (8cm x 7.5cm 8cmx), and the third model C size (12cm x 12 cm x 7.5 cm) developed "Plexiglas." Three slopes were studied in this experiment: α = 20 °, 30 ° and α = α = 45 ° for the three models, with flow rates ranging from q = 0.96 l / s / ml up to q = 33.02 l / s / ml.The purpose of this experimental study is to show the evolution of the velocity profiles in the cross sections of the flows, and pressure variations in the three studied models. The analysis of our results led us to conclude that, The result obtained in the model B and C where the flow is in nappe flow; the pressure field increases in horizontally steps and decreases in vertically steps; this is due to the effect of the impact of the flow on the step; and against the pressure in step is below atmospheric pressure (vacuum). Furthermore, the speeds increase significantly with increasing rate of flow and accelerated

more than one moves downstream; In the last, for the skimming flow, longitudinal flow velocity distribution is nearly constant which is shown in the uniform area flow.

Keywords:

Nappe Flow, Pressure, Skimming Flow, Stepped Channel, Velocity