HYDRAULIC PERFORMANCE OF SYPHONS UNDER CONTROL BY INLET AND OUTLET PIPE CUTTING ANGLES

Mohamed A. Awad, Gamal M. Abd-elaal, Mohamed N. Salem, Magdy H. Mowafy

Abstract

This study aims to improve the hydraulic performance of pipe siphon. An inlet and different outlet cutting angles used to control the flow through the pipe and to minimize losses resulting from the sudden contraction of the pipe. Experimental works were carried out using rectangular circulating flume and pipe syphon model. The pipe constant cutting angle of ($\alpha_1 = 15^\circ$) anticlockwise from the vertical axis of. The pipe outlet model had different angles of ($\alpha_2 = 0^\circ$, $15^\circ$, $30^\circ$, $45^\circ$, and $60^\circ$) clockwise from the vertical axis of the pipe outlet. The pipe siphon tested using different discharges ($Q = 7.28$ to $57.20$ lit./sec) and different downstream submergence ratios ($0.0$, $0.25$, $0.50$, $0.75$, and $1.0$). Dimensional analysis was employed to get the inter-relationships among the factors affecting the head losses through the syphon. The results of the study led to ($\alpha_1 = 60^\circ$) with submergence ratio ($H_d/D = 0.0$ and $0.25$) gives best results for losses and upstream water depth, while The outlet cutting angle ($\alpha_1 = 30^\circ$) with a downstream submerged ratios of ($H_d/D = 0.50$, $0.75$, and $1.00$) gives best results for losses and upstream water depth.