

Effect of Submerged Water Jet's Cross Section Shapes on Mixing Length

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Abstract : One of the important applications of hydraulic jets is used for discharge industrial, agricultural and urban wastewater into the rivers or other ambient water to reduce negative effects of pollutant water. Submerged jets due to turbulent condition can mix large amount of dense pollutant water with ambient flow. This study is conducted to investigate the distribution and length of the mixing zone in hydraulic jet's flow field with change in cross section shapes of nozzle. Toward this end, three shapes of cross section (square, circle and rectangular) and three saline densities current with different concentration are considered in a flume with 600 cm as long, 100 cm as high and 150 cm in width. Various discharges were used to evaluate mixing length for a wide range of densimetric Froude numbers, Fr_d , from 100 to 550 that is defined at the nozzle. Consequently, the circular nozzle, in comparison with other sections, has a densimetric Froude number 11% higher than square nozzle and 26% higher than rectangular nozzle.

Keywords : hydraulic jet, mixing zone, densimetric Froude number, nozzle

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