3D Numerical Simulation of the Flow Pattern in Pre Settled Pools Using Fluent Software

Alireza Jabbari[1], Hassan Ahmadi[2], Bahram Malek Mohammadi[3]

[1] MSc Student in Civil-Water Engineering, Islamic Azad University of rood hen, Tehran, Iran
[2] Assistant Professor, Department of Civil-Water Engineering, Islamic Azad University of rood hen, Tehran, Iran
[3] Assistant Professor, Department of Civil-Water Engineering, Islamic Azad University of rood hen, Tehran, Iran

Abstract

Pre settled pools were most important elements in water purification process. Because of enormous cost of making these pools which have been allocated about 30% of the total cost to water purification process Modeling and optimal performance of Pre settled pools is very important. The present study investigates numerical simulation of flow in a rectangular basin. Continuity and Navier-Stokes equations are solved using finite volume method. Flow simulation was performed in 3D using the standard k-ε turbulence model. Flow velocity profiles were compared with the experimental results in different sections of Pre-sedimentation basin. The comparison shows that there is a good agreement between numerical and experimental study. Then, the results of the velocity profiles in different sections of the basin and flow separation zones were compared with the experimental results. It showed that there is a good agreement between the numerical and experimental results. It also indicates excellent ability of this numerical model in predicting velocity distribution profiles and flow separation zones in pre-sedimentation basins.

Keywords: Pre Settled Pools, Flow Pattern, Fluent Software, Standard K-ε Turbulence Model

1. INTRODUCTION

Pre settled pools plays important role at separating Aerosols of fluids, so that in purification department, before pre settled pool, Coagulant have been added and, so particles size have been increased and time of sediment have been decreased. Given the importance of drinking water quality and purification with high efficiency purification water process, performance of pre settled pool has been addressed. Sediment particles moves to floor of pre settled pools by Gaining