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Numerical simulation of the inlet sedimentation rate to lateral intakes and comparison with experimental results

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ABSTRACT:

Intakes are generally used in water distribution networks, irrigation channels, sewage networks, water/wastewater treatment facilities, input to power generation facilities, etc. Due to the flow complexity and also the effects of scale, physical models can not solely provide a clear understanding of the physics governing the flow field and it is necessary to study this phenomenon numerically along with field and experimental studies. Lack of inlet sediment control to intake due to sediment transport to irrigation channels and facilities create difficulties for different parts. In this study, the flow numerical simulation has been performed in the direct path of rectangular channel using SSIIM software and k-ω turbulence model. The effects of the geometric and hydraulic parameters on flow separation zones are investigated. Then, for investigation of the sedimentation, effect of deviation angles of 45 to 90 degree and discharge ratio on the ratio of inlet sediment to intake is simulated. Numerical results were compared with the experimental; and a good agreement has been found between them. Results showed that with increasing the discharge ratio and deviation angle, there found increase in the inlet sediment ratio to the intake.

Keywords:
Runoff, neural network model, ICAR method, Justin method

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