

## عنوان مقاله:

Numerical simulation of turbulent water-solid-particle flows to predict the solid deposition process and the velocity distribution of water in sewage pipes

## محل انتشار:

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## خلاصه مقاله:

Research on the dispersion and deposition of solid particles in sanitation networks is crucial due to its role in channel blockage and overflow of wastewater and stormwater systems. Conventional detection methods are excessively costly and demand a significant time investment, while predictive mathematical models are prone to uncertainties. This study aims to assess the influence of solid particles on fluid flow and incorporate the effects of added mass and pressure gradient into the equation governing particle behavior. It is motivated by observations in Algeria, where the density of solid particles is notably high, thereby accentuating their impact on wastewater flows. To achieve these objectives, a bidirectional Eulerian-Lagrangian coupling method is employed, combining the advantages of various turbulence models, including the  $k-\omega$ -sst model and the standard discrete random walk (DRW) model. This approach enhances our understanding of solid particle dispersion and deposition in sanitation networks, contributing to more efficient management and prevention of pipe obstructions, with implications for environmental preservation and the sustainability of urban sanitation systems. The use of turbulence models recommended in this study is inspired by Kolmogorov's pioneering work on turbulence, while the integration of added mass and pressure gradient forces falls within the context of particle dynamics in suspension. By leveraging in-situ data and incorporating the aforementioned forces, this innovative approach deepens our understanding of the processes involved in solid particle dispersion and deposition in urban drainage networks. These advancements are pivotal for the management and prevention of pipe obstructions, thus contributing to the preservation of the environment and the sustainability of urban sanitation systems.

## کلمات کلیدی:

**لینک ثابت مقاله در پایگاه سیویلیکا:**

<https://civilica.com/doc/1902824>

