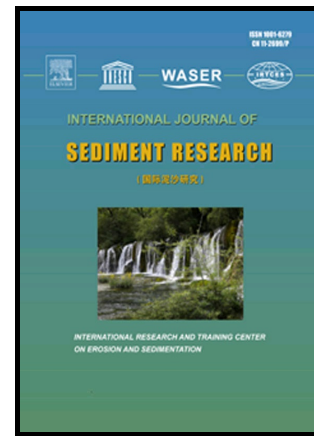


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# Multigene genetic programming for sediment transport modeling in sewers for conditions of non-deposition with a bed deposit

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**ABSTRACT** It is known that construction of large sewers based on consideration of flow with non-deposition without a bed deposit is not economical. Sewer design based on consideration of flow with non-deposition with a bed deposit reduces channel bed slope and construction cost in which the presence of a small depth of sediment deposition on the bed increases the sediment transport capacity of the flow. This paper suggests a new Pareto-optimal model developed by the multigene genetic programming (MGGP) technique to estimate particle Froude number ( $Fr_p$ ) in large sewers with conditions of sediment deposition on the bed. To this end, four data sets including wide ranges of sediment size and concentration, deposit thickness, and pipe size are used. On the basis of different statistical performance indices, the efficiency of the proposed Pareto-optimal MGGP model is compared to those of the best MGGP model developed in the current study as well as the conventional regression models available in the literature. The results indicate the higher efficiency of the MGGP-based models for  $Fr_p$  estimation in the case of no additional deposition onto a bed with a sediment deposit. Inasmuch as the Pareto-optimal MGGP

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