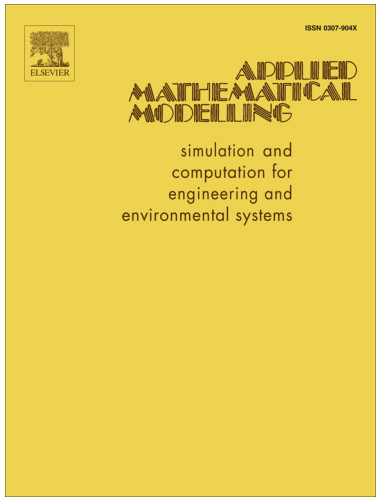


# Application of Smoothed particle hydrodynamics for Modelling gated spillway flows

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PII: S0307-904X(14)00270-4
DOI: http://dx.doi.org/10.1016/j.apm.2014.05.008
Reference: APM 10015

To appear in: *Appl. Math. Modelling*

Received Date: 27 August 2013
Revised Date: 15 May 2014
Accepted Date: 15 May 2014

Please cite this article as: K. Saunders, M. Prakash, P.W. Cleary, M. Cordell, Application of Smoothed particle hydrodynamics for Modelling gated spillway flows, *Appl. Math. Modelling* (2014), doi: http://dx.doi.org/10.1016/j.apm.2014.05.008

# APPLICATION OF SMOOTHED PARTICLE HYDRODYNAMICS FOR MODELLING GATED SPILLWAY FLOWS

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## Abstract

Computational models of spillways are important for evaluating and improving dam safety, optimising spillway design and updating operating conditions. Traditionally, scaled down physical models have been used for validation and to collect hydraulic data. Computational fluid dynamics (CFD) models however provide advantages in time, cost and resource reduction. CFD models also provide greater efficiency when evaluating a range of spillway designs or operating conditions. Within the present literature, most studies of computational spillway models utilise a mesh-based method. In this work we use the particle based method of smoothed particle hydrodynamics (SPH) to model weir flow through a four bay, gated, spillway system. Advantages of SPH for such modelling include automatic representation of the free surface flow behaviour due to the Lagrangian nature of the method, and the ability to incorporate complex and dynamic boundary objects such as gate structures or debris. To validate the SPH model, the reservoir water depth simulated is compared with a related physical study. The effect of SPH resolution on the predicted water depth is evaluated. The change in reservoir water level with discharge rates for weir flow conditions is also investigated, with the difference in simulated and experimental water depths found to range from 0.16 to 11.48%. These