

Erosion Model

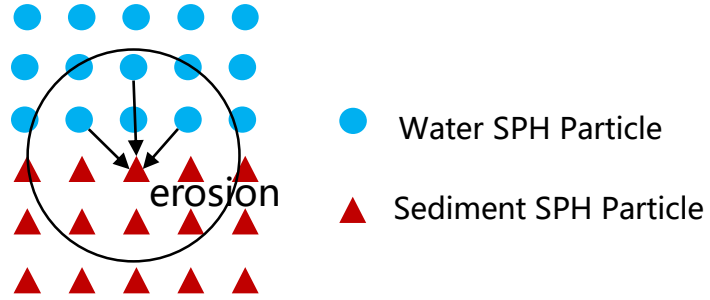


Fig.1 Erosion diagram at the interface.

Erosion Rate $\varepsilon_s = k_\varepsilon(\tau_s - \tau_c), \tau_s = k_s\sqrt{J_2}$

Erosion Mass $dM_e = \rho_s \varepsilon_s dAdt$

Erosion Condition $\tau_s > \tau_c$

Incipient Condition $M_e > M_s$

Initial Configuration

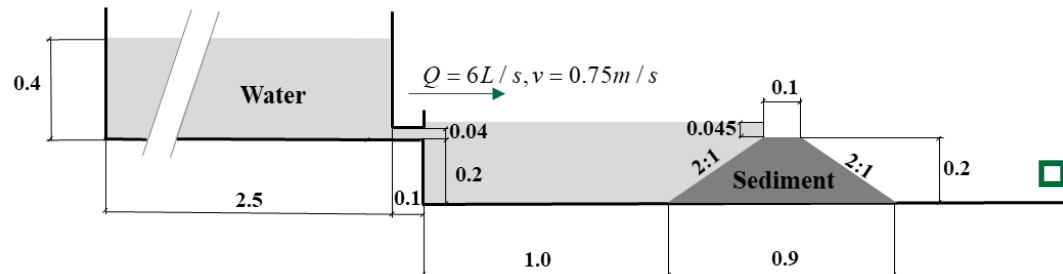


Fig.2 Sketch of the numerical case.

Results

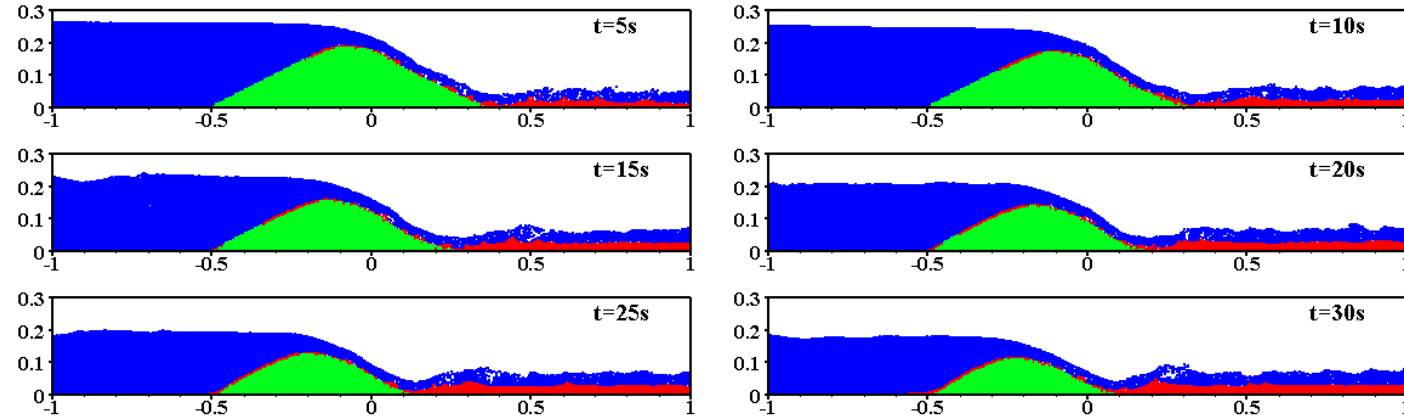


Fig.3 Scouring process; blue, red and green colors represent water particles, eroded particles and un-eroded particles, respectively.

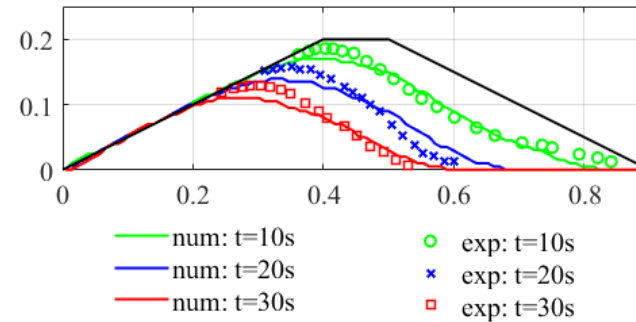


Fig.4 Comparison of experimental and numerical dam profiles.

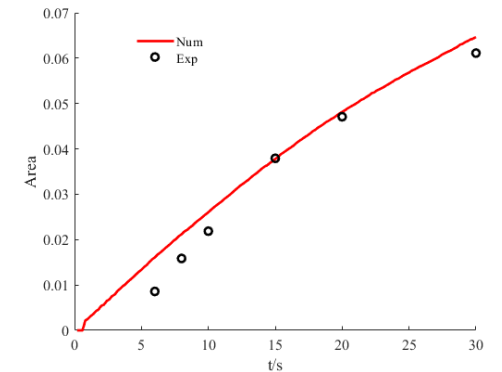


Fig.5 Comparison of experimental and numerical erosion mass.

Conclusion

We simulate overtopping dam-break flow with the newly developed multi-phase erosion model. The results show the developing process of dam profiles and erosion mass which are well validated with the experiment.