

# SPH European Research Interest Community SIG

## Test case 6

### 2D SPH Validation. Effect of wet bottom on dam break evolution.

By

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Evolution of a dam break is reproduced using 2D version of SPH model. Starting from experimental results we can validate our model. So, different results depending on height of wet bottom are obtained.

The experiment was taken from the paper by Janosi *et al.* 2004. Experimental setup is depicted in figure 1, where  $d_0 = 15$  cm is the dam-break height and  $d$  is the fluid depth in the bottom of the tank ( $d=0$  indicates a dry bed). In the experiment two different bottom depths were considered; 18 and 38 mm.

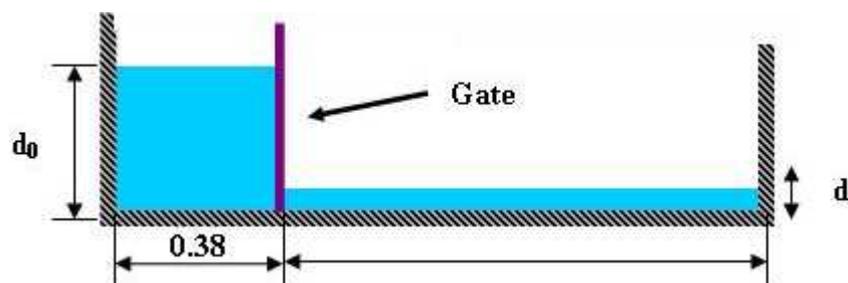
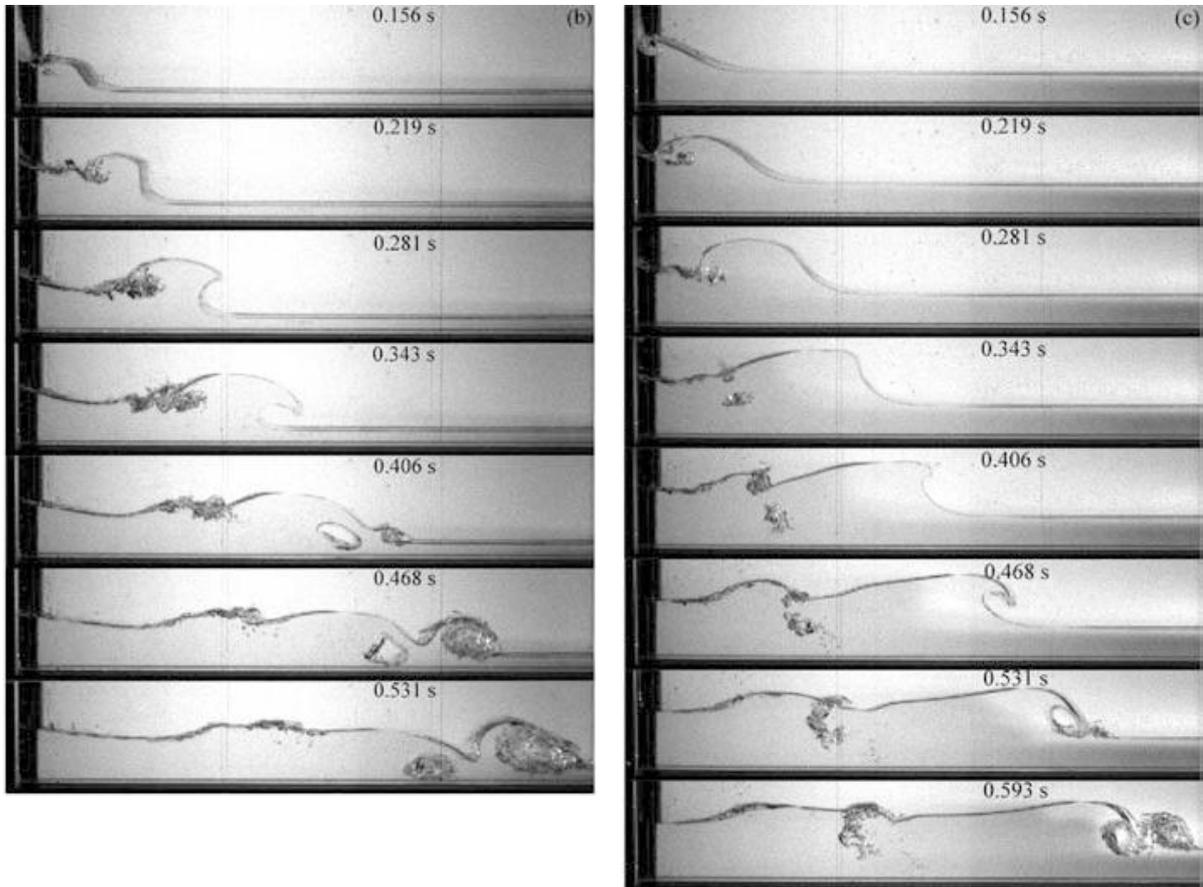


Figure 1. Experimental setup.

The experiments were recorded by two CCD cameras.



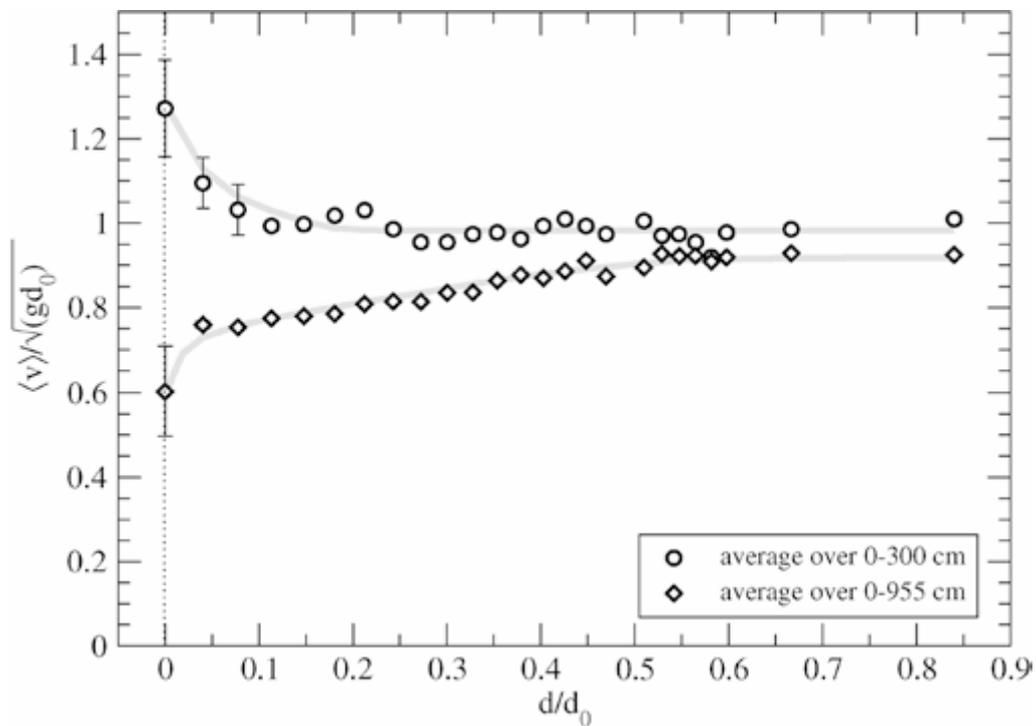
**Figure 2.** Snapshots after releasing fresh water from the lock in the dam-break experiment.

I digitalized experimental wave profiles in order to compare with SPH profiles: ([d18\\_1](#), [d18\\_2](#), [d18\\_3](#), [d18\\_4](#), [d18\\_5](#), [d18\\_6](#), [d18\\_7](#), [d38\\_1](#), [d38\\_2](#), [d38\\_3](#), [d38\\_4](#), [d38\\_5](#), [d38\\_6](#), [d38\\_7](#), [d38\\_8](#)). The dimensions of the digitalized snapshots are  $0.38\text{m} \leq X \leq 1.04\text{m}$  and  $0.0\text{m} \leq Y \leq 0.13\text{m}$ .

In the experiment the gate is removed from above at a constant velocity of 1.5 m/s. So we have to simulate dam-break evolution including the gate movement.

In the figure 3, velocity is represented for several  $d/d_0$  (the ratio between fluid depth in the bottom of the tank and initial dam height). An average velocity along the first 3 meters [0,3] m was measured.

Some problems can appear comparing your SPH velocity with experimental one, since it is very difficult to get an absolutely dry bed in the experiment and there is always a very thin water layer near bed.



**Figure 3.** Experimental velocity of the dam-break. ([veloc.txt](#))

### Suggestions

If you have something to add or if there is something else you think should be added, please write me to [alexbece@uvigo.es](mailto:alexbece@uvigo.es).

### References

Janosi, I. M., Jan, D., Szabo, K. G. and Tel, Tamas. "Turbulent drag reduction in dam-break flows". *Experiments in Fluids*, 37: 219-229, (2004).