3D Dam break

At the Maritime Research Institute Netherlands (MARIN), experiments have been performed for breaking dam flow. These experiments can be seen as a simple model of green water flow on the deck of a ship (Issa *et al.* 2006). Green water can cause serious damage to deck structures, deck house, cargo and personnel. In this case an object, that for example can resemble a container, is placed on deck. The pressures that are exerted from the plunging dam are measured as function of time. The model is described in figure 1 and consists of a tank with open roof of dimensions 3.22x1x1 meters. The dam has a height of 0.55 meters and is closed behind a door. The door is opened almost instantaneously by releasing a weight. The locations of the pressure gauges are shown in figure 2. The case has previously been used to validate a Volume-Of-Fluid method (Kleefsmann *et al.* 2005).

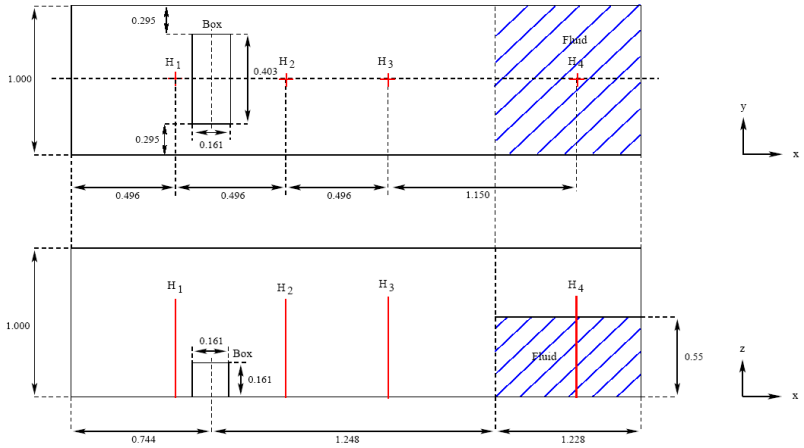


Figure 1, Dimensions of dam break tank (Issa et al. 2006)

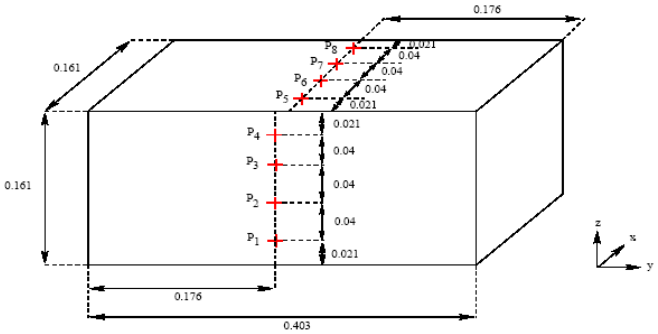


Figure 2, Positions of pressure gauges (Issa et al. 2006)

The fluid is incompressible with density of 1000 kg/m^3 and viscosity of 0.001 kg/ms. On the walls of the tank the slipping boundary condition is imposed. The model consists of 1.16 million tetrahedral elements in an unstructured mesh. Figure 3 shows a comparison between the zero level set function, the free surface, and the experimental water front. The pressures at eight gauges are compared in figure 4. P1 to P4 are positioned close to or at the initial impact point. P5 to P8 are positioned at the top of the object. It is seen that all the cases agrees well with the experimental data.

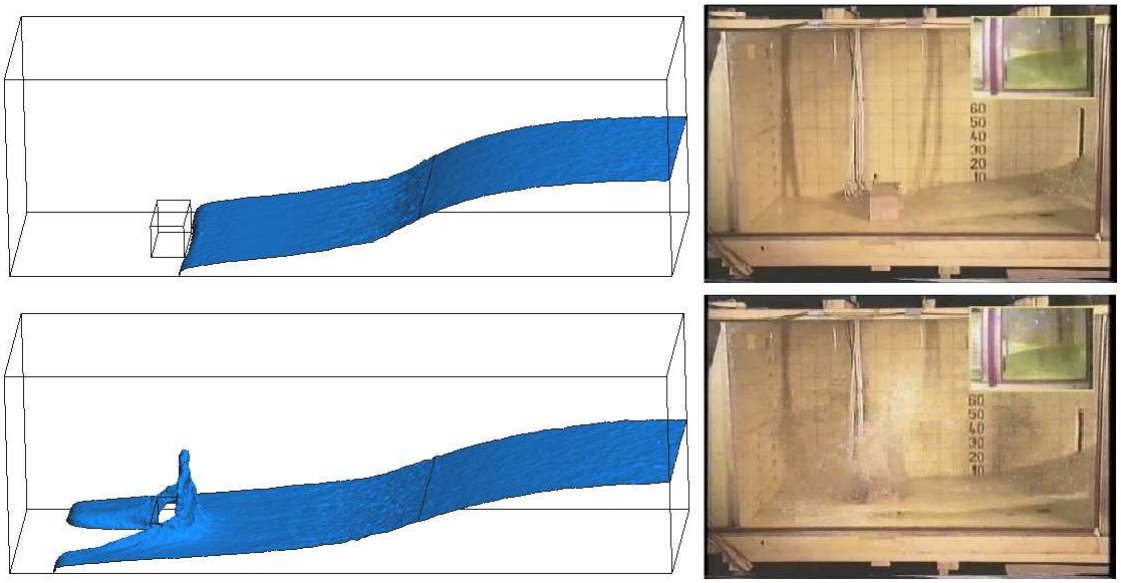
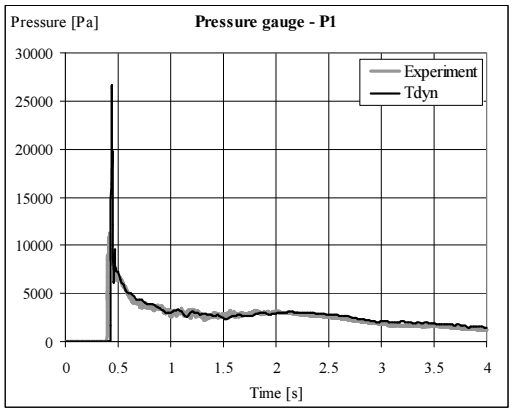
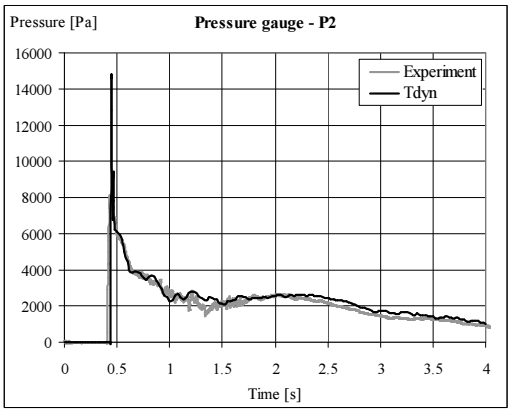
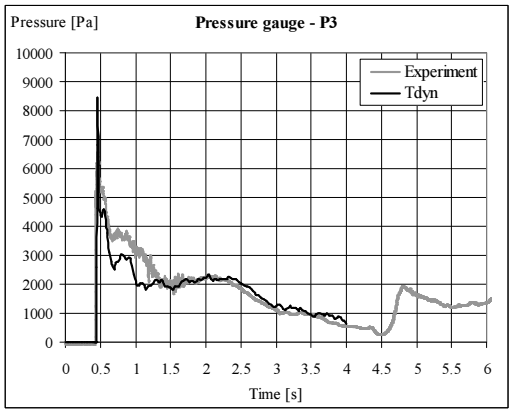
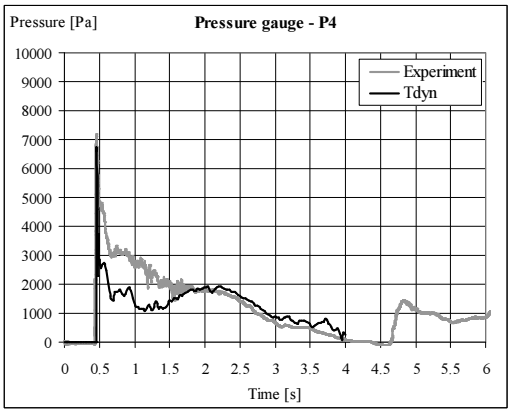


Figure 3, Zero level set surface at t = 0.425 s (upper) and t = 0.575 s (lower)









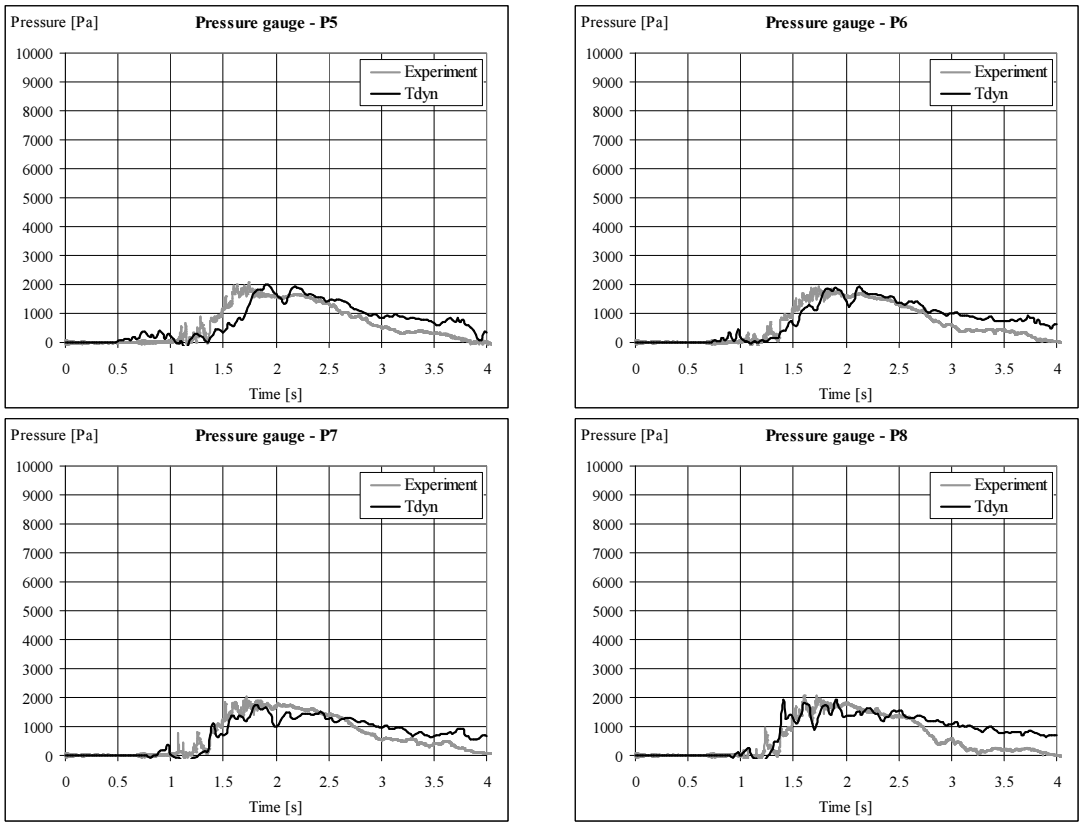


Figure 4, Comparison of pressures at positions P1, P2, P6 and P7

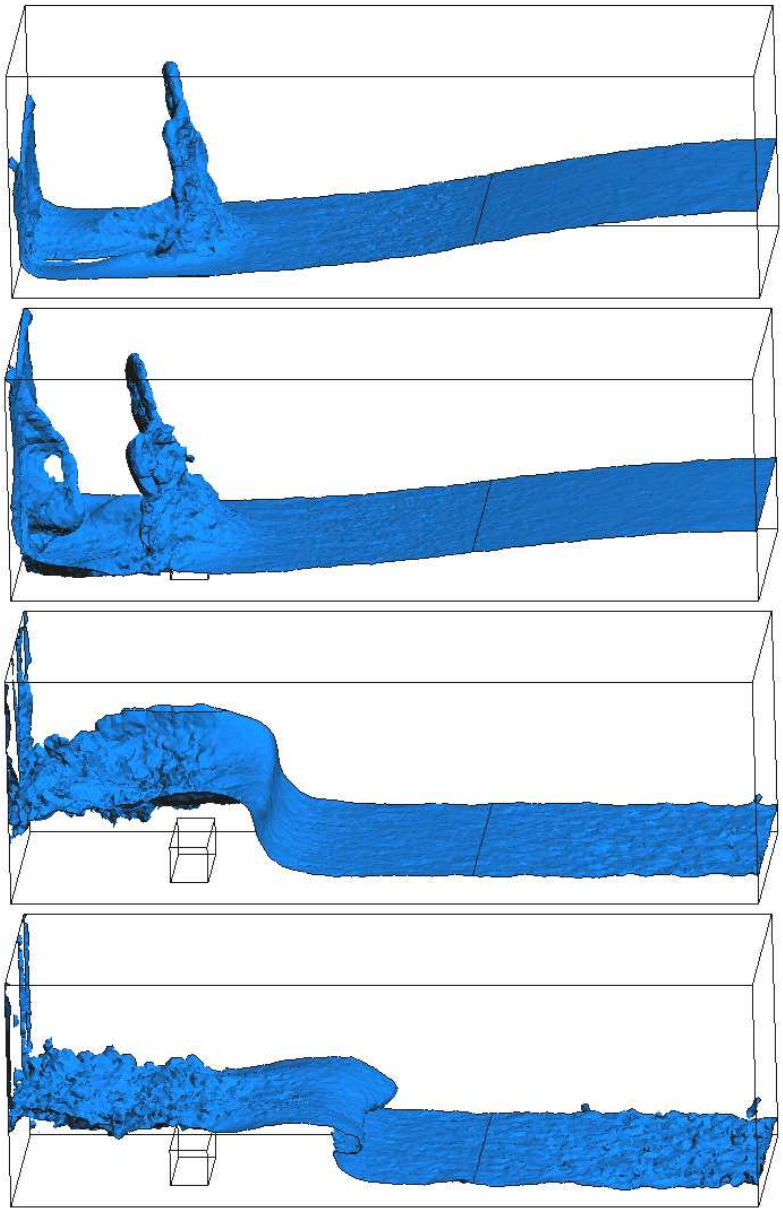


Figure 5, Zero level set surface at t = 0.8 s, 1.0 s, 2.0 s and 2.3 s

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