

Numerical evaluation of fluid force acted on bridge girders during tsunami by using a particle method

***Shoichi Tanabe¹, Mitsuteru Asai², and Yoshimi Sonoda²**

¹Department of Civil Engineering, University of Kyushu, JAPAN.

²Department of Civil Engineering, University of Kyushu, JAPAN.

*Corresponding author: tanabe@doc.kyushu-u.ac.jp

On March 11, 2011, the huge tsunami caused by the great east Japan earthquake devastated the Pacific coast of north-eastern Japan. Many infrastructures including bridges were collapsed by the tsunami. New generation of tsunami disaster prevention and mitigation method should be reconsidered toward the next millennium Tsunami.

Numerical evaluation of the fluid force during tsunami is strongly desired for generating the new regulation of tsunami disaster prevention, because real scale experimental tests are almost impossible and too costly. In this study, a stabilized Smoothed Particle Hydrodynamics (SPH) has been utilized for an evaluation of fluid force acted on bridge girders. In addition, a new boundary treatment using the fixed ghost boundary method is developed in the model having step-shaped incompatible boundary surface. Finally, the accuracy and efficiencies of our proposed method are validated by comparison between a numerical solution and experimental results.

Key Words: *SPH, Fluid Force, Boundary Condition, Tsunami*