

**STUDY OF FLOATING BODIES IN WAVE BY USING SMOOTHED
PARTICLE HYDRODYNAMICS (SPH)**

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HYDRODYNAMICS (SPH)

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My lovely family, thank you for always being there for me.

I love you all.

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ABSTRACT

One of the problems is the environment area which involves the floating of body with effective microorganism (SM). As a result, we need a detail description as well as calculation of floating body is using finite difference method (FD). However, this method produces low accuracy results. Beside, FD method is based on regular grid problem which is not efficient especially in river layout. In recent years, Smoothed Particle Hydrodynamics (SPH) method is developed to solve mechanical problems as well as fluid flow problems. In order to simulate the floating body problem using irregular grid as well as higher order accuracy, SPH is the suitable method. The advantage of SPH is its meshless technique which avoid the time consuming remeshing process especially in finite element method. The above numerical methods are coded in Fortran program. SPH can be a useful hydrodynamics model for breaking waves and the nearshore zone, particularly for case where spray and splash are important. The advantage of SPH is to be able to accurately model the complex flows associated with breaking water waves, including instantaneous motions as well as (time-averaged) wave-induced flows, such as undertow, longshore currents, and rip currents. The results of the computations show that SPH can be used to simulate free surface flows without difficulty provided the density.

ABSTRAK

Salah satu masalah pencemaran alam adalah melibatkan apungan badan dengan mikroorganisma berkesan (EM). Jesteru, kita perlu membuat perangkaan secara terperinci termasuk pengiraan apungan jasad dengan menggunakan kaedah perbezaan terhingga (FD). Walau bagaimanapun, kaedah ini akan menghasilkan keputusan yang mempunyai ketepatan yang lebih rendah. Selain itu, kaedah FD adalah berdasarkan permasalahan grid biasa yang kurang sesuai dalam geometry yang kompleks, terutamanya dalam geometry sungai. Sejak kebelakangan ini, kaedah Rataan Zarah Hidrodinamik (SPH) digunakan untuk menyelesaikan masalah mekanikal serta aliran bendalir. SPH adalah satu kaedah yang sesuai untuk mensimulasikan masalah apungan jasad menggunakan teknik grid tidak teratur dengan ketepatan lebih tertinggi. Antara kelebihan SPH adalah tanpa penggunaan unsur teknik bilangan pecahan yang kecil, dan ini dapat mengelakkan proses penyusunan unsur dengan masa yang panjang dalam kaedah elemen terhingga. Kaedah SPH kemudiannya dikodkan dalam program Fortran. SPH juga menjadi model hidrodinamik yang berguna untuk pemecahan ombak dan zon yang berhampiran dengan pantai, terutamanya dalam penting bagi kes semburan dan percikan. Selain itu, SPH juga dapat menghasilkan model dalam bentuk aliran kompleks yang berkaitan dengan gelombang air terbuka, termasuk gerakan secara terus (serta-merta) serta (purata masa) gelombang yang disebabkan oleh aliran seperti arus bawah, arus panjang pantai dan rip semasa. Hasil pengiraan menunjukkan bahawa SPH boleh digunakan untuk mensimulasikan aliran permukaan bebas yang melibatkan apungan badan.