Numerical Simulation of Air Bubble Characteristics in Stationary Water

C. X. Zhang^{1*}, Y. X. Wang¹

¹The State Key Laboratory of Coastal and Offshore Engineering, Dalian University of Technology, Dalian 116024, China

Email: zhangchengxing19@163.com

Abstract

The motion of air bubble in water plays a key role in such diverse aspects as air bubble curtain breakwater, air curtain drag reduction, air cushion isolation, weakening the shock wave in water by air bubble screen, etc. At present, the research on air bubble behaviors can be subdivided into several processes: air bubble formation from submerged orifices; interaction and coalescence during the ascending. The work presented in this paper focuses on numerical simulation of air bubble characteristics in stationary water, for example, air bubble formation, the ascending speed, the departing period, and so on. A series of models to simulate the characteristics of air bubble are developed by the VOF method in the two phase flow module of FLUENT. The numerical simulation results are consistent with the theoretical characteristics of air bubble in many aspects. So it is concluded that numerical simulation of air bubble characteristics in stationary water based on FLUENT is feasible. Due to the fact that the characteristics of air bubble are complicated questions, it is important that study on the air bubble behaviors in stationary water should be conducted on deeply.

Figure: The bubble's expanding and departing in numerical simulation

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