Development of Ballast Water Treatment System using Bubbling Bed Design

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To prevent marine pollution, we need to dispose of microorganism in ballast water which is loaded to ship. In this research, we used bubbling reactor system to dispose microorganism as an eco-friendly and energy-saving system. The mortality of microorganism was very high when micro-bubble was sufficiently supplied or residence time of ballast water was enough. Therefore, the fluid residence time and bubble amount are crucial for the microorganism mortality. The effects of them on mortality are studied to find the optimum condition. The mortalities of treated ballast water samples at different conditions were monitored during 60 hours. And the experiment was performed whether the effect of oxygen contact was influenced on the treated ballast water.

In addition, the CFD simulation for bubbling reactor system was carried out by using ANSYS FLUENT software tool. The interpretation was implemented in 2D surface and 3D volume rendering. Because the distribution and concentration of gas are important in reactor efficiency. The results were coincided with the experimental performance. Therefore, the CFD simulation can contribute to designing efficient bubbling reactor.