Study on forecast and evading of Freak wave

Takeshi Kinoshita

(The University of Tokyo, nstitute of Industrial Science, Professor)

【**Outline of survey**】

This project is succeeding to our previous one, which was a three-year joint project between various fields of sciences and engineering. It includes

- To understand the generation mechanism of Freak waves and to regenerate them in laboratory wave tank.
- To observe and forecast Freak waves based on remote sensing.
- To study Freak wave loads and corresponding structural responses of large ships due to Freak waves.
- To develop evading systems so that ships or offshore structures could avoid Freak wave impact.

The previous project provided us general understanding of Freak wave generation great deal and showed where to go for evading Freak wave. This project continues to study Freak wave generation mechanism both theoretically and experimentally, for example effects of wave directional spreading and spectrum bandwidth on freakiness. Breaking is studied as well. Numerical wind and wave tanks will be also studied of 2D as well as 3D. Wave forecasting will be reconsidered to take into account of growth of freakiness and wave breaking.

【**Expected results**】

From the results of this project we can expect much more knowledge about Freak wave generation, and then we may predict "the index" which shows the possibility of growth of freakiness of waves. We may measure "the index" by buoys and hopefully from satellite data. Then we may have a scope to safely utilize ocean much much more.

【**References by the principal investigator**】

・Motoki Yoshida, Takeshi Kinoshita and Weiguang Bao, Nonlinear Hydrodynamic Forces on an Accelerated Body in Waves, Journal of Offshore Mechanics and Arctic Engineering, Vol. 127, 1, ASME, pp.17-30, 2, 2005

・T.Kinoshita and W.Bao : Third-order wave diffraction by a truncated circular cylinder, Proceedings of International Mechanical Engineers, Vol.214, Part C, pp789-800, 2000.

【**Term of project**】　FY2007－2011

【**Budget allocation**】　16,500,000 yen

(2007 direct cost)

【**Homepage address**】　　http://ketch.iis.u-tokyo.ac.jp/home/index-j.html