



Dependence of Drag Coefficient on the Wind Gustiness

C.-H. Ting, A. Babanin, and D. Chalikov

Swinburne University of Technology, Faculty of Engineering and Industrial Sciences, Melbourne, Australia
(ababanin@swin.edu.au, +61-3-9214-8264)

The purpose of this study is to consider the effect of wind gustiness on the drag coefficient by using the Wave Boundary Layer Model (Chalikov and Rainchik, 2011). Most of the dependences employ the sea drag as a function of wind speed at 10 meter height. However, the scatter of field observation data with respect to such dependence is very significant and this is not caused by measurement errors. Babanin and Makin (2008) suggested that, apart from the wind speed, the drag coefficient should also depend on a number of other properties, wind gustiness is one of them. In this paper, the dependence of drag coefficient on the wind gustiness is studied. Two separate situations are investigated and results are compared with steady-wind cases. First, wind speed is assumed to have sinusoidal fluctuations, with certain amplitudes with respect to the mean wind and certain periods with respect to dominant waves. Second, Ochi and Shin (1988) observational wind-gustiness spectrum is used. The results show that, for the same wind speed, the effect of gustiness can lead to a drag coefficient enhancement up to a factor of 2.

References

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