Numerical simulation of flow around a train under side winds

Project Representative

Masahiro Suzuki

Aerodynamics laboratory, Railway Technical Research Institute

Authors

Koji Nakade[*1], Masahiro Suzuki[*1], Yuichi Hirokawa[*2], Noriaki Nishikawa[*2]

＊1　Aerodynamics laboratory, Railway Technical Research Institute

＊2　Japan Agency for Marine-Earth Science and Technology

Abstract

   This report describes large-scale simulations of flow around an embankment within a turbulent boundary layer. The computational domain of the flow around the embankment needs an inflow boundary condition, which simulates the turbulent boundary layer. In order to realize the numerical simulation with the inflow turbulence, we performed two flow simulations simultaneously, one of them regarding the flow domain of the embankment and the other of the turbulent boundary layer, which is applicable to determine the inflow condition of the embankment. The numerical model and conditions on the Earth Simulator were identical as previous numerical simulations on the XT4 (Cray) in RTRI, except grid resolution. We compared the instantaneous flow field with the previous simulations, and we observed finer vortex structures by computing on the Earth Simulator. A comparative discussion of the statistics of the flow field is future task.

Keywords:　Railway, Crosswinds, Large-scale simulation, LES, Embankment, Turbulent boundary layer