

## Large eddy simulation and wind tunnel experiment of turbulent boundary-layer flow around a floor-mounted cube - DTU Orbit (08/11/2017)

### Large eddy simulation and wind tunnel experiment of turbulent boundary-layer flow around a floor-mounted cube

Large Eddy Simulations (LES) are used to numerically simulate the flow around and the surface pressure on a floor-mounted cube in a turbulent boundary layer flow. Both a full LES and an embedded- LES (ELES) approach was used and the simulation results were compared to data from wind tunnel experiments. The computations were performed with the commercial CFD software ANSYS FLUENT at a Reynolds number at the cube height of  $Re_h = 1.3 \times 10^5$ . The object was to evaluate the numerically generated flow upstream and around the cube and the accuracy of the timeaveraged surface pressure on the cube. Furthermore, the fluctuating surface pressure simulated by the ELES is also discussed. The computed time-averaged flow is comparable to the wind tunnel measurements while the frequency spectrum of the upstream flow has deficits in the low and high frequency ranges. The time-averaged surface pressures on the cube reflect the expected characteristic wind load distribution along the streamwise centerline of the cube with relative deviations from -16% to +18%. The fluctuating surface pressure from the ELES shows large deviations at the top face of the cube while the values at the up- and downstream faces are more accurately captured.

### General information

State: Published

Organisations: Department of Civil Engineering, Section for Structural Engineering, Rambøll Danmark A/S

Authors: Jørgensen, N. G. (Intern), Koss, H. (Intern), Bennetsen, J. C. (Ekstern)

Number of pages: 8

Publication date: 2014

### Host publication information

Title of host publication: Proceedings of the 6th International Symposium on Computational Wind Engineering

Main Research Area: Technical/natural sciences

Conference: 6th International Symposium on Computational Wind Engineering , Hamburg, Germany, 08/06/2015 - 08/06/2015

Source: PublicationPreSubmission

Source-ID: 118446560

Publication: Research - peer-review › Article in proceedings – Annual report year: 2015