Optimization study of porous wind fence on reducing and stabilizing fluctuating pressure in the wake region XINGZHOU ZHOU, HEECHANG LIM, Pusan National University — The sheltering effect of the porous wind fence on wind flow has been highlighted last several decades, which provides a tremendous reduction and stability of wind speed in vegetation area by changing the porosity. This study aims to examine a variety of the wind fence, which varies the porosity (i.e., = 0.1, 0.2, 0.3, 0.35, 0.4, 0.45, 0.5, 0.7) and the location of a porous fence placed in a simulated turbulent boundary layer. The sheltering effect was observed by the mean and fluctuating quantities such as velocity and pressure variation in the wake of porous fences. The study performed a numerical simulation by using a 2-equation RANS model such as k- turbulence closure models, k- SST, and LES models. The study analyzes wind and pressure characteristics behind wind fences under flat smooth surface as well as rough. In a preliminary result, the wind speed behind the wind fence decreased more than 50% in the porosity 0.1-0.6, which is considered as the wind-protect (i.e., stable) area. In addition, the numerical predictions show good agreements with the existing experiments. Regarding optimum porosity, around 0.3-0.5 seems to be most effective in terms of reduction in wind speed and fluctuating pressure in the wake of wind fence.

Xingzhou Zhou
Pusan National University