Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Vertical fence wake control using periodic blowing and suction of upstream flow YOUNG-HO CHOI, HYOUNG-BUM KIM, Gyeongsang National University — In this study, we experimentally investigated that the effect of periodic blowing and suction of upstream flow on the separated flow behind the fence. The vertical fence was submerged in the turbulent shear flow and we used PIV method to measure the instantaneous velocity fields around the fence in a circulating water channel. Piston device was precisely controlled to generate the pulsating jet which is passing through the spanwise slit in front of the fence and net mass flux was zero. We changed the frequency of pulsating jet from 0.4 Hz to 1.2 Hz and maintained the area of piston was constant. The frequency and the exit velocity were determined by the velocity and the length of stroke. We divided one period of pulsating jet as 20 phases and performed phase-averaged velocity measurement. The results showed that the reattachment length continuously varied with the phase of upstream jet flow. From this study, the shortest mean reattachment length was about 60% of uncontrolled reattachment length. We also found that the lower frequency was more efficient to decrease the reattachment length than the higher one with the same magnitude and the faster exit velocity was useful to control the reattachment length at the same frequency.

Young-Ho Choi
Gyeongsang National University

Date submitted: 01 Aug 2007 Electronic form version 1.4