Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Unsteady flow around impacting square cylinder CHANGYOUNG CHOI, MAN YEONG HA, HYUN SIK YOON, Pusan National University — The problem on the flow resulting from the collision without rebound of square cylinder with a wall at Re=200 is investigated computationally using the DF/FD method with a finite volume method. Emphasis is on the case of a square cylinder impact by three-dimensional numerical simulation, but comparisons with the flow generated by the impact of a circular cylinder are included. A cylindrical body impacting on the wall produces two primary vortex rings. The primary vortex rings spread outward away from the body along the wall. This continues until stalling while lifting induced wall vortices into the primary vortices. For normal square cylinder impact, secondary vortices exhibit a three-dimensional instability. Comparison with the circular cylinder impact reveals that this is caused by the differences in flow strength after the cylinder collides with the wall. Oblique square cylinder impacts are also considered. For the oblique square cylinder, a three-dimensional instability does not appear in the flow around the cylinder. As the impact angle increases, the wall effect is gradually reduced on one side of the square cylinder. This causes the roll-up of the secondary vortex and the increase of the rebound height of the vortex system.

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Date submitted: 01 Aug 2012 Electronic form version 1.4