중력류 흐름에 대한 직접수치해석

이재룡† · 하만영*(부산대) · S.Balachandar**(UIUC)

Direct Numerical Simulation of Gravity Currents

Jae Ryong Lee, Man Yeong Ha and S. Balachandar

Key Words: Direct Numerical Simulation(직접수치해석), Gravity Currents(중력류), Front Velocity (전방속도)

Abstract : Resolved simulations are presented for gravity current flows aiming at studying their spreading rate. The simulations are performed for two extreme configurations such as planar and cylindrical and for 3 different Grashof numbers: 10^5, $1.\times10^6$ and 10^7. Varying the size of the heavy fluid release, the study is performed for several phases of spreading, namely acceleration, slumping and inertial phases. For the simulations, efficient spectral multi-domain code is used. From the simulations results it is concluded that 2-D results predicts well the mean front velocity during the slumping phase, but fails to predict it during the inertial phase of spreading. It is also observed that the vortex dynamics of the flow is not reproduced well by the 2-D simulation.

A Study of the Flow Characteristics through a Dump Diffuser

Srikanth V. Deshpande, V. R. Sanal Kumar and H. D. Kim

덤프 디퓨저를 통하는 유동특성에 관한 연구

S. V. Deshpande†(안동대 원) · V. R. S. Kumar*(안동대 원) · 김희동**(안동대)

Key Words: Dump Diffuser(덤프 디퓨저), Dump Gap Ratio(덤프 간극률), Aircraft Combustor(항공기 연소기), Flow Separation(유동 박리), Internal Flow(내부 유동)

Abstract : Experimental and numerical studies have been carried out to examine the flow features of dump-diffusers with different dump gap ratios. Numerical studies have been carried out using a two-dimensional standard k-epsilon turbulence model. Experimental studies have been carried out in a wind tunnel facility. It was observed that at sufficiently small dump gap and with high turbulence intensity the flame tube head proximity creates a back pressure on the pre-diffuser discharge flow and displaces it towards the walls and thus inhibits separation and thereby the pre-diffuser pressure recovery significantly increases. It is concluded that the dump gap ratio not only influences flow features, but also has a pronounced bearing on the losses in the dump zone.