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Santorini Island, Greece, July 17-21, 2014

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Plenary Lecture 1

Investigate of Air Core Phenomenon in Cylindrical Tank during Draining

Prof. Chang Hyun Sohn
School of Mechanical Engineering
Kyungpook National University
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Abstract: An air core phenomenon observed from lavatory bowl draining in our daily lives has a very important scientific meaning because it is also observed from many industrial applications and related with a natural phenomenon such as tornado. Moreover since the air core affects the drain flow rate, it is deeply connected with a disaster such as flood from local heavy rain. In order to prevent air core generation, various ideas have been suggested and demonstrated experimentally: for example, inclining the tank's bottom wall, positioning the drain port eccentrically, and other types of vortex suppressing device. Very recently, we found that the generation of air core highly depends on the temperature of water. To investigate the mechanism of air core suppressing while draining, the numerical simulation on air core phenomenon is introduced and a lot of simulating results will be presented. In addition, 3-D flow structures such as toroidal Taylor vortex rings and spiral waves on free surface which could not be obtained in axisymmetric simulations will also be demonstrated.

Brief Biography of the Speaker:
Professional Experience and Honours:
1991 to 1994 : ADD Team Manager of Small Jet Engine development
1994 to 1996 : Assistant Professor, Kyungpook National University
1996 to 1997 : Visiting Professor. University of Cambridge
1996 to 2000 : Associate Professor, Kyungpook National University
From 2000 : Professor, Kyungpook National University
1999 to 2003 : Vice Head of School of Mechanical Eng.
2003 to 2005 : Head of School of Mechanical Eng.
2005 to 2006 : Visiting Professor in University of Tennessee, Knoxville
2007 to 2008: Vice Dean of College of Engineering
Director, Industrial-University Consortium Center
Director, Industrial Technology Support Hotline Center
2012 to 2013 :President of Daegu-Kyungpook Branch of the Korean Society of Mechanical Engineers(KSME),
2011 to 2013 President of Daegu-Kyungpook Branch of the Korean Society of Automotive

Engineers(KASE),
2011 to 2012 Vice-Chairman, Faculty Assembly of Kyungpook National University
2012 to 2013 : Chairman, Faculty Assembly of Kyungpook National University
Major Research Field
a) CFD Analysis and Study for Thermal-Fluid Flow Phenomena
b) PIV Measurement for Thermal-Fluid Flow Phenomena
c) Flow Induced Vibration
Publications in Journals : 87