



**Osaka University**

Graduate School of Engineering  
Department of Naval Architecture & Ocean Engineering

# Hydro-Seminar

by Lab. of Floating-Body Dynamics in Waves

**The speaker in the 22nd Hydro-Seminar is**

**Professor Tatyana Khabakhpasheva**

Lavrentyev Institute of Hydrodynamics, Novosibirsk, Russia

**Date: Wednesday, 21 December, 2011**

**Time: 16:20 – 17:20**

**Venue: Lecture Room 311, S-1 building  
Suita Campus, Osaka University**

## **Inclined Impact of Smooth Body onto Thin Liquid Layer**

### **Abstract**

Inclined impact of a body is usually studied in connection with the emergency landing of aircraft onto the water. The knowledge of the body motions during the process and the hydrodynamic loads acting on the body surface are of primary interest. Two-dimensional problem of inclined impact of a rigid body with smooth surface onto the thin layer of an ideal incompressible fluid is considered. The problem is coupled: liquid flow, body motion, hydrodynamic loads distributed along the contact region and the position of this contact region on the body surface should be determined simultaneously. The process of the inclined impact can be divided into two phases. During the first phase spray jets are formed at the periphery of the contact region. During the second phase the free surface of the liquid separates from the surface of the moving body in the rear part of it. The liquid flow during the first stage is obtained by using the method of matched asymptotic expansions. According to this method the flow region is subdivided into several subdomains. A complete solution is obtained by matching the solutions within these subdomains. At the second phase, main attention is given to conditions at the separation point. The coupled problem is reduced to a system of integro-differential equations. The equations are solved numerically for elongate ellipse. Displacement and rotation of the body caused by the hydrodynamic loads during both phases are investigated.

### **The Speaker: Professor Tatyana Khabakhpasheva**

Khabakhpasheva Tatiana received her B.S. degree in Mechanics and Mathematics from Novosibirsk State University (NSU), Russia. In 1991 she received her Ph.D degree from Lavrentyev Institute of Hydrodynamics (LIH) with a specialization in differential equations and mathematical physics. In 2009 she received her degree of Doctor of Sciences from the Russian Academy of Sciences for her achievements in the field of Fluid-Structure Interaction. Since 1983 she has been working at LIH in Theoretical Department and Department of Applied Hydrodynamics, and in 2008-2010 she was the Head of Hydroelasticity Laboratory (LIH). In 1990 she also joined the Special Educational and Scientific Center of NSU and was promoted to Professor in 2010. Her current research interests include: unsteady problems of fluid-structure interaction, Very Large Floating Structures and flexural waves in ice cover, water impact of elastic bodies with application to emergency landing of aircraft on water.



**Contact Person: Prof. Masashi Kashiwagi, Tel: 7572, Email: [kashi@naoe.eng.osaka-u.ac.jp](mailto:kashi@naoe.eng.osaka-u.ac.jp)**