IUTAM Symposium on

Bluff Body Wakes and Vortex-Induced Vibrations

22-25 June 2010 – Capri Island, Italy

Institut de Recherche sur les Phénomènes Hors Équilibre



Program

* presenting author
(P) poster

Tuesday 22 June 2010

10:00 – 12:00 **Registration**

12:00 – 2:00 **Lunch**

2:00 – 2:40 **Opening Lecture** by *Peter W. Bearman
Circular cylinder wakes and Vortex-Induced Vibrations

2:40 – 4:20 ***Session 1*: Wakes (3D bodies) – Part 1**

*Sheard, G. J.
Altering the symmetry of rings and square cylinders: First-occurring mode switching and non-linear evolution behaviour

Szałtys, P., Chrust, M., Przadka, A., Gumowski, K., Jenffer, P., *Goujon-Durand, S., Tuckerman, L. S., Wesfreid, J. E.
Experiments on the nonlinear evolution of instabilities behind spheres and disks

*Kawai, H., Okuda, Y., Ohashi, M., Tamura, T.
Wake structure behind a 3D square prism in shallow boundary layer flow

Gonçalves, R. T., Franzini, G. R., *Fujarra, A. L. C., Meneghini, J. R.
Two degrees-of-freedom vortex-induced vibration of a circular cylinder with low aspect ratio

*Ryan, K.
Flow around a tethered body: the effect of tether length

4:20 – 4:50 **Break**

4:50 – 5:30 **Invited Lecture** by *Christophe Clanet (with G. Dupeux, A. Le Goff, D. Quéré)
The Roberto Carlos spiral

5:30 – 5:50 ***Session 1*: Wakes (3D bodies) – Part 2**

*Asai, T., Kamemoto, K.
Flow structure on knuckling effect in Football

5:50 – 6:50 ***Session 2*: Wakes (Perturbation & control)**

*Sigurdson, L., Baugh, A., Gilbert, S., Schostek, M., Breakey, D.
"RoboStep" spanwise varying forcing of a backward-facing step flow

*Mackowski, A., Williamson, C. H. K.
Developing a Cyber-Physical Fluid Dynamics facility for fluid-structure interaction studies

*Parezanović, V., Cadot, O.
The mechanism of drag reduction due to a steady perturbation in the wake of a bluff body

7:30 **Reception**

Wednesday 23 June 2010

8:30 – 9:10 **Invited Lecture** by *Richard H. J. Willden (with M. Guerbi)
Vortex dynamics of stationary and oscillating cylinders in yawed flow

9:10 – 10:30 ***Session 3*: VIV (Multiple cylinders)**

*Assi, G. R. S., Carmo, B. S., Bearman, P. W., Sherwin, S. J., Meneghini, J. R.
The concept of wake stiffness in the Wake-Induced Vibration of tandem cylinders

Brosse, N., *Ern, P.
The coupled motion of two bodies falling in tandem or side by side

*Kevlahan, N.
The role of vortex wake dynamics in the flow-induced vibration of tube arrays

*Sewatkar, C. M., Sharma, A., Agrawal, A.
(P) *Flow regimes and wake interaction for flow across a row of transversely oscillating square cylinders*

Sewatkar, C. M., Sharma, A., *Agrawal, A.
(P) *Aerodynamic forces on square cylinders placed in V-formation*

*Cesur, A., Revstedt, J.
(P) *Influence of staggering on wake dynamics of multiple cylinders*

*Srikanth, T., Dixit, H. N., Govindarajan, R.
(P) *Shedding behaviour in flow past an inline oscillating square cylinder*

10:30 – 11:00 **Break**

11:00 – 11:40 **Invited Lecture** by *Sanjay Mittal
Instabilities in flow past a circular cylinder

11:40 – 12:50 ***Session 4*: Wakes (Stability, chaos, & modelling)**

*Luzzatto-Fegiz, P., Williamson, C. H. K.
Determining the structure and stability of steady wake flows using "IVI-diagrams"

*Roenby, J., Aref, H.
Chaos in body-vortex interactions

*Assemat, P., Fabre, D., Magnaudet, J.
Linear stability of the wake of objects in imposed or free movement in a viscous fluid

*Gabbai, R. D.
(P) *A first-principles approach to wake-oscillator models for VIV*

Shoshani, O., Ioffe, L., *Gottlieb, O.
(P) *Nonlinear dynamics and orbital stability of a wake oscillator model for self-excited vortex-induced vibration of a spherical pendulum*

12:50 – 2:00 **Lunch**

2:00 – 3:50 ***Session 5*: Wakes & VIV (Analysis)**

*Stremler, M. A., Salmanzadeh, A., Schnipper, T., Andersen, A.
A point vortex model of '2P' mode wakes

*Griffith, M. D., Leontini, J., Thompson, M. C., Hourigan, K.
Three-dimensional stability of the wake of a confined circular cylinder, with transverse oscillation

*Meliga, P., Chomaz, J.-M.
Low-Reynolds number vortex-induced vibrations in the wake of a circular cylinder by means of adjoint methods

*Blackburn, H. M., Sheard, G. J.
Wake symmetry, subharmonic and quasi-periodic instability modes

Silveira, L. M. Y., *Martins, C. A.
(P) *A qualitative study of VIV in risers using a phenomenological model*

Peppa, S., *Kaiktsis, L., Triantafyllou, G. S.
(P) *Chaotic wakes in flow past an oscillating cylinder*

*Luchini, P., Giannetti, F., Pralits, J.
(P) *Global stability of the flow past a cube*

*Barbeiro, I. C., Meneghini, J. R., Aranha, J. A. P.
(P) *Nonlinear stability analysis of the flow past a cylinder: a geometrical reduced model*

*Pralits, J., Giannetti, F., Luchini, P.
(P) *The leading Vortex-Induced-Vibration modes of a free cylinder*

*Elbanhawy, A., Turan, A.
(P) *Wake dynamics and response predictions of low mass-damping circular cylinder in high Reynolds number flow-induced vibrations*

3:50 – 4:20 ***Session 6*: Wakes (Cylinders and 3D bodies) – Part 1**

Doddipatla, L. S., Naghib-Lahouti, A., *Hangan, H., Siddiqui, K.
The near-wake topology of a blunt trailing edge profiled body

*Muld, T. W., Efraimsson, G., Henningson, D. S.
(P) *Mode decomposition of flow structures around a surface mounted cube*

*Korkischko, I., Meneghini, J. R.
(P) *Three-dimensional visualization of the mean flow around a straked cylinder*

4:20 – 4:50 **Break**

4:50 – 5:30 **Invited Lecture** by *Alexandra H. Techet
A spin on water-entry of hydrophobic and hydrophilic spheres

5:30 – 6:00 ***Session 6*: Wakes (Cylinders and 3D bodies) – Part 2**

Gonzalez-Juez, E. D., *Meiburg, E., Tokyay, T., Constantinescu, G.
Gravity current flow past a circular cylinder: forces, wall shear stresses and implications for scour

*Arakeri, V. H.
(P) *Visualization of flow in the near wake region of a sphere near its critical Reynolds number*

*Deloze, T., Hoarau, Y., Dušek, J.
(P) *Simulation of a free sphere in a tube with automatic chimera method*

6:00 – 7:10 ***Session 7*: VIV (Risers, WIV & VIV)**

*Bourguet, R., Karniadakis, G., Triantafyllou, M.
Lock-in of the vortex-induced vibrations of long flexible cylinders in shear flows

*Modarres-Sadeghi, Y., Patrikalakis, A., Zheng, H., Triantafyllou, M., Tognarelli, M., Beynet, P.
Mode competition, chaotic motion and traveling waves in riser Vortex Induced Vibrations

*Freire, C. M., Meneghini, J. R.
(P) *Experimental investigation of VIV on a circular cylinder mounted on an articulated elastic base with two degrees-of-freedom*

*Huang, Z., Larsen, C. M.
(P) *A numerical study on vortex induced forces and wake structure of an oscillating cylinder*

*Duclercq, M., Broc, D., Cadot, O.
(P) *Characterization of mode changes in the flow around an oscillating cylinder from force spectra*

*Assi, G. R. S., Carmo, B. S., Bearman, P. W., Sherwin, S. J., Meneghini, J. R.
(P) *The influence of the structural mass and damping on the Wake-Induced Vibration of a circular cylinder*

Franzini, G. R., *Pesce, C. P., Gonçalves, R. T., Fujarra, A. L. C., Meneghini, J. R.
(P) *An experimental investigation on frequency modulated VIV in a water channel*

Krakovich, A., *van Hout, R., Gottlieb, O.
(P) *Vortex-induced-vibrations of a tethered sphere: simultaneous high-speed measurements of sphere motion and vortex shedding mechanisms*

Thursday 24 June 2010

8:30 – 9:10 **Invited Lecture** by *Julio R. Meneghini (with B.S. Carmo, S.P. Tsiloufas, R.S. Gioria)
Wake instabilities issues: from circular cylinders to stalled airfoils

9:10 – 11:00 ***Session 8*: VIV (Single & multiple cylinders)**

*Marcel, T., *Barbut, G., Braza, M., Hoarau, Y., Harran, G., Longatte, E., Baj, F., Magnaud, J. P.
Simulation of fluid structure interaction in a tandem and in a tube array under cross flow at high Reynolds number

*Huera-Huarte, F. J., Gharib, M.
Vortex and wake-induced vibrations of two flexible circular cylinders in tandem arrangement showing independent wakes

*Larsen, C. M., Aronsen, K., Soni, P.
On empirical models for higher order frequency components of Vortex Induced Vibrations

Belloli, M., *Muggiasca, S., Giappino, S.
Vortex induced vibrations of a circular cylinder subjected to sinusoidal wind flow

*Leontini, J. S., Thompson, M. C.
(P) *Cylinder wake destabilisation due to elastic mounting*

*Waterson, N. P., Baker, N.
(P) *Simulation of fluid/structure interaction for semi-streamlined prismatic sections*

*Ruck, S., Schenkel, T., Oertel, H.
(P) *Vortex configuration behind flapping wings*

Rocchi, D., *Belloli, M., Argentini, T., Rosa, L., Ozkan, E.
(P) *Cross wind effects on a heavy vehicle running on a bridge deck*

*Visscher, J., Pettersen, B.
(P) *PIV measurements in the wake of straked cylinders*

*Fernandes, A. C., Mirzaeisefat, S., Coelho, F. M., Ribeiro, M.
(P) *Investigation of the flow induced small amplitude rotation triggering flat plate fluttering*

11:00 – 11:30 **Break**

11:30 – 1:30 ***Session 9*: Wakes**

Gioria, R. S., Meneghini, J. R., Aranha, J. A. P., Barbeiro, I. C., *Carmo, B. S.
Effect of the domain spanwise periodic length on DNS of the flow around a circular cylinder

*Guilmineau, E.
Numerical simulation with a DES approach for automotive flows

Sheard, G. J., *Fouras, A., Hourigan, K.
(P) *PIV measurement of a subharmonic "mode C" three-dimensional instability behind inclined square cylinders*

*Arslan, T., Andersson, H. I., Pettersen, B.
(P) *Calculation of vortex shedding around ship bodies by using LES model*

*Khaledi, H. A., Andersson, H. I.
(P) *The wake behind a normal flat plate in a turbulent plane channel*

*De Kat, R., Humble, R.A., van Oudheusden, B. W.
(P) *Time-resolved PIV study of a transitional shear-layer around a square cylinder*

*Weiss, P.-E., Deck, S.
(P) *ZDES of the control of the unsteady buffet load on a high Reynolds turbulent afterbody flow*

*Fiabane, L., Gohlke, M., Le Maitre, O., Cadot, O.
(P) *Flow structures and force creation over a circular cylinder*

*Lu, L., Papadakis, G.
(P) *Study of wake forcing behind a single cylinder with external flow pulsation using a linearised approach*

*Gembarzhevskii, G. V.
(P) *Mode change of two cylinders wake induced by glow discharge*

*Zobeiri, A., Avellan, F., Farhat, M.
(P) *The effect of hydrofoil trailing edge geometry on vortex shedding*

*Deshpande, P. J., Sharma, S. D.
(P) *Vortex flows in near wake of a plane blunt trailing edge with prismatic appendages*

*Prothin, S., Lasserre, J. J., Pust, O., Djeridi, H., Billard, J.-Y.
(P) *Effect of vortex generator on the boundary layer detachment on NACA0015 2D foil*

*Herry, B. B., Paquet, J.-B., Keirsbulck, L., Labraga, L.
(P) *Mean flow asymmetry at zero-degree sideslip downstream of a 3D double backward facing step*

Rho, J., *Lee, Y., Kim, K., Lee, D.
(P) *Experimental investigations on aerodynamic characteristics of scaled pantograph system with various panhead shape for high speed train*

*Marié, S., Lambaré, H.
(P) *On the unsteady loads induced by the bluff wake of the Ariane 5 rocket*

*Fallenius, B. E. G., Fransson, J. H. M.
(P) *Experimental investigation of the wake instability behind a rectangular-based forebody*

Gioria, R. S., *Meneghini, J. R.
(P) *Spectral analysis of the wake of a fixed circular cylinder using Koopman operator*

Duong, T. T. L., Luo, S. C., *Chew, Y. T.
(P) *Vortex shedding of a rotating circular cylinder*

1:30 – 2:30 **Lunch**

8:00 – 10:00 **Banquet**

Friday 25 June 2010

8:30 – 9:50 ***Session 10*: VIV (Simulations)**

*Saltara, F.
Detached Eddy Simulation of the flow around a free oscillating cylinder

*Sen, S., Mittal, S., Biswas, G.
Free vibration of cylinders of various cross-sections

*Gendel, S., Degani, D., Gottlieb, O.
Numerical analysis of the influence of finite rotations on vortex-induced-vibrations of a tethered cylinder undergoing m:n:1 internal resonances

*Baranyi, L.
Effect of in-line or transverse cylinder oscillations on laminar flow – a numerical study

9:50 – 10:30 **Invited Lecture** by *Anthony Leonard (with A. Tchieu)
On the fluid dynamics of maneuvering micro air vehicles with fluidic control

10:30 – 11:00 **Break**

11:00 – 12:20 ***Session 11*: Wakes (Vortex shedding)**

*Lee, W.-K., Taylor, P. H., Borthwick, A. G. L., Chuenkhum, S.
Shed vortices in the wakes of wavy surfaces

*Finnegan, S. L., Meskell, C.
Duct acoustic resonance induced by a bluff body wake

*Kolomenskiy, D., Moffatt, H. K., Farge, M., Schneider, K.
Two- and three-dimensional numerical simulations of clap-fling-sweep of hovering insects

*Michelin, S., Llewellyn Smith, S. G.
Thrust production and vortex wake behind flapping flexible membranes

12:20 – 1:30 **Lunch**

1:30 – 2:10 **Invited Lecture** by *Kerry Hourigan (with A. Rao, B.E. Stewart, M.C. Thompson, T. Leweke**)**
Wake transitions of rolling and sliding cylinders and spheres

2:10 – 3:30 ***Session 12*: VIV (Two degrees of freedom)**

Sherwood, J., Dusting, J., Konstantinidis, E., *Balabani, S.
Response of a cantilevered cylinder undergoing coupled rotational and translational oscillations in the streamwise direction

*Korkischko, I., Freire, C. M., Meneghini, J. R., Franciss, R.
Amplitude response of plain and straked cylinders mounted in 2DOF elastic base: Isolated and tandem configurations

*Pinto, L. C., Berwaldt, A. P. S., Schettini, B. C., Silvestrini, J. H.
Vortex shedding around a cylinder under forced oscillation in transversal, arch and convex eight-shaped trajectories

*Franzini, G. R., Gonçalves, R.T., Fujarra, A. L. C., Meneghini, J. R., Franciss, R.
Experiments of VIV on rigid and inclined cylinders mounted on a base with two degrees-of-freedom

3:30 **Closing Remarks – End of Symposium**