



Preface

This Special Volume consists of selected papers from the Conference on Bluff Body Wakes and Vortex-Induced Vibrations, held at Port Douglas, Queensland, Australia, 17–20 December 2002.

The Conference on Bluff Body Wakes and Vortex-Induced Vibrations (BBVIV-3) was the third in the series, following on from the Forum on Advances in the Understanding of Bluff Body Wakes and Vortex-Induced Vibrations (BBVIV-1), which was part of the 1998 ASME-FED Summer Meeting in Washington, DC, USA, and the IUTAM Symposium on Bluff Body Wakes and Vortex-Induced Vibrations (BBVIV-2) held in Marseille in 2000. The series of Conferences on Bluff Body Wakes and Vortex-Induced Vibrations is designed to provide a stimulating and constructive forum for researchers specializing in the areas of flows around bluff bodies that are either fixed or undergoing vortex-induced vibrations (VIV). The formal sessions consisted of single sessions including invited talks with ample time outside the formal sessions for participants to meet in a convivial atmosphere.

The papers in this volume were selected by the Scientific Committee from amongst the oral presentations at the Conference and have all been peer-reviewed. The conference attracted 66 participants from 14 countries, including many of the most active researchers in the field. The meeting took place over four days and consisted of single plenary sessions with 8 keynote speakers, 36 oral presentations, and 13 poster presentations. A total of 86 abstracts were received and reviewed by the Scientific Committee and the Chairmen. It is believed that the high level of the standard of the presentations and the science set at the previous two conferences was maintained.

A full set of papers, of both oral and poster presentations, was provided to each participant at the conference site – a detailed list is provided below. The sessions at the Conference were grouped under the following titles:

- Vortex-Induced Vibration of a Circular Cylinder (9 talks of 20 minutes, 1 poster presentation)
- Flow around Square Cylinders (3 talks, 2 posters)
- Wake Interference (3 talks, 4 posters)
- Three-Dimensional Effects and Three-Dimensional Instabilities (5 talks)
- Wake Manipulation and Control (5 talks, 2 posters)
- Applications (3 talks, 4 posters)
- Vortex-Induced Vibrations of Flexible Structures (4 talks)
- Fundamentals (4 talks)

Although the canonical geometries of the circular cylinder and the sphere were favoured by researchers, other shapes such as the square cylinder, the flat plate, elliptical cylinders and tori emerged as the subtleties of the problem begin to be explored in more detail. Typical applications involve complex three-dimensional geometries, such as two-dimensional bodies with modified surfaces (e.g., cylinders or spheres with bumps, wired or wavy surfaces and naturally occurring bodies such as cacti), flexible cables or cantilevers, turbine blades and automobiles.

Progress has been made in closer matching of the experimental and computational results. Computational Fluid Dynamics was shown to capture the three-dimensional wakes of spheres, tori, cars, modified and unmodified circular cylinders, and square cylinders at both low Reynolds numbers (Direct Numerical Simulations) and high Reynolds numbers (Large Eddy Simulations).

From the meeting, it was clear that fundamental models of the VIV process are important to explain the essence of the process. Some models were presented that show good agreement whilst indicating areas for which more information is needed, such as evolution equations for vortex strengths and locations. It was also argued that the energy transfer initiating large amplitude VIV could be induced by a parametric condition, and that the presence of turbulence complicates substantially the vibrational response.

The topic of bluff body wakes and vortex-induced vibration is motivated by examples in many natural examples and industrial applications. This series of conferences has been strongly stimulated by the support of the Ocean Engineering Division of the U.S. Office of Naval Research, monitored by Dr. Tom Swain, for research in this area and for the provision of funds for

the conference and the proceedings, in conjunction with Dr. Peter Majumdar of the U.S. Office of Naval Research International Field Office.

The Conference was held at a coastal resort hotel complex at Port Douglas, Queensland, situated near the Great Barrier Reef, Cape Tribulation and the Daintree Rainforest in the far north of Australia. The hotel was an ideal location for concentrated technical sessions in air-conditioned comfort, relaxed discussions in the palm-clad ‘piscines’ serviced by a swim-up bar and adjoining restaurants and wonderful excursions into the nearby spectacular coastline and natural attractions. The conference Banquet was held at a nearby resort and entreated to a marvellous display of indigenous dance and didgeridoo playing, followed by some exuberant games of petanque. The frontier nature of the location was symbolised by the signs on the neighbouring golf course that read “Beware of crocodiles”. The “local” organising committee was situated thousands of kilometres to the south in Melbourne but were able to attend to the myriad of details that led to a very successful conference. All participants came away from the meeting with both the intellect and the senses stimulated and new insights into VIV.

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