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CONFERENCE REPORT
FIV2000:
SEVENTH INTERNATIONAL CONFERENCE ON FLOW-INDUCED VIBRATION, HELD AT LUCERNE, 19–22 JUNE 2000

THE SERIES OF International Conferences on Flow-Induced Vibrations (FIV) was initiated in 1973 in Keswick, England, beginning with a focus on problems that had arisen in the design of large nuclear power plants. It has been repeated at approximately 4-year intervals, covering a gradually expanding scope of fluid/structure vibration problems, in fields ranging from civil and marine engineering at one end of the spectrum, to manufacturing and processing at the other. The seventh conference was held in June 2000 in Lucerne, Switzerland.

Mechanical engineers tend to divide into two groups: on the one hand, there are the specialists in mechanisms, materials, stress, dynamics, or vibrations; on the other, there are the specialists in fluids, convection, heat transfer, power, or thermodynamics. The FIV conferences bring together a special community of engineers who, like the readers of this journal, bridge the gap between those two groups. Coming from 25 different countries, the attendees presented 106 papers, published in one hardbound octavo volume (cited below) totalling 862 pages.

Because some of the 22 sessions had to run in parallel, the organizers carefully sorted the papers into 15 topical areas:

1. Vortex-induced vibration (14 papers), related to marine applications, overhead transmission lines, fundamental physics, and experimental technique.
2. Vibration of rectangular profiles in cross-flow (six papers), including bridge decks in crosswinds.
3. Oscillations of free shear layers and jets (five papers): cavity flows, wall jets, flows over cavities, incident vortices, and impinging jets, including a study of active-control stabilization.
4. Vibration of hydraulic structures (five papers): field experiences, model tests, and analyses of gates and valves.
5. Applications of computational fluid dynamics (11 papers): some topics were comparison of Finite-Element versus Surface-Vorticity Method, coupling of Direct Numerical Simulation of fluid flow with structural codes, and large-eddy simulation.
6. Fluid–structure interaction: axial flows (nine papers): global and local instabilities, and response to excitation.
7. Fluid–structure interaction: biomedical applications (five papers), relating to red blood cells, arterial flow, and vocal folds.
8. Aeroelasticity (five papers): stalled airfoils, flutter, turbine blades, and buffeting.
9. Vibration of heat-exchanger tube bundles (12 papers—five of them for two-phase flow): prediction, failure experience, effect of loose supports, and wear phenomena.
10. Flow–sound–structure interaction (15 papers), including cross-flow, flow in elbows, field experiences, and experimental techniques.

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11. Thermo-acoustic instabilities (five papers), reporting several observations of problems in industrial installations.

12. Vibration of turbomachines and piping systems (five papers): gas turbines, centrifugal compressors, bubbly flows, and piping systems.

13. Flow-induced vibrations related to rotors (four papers): fluid confinement and bearings.

14. Flow-induced vibrations related to paper machines (three papers): flutter of thin webs and sheets; vibration of coater blades.

15. Leakage flow-induced vibration (two papers): rigid and elastic plates in narrow gaps.

The continuing progress reflected by the large number of papers in the core areas is gratifying. At the same time, the emerging study of critical new problems stimulated lively discussions in the sessions. For this reviewer, one highlight occurred during the session on thermoacoustics in systems with large temperature gradients: first, Frank Eisinger presented an instructive review of the classic Sondhauss and Rijke tubes; second, Hans Graf, with A. Oengoeren, documented a strong structural vibration originating in the annulus of a double-walled exhaust stack and reduced it to a thermodynamic cycle within the cavity; third, Alexander Ni introduced the possibility of thermodynamically-driven instabilities within heat exchanger.

The conference organizers made the most of the setting in Lucerne for additional activities; a favorite was the field trip to nearby Pilatus Aircraft Ltd., with A. Vollan demonstrating computational tools for flutter analysis.

The younger quadrennial series of International Symposia on Fluid–Structure Interaction, Aeroelasticity, Flow-Induced Vibrations and Noise, brings together on the American continent many of the same participants as attend FIV conferences in Europe. The two series are generally scheduled to alternate: the fifth International Symposium on FSI, AE & FIV + N will be held by ASME during IMECE in New Orleans, 17–22 November 2002.

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