



## PREFACE

PRACTICING ENGINEERS have often expressed the view that technical journals have little of value to offer them. While an essential function of such journals is to disseminate the results of current research, including research with no immediate practical application, there is often material which has significance to the practice of engineering. Unfortunately, this new technical knowledge may not be read by practitioners, and a gap develops between current practice and available technology. The concept for this Special Issue was to collect in a single issue some typical research papers which use state-of-the-art technology to solve complex flow-induced vibration problems found in industrial applications. Thus, it is hoped to demonstrate that technical journals, and in particular the *Journal of Fluids and Structures*, have much of value to offer practicing engineers.

The papers of Eisinger and Ziada *et al.* describe acoustic resonance problems in a coal pulverizer and a steam locomotive, respectively. In each case it is shown how measurements and mathematical modelling provide identification of the acoustic mode and excitation mechanism which, in turn, leads to practical methods for eliminating the problem. Blevins *et al.* conducted a detailed study of damping in thermowells. The physical insights and data generated provide essential information for predicting the vibration amplitude response and potential for damage to these common structures when subjected to vortex shedding excitation. Jakubauskas & Weaver use a combination of numerical and analytical tools to develop a relatively simple method for accurate prediction of the transverse natural frequencies of bellows expansion joints. This methodology is useful for reliable estimation of the limiting flow velocities through bellows in order to prevent damaging flow excited resonance. Smith & Derksen describe the design, calibration and operation of a model CANDU nuclear fuel bundle. The paper shows how the development of a suitable model can be used to understand and significantly reduce the flow excitation, thereby eliminating the need for extensive and costly full-scale or on-line experiments. Finally, active control of flow-induced vibrations is a research topic of great current interest. The paper by Ziada & Graf shows how this technology can be applied in a hostile environment to eliminate unstable combustion oscillations in a household burner. All these papers demonstrate the importance of understanding the excitation mechanisms associated with flow-induced vibration problems and show how modern technology can be used to prevent their damaging effects.

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## A WORD FROM THE EDITOR

AS THE STATEMENT of the Aim and Scope of the Journal makes it clear, the *Journal of Fluids and Structures* publishes papers on (a) fundamental aspects of fluid–structure interactions, (b) application-oriented or -inspired papers, and (c) appropriate topics in unsteady fluid dynamics—see the inner back cover, where these items are expressed more fully.

Thus, it is very clear that application-oriented work is very much of interest to JFS, and has been so from the very beginning. Indeed, I consider this to be one of the strongest features of this journal, beneficial for two reasons: (a) it provides the fundamentalists with a glimpse of “industrial” problems and gives them ideas for further pertinent research; and (b) it encourages the practicing engineers and technologists to browse through JFS and perhaps find work of interest to them, tackled in a more fundamental (analytical, numerical or experimental) way.

I am therefore very pleased to see this Special Issue on this topic, which reinforces our stated interests in this area and, thanks to the efforts of this issue’s Editor, does so in such an interesting and convincing way.

I should like to say that the two papers in this issue, co-authored by D.S. Weaver, have been included at my insistence. They were handled editorially by myself. I thought they fitted so well in the theme of the Special Issue, and they took the place of others, the final form of which will take a bit longer before they reach us.

This is the second Special Issue in JFS. The first [issue **10**(5)] was on Vortex Shedding; it was dedicated to the memory of Owen M. Griffin and edited by Charles Dalton. More are forthcoming on other special topics of interest to our readership. Look out for them!

Michael P. Païdoussis  
Editor