BOOK REVIEWS

Flow-induced vibration design guidelines

Edited by P. Y. Chen

This monograph consists of eight papers by leading workers in the field of flow induced vibrations (fiv). It will be one of the supporting documents for the forthcoming ASME Section III Code on Flow Induced Vibration.

G. J. Bohm and S. W. Tagart provide a historical introduction to the volume, concentrating particularly on nuclear power plant component failures due to fiv. They also survey the USA regulatory and other requirements against a background of safety and economic considerations.

Four of the papers consider the problems of tubes in cross- and axial-flow, and in particular the application to heat exchangers. M. P. Paidoussis presents a unifying study of the subject, trying to find common ground between the advocates of the 'buffeting' and 'vortex shedding' points of view. H. J. Connors deals with vibration amplitudes of cylinders in cross-flow due to vortex shedding excitation, giving three sample calculations to illustrate the application of his data. S. S. Chen's paper gives a wide-ranging review of the many sets of values proposed for the parameters governing the instability criteria, while observing that data are still lacking in many applications. Two-phase flow is treated briefly in the paper by M. J. Pettigrew and D. J. Gorman for both periodic wake-shedding and fluid-elastic instability phenomena. A review of design procedures for submerged structures is given by R. J. Scavuzzo, considering especially the cases where fluid/structure interaction is important.

The subject changes in the paper by S. D. Savkar which relates some work done on a piston-in-cylinder slip joint. He puts forward two main parameters governing the stability boundary.

The paper by T. M. Mulcahy does not fit so well under the title of the volume as it is concerned with the modelling parameters which must be observed (or at least recognised) in an experimental determination of the response of fluid excited structures. It indicates how to establish which parameters may be distorted in any particular case without dire results.

The papers are generally well-written and complete within the authors' declared aims. It is inevitable in a developing subject such as this that leading workers will disagree in detail. This is not necessarily a bad thing in a design guide handbook as long as the reader can appreciate the finer points of the debate and decide which particular view most nearly relates to his problem. The editor of the volume claims that these differences of opinion have 'been sought... with the view that technical controversy is a catalyst to improving technology'. Such controversy is undoubtedly healthy but makes difficulties for the non-specialist designer when no assistance is given in choosing between the various views offered. As a technical review, this book is well done, but can it really be called "FIV Design Guidelines"?

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Engineering Calculation Methods for Turbulent Flow

P. Bradshaw, T. Cebeci and J. H. Whitelaw

The expressed objectives, stated by the authors in the preface, have been largely achieved in this concise, readable text. Not only do the authors manage to include a concise 'revision' of the basic equations currently utilised to solve turbulent flow problems, but also extend these into an up-to-date exposition of current practice supported by an adequate bibliography. A particularly useful aspect is the inclusion of some software utilising the finite difference method for the solution of unsteady two dimensional boundary layers, which could be extended to other applications. Although the book is primarily concerned with the solution of partial differential equations, the physical assumptions necessary to characterise turbulent flow, heat transfer and combustion are also included.

The book should prove to be an asset to those in industry, government institutions and universities who wish to gain a better insight into, or expand their work in this field of application.

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