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BOOK REVIEW

Passive Energy Dissipation Systems in Structural Engineering, 1997, by T. T. Soong and G. F. Dargush. Chichester: John Wiley, xi + 356 pp., Price £60.00; $105·00. ISBN 0-471-96821-8.

This is an excellent book for engineers and analysts concerned with the low frequency vibration of building structures excited by ground motion or wind turbulence. It is an important new addition to vibration literature and will be especially valuable to the practising engineer.

After a brief chapter of introduction, the second chapter deals (also briefly) with fundamental vibration theory, starting from the simple single-degree-of-freedom model and moving rapidly into multi-freedom theory. It gives significant references to modern computational methods for finding modes, frequencies and dynamic response. Harmonic and transient response are both considered, the latter being illustrated with reference to measured and predicted earthquake-excited vibrations. In this context, it emphasizes the importance of energy formulations of the response and design problem.

Subsequent chapters deal successively with six basically different methods of dissipating vibrational energy in buildings. They are by means of metallic dampers (involving plastic deformation of the actual structure and of added metal dampers), friction damping (involving sliding surfaces), visco-elastic damping (involving plastic materials at interfaces), viscous fluid dampers (involving cylinders, pistons and oil) and tuned mass dampers (the ''vibration absorber'' involving springs, masses and dampers). Each of these chapters has a similar layout, setting out in turn the basic principles of operation, the modelling of the device, the structural analysis of the device in conjunction with the building, experimental studies of verification, design considerations and actual implementations. A brief final chapter reviews some of the ways in which ''smart materials'' have been proposed (but not yet utilized in buildings) as means of reducing vibration.

The authors rightly claim this book to be the first attempt to present a unified treatment of passive energy dissipation systems in the context of building vibration. It is directed primarily towards the professional engineer confronted with design decisions, but also to graduate students and other researchers in civil engineering. A fascinating feature of the book is its numerous photographs and diagrams of actual installations, which exemplify the various dissipating systems. It is by no means a dull textbook, but is one which shows clearly how carefully designed anti-vibration systems can improve the safety of tall buildings in the hazardous earthquake-prone regions of the world.

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