Table of Contents

Foreword

The origins of this book date back to a pre-conference course given at the First European Workshop on Structural Health Monitoring, which was held at the Ecole Normale Supérieure of Cachan (Paris) in July 2002. In 2004, this course was extended to form a continuing-education short course lasting three and a half days, organized by the Ecole Normal Supérieure of Cachan.

The motivation of the authors has essentially been to make the information collected for this short course more widely available, especially at the present time, which is characterized by the strong emergence of approaches in the technical community to the problems of Structural Health Monitoring.

The book is organized around the various sensing techniques used to achieve the monitoring. For this reason, emphasis is put on sensors, on signal and data reduction methods, and on inverse techniques, allowing the identification of the physical parameters affected by the presence of the damage on which the diagnosis is established. This choice leads to a presentation that is not oriented by the type of applications or linked to special classes of problems, but presents the broad families of techniques: vibration and modal analysis (Chapter 2), optical fibre sensing (Chapter 3), acousto-ultrasonics using piezoelectric transducers (Chapter 4), and electric and electromagnetic techniques (Chapters 5 to 7).

Each chapter has been written by specialists in the domain of the chapter, who have been working in the field for a long time and have wide knowledge and experience. The authors, who come from the academic world or from research centres, have written their contributions in a pedagogical spirit, so that this book can be easily understood by beginners in the field and by students. Nevertheless, the book aims to present an exhaustive overview of present research and development, giving numerous references that will be useful even to experienced researchers and engineers.

The Editors
D.L. Balageas, C.-P. Fritzen, A. Güemes