NOISE CONTROL: Measurement, Analysis, and Control of Sound and Vibration

NOISE CONTROL: Measurement, Analysis, and Control of Sound and Vibration
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This is a 1994 reprint, with corrections, of a book originally published in 1989. The ten chapters in the book cover a wide variety of topics in acoustics, noise control, and vibration. The basic principles of acoustics are covered in the first chapter. These include sound pressure, sound power, and sound intensity, combining sound levels, frequency analysis, sound propagation, the principles of active and passive noise control, and criteria and standards. Chapter 2 contains additional basic principles, especially monopole, dipole, and quadrupole radiation, normal mode theory, principles of diffraction, diffraction due to sound barriers, and noise contour mapping.

The third chapter is devoted to instrumentation and measurement in acoustics and noise control. Microphones and intensity probes are described, and several examples, mostly from Brü el & Kjæ r, are presented. Fast Fourier Transform methods are covered, as are intensity methods and methods for the determination of sound power.

Chapter 4 covers hearing conservation, including a basic description of the hearing mechanism, audiometric principles and testing, criteria for hearing damage, and hearing protectors. Community noise is the subject of chapter 5. Here, such subjects as community response, non-auditory effects of noise, speech interference, equivalent sound levels, noise prediction, and regulatory measures are covered.

Control of noise inside buildings is covered in Chapter 6. The subjects include sound transmission through structures, prediction and control of interior noise levels, and control of noise from common indoor noise sources such as home appliances, heating and ventilating systems, and plumbing noise.

Chapter 7 is titled industrial noise control, but it does not emphasize broad topics such as in-plant noise control. Rather, it covers control of machinery noise itself, including gear noise, mufflers and silencers for noise control, and enclosures. There is, however, a section of the chapter devoted to industrial noise control case histories.

Highway noise as well as surface transportation noise control are covered in Chapter 8. This includes sources of vehicle noise, highway noise prediction, noise barriers, non-highway noise sources, and environmental impact statements. This chapter is followed by a chapter on aircraft noise which gives an overview of aerodynamic noise sources, prediction of noise around airports, and airport noise compatibility planning.

The last chapter in the book is devoted to vibration analysis; the principles of vibration, the design of vibration isolators, and vibration measurement.

Each chapter contains examples, sample problems, and references. There are several flow charts in the book which will assist in the programming of some of the algorithms described.

The book is intended for those with training in engineering, and, in the preface, it is stated that the content could be covered in a three-credit-hour course for students in their third or fourth year, or in a graduate course.