Engineering Noise Control

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This is the second edition of a book first published in 1988. The first edition was used by graduate students and final year undergraduate students at the University of Adelaide in Australia. Most of the chapters in the book have been updated to reflect new information developed in the last seven years. Two significant modifications include the addition of more information on sound intensity and a new chapter on active noise control.

Fundamentals and basic technology is the subject of the first chapter. The topics covered include basic wave propagation, sound intensity, spectra, impedance, and flow resistance. Then follows a brief description of the human ear in chapter 2. Chapter 3 is devoted to instrumentation for noise measurement and analysis; subjects such as microphones and sound level meters, noise dose meters, spectrum analyzers, tape recorders, and intensity meters are covered.

Chapter 4 deals with criteria for noise control, and includes material on hearing damage criteria, specification of ambient noise levels, community noise level criteria, and speech interference criteria. Physical acoustics, sound power, and architectural acoustics are the subjects of chapters 5, 6, and 7. In chapter 5, there are discussions of basic sources of sound, transmission and reflection of sound, and sound propagation outdoors.

Chapter 6 contains a discussion of sound power, including the relationship between sound power and sound pressure, the determination of sound power using several techniques, and the uses of information on sound power levels. Chapter 7 deals with architectural acoustics, and includes material on sound propagation in rooms, and porous absorbers. There is a discussion of sound propagation in long and flat rooms - rooms typical of those found in many industrial plants.

Methods for controlling noise using "noise control elements" are covered in chapters 8, and 9. These elements include enclosures, barriers, and various kinds of mufflers.

Chapter 10 contains information on vibration isolation, and includes a discussion of various types of isolators, including rubber, metal spring, cork, and felt isolators.

Machinery noise is the subject of Chapter 11. The subject is treated through a description of how to estimate sound power levels and sound pressure levels for a wide variety of machinery, including fans, pumps, valves, engines, transformers, and gears.

In chapter 12, active noise control is introduced. This includes various configurations for active control in ducts, and control of radiation from vibrating structures. Chapter 13 is devoted to a survey of analytical techniques for estimating sound power levels; there are six appendices in the book, three devoted to porous acoustical materials.