

Encyclopedia of Acoustics

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This Encyclopedia of Acoustics is a 4-volume work divided into 18 parts and 166 chapters. Each of the 18 parts begins with an introduction to the subject matter in that part. There is a total of 1980 pages of technical information in the four volumes - devoted to nearly all aspects of acoustics.

For those interested in noise control, an obvious place to start is with Part VIII which contains chapters 79-89 - devoted to Noise: Its Effects and Control. Chapter 79, the introduction, is an overview of the material in the next 9 chapters; Chapter 80 is a description of noise rating procedures, loudness, annoyance, criteria for indoors environments (NC curves, RC curves, NCB curves, etc.). The chapter continues with brief descriptions of many rating methods, past and present. These include equivalent levels, the composite noise rating (CNR), the noise exposure forecast (NEF), the noise and number index (NNI), and others. There is also information on community response to noise, recommended indoor noise levels, and guidelines on noise exposure given by several government agencies.

- Chapter 81 is devoted to hearing protective devices, how to fit them, and how to measure their performance.
- Chapter 82 is devoted to the determination of sound power level for noise sources. Current standards using measurement of sound pressure are covered; methods using sound intensity are covered in Chapter 156.
- Chapter 83 begins with the source-path-receiver model for studying a noise problem - first proposed by Bolt and Ingard in 1956. There is a large section on isolation of machinery vibrations as well as information on the use of sound absorptive materials and enclosures. Then there is information on noise sources - gears, bearings, fans, valves, and other sources. Finally, classical noise source identification techniques are covered. These include noise source wrapping and path blocking.
- Chapters 84 and 85 are devoted to the principles of active noise control and noise control in ducted air distribution systems, respectively.
- Chapter 86 is devoted to the prediction of the sound power levels of industrial equipment, and data are given for a wide variety of heavy equipment - including compressors, transformers, gas turbines, pumps, and similar equipment.
- Chapter 87 is devoted to airport noise. This includes descriptors for noise around airports, noise monitoring, calculation of noise impact, methods that can be used to control environmental noise. There is also a discussion of noise certification and the phase-out of older (noisy) aircraft. Chapter 88 on surface transportation noise is mainly devoted to noise sources and noise regulations.
- Finally, Chapter 89 on community response to noise describes the percentage of persons annoyed under various circumstances, the assessment of annoyance, and regulations.

Having read the chapters in Part VIII on the effects of noise and its control, the reader is left with the task of identifying additional information related to noise control and determining in what order to read it. It is perhaps dangerous to plot what seems to be a logical course in a hyperlinked world, but reading in the following order may be useful for those who want to learn more about noise control.

Chapter 1 is an introduction to linear acoustics; the basics of sound fields, decibels and levels are discussed as well as the principles of radiation, scattering, reflection and diffraction. Chapters 154 and 155 related to instrumentation are devoted to a discussion of sound pressure, microphones, and sound level meters of various kinds. Chapter 156 is devoted to sound intensity.

Part III of the volumes is devoted to aeroacoustics and atmospheric sound. The introduction, Chapter 27, and Chapter 32 on atmospheric sound propagation are useful; the latter contains information on atmospheric absorption, effects caused by ground, refraction, diffraction, and the effects of turbulence on sound propagation.

Part IX of the volumes is devoted to architectural acoustics; several chapters contain information related to noise control. Chapter 91 contains information on sound in enclosures, wave acoustics, geometric acoustics, and statistical acoustics. Chapter 92 is devoted to sound absorption and sound absorption coefficients. Chapter 93 covers sound insulation of walls, floors, etc., and touches on acoustical requirements in building codes. Chapter 94 is devoted to ratings and descriptors useful for building acoustics - with some overlap with similar sections in the noise control portion of the encyclopedia. There are useful descriptors for criteria and assessment of noise as well as for ratings for sound absorption and transmission. Chapter 95 covers sound propagation in workspaces - flat rooms, long rooms, etc. A discussion of the effects of scattering objects rooms is also included. Chapter 97 is devoted to noise requirements in building codes and criteria; a summary of codes in 10 different countries is given. Chapter 98 is devoted to noise control for mechanical systems and ventilating systems.

There are several other parts of these volumes related to noise and its control. These include Chapter 28 on aerodynamic and jet noise, Chapter 46 on ship and platform noise, and propeller noise, many Chapters in Part IV which is devoted to mechanical vibration and shock, the chapters in Part VII which are devoted to statistical methods in acoustics, Chapters 14 and 15 which are devoted to finite element analysis and boundary element methods, respectively, and Chapter 9 which is devoted to steady-state radiation from sources.

While psychological and physiological acoustics are covered, there does not seem to be any discussion of sound quality - a topic of current interest to noise control engineers - especially in the automotive industry.