function. Chapter 5 reports on the variance function, its behavior near the frequency range with examples using the family of Markovian spectrum for one-dimensional cases. This leads into some useful algebraic relations of the covariance function and correlation local averages, and continues with analytical models for the variance function, i.e., variance functions for narrow band random and power law approximation for the variance function. The last sections report on the existence of the mean-square derivative, limiting values for the spectral bandwidth region, level crossing statistics plus parallel results for random series and point processes. It is an excellent chapter that requires careful reading and understanding.

The next chapter progresses into two-dimensional local average processes. Beginning with the variance function and measure of correlation, this includes cases where the correlation structure is elliptical, isotropic, and separable. We continue with the conditional variance function, scales of correlation, covariance of local averages and statistics of level excursions and extremes. The last sections discuss space-time processes, i.e., frequency-dependent scale of fluctuations of two-dimensional space and the effect of spatial averaging on frequency content.

Chapter 7 extends the previous information to n-dimensional homogeneous random fields. It follows the same pattern as chapters 5 and 6 and considers variance function and correlation measurement, conditional variance function, and measurement of correlation space-time processes plus the statistics of excursions and extremes. The concluding sections cover the partial derivative of the random field of local averages, invariance under linear transformation plus the limiting form of the correlation function and regenerative property.

The last chapter is novel and reports on new methods in the area of estimation and prediction. Practical estimation procedures are furnished which include multicomponent, continuing analysis using finite elements and the optimal linear prediction. The concluding section reviews the authors’ recent work on fluctuations of level crossing and extremes with the perspective on the application to transport processes.

In summary, this is a good book that requires careful reading and studying. The reviewer believes that a table of nomenclature describing the symbols would be helpful to the reader. In addition, application of random vibration to beams and plates plus a more detailed explanation of fluctuations in turbulent flow would be of great value. The important subject of random fatigue is not mentioned, yet many of the aspects mentioned by the author would help in better understanding some of the problems arising in fatigue studies. The reviewer further believes that computer programs describing some of the work in the random field area would be of great assistance in understanding the book. Nevertheless, the reviewer does recommend this book to analysts and designers interested in obtaining the latest in research endeavors in random field theory.


This book packs a “terrific wallop.” It begins with the basics and progresses to the more complex. The tome explains noise control in a very simple fashion, accompanied by a veritable number of examples. As stated by the author, “The book is intended for both students and professionals who have little or no knowledge of acoustics but want a practical and systematic approach to controlling noise and vibration.”

The book consists of four parts with a number of chapters comprising each part. An elaborate set of appendices contain (a) international system of units, (b) conversion factors, (c) standards and procedures, (d) recommended list of commonly used symbols in acoustics, (e) Dept. of Labor Occupational Noise Exposure Standard, (f) sound absorption coefficients, (g) noise as a function of sound pressure level.

Part 1 describes nature and measurement of sound. Chapter 1 discusses physical acoustics. This consists of sound waves, mechanics of hearing plus audible, infrasonic and ultrasonic sound. Chapter 2 reports on levels and spectra. This introduces the reader to the decibel scale, sound power, and sound intensity level. The discussion on spectra is too short. Chapter 3 delves into the character of noise. Initiating the subject, we encounter the description of discrete frequency noise, broadband, impulse-impact noise and the frequency weighting scale (A, B, C, D). The concluding section speaks about loudness and loudness level. A very good chapter that should be read.

The next chapter covers the various aspects of sound propagation. Beginning with the point and line source, the chapter progresses to sources on a line, finite plane sources and propagation of sound outdoors. The author furnishes a good example on partial barriers with proper explanation. However, the reviewer feels that barrier design should be extended to include barriers on roads and airports. A discussion of dipoles and quadrupoles is in order. Again, a good chapter to be read. Chapter 5 mentions the various instruments used in sound measurement and analysis in a very high fashion. This includes sound level meters, spectral analysis (constant or fixed bandwidth and percentage bandwidth), impact noise measuring devices, graphic level recorders, and magnetic tape recorders. The concluding section informs the reader of dosimetry measuring instruments with a section on data recording that is too abbreviated.

Part 2 introduces the reader to noise control methods. Chapter 6 reports on acoustical materials and their respective absorption coefficients. This encompasses absorbing, barrier type, and damping materials. The latter refers to free-layer damping, constrained layer damping, and constrained layer laminates.

Chapter 7 goes into the practical applications of enclosure materials and methods. This is extremely important in machine and personal enclosure applications in order to reduce the adjacent noise level. Additional topics are custom and partial enclosures and acoustical curtains. The next chapter focuses on silencer and muffler design. This relies upon extensive test results. Beginning with acoustical performance parameters, this leads to absorptive silences and ducts (lined, plenum, and bends). A discussion on acoustical louvers, stack insert, and reactive silencers, plus specialized silencers, concludes the chapter. The reviewer feels that this important section should be read thoroughly.

Chapter 9 treats reverberation, reverberant sound fields, and absorptive treatments. The reviewer feels that this section should be expanded to include more extensive information on reverberant fields with more extensive application to room design. The next chapter examines vibration control. This is a “blood brother” to acoustics. The simple single degree-of-freedom systems with and without damping are considered. Additional topics include the use of vibration isolators and absorbers plus flexible couplings. The concluding section mentions too briefly the topics of vibration measurement and analysis and measurements, transducers and the employment of processing and analysis equipment. Although the chapter is brief, the author gets his point across.

Part 3 encompasses the basic source of noise, its character, and treatment. Chapter 11 communicates to the reader the subject of fans and blowers. This embraces centrifugal and axial fans and blowers. Discussion of noise control of the former and latter concludes the chapter. Chapter 12 accounts for gas jet noise. This important problem occurs in pipes,
burners, and furnaces. An additional important subject is the impingement of noise and noise control for furnaces. Again a brief chapter, but to the point.

The next chapter considers gear noise, its major sources and characters. The use of synthetic gear and damping materials and proper design of enclosures are important to noise reduction. Application to noise reduction of saws would be of great value. Chapter 14 mentions additional topics and case histories, including power presses, machine tool, and tool screech.

Chapter 15 itemizes the various aspects of sound control in buildings. This incorporates sound isolation and acoustical correction to mechanical equipment, including plumbing noise. The last chapter reports on community noise. Employing previous and new information, the author details the aspects of audibility, the use of weighted sound levels, loudness and perceived noise level. The latter consists of effective perceived noise level, noise exposure forecast, statistical description, and equivalent sound level. The last section reports on noise pollution level, day and night average sound level, and speech interference level. Again a good chapter but too short.

In summary, this is an excellent book and well worth the money. The author overcomes all road blocks and explains everything in a clear, lucid, and simple fashion. The reviewer notes that a number of additional topics should be included. They are: (a) acoustic intensity methods of measurement; (b) helicopter blade noise; (c) correction factors for pipe transmission below the ring frequency; (d) more extended discussion of rotating machine noise, i.e., electrical and stationary turbine power plants; (e) additional discussion on acoustic noise emanating from aircraft, i.e., turbine and space vehicles. A few typographical errors were noted but they should not detract from the book. The reviewer highly recommends this book to the informed as well as the tyro in acoustics. A book well written!