
Preface

This book presents the English translation of the author's German edition 'Technische Akustik' (the 8th edition published by Springer Verlag in 2009). In whatever language, 'Engineering Acoustics' sees itself as a teaching textbook that could serve as a tool for autodidactic studies and as a compendium of lectures and courses as well. Readers are addressed who already possess a certain training in physical and mathematical thinking and in expressing ideas and explanations using mathematical formulas. On the other hand no highly specified knowledge is vital: readers with no more than the usual skills – like taking derivatives and solving simple integrals – are assumed. The appendix gives a short introduction on the use of complex amplitudes in acoustics and the reasons for their use. It is in general one of the author's most important aims not only to describe *how* the topic and its description develops but also *why* a specific way is chosen. Often difficulties in understanding do not consist in comprehending the single steps but in the question why they are done in that - and in no other way.

Moreover the explanations do not restrict themselves to the mathematical formulas. No doubt that formulas give the most unambiguous description of matters, and they show problems and their solutions in quantity also, but more remains to be done. Only the illustrative explanation relying on the reader's imagination produces understanding and comprehension. Textbooks should make learning – often difficult enough – as easy as possible, and this certainly does not imply to reduce the level.

In many respects this book is obliged to Lothar Cremer. For example, parts of the author's own knowledge originate from Cremer's very first 'Vorlesungen über Technische Akustik'. Important discoveries of Cremer are included in this new edition and its translations. Examples are, the optimum impedance for mufflers and the coincidence effect which leads to a satisfying explanation for sound transmission through walls; perhaps Cremer's most important discovery.

This book tries to present the foundations of that what nowadays seems necessary to make our environment quieter. All chapters between 'elastic iso-

lation' – the 5th – and 'diffraction' – the 10th – directly or indirectly address the question, how to reduce the sound level in the most important environs of everyday life indoors and outdoors – in buildings and in the open air. This requires the understanding of some principal features first. To fully comprehend the physics of sound transmission through walls for example, implies the understanding of bending wave propagation on plates. Because of that reason chapters on 'the media' precede the chapters on the noise reduction methods. The (short) chapter on sound perception serves as an introduction. The last chapter deals with the most important receiving and source instruments: microphones and loudspeakers. Specific measurement procedures are already discussed in many other chapters. The chapter 'absorption' for example begins with a discussion of how to measure the absorption coefficient.

The translation of this book was done by Stefan Zimmermann and Rebecca Ellis. The cooperation with them was interesting, satisfying, and excellent. Many thanks to them for all their efforts and patience with me.

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