

# Review of *Explosives Engineering*

Paul W. Cooper

Wiley-VCH, Inc., 1996  
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This book is intended as a non-trivial text for those interested in the technology and science that lies behind explosive events and devices.

While the book starts with introductions to some very basic chemical concepts, this reviewer is of the opinion that the book's intended audience is not the rank amateur, but the working professional, who may not have a background in this area, but is technically competent in some engineering or scientific field. This is bolstered by a (proper) reliance on the use of mathematical descriptions of concepts and events. While the math involved is not overly advanced, it does require some college level courses to be fully comprehended.

The text comprises six sections containing a total of thirty chapters, and is approximately 450 pages in length. At odds with the book's title is that only the last section actually deals with engineering applications. The bulk of the book is devoted to the chemistry and physics of detonation, explosives, explosive effects, and explosive devices. Not obvious from the title is the overwhelmingly military/governmental orientation of the uses and devices presented. However, this is not entirely unexpected, especially if one considers that the bulk of the basic work done in this field is at the behest of the military—and that Mr. Cooper spent most of his career employed in that area. Furthermore, private companies and organizations are generally reluctant to disseminate what they may consider to be proprietary.

The first section, *Chemistry of Explosives*, introduces the nomenclature and reactions that are needed to understand the basics of explosives.

The second section, *Energetics of Explosives*, introduces thermodynamics and goes on to cover the thermophysics, thermochemistry, and reactions that lead to the estimation of the detonation properties.

The third section, *Shock Waves*, continues from the previous section by describing the phenomena of the shock wave and covers the equations and current theory describing the shock wave and its interactions.

The fourth section, *Detonation*, speaks to the effects within the explosive itself. This joins together much of the previous material presented.

The fifth section, *Initiation and Initiators*, covers the theory of initiation (which is not limited to detonation) and the theory that governs the function of some types of initiating devices.

The last section, *Engineering Applications*, starts with a section on scaling. This is important in many design areas as the required development testing of full scale items may not be financially or "politically" feasible. Also covered is information on fragments, blast effects, jetting, and explosive welding.

It must be stressed that this book is primarily devoted to the area of "high", or detonating, explosives and has minimal, but not zero, information dealing with general pyrotechnics, and fireworks in particular. However, this reviewer would recommend that the pyrotechnic, and especially the fireworks, community read and understand the information presented in the excellent section on initiators and particularly the section on hot-wire initiators.

In contrast to an earlier book by Mr. Cooper, also published by Wiley-VCH, this book is reasonably free of typographic and other errors.

The reviewer would recommend this book to anyone who wanted to increase their knowledge and understanding of the field of explosives and their effects.

