

# Chapter 1

## Introduction

The primary purpose of this text is to document many of the lessons that have been learned during the author's more than 50 years in the field of blast and shock. This writing therefore takes on an historical perspective, in some sense, because it follows the author's experience. The book deals with blast waves propagating in fluids or materials that can be treated as fluids.

The intended audience has a basic knowledge of algebra and a good grasp of the concepts of conservation of mass and energy. The text includes an introduction to blast wave terminology and conservation laws. There is a discussion of units and the importance of consistency.

This book is intended to provide a broad overview of blast waves. It starts with the distinction between blast waves and the more general category of shock waves. It examines several ways of generating blast waves and the propagation of blast waves in one, two and three dimensions and through the real atmosphere. One chapter covers the propagation of shocks in layered gasses. The book then covers the interaction of shock waves with simple structures starting with reflections from planar structures, then two dimensional structures, such as ramps or wedges. This leads to shock reflections from heights of burst and then from three dimensional and complex structures.

The second edition has added sections on numerical simulation and on blast loading on animals. Some guidance is provided on exposing animals to blast waves; what to do and what not to do. Blast loading on personnel and the relationship to traumatic brain injury is discussed.

Some sample exercises have been added to some chapters to help clarify procedures for determining shock properties and scaling relations. Some useful personal computer routines relating blast wave propagation are included.

The text is based on a short course on air blast that the author has been teaching for more than two decades.