
Preface

Forensic engineering is the application of engineering principles, knowledge, skills, and methodologies to answer questions of fact that may have legal ramifications. Forensic engineers typically are called upon to analyze car accidents, building collapses, fires, explosions, industrial accidents, and various calamities involving injuries or significant property losses. Fundamentally, the job of a forensic engineer is to answer the question, what caused this to happen?

A forensic engineer is not a specialist in any one science or engineering discipline. The solution of “real-world” forensic engineering problems often requires the simultaneous or sequential application of several scientific disciplines. Information gleaned from the application of one discipline may provide the basis for another to be applied, which in turn may provide the basis for still another to be applied. The logical relationships developed among these various lines of investigation usually form the basis for the solution of what caused the event to occur. Because of this, skilled forensic engineers are usually excellent engineering generalists.

A forensic engineering assignment is perhaps akin to solving a picture puzzle. Initially, there are dozens, or perhaps even hundreds, of seemingly disjointed pieces piled in a heap. When examined individually, each piece may not provide much information. Methodically, the various pieces are sorted and patiently fitted together in a logical context. Slowly, an overall picture emerges. When a significant portion of the puzzle has been solved, it then becomes easier to see where the remaining pieces fit.

As the title indicates, the following text is about the analyses and methods used in the practice of forensic engineering. It is intended for practicing forensic engineers, loss prevention professionals, and interested students who are familiar with basic undergraduate science, mathematics, and engineering. The emphasis is how to apply subject matter with which the reader already has some familiarity. As noted by Samuel Johnson, “We need more to be reminded than instructed!”

As would be expected in a compendium, the intention is to provide a succinct, instructional text rather than a strictly academic one. For this reason, there are only a handful of footnotes. While a number of useful references

are provided at the end of each chapter, they are not intended to represent an exhaustive, scholarly bibliography. They are, however, a good starting point for the interested reader. Usually, I have listed references commonly used in “the business” that are available in most libraries or through inter-library loans. In a few cases I have listed some hard-to-get items that are noteworthy because they contain some informational gems relevant to the business or represent fundamental references for the subject.

The subjects selected for inclusion in this text were chosen on the basis of frequency. They are some of the more common types of failures, catastrophic events, and losses a general practicing forensic engineer may be called upon to assess. However, they are not necessarily, the most common types of failures or property losses that occur. Forensic engineers are not usually called upon to figure out the “easy ones.” If it was an easy problem to figure out, the services of a forensic engineer would not be needed.

In general, the topics include fires, explosions, vehicular accidents, industrial accidents, wind and hail damage to structures, lightning damage, and construction blasting effects on structures. While the analysis in each chapter is directed toward the usual questions posed in such cases, the principles and methodologies employed usually have broader applications than the topic at hand.

It is the intention that each chapter can be read individually as the need for that type of information arises. Because of that, some topics or principles may be repeated in slightly different versions here and there in the text, and the same references are sometimes repeated in several chapters. Of course, some of the subjects in the various chapters naturally go together or lead into one another. In that regard, I have tried to arrange related chapters so that they may be read as a group, if so desired.

I have many people to thank for directly or indirectly helping me with this project. I am indebted to my wife Leslie, who encouraged me to undertake the writing of this book despite my initial reluctance. I also thank the people at CRC Press, both present and past, who have been especially supportive in developing the professional literature associated with forensic science and engineering. And of course, here’s to the engineers, techs, investigators, and support staff who have worked with me over the years and have been so helpful. I’ll see you all on St. Paddy’s at the usual place.

R. N.