regulatory compliance monitoring. In Part III of the book, 11 detailed procedures are described for determining inorganic substances (N, D, CN, CoD, SO_4, etc.) in environmental sampling.

Gary F. Bennett

Dust Explosions in the Process Industries by Rolf K. Eckhoff

The first edition of Professor Rolf Eckhoff's book was published in 1991 as a hardback, and then as a paperback in 1994. It is an up-to-date and comprehensive publication, and covers in detail the science and technology of dust explosions.

A second edition has now been published. It differs from the first in that an additional chapter has been included, which is essentially a literature survey of work published between 1990 and 1996 on research and development in dust explosions.

Chapter One is an extensive overview, which covers the practical aspects of the topic. Eckhoff reviews why and how dust explosions occur, likely ignition sources, the consequences of an explosion and the practical measures that can be taken to either prevent them or minimise their effects. It is an excellent introduction, giving detailed background on the industrial significance of dust explosions and how they can be dealt with.

The importance of employing effective prevention and protection techniques is underlined in Chapter 2, which is devoted to case histories of dust explosion incidents. The range of materials involved and the variety of incident that occur is demonstrated, as is how complicated the propagation of an explosion through plant can be.

Chapters 3 to 7 cover in more detail some of the topics in Chapter 1, but with much emphasis on the formation of dust clouds and the propagation of explosions.

The dust cloud concentration, inhomogeneity and turbulence affect strongly the propagation of an explosion. Chapter 6 shows how the degree of protection applied to plant can vary with the state of the cloud. Chapter 3 is a lengthy discussion of dust dispersion, and reviews the forces of attraction between particles, and how particle dispersion can be achieved by air flow over dust deposits, and other methods.

Chapter 4 describes the propagation of dust flames. The behaviour of laminar flames is dealt with comprehensively. The laminar burning velocity of a dust flame is an important parameter. Various published theories of laminar combustion are discussed, and experimental techniques for measurement of the laminar burning velocity described. The importance of turbulence in the propagation of explosions is stressed, and its influence in compact vessels and elongated enclosures described. Chapter 5 expands on the ignition of clouds and bulk powders, covering some theories of ignition and describing in detail experimental work. Chapter 6 is a discussion chapter on dust explosion venting, and is a good review of the current position, pointing out that practical venting requirements can differ considerably from prediction.

Chapter 7 discusses laboratory scale testing of the ignitability and explosibility of dusts.

Chapter 8 is a survey of published work in dust explosions from 1990–1996. This is as up-to-date as publication allows, and expands on a paper published in the Journal of Loss Prevention in the Process Industries. The material covers a wide range of topics, and as a literature survey of the latest findings it is a good place to start. I hope in the next edition of this very valuable book, much of the information in Chapter 8 will have been expanded and added to the relevant parts of the earlier chapters.

In summary, this is an excellent book on dust explosions, and should interest anyone concerned with the topic.

G.A. Lunn