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BOOK REVIEW

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A Review of *Electrical Fire Analysis*

REFERENCE: Yereance, R. A., *Electrical Fire Analysis,* Charles C Thomas, 2600 South First, Springfield, IL 62794-9265, 1987, 255 pp.

This is a book intended for fire investigators but is also of interest to forensic scientists, insurance adjusters, or attorneys who may have occasion to deal with fires involving electrical equipment. As the author points out, nearly all fires involve damage to some sort of appliance, and suspicion often falls (rightly or wrongly) on the mysterious forces of electricity as the source of ignition. The author, an independent electrical engineer with several decades of experience at Battelle Laboratories and as a consultant to the Consumer Product Safety Commission, has examined thousands of samples of wiring and equipment. It is that considerable experience which he shares in this book. It is not an exhaustive study of all the electrical, mechanical, and chemical effects that interact in fires, but a straightforward exposition of one expert's experience and knowledge. The text is written in an informal, conversational style in the first person, which is sometimes distracting, but it does make reading it quite easy. There are occasions, for instance, when the author freely admits he does not know the reasons for a particular phenomenon. At these times the total absence of literature citations is most acutely noticeable since the reader is breezily dismissed without a clue as to where one might seek more technical information.

The text gives a generally comprehensive outline of fire cause-and-origin investigation recommending thorough, methodical examination and documentation at all stages especially when dismantling burned equipment. In spite of more than one entire chapter on the uses and techniques of photography, there is not a single photograph or diagram in the text. There is an extensive treatment of television set fires which is not found elsewhere and some discussion of electrical arson sets. The critical topics are all covered, but the chapters on common electrical components and fire initiation make extensive use of technical terms and concepts such as current, wattage, and electrical controls which are not described until very nearly the end of the book. The guidelines offered for report writing and record keeping are suitable only for civil proceedings and could pose problems for anyone in criminal cases.

Fire development is treated fairly simplistically but in adequate depth for the reader to be able to relate "electricity" as a source of ignition to fire spread throughout a fuel. The author uses the unique term "plastigas" to describe the gaseous and aerosol products of plastics (which apparently to him is synonymous with synthetic materials). He correctly describes the contributions made by pyrolysis products of synthetics to fire spread but then implies that "plastics" form the only flammable fuels in an appliance or a room, apparently ignoring

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the contributions of wood, wool, cotton, and linen which are still found in most fire environments.

There are several other minor errors that would be apparent to experienced fire investigators (for example, clothes dryers can be found on 110-V circuits and have been known to start fires by spontaneous combustion of overheated cotton loads), but the author offers dangerous counsel when he suggests that fire environments never pose gaseous hazards to the investigators and that masks and breathing apparatus are unnecessary.

There is curious logic to his rationale that the opinion of an expert, even when that expert is only 80% certain, is better than the 100% certainty of an amateur opinion. A lot would depend on what expression was made of the 20% *uncertainty* of the expert.

In spite of its shortcomings (and the lack of photos, literature references, and a complete index are significant oversights), the text does treat an area of fire investigation that confounds many experienced investigators. Its informal style makes it worthwhile reading for investigators and forensic scientists often confronted with fire-damaged appliances and challenged with the query: "Could this have been responsible?" Electricity is frequently wrongly blamed because it is so misunderstood and this text goes some way to dispelling some of the myths. After reading instance after instance of material failure and poor design and the myriad of ways appliances, tools, and equipment can fail and produce fire and shock hazards, this reader was sorely tempted to go home and unplug everything!