Book Review

Fitzgerald and Meacham: Fire Performance Analysis for Buildings, 2nd Edition

The second edition of *Fire Performance Analysis for Buildings*, by Robert W. Fitzgerald and Brian Meacham (Wiley and Sons, May 2017, 640 pp, ISBN: 978-1-118-65709-6), takes a deep and comprehensive look into the domain where buildings and fire meet. Buildings are the underpinnings of today's civilization, and each is starkly unique. Likewise, fires in buildings are just as unique. The challenges of analyzing fires and their performance in buildings is a challenging topic, and this essential publication charts an effective holistic approach for addressing this complex issue.

This work lays out the details of a framework to analyze a building's fire performance. The approach is universal, and applies to any building in any jurisdiction in any era. It includes numerous graphics to explain multiple decision making tools. With a good flow, it allows an easy way for a fire protection professional to get involved with risk assessment even when knowing little. The book fulfills its intent to speak to readers with varied levels of knowledge who want to understand fire performance of buildings.

The 38 chapters and close to 700 pages of this publication provide a wealth of detail, and it is well organized and easily absorbed. Logical procedures address individual components, systems and concepts in a dynamic and integrated basis to yield a comprehensive understanding. Effective tools are utilized, including the IPI (Interactive Performance Information) chart that visually maps the time-dependent interactions between a building, its features, the fire, defenses like manual intervention, and associated risks. The IPI chart is a key tool for organizing and communicating the dynamic interactive behavior of fire performance in buildings.

This second edition builds upon the baseline concepts laid out in this first edition, and it does so with noteworthy clarity and enhancement. The prior edition had a strong focus on probabilistic descriptors used for the complicated interactions of the analytical framework, and the second edition emphasizes state-of-the-art deterministic fire science and engineering, built around the IPI chart and related practical tools. Among the new techniques is an emphasis on the building analysis role of manual fire suppression involving fire departments and fire brigades.

The second edition is conveniently separated into four basic parts. Part One provides the foundational concepts that support the overall analytical approach. Up through Chapter 5 this addresses topics such as organizational concepts, barriers and compartmentation, fire defenses, tools of analysis, and quantification. A

special focus is given to the IPI chart, as an essential tool for dynamically relating the fire to the use of fire defenses and risk characterizations.

Part Two addresses the elements that compose buildings and the fire. Detailed explanation is provided up through Chapter 23. This includes components such as the phenomenon of fire, a room fire, fire beyond the point of origin, barrier effectiveness, smoke analysis, diagnostic fires, detection, manual intervention, built-in fire protection measures, building materials, fire testing, and analysis for fire conditions.

Part Three focuses on the analysis of this approach, with the holistic performance identified by the analytical framework for each aforementioned component, system and concept. The IPI chart is a key tool utilized in Part Three, proceeding up through Chapter 34. This explores the use of a diagnostic fire as well as a composite fire to follow the time scale through detection, notification, and intervention. Specific attention is given to topics such as smoke analysis and life safety analysis, along with prevention techniques and special hazards.

Part Four is all about managing uncertainty, up through Chapter 38 and the end of the book. The basic concepts include an overview of fundamental uncertainty principles, visual thinking, risk management programs, logic diagrams and networks, probability and the role of judgement.

This book is timely based on our need to better understand fire performance with buildings. Today the built infrastructure is proliferating at an incredible rate. According to the United Nations Population Fund (UNFPA) the world is undergoing the largest wave of urban growth in history. Today more than half of the world's population now lives in towns and cities, and in the next three decades this number is expected to swell to about 5 billion.

Today's fire protection professionals are facing new building with designs, configurations, materials, and other factors that are challenging our capabilities. The second edition of *Fire Performance Analysis for Buildings* is an important contribution to our body of knowledge to provide a fire safe future for tomorrow's world.

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