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Introduction

Building and industrial asset complexity is increasing, and new fire threats are emerging. Risk-based approach, instead of prescriptive rules, can give a better perspective to various stakeholders (not only in the design phase but also in the operation phase), but an effective fire risk assessment should be based on sound foundations around fire characteristics, building/industrial asset characteristics and people characteristics as well as the interactions among these elements. Fire-safety level should be managed and maintained during the life cycle of the asset and, in particular, during design and operation phases, including any emergency situation that may arise. Fire strategy should be defined, shared and communicated among stakeholders that often have different knowledge and feeling about fire protection measures, assessment methods, codes and standards. This book allows the readers achieving a common and intuitive overview of the process to select, design and operate a fire strategy in a risk-based framework, in which the strategy, as a pool of different measures, is not unique.

Given a fire scenario, the proper fire strategy should be defined given the risk (magnitude and probability of occurrence), the risk-reduction factor, the cost to implement and to maintain the measures, the vulnerabilities, etc. Resilience is achieved when fire risk assessment allows the consideration of the relevant fire scenarios, and their mitigation in frequency and magnitude to an acceptable level, given a defined risk criterion, is put in place and maintained over the time with a sound fire-safety strategy, known and shared among the stakeholders.

Stakeholders should be aware of considering the fire strategy as a common and shared holistic approach that goes beyond the differences among the parties (*in primis* the 'famous' gap among architects or civil engineers and fire protection engineers) to a specific additional and inalienable objective for the building performance: fire safety.

This approach would benefit from the increasingly common collaborative and working environments (even digital) that could solicit a common discussion around fire-safety issues.

According to the complexity of the building/asset under consideration, the readers will gain an overview of the general approach to achieve a structured fire-safety strategy in the design phase to be maintained over time, based on fire risk assessment results and eventually coupled with performance-based approaches for alternative solutions.

This workflow, based on fire-safety principles and from the examples gained, in terms of lessons learnt from real and severe fire events, is regulation-free and codes-neutral. This framework may become the basis of a common fire-safety culture among professionals with different expertise and from different environments, including the people who should manage fire safety during the operation phase under the use cases defined during earlier design.

Fire Risk Management: Principles and Strategies for Buildings and Industrial Assets, First Edition.
Luca Fiorentini and Fabio Dattilo.

Companion Website: www.wiley.com/go/Fiorentini/FireRiskManagement

These use cases, built around fire-safety objectives, should nowadays face complexity of socio-technical organisations using basic fire-safety principles. For professional engineers who want to adopt performance-based approaches (often built around the use of sophisticated tools), this book serves as a reminder of the objectives to be achieved considering the fire-safety fundamentals. For all the involved stakeholders, the content discusses the fire-risk-based workflow to be followed to verify and document the achievement of the performance as well as the requirements for the building/asset owners to maintain over time the required performance levels for each preventive/mitigative safety measure in the selected fire strategy as defined by a consistent fire risk assessment activity that becomes, together with the fire engineer, the main element of the entire process, while increasing the responsibilities of the expert himself:

> *"The fire engineer needs a certain toughness – and I am referring to intellectual toughness. The engineer must be able to be tested, challenged and deal with matters in a rigorous, analytical and, above all, honest way".*
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> *Margaret Law, OBE, 1990*