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INTRODUCTION

Scope

This guide provides information on the special topics that affect the fire safety performance of very tall buildings and their occupants during a fire. These topics are addressed as part of the overall building design process using performance-based fire protection engineering concepts as described in the *SFPE Engineering Guide to Performance–Based Fire Protection*.[1] It is not intended to be a recommended practice or a document that is suitable for adoption as a code.

The guide pertains to "super tall," "very tall" and tall buildings, all of which are characterized by heights that impose fire protection challenges. They require special attention beyond the fire protection features typically provided by traditional methods. This guide does not establish a threshold of what constitutes a building that falls within its scope. It directs the user to perform a risk analysis to achieve a reasonable and adequate solution for the specific building. A description of the elements of a risk analysis is presented in Chapter 6.

While the focus of this guide is fire safety in very tall buildings, it should be recognized by the building designers that fires may be a consequence of a primary incident, such as earthquakes, floods, tsunamis, hurricanes, tornados, cyclones and other natural or man-made events. All of these events could jeopardize one or more systems or pieces of equipment comprising the fire safety systems or means of egress provided in the building. Although the building designer should consider reasonable assaults that may be imposed upon fire safety systems from these other primary events, this guide does not address these other events in any specific manner.

Additionally, while this guide primarily addresses new construction, designers of existing tall buildings that are undergoing fire safety upgrades can benefit from the topics discussed here, provided appropriate risk analysis is performed.

Purpose

The purpose of the guide is to identify issues unique to "very tall" buildings and provide design professionals with sufficient information on the topics that affect the performance of tall buildings and their occupants during a fire. By considering these topics, the professional can prepare a fire protection design report or Fire Protection Engineering Design Brief (FPEDB) for the project. Further information on this topic is provided in Chapter 6. The guide is written for professionals who have a fundamental understanding of fire dynamics and are competent in the application of scientific and engineering principles to the evaluation and design of systems and methods to protect people and their environment from the unwanted consequences of fire. The topics identified are intended to be addressed using performance-based fire protection and engineering concepts and the lessons learned from experience with current tall buildings.

Background

This guide is a joint effort of the Society of Fire Protection Engineers (SFPE) and the International Code Council (ICC). The impetus for this guide was an increase in the design and construction of many very tall buildings in a multitude of countries. These buildings were being constructed to a variety of regulations, codes and standards, many of which did not address the heights that were being built.

The World Trade Center attack in 2001 caused enhanced interest in the challenges of tall buildings. Among those challenges are:

1. Egress and evacuation;
2. Emergency access;
3. Communications/situation awareness;
4. Fire resistance/resiliency; and
5. Reliability of water supply and active fire protection systems.

Another factor is the increased number of "very tall" buildings, resulting from improvements in design technology in areas such as structural design. Building codes address high-rise buildings, but may not adequately address risks inherent with "very tall" or "super tall" buildings.

Many building fire risks are exacerbated by height. Challenges associated with height will vary depending upon the system type, e.g., egress, smoke control, structural fire resistance and suppression. For this reason, "high rise," "tall," "very tall" and

"super tall" can have different meanings as they relate to different types of systems and physical phenomena. So rather than provide definitions of these terms, or categorize buildings by height, this guide addresses the tasks of identifying the factors affecting fire safety in tall buildings.

This guide emphasizes the importance of taking an integrated approach to the design of fire safety in tall buildings. An integrated approach looks beyond complying with codes and standards and considers how the height of the structure impacts safety and how the various fire safety systems in the building complement each other to achieve the building's fire safety goals.