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ASHRAE Guideline 29-2019
Guideline for the Risk Management of Public Health and Safety in Buildings

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NOTE

Approved addenda, errata, or interpretations for this guideline can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

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(This foreword is not a part of this guideline. It is merely informative and does not contain requirements necessary for conformance to the guideline.)

FOREWORD

Risk management of extraordinary incidents is a critical step in the process of establishing project goals and programs in the design and operation of new facilities or the renovation of existing facilities. This process will assist in determining what facility protection measures are appropriate to mitigate potential threats to meet the decision maker's operational needs at an acceptable cost. Methods described in this guideline show how analyses can be performed to assist the decision maker in this process. The guideline focuses primarily on office and multifamily residences as opposed to industrial or specialty designs such as transportation or detention facilities.

While several International Organization for Standardization (ISO) standards currently exist for emergency preparedness, they deal primarily with high-level recommendations for development of risk management plans. ASHRAE provided "initial guidance on actions that should be taken to reduce the health and safety risks of occupants in buildings that might be subject to extraordinary incidents" in its Report of Presidential Ad Hoc Committee for Building Health and Safety under Extraordinary Incidents, dated January 26, 2003. This initial guidance raised the awareness of the possibility of the occurrence of terrorist-like acts and addressed the tools necessary to design a system that would provide better protection of material and/or human assets. Events such as the 2008 hotel attack in Mumbai and the U.S. embassy attacks in Sanaa and Jeddah, among others, highlight the increased vulnerability of Americans with shifting social mores around this country and the world.

There have been many studies and reports that provide more specific guidance in many subject areas, especially the FEMA Risk Management Series, including FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings*, but they do not all provide comprehensive guidance in many subject areas. Few provide a holistic overview of the pieces that are within the purview of the HVAC design professional and are integrated with the architecture of the building. This guideline recognizes that all of this is to be performed in conjunction with ongoing requirements such as remaining within budgets, providing customer satisfaction, improving indoor air quality (while also potentially mitigating threats of biological and chemical airborne agents), and minimizing environmental impacts for both new and existing facilities.*

Many of the concerns that design professionals face during the normal project development cycle (wind load, seismic levels, etc.) lead them to create safe and secure facilities. Mitigation of terrorist threats may also be beneficial in these areas and serve as an enhanced multihazard approach that may be more easily justified in the project budget. This guideline provides information that encourages us to take the next step and consider the value of the assets that we are designing around—our people, our physical assets, and our continued business operations.

1. PURPOSE

The purpose of this guideline is to provide guidance for the practical evaluation, design, and implementation of measures to reduce multiple *risks* in new and existing buildings.

2. SCOPE

This guideline contains qualitative and quantitative methods for management of the *risk* of *extraordinary incidents* in buildings. Specific subject areas of concern include air, food, and water. The extraordinary events addressed in this guideline include fire, seismic event, chemical and biological release, blast, and other extraordinary hazards. The guideline will address *extraordinary incidents* from a multihazard perspective and will cover both intentional and accidental occurrences. The guideline addresses aspects of building performance that affect occupant health and safety, including egress; chemical, biological, and radiological (CBR) protection; fire protection; smoke removal or purging; filtration; air quality; entrance paths for contaminants; and building envelopes.

3. DEFINITIONS

Definitions of most terms used in this guideline may be found in *ASHRAE Terminology of Heating, Ventilation, Air Conditioning, & Refrigeration* [1].

Terms used in this guideline that are not found in *ASHRAE Terminology of Heating, Ventilation, Air Conditioning, & Refrigeration*, or that are used differently, are defined in this section and are italicized in the body of the guideline.

area of refuge: an area that is protected from the effects of fire or other hazards, either by means of separation from other spaces in the same building or by virtue of location, thereby permitting a delay in egress travel from any level.

dedicated outdoor air: a ventilation system that delivers 100% outdoor air to each individual space in a building at flow rates equal to or greater than required by ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality* [2].

extraordinary incidents: events or conditions that exceed those upon which locally accepted design practice is based.

hardening: reinforcement of the building structure and systems against impact of a blast, a ballistic assault, or ramming.

risk: the probability of suffering harm or loss.

terrorism:

> any action... that is intended to cause death or serious bodily harm to civilians or noncombatants, when the purpose of such an act, by its nature or context, is to intimidate a population, or to compel a government or an international organization to do or to abstain from doing any act [3].

threat: an indication of impending danger.

vulnerability: susceptibility to physical injury or *threat*.

4. RISK MANAGEMENT APPROACH

4.1 General Approach. *Risk* management is a systematic approach to the discovery and management of *risks* facing an organization or facility. It includes the identification of sources