

TERRORISM RISK FOR REGULATORS

Following the attack of September 11, 2001 the definition of building hazards in the United States has changed to include intentional attack. Protection of civilian population from acts of terrorism has become a major national priority.

Though historically focused on fire safety, the building regulatory system does address natural disaster mitigation (floods, earthquakes, windstorms, snow storms), some man-made risks (e.g., HAZMAT storage), and specific societal goals (energy conservation, accessibility). The regulation of all these areas is supported by well-established and accepted reference standards, regulations, inspection and assessment techniques, plan review methods, and quality control.

This chapter discusses terrorism risk as it relates to the building regulatory system. It is intended to provide information to building regulators in four categories, zoning, property maintenance, building rehabilitation, and building construction, so that they can initiate the process of developing regulations that will mandate cost-effective building investments in terrorism risk mitigation.

Regulation of Terrorism Risk

For a similar regulation of building-related terrorism risks, it will have to be shown that the development and implementation of such tools will be cost-effective. Some jurisdictions require rigorous cost/benefit analyses to support regulatory change. These determinations will require an understanding by the regulatory authorities of the potential occurrences and damages related to terrorism risk.

Balancing Stakeholder Interests

The codes and standards development process, involves thorough review and balloting by all interested stakeholder groups. This consensus process provides for the balance of diverse commercial and social priorities. It has the advantage that once a regulation or standard is promulgated it is likely to be widely accepted and used. It is thus an effective change lever. However, the consensus process is time consuming.

Implications for Building Regulation Enforcement

Zoning and planning regulation define land use, building density, transportation systems, and utility systems. They are usually

adopted by local governments, but state planners may provide guidance. For existing vulnerable properties, these regulations can address specific access-control measures. This will require a prioritization of hazards and buildings. For future developments, these regulations can, at the extreme, result in commercial development resembling military installations. How should such a decision be made when zoning and planning at the local level is the most political of the building regulatory processes?

Property maintenance codes govern the use and maintenance of existing buildings. Housing codes and fire codes are two examples. They are developed by model code and consensus standards organizations and adopted as regulations by local government agencies. These can be effective at addressing all building vulnerabilities. They will require extensive inspections, and enforcement will be burdensome unless targeted to highly prioritized vulnerabilities, and accompanied by financial incentives.

Building rehabilitation codes address health, safety, and welfare in existing buildings that are undergoing voluntary improvements. These are a relatively new development. They have been enacted by some state or local government agencies. These can be effective at addressing vulnerabilities in existing buildings in which rehabilitation investments are otherwise being made. They should be carefully calibrated, since these codes all have the objective of "encouraging the reuse of existing buildings" rather than risk reduction.

Construction codes (building, mechanical, plumbing, electrical) address health, safety, and welfare in new buildings. They are developed by model code organizations (ICC, NFPA) and adopted as regulations by state or local government agencies. Rarely does the federal government regulate construction requirements. Two recent examples of federal regulation are the Americans with Disabilities Act (ADA) enforced by the Dept. of Justice and the Fair Housing Act enforced by the Dept. of Housing and Urban Development. Construction codes can be effective at addressing the problem of vulnerability at its margin, that is, new buildings

to be built. Unlike the preceding three categories of regulation, these may be the easiest to accomplish ("words on paper are cheap compared to bricks and mortar in place"). However, many jurisdictions may require cost/benefit analysis to justify even these regulations.

CURRENT BUILDING REGULATION SITUATION

Current codes are effective at mitigating the effects of fire and, as discussed above, natural disasters. They also regulate aspects of indoor air quality and the installation of mechanical, plumbing, electrical, and communication systems.

Code Relation to Terrorist Threats

Bomb blast is not addressed in the codes, but some of the earthquake and windstorm provisions in the building codes may have a beneficial effect on mitigation of this hazard. Code-regulated earthquake design requires the building's structural system to have toughness, ductility, and redundancy, all of which may also contribute to the mitigation of blast effects. Code-regulated hurricane design requires the fenestration to resist the effects of impact of windborne debris, which may also mitigate the hazards of glass in explosions.

Progressive collapse, which is one of the effects of blast (but not the only one), is discussed in The American Society of Civil Engineers standard, ASCE 7 (the structural loads standard referenced in building codes). Some qualitative guidance is provided, but no design criteria are specified. ASCE 7 and the American Concrete Institute standard, ACI 318 (the reinforced concrete design standard reference in building codes) have references to structural integrity but not as a set of criteria for resisting progressive collapse.

Chemical, biological, and radiological agents are not addressed in the codes, but certain details of the design of building heating, ventilating, and air conditioning (HVAC) systems, as regulated by mechanical codes, may mitigate the effects of these agents.

Armed attack may be addressed to a limited extent insofar as the codes regulate the design and construction of correctional facilities, but the phenomena of incarceration and of terrorist attack are quite different in many respects.

Regulatory Activities Related to Terrorism Risk

The Federal Emergency Management Agency (FEMA) has published *The World Trade Center Building Performance Study* "to examine the damage caused by these events, collect data... and identify studies that should be performed."

The New York City Department of Buildings, soon after the WTC attack, initiated an effort to analyze the code as it relates to terrorist threat. In February 2003, the task force issued a report of findings and 21 specific recommendations for code, code administration, and code enforcement changes.

The American National Standards Institute (ANSI) established a Homeland Security Standards Panel (HSSP) in February 2003, in response to The National Strategy for Homeland Security. The proposed mission of the HSSP is to catalog, promote, accelerate and coordinate the timely development of consensus standards within the national and international voluntary standards system intended to meet identified Homeland Security needs, and communicate the existence of such standards appropriately to governmental units and the private sector.

The National Fire Protection Association (NFPA), a standards organization active in the field of fire safety, established a committee on Premises Security before 9/11. It plans to produce two standards by 2005: NFPA 730, *Guide to Premises Security*; and NFPA 731, *Security System Installation Standard*.

The American Society for Testing and Materials (ASTM), a standards organization active in the field of materials, specifications, and test methods, many of which are referenced in building codes, is considering the creation of a Homeland Security Committee, or Subcommittee.

The American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE), a standards organization active in the field of mechanical systems and indoor air quality in buildings, may initiate activities addressing chemical and biological agents in buildings.

The American Society of Mechanical Engineers (ASME), a standards organization active in the field of boilers & pressure vessels, elevators, and other building equipment, has developed a program of seminars for engineers entitled “Strategic Responses to Terrorism,” which cover a range of topics including biological and chemical terrorist attacks.

The National Institute of Standards and Technology (NIST) is conducting an extensive review and analysis of the WTC collapse. It is anticipated that it will lead to code changes related to structural safety and fire safety in high-rise buildings.

The General Services Administration (GSA) published PBS-PQ100.1, *Facilities Standards for the Public Buildings Service*, June 14, 1996. Chapter 8, Security Design, contains building design criteria for blast resistance, progressive collapse, and chemical, biological and radiological attack. These criteria cover the design and construction of all GSA buildings, and will be applied to all government-leased buildings as well.

The Department of Defense (DoD), has a similar standard to GSA's entitled *Unified Facilities Criteria, DoD Minimum Antiterrorism Standards for Buildings*, UFC 4-010-01, 31 July, 2002.

BUILDING REGULATION MANAGEMENT MODELS

The four categories of building regulations, zoning, property maintenance, building rehabilitation, and building construction, have the potential, between them, to address all the physical aspects of terrorism risk, including common terrorist tactics and delivery systems as well as terrorist attack devices. Development of a specific typology that allocates specific risks to the specific regulation requires additional analysis. Table 4-1 is a matrix that can be used to begin this analysis.

In order to implement changes in the building regulatory system to address terrorism risk, it is important to recognize that there are four ways that regulatory change can take place:

- Federal preemption
- State mandate or preemption
- Local prerogative
- Model code and voluntary standards

Initiation of changes in each of the four categories of building regulations must be carefully analyzed for political acceptability and the availability of resources.

FUTURE DEVELOPMENTS

Development of codes and standards to deal with terrorism risk in both new and existing buildings will require broad acceptance of the character of the risk and the effectiveness of the mitigation measures as well as some form of societal cost/benefit assessment.

Table 4-1: Building Regulation Applicability to Terrorist Tactics and Threats/Hazards

| Common Tactics | Zoning | Property Maintenance | Rehab | Construction |
|-------------------------|--------|----------------------|-------|--------------|
| ATTACK DELIVERY | | | | |
| Ballistic weapons | | | | |
| Covert entry | ● | ● | ● | ● |
| Mail | | | ● | ● |
| Moving vehicle | ● | | | |
| Stand-off weapons | ● | | ● | ● |
| Stationary vehicle | ● | ● | ● | ● |
| Supplies | | ● | ● | ● |
| ATTACK MECHANICS | | | | |
| Airborne | | ● | ● | ● |
| Blast effects | | ● | ● | ● |
| Waterborne | | ● | ● | ● |
| THREATS/HAZARDS | | | | |
| Armed attack | | ○ | ● | ● |
| Arson/incendiary | | ● | ● | ● |
| Biological agent | | ● | ● | ● |
| Chemical agent | | ● | ● | ● |
| Conventional bomb | ● | ● | ● | ● |
| Cyber-terrorism | | | ○ | ○ |
| HAZMAT release | ○ | ● | ● | ● |
| Nuclear device | | | | ○ |
| Radiological agent | | ○ | ○ | ○ |
| Surveillance | | | | |
| Unauthorized entry | | | | |

LEGEND: ● = Applicability to designated type of regulation. ○ = Possible applicability.

