High Occupancy Buildings: Are You Vulnerable?

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The focus on terrorism has prompted many building owners and hospital executives not only to focus on serving the community but protecting the building infrastructure that serves both their customers and staff. As a leader in your particular organization, you rely heavily on your, architect, engineers, law enforcement, and other professionals to insure proper protections are in place to protect your building and those that step foot on your property. Is your facility really protected? Have you considered all the "what if" scenarios should a terrorist attack occur on your property? What are your vulnerabilities?

Security should never be taken with a blasé approach in today's environment. Many hospitals and building owners servicing large populations face the dilemma of providing an open and welcoming environment versus a barricaded environment thus creating an unappealing style. There are many options available today to create protection measures without obvious notice to your external surroundings. The challenge is also protecting critical assets within your facility. So where do you start?

There are thousands of publications and opinions published on building protections and most organizations rely on consultants to evaluate their internal and external vulnerabilities. While many building owners and hospital missions are so different, the focus of this paper will cover general building protection measures and steps to evaluate your present situation.

Strategic Plan

The most important keystone to any organization is to make sure you have developed a Security Master Plan. The security master plan can be developed with short and long-range objectives with key staff involvement. Ideal topics to evaluate include

- Intrusion Detection Systems
- Interior/Exterior Closed Circuit Television (Digital)
- Electronic Access Control Systems
- Crisis Management Plan
- Parking and Property Security
- Lighting Survey
- Identification badges
- Vehicle and perimeter barriers

The above topics are not an all inclusive list. There are many topics that the Security Master Plan can address. The plan is a journey and should not be completed over night. It takes time and analysis to compile the Security Master Plan while taking into account your current environment. Additional analysis should include your demographic surroundings, local crime index which can be obtained through your local police department or FBI, high profile iconic buildings, stadiums, amusement parks, and other area attractions. Once completed, the strategic plan can be properly budgeted in the overall organization's strategic plan. In regards to the Crisis Management Plan or Security plan, the facility should also address jurisdictional issues with local and federal authorities.

Hazard Vulnerability Analysis

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has significantly revised the standard for emergency management (EC 1.4). Although many organizations have a plan in place to respond to several disaster scenarios, the 2001 standard is still in effect and response plans must include plans "based on a hospital hazard vulnerability analysis performed by the hospital." The hazards that have occurred or could occur must be balanced against the population that is at risk to determine the vulnerability to the given hazard. Risks include:

- Threat to human life
- Threat to health and safety
- Property and system damage/failure
- Economic loss
- Loss of community trust/goodwill
- Legal ramifications

The Emergency Management EC1.4 is very detailed and should be reviewed. Owners of public buildings are not subjected to the requirements of JCAHO, however hospitals are required to comply, and they must sufficiently assess and document the analysis to include the scenario event, probability, risk, and preparedness.

Geographical Imagery Systems (GIS)

A great tool available to building owners and organizations is the use of GIS. GIS snapshots provide the owner's with detailed information concerning their particular area, region, and allow building owners and design professionals an added benefit to see the "whole picture" of their overall building environment. GIS is extremely valuable when conducting a Hazard Vulnerability Analysis. When conducting a vulnerability assessment, GIS imagery should focus on the following area:

Site. The site will provide the owners a top to bottom view of everything from a 10-mile radius. Areas to evaluate include:

- Transportation networks (railroad, vehicle, ports, tunnels, airports)
- Iconic structures
- Telecommunications infrastructures
- Electric Power and Gas Systems
- Water supplies and Ports
- Events and attractions (stadiums, amusement parks)
- Prevailing winds, physical barriers, climate, vegetation

Hazardous Imagery. Hazardous sites should be examined to determine your threat level. Many building owners have no idea exactly what's contained in their area and how to mitigate risks from hazardous areas located near their building. Areas to evaluate include:

- Chemical and experimental laboratories
- Dry cleaning and rubber manufacturers
- Nuclear plants
- Electric and gas companies
- Fuel and oil companies to include other environmental sites.

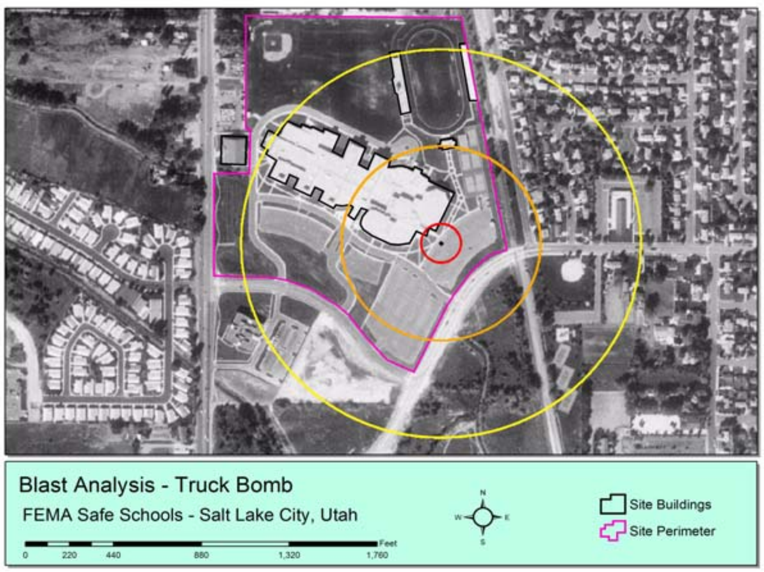
Emergency Management Systems (EMS) Imagery. GIS imagery can provide detailed EMS positions located around your area. These include hospitals, fire and rescue, police, and other

EMS management services. An evaluation of this GIS also allows building owners to calculate response times for various contingencies you are planning and also allows for proper planning to mitigate particular disaster scenarios.

Blast Analysis Imagery. The blast analysis imagery is extremely important to evaluate the blast effects using a 10-mile radius. Varying level of shock wave blast effects can be programmed to evaluate simulated damage to your building and the ripple effect to others in the area. The GIS review can assist owners to further plan mitigating phases and also to plan for additional security measures. Items to evaluate include:

- Window and structural damage (progressive collapse)
- Mechanical and electrical damage
- Parking lot damage (especially underground parking lots)
- Overall building envelope damage
- Calculation of injuries to people

An example of typical GIS scenarios.



A blast analysis is a valuable tool to gain information on varying levels of damage using GIS. The outer ring notes varying levels of damage.

Mitigation Madness! Where to Begin

A great starting point to assess your present facility, property, and situation is reading the new FEMA 426 Publication, “Reference Manual to Mitigating Potential Terrorist Attacks Against Buildings.” Most executives do not have time to comb through the volumes of information so they rely on an outside consultant to obtain the vulnerabilities and mitigation strategies for them. The key to a successful evaluation is to assess not only the exterior of the buildings but the inside as well with trained experts in various disciplines to include site, architecture, structural, mechanical, electrical, fire protection systems, communications systems, and physical security. Most consulting firms maintain all the disciplines under one roof, which can prevent the building owners from contracting out various disciplines to assess their vulnerabilities.

Most Common Vulnerabilities to Buildings and Hospitals

There are many types of buildings that serve specific missions. Some buildings are privately owned while others are Department of Defense, General Services Administration, or other Government owned entities. The most common vulnerabilities listed below are not all inclusive, but, generalized throughout the building industry.

- Zero access control for vehicles. Many facilities are open to the public and there are no security mechanisms in place to screen identification badges or conduct vehicle inspections. While this is not the intent to most hospitals throughout the country, they should have a system in place should terrorist threat conditions elevate in their area.
- Loading dock vulnerabilities remain a high target area. Many loading docks can be approached by a high-speed vehicle. The ramming effects to the loading dock impact various areas depending on the design of the building, however, a large majority of building damage includes mail room, central utility hubs such as telecommunications, electrical, and other critical areas. Most buildings do not screen incoming vehicles to their present loading dock and should a bomb release in the loading dock area, it may cause a progressive collapse (if the loading dock is centrally connected to the main building).
- Many mailrooms do not have proper ventilation systems in place to mitigate a potential bomb or anthrax exposure. Ideally, the mailrooms should be located away from the building structure to prevent blast effects and chemical exposures.
- Parking vehicles to close to sensitive buildings, loading docks, and other critical areas raise concerns for most building owners. Underground parking is extremely vulnerable without adequate security measures.
- Redundant utilities are a must to keep your operations functioning properly. Redundancy equates to a “system backup” should main utilities fail. Should a blast occur, are you sure your telecommunications, information systems, and ventilation systems will work properly? Redundant utilities are critical however; make sure any newly added systems can be properly loaded to the secondary generator.
- Electronic access control cards are popular feature in most facilities, however, new concepts such as the SMART card initiated by the government may not be compatible with other current systems in place. Make sure your access control systems are properly configured for all cards and appropriate systems security is applied.

Common Mitigation Strategies to Protect Your Building

Most hospitals and building owners are now faced with elevating their protection measures, unfortunately, the design of the buildings from many years ago never considered our current state of terrorism nor did they have to plan for such events. Nonetheless, the items below offer some ideas to enhance protection to your assets and your staff.

Roadways

A straight-line or perpendicular approach to sensitive buildings should not be used, because these give vehicles the opportunity to gather speed necessary to ram through protective barriers and crash into our penetrate buildings. Instead, approaches should be parallel to the façade, with berms, high curbs, appropriate trees, or other measures used to prevent vehicles from departing the roadway. The use of serpentine curving will alleviate high-speed approaches. Consider the use of retrofitted concrete bollards, planters, or use electronic pop up barriers in designated areas. Consider perimeter fencing as needed.

Parking

One of the most challenging areas to contain vulnerability is that of parking. Building owners must weigh the risk versus customer service and revenue; however, in heightened state of readiness conditions, building owners should consider the following:

- Maintain proper stand-off distance
- Restrict parking and access between buildings
- Consider one-way circulation in parking lots
- Locate parking within view of occupied building
- Restrict parking underneath buildings
- Well-lit, with security presence, emergency communications, and/or CCTV
- Apply progressive collapse hardening to columns when parking garage is underneath the building.

HVAC Systems

All buildings should have current emergency plans to address fire, weather, and other types of emergencies to include chemical, biological, and radiological emergencies (CBR). HVAC control or shutdown procedures should be addressed. Many building's fresh air intakes are located at ground level which invites exhaust fumes to be drawn indoors including wind and rain. Elevating the air intakes increases the distance of the source. In stable conditions, contaminants released near the ground will likely remain close to the ground unless the airflow over the building lifts it upward. Contaminants that are heavier than air will also tend to remain close to the ground under calm conditions. Placing air intakes at the highest practical level is most beneficial. They should be covered by screens so that objects cannot be tossed into the intakes or into air wells from the ground. The screens should be sloped to allow thrown objects to roll or slide off the screen away from the intake. There are products available to retrofit HVAC filters to combat against CBR contaminants. Additionally, a mechanical engineering consultant can advise you on additional protective measures such as central shutdown features, HVAC filtration for CBR, and ducting.

Others

- Facilities should have adequate CCTV and Intrusion Detection systems in place.
- Think Redundancy! Redundant electrical, mechanical, communications. What functions are critical and must remain operating should a power outage occur. If you only have one trunk line entering your facility, what will you do if that one trunk line terminates power?
- Exposed utilities should be protected ideally by concrete bollards, planters, or encased concrete.
- Make sure you have a solid Key Control. Program.
- Magnetometers may be required for some areas that detect guns and heavy metal objects.
- Consider using laminated glass in place of conventional glass for windows. Additionally, building-hardening techniques should be used in high target areas.
- Information system back up plans and tapes should be relocated 10 miles away from the facility.

- Conduct and review disaster drills and evacuation procedures.

A full vulnerability assessment to your particular building will prove very beneficial to your staff, customers, and insurance rates. A great way to begin the process of evaluating your facility is consulting FEMA 426. They provide a handy matrix to guide you through the process. Some buildings that are very complex and provide unique missions should be evaluated by trained consultants. Other approaches to take consist of thinking like a criminal or terrorist. In evaluating your property, what would you do? Where do you think you're vulnerable? Don't just evaluate the exterior of your property and building, evaluate the inside as well. Finally, make sure any mitigation measures you incorporate will comply with all the governing disability acts and occupational/health guidelines.

Hospitals will continually be challenged because they have to be prepared for all types of casualties including CBR and to compound the challenge, evaluate how they will protect themselves. It's a new world now and opened and inviting buildings now must always plan to "expect the unexpected."

Tom Yancoskie, FAAMA, is a healthcare consultant and is currently employed with Jacer Incorporated, Falls Church, Virginia. Healthcare organizations and the Federal Government heavily seek him out for his expertise in Capital Asset Management, Facility Planning, and Anti-terrorism/force protection.

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