



Building Security: Defining and achieving it

A conversation with Perkins & Will

One of a series of collaborations between Herman Miller, Inc.,
and leading architecture and design firms

The world of work and work environments has changed immensely in the past quarter century. Architects, building owners, organizations, and furniture manufacturers have changed their practices and products to keep up. Some of the changes were predictable—the growth in white-collar employees, the advances in computers. One change in particular was dramatic and unexpected—the change in the nature of building security.

According to a RAND report, the blast at the World Trade Center in 1993 was the equivalent of 2000 pounds of TNT. At the Murrah Federal Building in 1995, the blast equaled 4000 pounds. The forces that destroyed the World Trade Center on 9/11 equaled 480,000 pounds of TNT. Can a typical office-building owner or tenant reasonably expect protection from such forces?

IFMA Survey, February 2002,
www.ifma.org

As you might expect, the federal government is leading the way in developing new standards and guidelines for designing, constructing, and maintaining more secure buildings. Security has always been an issue at governmental facilities, but since the bombing of the World Trade Center in 1993, efforts to prevent or minimize attacks on buildings and the people in them have multiplied. An International Facility Management Association survey conducted in 2002 found that 90 percent of respondents have reassessed building security since September 11.

Building security is a multifaceted problem. The first question is: **How do you define security?** The problem becomes vastly different depending on the business, the location, and the nature of what you're securing. **Secure from what?** Realistic security threats range from terrorism to spouse abuse. Another question: **What are your plans should an event occur?** Do you have an evacuation plan in place? **How can you balance security and openness? Is the building yet to be built or are you retrofitting?** The costs and strategies differ. **How can interior layout affect security?**

Barbara Nadel, “Designing for Security,” *Architectural Record*, March, 1998

American Institute of Architects, “Building Security Through Design,” 2001

American Institute of Architects, “Annotated Bibliography of Security Resources,” www.aia.org/security/bib.asp

However you answer these questions, you will need to gather resources around you for help. One such resource is the architecture and engineering community. Architects and engineers are beginning to develop methods and processes for determining what is and isn’t possible, what is and isn’t reasonable. The following conversation with a group from Perkins & Will and their colleague on many projects, Holly Stone, an engineer with Hinman Consulting Engineers, will furnish you with a good basis from which to proceed with your own explorations into building security. One message is clear: Each project must be considered on its own terms. Ed Feiner, chief architect for the GSA, puts it this way: “There is no cookbook to solve all problems; every building is different.”

Herman Miller: The American Institute of Architects defines security as the sum of access control, surveillance, and response. In its pamphlet “Building Security Through Design,” the AIA goes on to add building hardening and biochemical protection to equal “enhanced protection.” Do you think about building security in those terms?

Fred Afshari, principal, Perkins & Will: Building security is a kind of risk management, in the same way that a building would be engineered to withstand natural disasters. The difficulty is defining the risk—chemical, biological, natural. What are we trying to protect against?

Holly Stone, consulting engineer, Hinman Consulting Engineers: There are a lot of different ways to approach the problem of protecting a building and its occupants. It’s not just about hardening a building, adding more concrete and steel. It’s about taking a holistic approach. The three best strategies are, first, to avoid the event. An owner or occupant through a combination of intelligence, surveillance, or controls may be able to stop an event from happening. That’s absolutely the best way to protect people. If an attack doesn’t happen, nobody is going to get hurt. Second, if something does happen, we want to blunt the effects by hardening the building or keeping the threats away from the building. This can keep an explosion from hurting people. Finally, if something does happen, people need to get out and rescuers need to get in. We look at ways to facilitate rescue and evacuation operations through the building’s design.

Herman Miller: How do you go about defining the security risk to a building? Where can you go to get help?

Stone: Before September 11, only a handful of firms did engineering for blast resistance, though there were security firms around the country with expertise in other areas. Since September 11, people are paying more attention. Established programs and criteria are in place, primarily centered on government buildings and programs. Government agencies have specific design criteria for blast resistance and have set standards for the knowledge level of blast consultants and blast engineers. Experts in the government community have been addressing these issues for years. The University of Pennsylvania has a program in blast-resistant design. Once you get outside the government sector and work with private clients, they’re just beginning to feel their way.

Aki Knezevich, principal, Perkins & Will: Architects and engineers are leading when it comes to devising solutions to security problems. We are the ones expected to come up with ideas about what to do. We also raise issues and spread successful solutions from one building project to another. The move toward addressing security on the private side is much, much slower than in government and institutional markets.

Afshari: We're also expected to come up with cost-effective solutions.

Stone: Before you make decisions about protecting a building or personnel, you should understand exactly what you're trying to accomplish. Here are some questions you might ask: Are you a target? What's nearby? Are you close to a major government building? Is your building on a suburban campus with plenty of room or in an urban setting with buildings close by?

Some of the higher profile financial institutions and property-management firms are looking at their existing buildings, trying to figure out their vulnerability and how to approach protecting them.

Rod Vickroy, associate principal, design director, Perkins & Will: We are seeing some corporations doing risk assessments, sometimes when they're contemplating leasing a building. They consider the location as it relates to security. When they talk about data centers and physical assets that don't need to be physically tied to a commercial aspect, they look to put their mission-critical activities outside urban areas where security is easier to create. But people need to be in commercial centers, and often that is the prime consideration when locating an office.

Stone: Distance is one of the most important blast issues. The pressures that act on a building from a blast decrease exponentially with distance. If you have mission-critical activities and you can place them in suburban areas with large standoff distances, you are better off than having them next to a city street with uncontrolled access. Before you buy a piece of land, you need to think about security.

Afshari: Whatever the conditions are, you must consider security before the project starts. Otherwise, it's too costly.

Herman Miller: A RAND-documented briefing claims that there is, as Holly said before, little you can do to prevent a "catastrophic event." And so "mitigating the effects of an attack" becomes the chief goal. How does an organization go about planning to blunt the effects of an attack or natural disaster?

Knezevic: The best way for a project team to work together is from the very beginning stages of work. Owner, architect and engineers, blast consultant, security consultant, landscape architects—everybody plays a role in enhancing the safety of the occupants. Security planning influences the most fundamental aspects of design, and early "security team" input can liberate the design process.

Stone: A building owner or potential owner can start the process with specific steps. First, what is the threat? Once you have determined the threat, perform a vulnerability assessment. For existing structures, this should include a blast analysis. Next, determine the performance criteria, or level of protection, for the different building elements—the glass, exterior envelope, and so on. The best way to accomplish this is to retain a security consultant. They can help an owner

RAND, "Security and Safety in Los Angeles High-Rise Buildings After 9/11," 2002, www.rand.org

determine ways of decreasing the threat. Throughout this process, keep the critical things in mind: What's the risk, what's being protected, what is the potential aftermath?

Afshari: Also look at the codes and life safety, which are geared to protect people. It's not important if the building is destroyed; it is important to get people out safely. Evacuation routes, enclosed stairways, all the procedures for handling a crisis once it happens are important to minimize the effects on people.

Tom Mozina, associate principal, Perkins & Will: I'd like to bring up the factor of insurance coverage. Many insurance companies are beginning to demand better security precautions. That's driving a lot of the demand for security assessment.

Knezevic: The front-end job of defining the threats and setting up appropriate design criteria is probably more difficult than the architect's job of designing solutions for identified threats. At one point in Europe, everyone was designing buildings to prevent car bombs from getting too close. But the IRA loaded up a rocket in the back of a van and shot it at a government building in England. Suddenly the threats—and the criteria—changed. You have to be creative in imagining threats.

Herman Miller: One of the chief conundrums of building security is balancing protection and openness. In a 1999 GSA symposium, the participants discussed this tension at great length. Senator Daniel Patrick Moynihan put it best: "Architecture is inescapably a political art, and it reports faithfully for ages to come what the political values of a particular age were. Surely ours must be openness and fearlessness in the face of those who hide in darkness. Precaution, yes. Sequester, no."

Afshari: Security wants to lock everything up, and of course people want everything as open as possible. I remember a hospital that insisted the building be open, even if it meant making it easier for a gunman to get in. We had exit systems that locked up the outside after hours but were completely open to people on the inside. The same hospital needed to get wounded people into the emergency room as quickly as possible, but they were also worried about drive-by shootings. We had to protect the entrance to the ER. People at the entrance are shielded from being seen by people driving by.

Mozina: In suburban call centers, the number-one threat is domestic violence. We had to account for that in the design of such a building recently. We had to find a way to separate visitors and employees. It became an issue in the design of the building and the campus.

Knezevic: In another example, a courthouse, security concerns required us to lock up certain corridors to control access, but that meant other people visiting the building could not reach exits through certain corridors in case of fire. We ended up designing two sets of exit corridors to resolve the conflict between fire and security requirements, despite additional costs.

Mixter and Owendorff, "Selected Insurance and Lease Issues to Consider after the Terrorist Attacks 11 September, 2001," *Journal of Corporate Real Estate*, September, 2002

US General Services Administration, "Balancing Security and Openness: A Thematic Summary of a Symposium on Security and the Design of Public Buildings," November 30, 1999

Randy Nason, "New Strategies are Emerging to Help Architects Design without a Bunker Mentality," *Architectural Record*, December 2000

Barbara Nadel, “Safety and Openness: An Ongoing Battle for Balance,” *Architectural Record*, January 2000

Stone: Ever since the 1983 bombings in Beirut, guidance and standards have become increasingly prevalent in government agencies. The Department of State came out with architectural and engineering guidelines, and after Oklahoma City, the GSA began creating security criteria, which later evolved into standards in use right now at federal buildings. The federal government has been very proactive.

Knezevic: Despite demanding federal security standards, we were able to design a courthouse that was extremely open yet also secure. The Los Angeles Federal Courthouse was part of the Design Excellence program for the GSA. Design was important to the client and the design community. Initially, there was some friction between design and security goals, so we looked closely at the design intent and the specific requirements for security. To keep the courthouse as open as possible, we designed a unique glass curtain wall at the front the building. We decided to use an elegant, point-supported glass system and allow it to fail in a blast event. We then needed to catch the fragments of glass before they entered the interior. The solution was a steel mesh behind the glass that also screened the interior from the sun—an unexpected synergy.

Herman Miller: Barbara Nadel, who has written several articles on building security, makes the point that “security need not be incompatible with good design.” Do you see any constraints on the design of buildings, the purely artistic side of design, that exist now because of security concerns?

Knezevic: To keep the Los Angeles Federal Courthouse from looking like a fortress was the most challenging part of this project, and it guided much of our design effort. In the past, the expression of openness and its implication of democracy have been sublimated to security; many government buildings end up looking like fortresses as a result. We wanted this courthouse to be open and express the concept of “justice for all” as much as possible.

Blast standoff distance or setback requirements can greatly influence the way a building is massed in the early stages of the design. The original setback in Los Angeles was 20 feet. The building was lower and lighter. When we had to increase the setback to 50 feet, the building grew by three stories, and the structure became heavier. The same amount of square feet had to be squeezed into a smaller footprint, while maintaining the same design quality. We managed a good compromise between design and security.

Mozina: We went through all kinds of gymnastics with the massing to keep the glass and the openness of the building, the flexibility to open up the building.

Stone: The design team also began to think about the relationships among the layout of the lower floors, the parking garage, the mechanical systems, and security. By incorporating security into the final scheme, the team was able to reduce the amount of specific hardening required. Building hardening can be very expensive if you don’t plan well for adjacency issues and massing.

Mozina: And if we can do the behind-the-scenes planning more efficiently, we can put more of the budget toward more visible and human parts of the building.

Knezevic: Our job is to help the client make the tradeoffs between security and budget and architectural expression. I would say that clients should not give up on a good design because of security. Set high expectations for your architects and engineers.

Herman Miller: What about retrofitting older buildings? Is any one type of building or location easier to retrofit for security than another? Suburban? Urban?

Stone: There is a whole array of retrofits available now, and more are coming on line rapidly. For external threats, solutions can include enhancing the exterior envelope and retrofitting windows with security film, blast curtains, or interior window systems. Still, retrofitting an existing structure is very problematic, especially when you're not doing a major renovation.

In the case of a typical, modern building, often the existing mullions in large window walls are not strong enough to resist blast effects. We often end up adding large mullions as part of a retrofit. In some cases, we may even have to divide the windows into larger panes. Another possible solution is to create a backup system, like a catcher's mitt, in large lobby areas. If the glass breaks in a blast, the backup systems catch the pieces before they can enter the occupied space and injure people.

You may also limit the area open to unscreened employees and visitors by keeping the security screening as close to the exterior walls of the building as possible. This results in fewer people able to get close to support columns before going through security. Retrofits can be more effective and less costly if you consider the entire situation—including layout and operations—rather than simply using “muscle” and hardening an entire building.

Mozina: You might also step up security, surveillance, cameras—all the things that would help prevent a blast—before the expense of strengthening columns and so on. Harden an existing building as a last resort. For any building, whether urban or suburban, you can reduce the vulnerability by increasing the standoff space. If there is room, you have a greater ability to install anti-ram barriers and so on.

Herman Miller: What steps should you go through before you lease a building? Is it possible to match a building to an organization's risks?

Knezevic: It certainly is. We have clients who ask us to evaluate potential leased space for many factors, including security. If they have a risk policy, we can develop criteria and match a building and an organization. It's still a matter of threat and appropriate response. Landlords cannot be expected to accurately predict risk profiles of future tenants, and for them security issues are more difficult to define.

Herman Miller: In retrofitting buildings, is there a common mistake people are making in the pursuit of security, things that will come back to haunt them in the future?

Stone: Yes, it can be a mistake if people do not look at things as systems. Windows are a system: glass, frames, mullions, anchors. By putting laminated glass in older mullions and anchors, you might actually end up doing more harm than good. The entire window structure might get thrown into the building, creating a greater hazard than the original window. Taking steps that aren't integrated with the plans for an entire building is usually a mistake. It's also important to think about what information is publicized about your building. It may not be a good idea to share security details with the public.

Herman Miller: Could you talk for a minute about how an interior space can increase security? Access control? Surveillance?

Vickroy: It's about balancing what needs to happen operationally and what needs to happen with floor security. Having public space that is secure from the open office space is important for clients. Very seldom do you see an elevator that opens directly into an unsecured area.

There are clever ways to make the office area secure, but it doesn't have to feel like a fortress. It should feel natural. We need to balance what a space needs to say from a brand-image or organizational culture point of view with what we need to be secure. Begin with human contact: have someone who can assess the situation and lock or unlock doors meet visitors.

You also want people to make turns. You don't want them to have unimpeded, straight-ahead access to interiors. You need them to have to make a choice about which way to go. This slows things down. People these days are increasingly asking for fail-secure systems. Even when the power goes down, the locks stay locked. This involves more planning for such things as stairwells that are accessible from the lobby and stairwells that are accessible from the office areas.

Afshari: Another way is to provide exiting systems that function independently of entrances; that lets you keep your doors locked always.

Vickroy: Clients are also concerned about industrial espionage and losing valuable intellectual capital. When a client has outside people come in, we design areas where meeting and engagement spaces for consultants or other kinds of collaborators don't give everyone access to all areas. A concern about security is really changing how law firms are being designed, for example. Now partners' offices are separated from conference rooms and centers. There is a third kind of space, secure from some spaces but open to collaborative kinds of work. It's just a reflection of new realities for business, a layering of access.

Afshari: Laboratories are also similar. Projects are separated from each other, and some spaces are kept private from independent contractors. Schools are also changing. Barriers now keep people who are visiting libraries or gymnasiums from entering the rest of the building.

Herman Miller: Do codes now require security measures since the World Trade Center and Oklahoma City bombings?

Afshari: The codes really haven't changed that much with regard to security. It's hard to identify the specific risk, and codes have to apply to everyone. Some people take the approach that other ways will be found to make buildings more secure. For example, since 9/11, airport and airplane security has risen immensely. The odds that a building will be attacked with an airplane have gone down. That puts the possibility of air attack at the bottom of a list of risks.

One result of a greater interest in security is greater attention to evacuation plans and exit routes. Organizations after 9/11 are realizing that what happens after an attack or disaster is very important, especially if your goal is protecting people rather than data or technology.

Afshari: Yes, what happens after a blast is important. Intercoms in the stairwells, this is the case everywhere for high rises. Security is drawing attention to all parts of a building. Smoke detectors, fire alarms, all should be designed to survive an event.

Knezevic: Never do anything in a vacuum. Always consider the points of view of architects, engineers, and security and blast consultants early in the design process.

www.perkinswill.com

www.hce.com

Stone: Education is a huge part of security. Either Perkins & Will's or my firm's web site is a place to start.

Knezevic: I would also advise clients to give their architects and engineers the license, and funds, to find a creative solution to security and design. It's a little bit of a research project every time.

Afshari: The best security is to raise human awareness.