Balancing Airport Life Safety and Security

Vince Caponi

Over the past several years, the Federal Aviation Administration (FAA) has mandated security improvements in airports throughout the nation. In fact, airport terminals have one of the most restrictive sets of security requirements of all assembly occupancies. These requirements have challenged airport fire protection and security specialists to re-evaluate their approach to life safety and security management and to redefine the relationship between life safety and security.

Historically, life safety and security have been at odds. Security experts tend to focus on controlling the movement of people into and through interior areas and out of buildings through designated doors, while fire protection experts tend to focus on rapidly evacuating buildings through any available door. Now, new security requirements are forcing fire and security specialists, building officials, and airport management personnel to work together to establish a balance between life safety and security without compromising individual needs.

The first step to achieving this balance is realizing that integrating security requirements into the overall life safety management philosophy will enhance both life safety and security. A three-pronged approach helps establish this balance through facility design, installation and integration of fire and security systems, and emergency planning.

Defining the problem

Airport facilities are unique for several reasons. They have special security requirements and the potential for a high occupant load. Egress to public areas outside the buildings is usually limited because much of the buildings’ perimeters and many perimeter doors are surrounded by access-controlled airport operations areas (AOAs). And highly concentrated aircraft servicing operations take place at ramp areas near emergency exit discharge points. This combination of unique characteristics requires innovative solutions to life safety and security challenges.

Design considerations

Developing a functional building design that balances life safety and security requires that emergency operations be understood before design review begins so problems can be alleviated through design changes. This understanding ultimately influences which types of fire/life safety and security systems will be installed and, most important, the sequence of operation.

Primary consideration should be given to the size and placement of emergency exit doors on the public sides of the building, while complying with building code requirements for exit spacing and travel distance. Emergency exit door configurations that place the maximum number of doors on the public sides of buildings can keep occupants from exiting through doors that discharge into secured AOAs. This becomes especially significant when code requirements prohibit the installation of any type of security device, such as delay egress hardware, on emergency exit doors in airport terminals.

The conflict arises when exit doors located along a building side that adjoins an AOA must be secured, but must also remain operational for emergencies other than fire. This problem is compounded in terminal buildings that are completely surrounded by AOAs. If doors can’t be relocated or secured during building design or renovations, another possible solution is to control exit discharge points by using corridors that turn into public areas. Consideration should also be given to reconfiguring AOA boundaries to place exit doors on the public side whenever possible. Compartmentation is also essential in building design. Fire and smoke barriers provide significant protection for occupants.

The installation and functional integration of fire detection, fire suppression, smoke management, and occupant alarm/notification and security systems complete a systems package that provides early warning, rapid intervention, real-time visual monitoring of conditions, and occupant notification. This systems package allows emergency response personnel to manage the evacuation process, and, subsequently, reduces the potential for a large-scale or total evacuation by terrorist bombings is on the rise could prompt a greater willingness on the part of airport and airline personnel to participate in the planning and implementation of evacuation procedures. As NDPs’ Comeau points out, the Dusseldorf incident is prompting all airport fire officials to take a hard look at airport terminal evacuation, communication, and coordination procedures. Some airports have instituted major changes as a direct result of this tragedy.

In some ways, Europe may offer a window on the future of American airports. At Gatwick, for example, where 24 million passengers pass through the airport annually, there have been 10,000 alerts for unattended bags so far this year. The majority turn out to be nothing but old forgotten suitcase or handbag. But there have also been seven seriously considered bomb threats this year. On average, terminals are evacuated every two or three days over the course of the year, about half because of fires, and half because of bombs or bomb threats.

Compared to those at most U.S. airports, evacuations at Gatwick are conducted with an admirable degree of order and organization. For example, each section of the airport has its own evacuation routes and assembly points. The assembly points are marked by large letters or numbers on metal signs in the parking lot or other clear areas around the facilities. At each assembly point, there’s a clipboard, a bullhorn, flashlights, and a fluorescent vest for the evacuation coordinator, who takes a roll call as soon as he or she arrives.

To prepare airport personnel for evacuations, the Gatwick airport fire service holds two-week-long training courses annually. The airport is divided into security sections. The courses are attended by some 50 to 60 trainers, who return to teach a half-day course to the employees in their respective sections. The trainers are not only taught fire safety, but how to give a lecture and to tailor their instructions to the particular group. For example, airport porters and janitors may get different instructions and route assignments than retail store managers.

Among the challenges, says Whittington, are the high turnover of airport staff and the variety of employees’ ethnic backgrounds. Because restaurant staffing tends to be largely Hispanic, some training is given in Spanish. Another concern is the trend toward outsourcing and the use of temporary contractors for some airport services. The short duration and turnover of such staff may place them at risk.

“If there’s an incident, they may not be properly trained or supervised,” says John O’Sullivan, the British Airways fire protection manager in London.

By law, airlines operating out of the United Kingdom must give employees fire safety courses. British Airways requires four hours of fire safety training for every new employee, from ticket counter staff to mechanics, and a re-
loving occupants to remain in the building while emergency response personnel size up the situation.

A fire suppression system can reduce the spread of fire, which should reduce the magnitude of the incident.

An effective smoke management system helps maintain a more tolerable interior environment for a longer time by removing smoke and toxic byproducts of combustion. This will also help reduce the need for evacuation.

A presignal alarm system, used in combination with a manually activated voice—not prerecorded—evacuation system, provides the fire department with early detection and warning, and enables fire department personnel to direct occupants using clearly understandable voice instructions. This is especially important since most airport occupants don’t understand coded audible signals and are slow to react in the absence of a visible threat, even when signals are activated. Dividing a facility into clearly defined evacuation zones is an essential part of the managed evacuation process. Occupants must be able to identify features clearly to use as reference points upon which to base their movement. Gate locations can serve as excellent reference points.

Security cameras both inside and outside a facility can provide incident command personnel with real-time monitoring of interior and exterior conditions and the evacuation process, while door alarms can indicate which exterior discharge points may require immediate response to manage evacuation into AOGs.

Emergency planning
We’ve already established that emergency evacuation planning is the best place to start when trying to alleviate potential problems through design changes. Relocation should be used in airport terminal facilities as it is in other occupancy classifications, where egress must be managed. Depending on the circumstances, uncontrolled egress into access-controlled AOGs could place occupants in danger. For example, would it be safer to evacuate several hundred occupants onto aircraft ramps during peak times of aircraft servicing activity or to relocate them to another part of the building until they can be directed to exits on the public side of the facility?

The discharge of several hundred occupants into an AOG near a parked aircraft can also create significant security problems. Even though occupants have already passed through the security screening process, they’re still not authorized to be in AOGs without proper escort.

A comprehensive emergency evacuation plan must be developed to establish a framework for managing the evacuation process. The plan must delineate, at the very least, the specific responsibilities of airport operations personnel, the fire department, and the police for interdepartmental cooperation and planning; an incident command structure; employee training; procedures for isolating occupants after discharge onto ramps; post-evacuation security procedures; transportation of occupants discharged to AOGs to other areas; and securing damaged and evacuated building areas. Tabletop exercises should be conducted periodically to evaluate the plan and establish proficiency.

Each employee must be trained to serve as an evacuation monitor who can direct occupants toward egress points as specified by incident command personnel. This function requires a clear understanding of the overall building evacuation plan.

Future trends
As airports become busier and security processing requires more time to complete, more occupants will be in terminal buildings for longer periods. Building design, integrated life safety and security systems, and comprehensive emergency planning will be more essential than ever. No single element should be expected to equal the combination of elements that make up the life safety management package.

The unique challenge facing airports requires a paradigm shift from the traditional separation of life safety and security as unrelated functions. Airport personnel responsible for life safety and security must work together as a life safety management team to develop solutions to new challenges through the application of collective expertise and to evaluate the effectiveness of building design, life safety and security systems integration, and emergency plans designed to maintain acceptable levels of public safety.

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Another area of training and fire safety preparation that’s often overlooked, says O’Sullivan and others, is that of coordinating airport fire, police, and mutual-aid agencies. Indeed, that was one of the lessons learned the hard way in Dusseldorf. While most fire services are well prepared to deal with a burning aircraft on the runway, a terminal blaze can require more coordination. At most airports, a terminal fire is the joint responsibility of the local fire department and the airport fire service. But the local fire department may be unfamiliar with the terminal layout and evacuation procedures.

“The various emergency teams have to be able to communicate with each other,” observes O’Sullivan. While larger airports may have established procedures, radio frequencies, and joint training exercises, he notes that smaller facilities may not.

What’s needed is what Maurice Pilette, fire protection engineer at Massport, calls the “big picture” approach. And not just in coordinating emergency teams. Massport, the agency that operates Logan Airport in Boston, has begun a formal evaluation of evacuation procedures and the building and fire codes, as well as other fire safety systems. “At many airports, you have separately installed sprinkler, fire alarm, smoke alarm, and communications systems. Throw public safety into the mix and, in the end, the majority of the systems don’t work in unison,” says Pilette. “Do you end up evacuating 10,000 people when smoke from a kitchen hood activates an alarm?”

Such inconsistencies can also exist in the training levels. While most airport operators are in charge of training for their staffs, each airline at the airport may have a different level of training or interest in fire safety.

“In some terminals, one big airline may be, in effect, the ‘owner’ of that terminal,” says Pilette.

Given the current environment of heightened concern about terrorism, as well as the Dusseldorf wake-up call, several fire safety experts observe that Pilette’s big-picture approach may prevent a way to reduce the friction between security and life safety issues. It’s a matter of management structure.

“One of the safest, best-run airports—Logan and San Francisco, for example—have both fire and security coordinated under one umbrella,” says Pilette.

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