Don’t Panic!

An Introduction to Facility Exit Devices

ASSA ABLOY

The global leader in
door opening solutions

Fast Exits Save Lives

Crowds of people gathering in public places tend to take their safety for granted. After all, if you've been to 100 concerts without incident, why should the 101st be any different? But when an emergency strikes, people panic: Where's the door? How do I open it? Modern exit devices are designed to operate without any prior knowledge of the door's function so everyone can get out of a building quickly and safely, whether they've been there before or not.

Before the advent of modern safety standards, people in burning buildings were often crushed in a stampede for the exits, couldn't find the doors that would lead to safety, or reached a door only to find that the exit was blocked. This was the case during the 1903 Iroquois Theatre fire in downtown Chicago that killed more than 600 people. The high death toll in that tragedy can be attributed to panic-stricken people finding doors that were secured by unfamiliar locking devices and being unable to operate them. This prompted the call for fire safety standards in the United States, and ultimately led to widespread implementation of the panic bar, a device on an outward-opening door that releases the door quickly when pressed from the inside.

"The whole idea around exit devices is that people should be able to exit an area quickly and easily without having to spend time figuring out how it opens,"

says Chris Gaughan, director of product management, commercial mechanical products at ASSA ABLOY.

"Single-motion egress with no prior knowledge of operation is critical," Gaughan says. "In an emergency, building occupants may not be thinking clearly and may be unfamiliar with the venue. With a clearly marked exit equipped with panic-rated hardware, they make it out of the building safely. And if a crowd is pushing toward the exit door, you can still get it to open. That's why the push pad — the actuation part of the exit device — has to be half the width of the door." The crush of a crowd against a door causes it to release.

Do Your Doors Require Exit Devices?

Written by Michael Miller

Building owners, architects and facility managers all need to be aware of regulations (including any local codes) governing where exit devices should be used. The rules that identify what kinds of buildings need exit devices come from the International Building Code, a model code developed by the International Code Council and revised every three years, most recently in 2012. The council issues and updates its requirements, but the code is not mandatory until a state or local jurisdiction adopts it. At that point it gains the force of law.

In general, doors in areas where more than 50 people are expected to gather are required to have exit devices, according to Kurt Roeper, director of industry affairs, codes and standards for ASSA ABLOY Americas.

"It's not a matter of whether you want them or not," he says. "The law requires you to have them in assembly and educational occupancies."

In places where an exit device is required, additional locks cannot be used on the door, Roeper says. "You often see people applying additional locks or security devices to the doors because they're afraid of unauthorized entry in remote areas of the building that may not be under visual observation all the time," he says. "So a building owner or manager will add locking devices to the door, not thinking about the fact that it defeats the purpose of emergency egress. It's completely against the building code, against the fire code and against the law."

Since building code adoption and enforcement varies across the country, project owners should consult with a professional specification writer to ensure compliance with local regulations. The local Authority Having Jurisdiction has final judgment for requirements related to any specific project or building.

A 15-Second Delay

So how can facility managers prevent unauthorized entry without inhibiting emergency exit? By choosing exit devices tailored to the needs of the facility. For example, a big-box retailer might be required to have an emergency exit at the back of the store, but not want to facilitate someone walking out carrying a television set. A situation like that calls for a delayed egress exit device. As Chris Gaughan describes it,

"If you push on the exit rail, an alarm sounds and the door will not open for 15 seconds,"

he says. "After 15 seconds the door will release, but that gives the store owner time to investigate and prevent a theft."

Delayed egress devices are allowed on doors serving any occupancy except assembly, education and hazardous materials, and only in conjunction with an automatic sprinkler system. Upon activation of the sprinkler system, the delay function of the device is deactivated, allowing free and immediate egress.

These devices are also useful for stairwell access in hospitals and university dormitories where authorized users can use cards or credentials to override the device and have free movement between floors. The stairwell remains useful for fire evacuation in an emergency, but functions as an access control point for day-to-day use. Another useful application for a 15-second delay would be a hospital maternity ward which requires free egress but is also among the most secure areas of a hospital.

The next version of the International Building Code, due out in 2015, will add provisions for delayed egress devices in places where Alzheimer's disease and dementia patients are housed. The fire code does not allow facilities to simply lock people in, so a delayed egress device provides a balance between people slipping out the door unnoticed, and immediate exit in the event of a fire. When there is a chance that someone might wander out on to the streets, the 15-second delay allows the staff to take charge.

Trial By Fire

Another important function of exit devices is to help keep doors closed in the event of a fire. Exit devices and doors can be certified as either fire-rated or non-fire-rated, depending on their location in the building. Fire-rated doors and frames are designed to withstand fire for a specific period of time. They prevent backdraft and keep a fire from spreading in a building, protecting people and property. Doors installed in fire-rated walls are also required to be rated, as are the exit devices installed on those doors. A door that goes from one part of a building to another — such as from the gymnasium to the main part of a school — might be non-fire-rated if it is in a location that is not considered to pose a hazard.

Underwriters Laboratories (UL) is the main regulatory authority that sets fire-rated standards for exit devices.

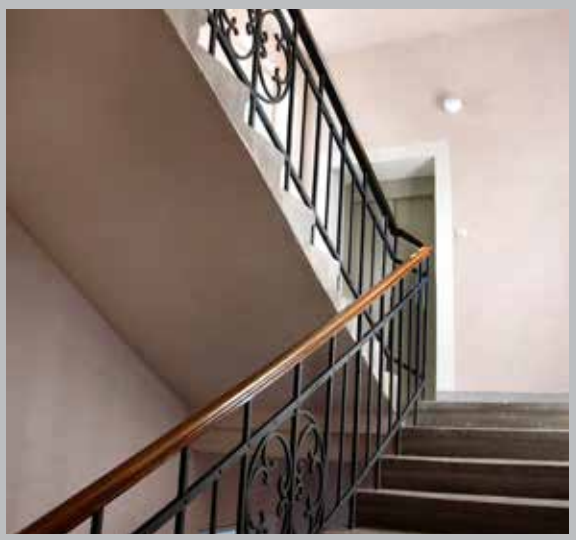
Rich Crispi, standards coordinator for SARGENT, an ASSA ABLOY group company, describes the testing that goes into fire-rated doors and exit devices. "UL builds a wall, puts a door frame in it, and then mounts a steel door with our exit device on it," he says. "Flames from a furnace attack the door and the exit device for three hours at about 2,000 degrees. The latch has to stay latched. The whole device can melt off the door, but the latch has to stay latched."

After the flames go out, the door is immediately hit with cold water from a fire hose to simulate a real-life scenario. To pass the test, the door has to remain latched. This test ensures that people in a part of the building that is not burning have time to get out without a backdraft reaching them through an unlatched door.

Certification by Underwriters Laboratories is not a one-time event. "Exit devices and other door hardware that are listed with UL are often retested every year, or every three years," Crispi says. "If we make any changes to a product, we have to go back to UL. They also send their field inspectors to our facility. They can grab a device right out of production and inspect it to make sure we're compliant. If we're not, they can shut us down. Our laboratory is also evaluated every year. A team comes in from UL and makes sure all our equipment is calibrated to National Institute of Standards and Technology standards. Once you meet the standard, you have to keep it up."

In addition, the NFPA publishes guidelines (NFPA 80) about fire doors.

Underwriter Laboratories certifies product for fire safety standards compliance, with doors and frames having rating levels (20 minute, 60 minute, etc.). The rating level required for an opening is specific to its location and purpose and defined in the local building code.



Safe For All

Another concern from a regulatory point of view is compliance with the guidelines of the Americans with Disabilities Act, or ADA. "For door hardware, the issue is how high the device is off the floor," Crispi says. "You can't have anything where pinching or twisting is required to open the door. For visually impaired people we have levers on the exterior trim with a textured back, so that people who are visually impaired know what they're holding on to. And thresholds can't be over a certain height, so if we're going to make a vertical rod device with a latch that goes into the floor, we have to make sure that the height of the latch does not exceed the ADA standard."

Built To Last

In addition to meeting UL and ADA standards, exit devices are tested to standards set by the Builders Hardware Manufacturers Association (BHMA). The BHMA sets minimum standards for performance, such as the number of cycles a device withstands before failure.

BHMA's Grade 1, the industry group's top rating, stipulates that a device has to withstand one million cycles before it fails — a threshold that Gaughan describes as low. If a device is to last the lifetime of a building, it will need to last through tens of millions of cycles. "Think about the main entrance on a hospital," Gaughan says, "and how many times it is used in the span of a minute. At just two uses per minute, that's over a million cycles per year."

The BHMA also specifies opening force tests for both the inside actuating bar and the outside trim. To meet the standards, an exit device must have outside levers and thumb pieces that can withstand heavy forces to prohibit entry. The latch must also be able to withstand a 400-pound load in the direction of egress without allowing the door to spring open.

In order to ensure products last the life of the building, architects and facility managers must make sure that any exit device they plan to employ bears the "BHMA-certified" logo and is listed in the BHMA directory of certified products on-line. Products that merely claim to be ANSI compliant or are "designed to meet" ANSI/BHMA standards may not. BHMA certification is the ONLY assurance that a product meets or exceeds the ANSI/BHMA standard.

Utilizing BHMA Grade 1 certified exits also reduces the total cost of ownership of the door opening.

According to FacilitiesNet.com, for most door applications, the initial door component purchase represents only 10 percent of the total cost of ownership. The other 90 percent of ownership cost is maintenance. Grade 1 hardware is proven to have a longer projected service life, lower maintenance requirements and longer maintenance intervals.

Other Considerations

Beyond safety considerations, the choice of an exit device can be influenced by concerns about noise and aesthetics. Devices that use motors rather than solenoids are known for operating quietly, which is especially important in facilities like hospitals and dormitories. "Solenoid devices tend to be very loud and distracting if you have to listen to it all day," Gaughan says.

Another consideration is aesthetics. Exit devices are required by building code, but given the choice, most people would prefer modern, attractive hardware. The challenge is to provide architects and designers with the best-looking exit devices possible. "In competitive and mid-tier devices, aluminum is used frequently as a cost savings," Gaughan says. "But when aesthetics are considered, people tend to want an all stainless steel or all brass finish."

A Safer Future

From the tragic events that spurred today's hardware standards, exit devices have improved steadily over the years to become increasingly user-friendly, aesthetic and compliant with new rules such as the Americans with Disabilities Act. Devices that enable safe exit without prior familiarity with the door mechanism are now mandated by code for relevant occupancies. Facility managers and owners have options like 15-second delays and alarms to prevent theft, unauthorized entry or exit. Fire rating of doors protects people and property from backdraft and fire spreading to further areas of a building. Standards from the UL, ANSI and BHMA ensure manufacturing processes and the resulting products meet a high level of performance, durability and safety. With all these areas of progress, and enough foresight, diligence and common sense, headlines about horrific casualty tolls from people trapped in a building can become relics of the past.

ASSA ABLOY is the global leader in door opening solutions, dedicated to satisfying end-user needs for security, safety and convenience

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