

Protecting Stairwell Safety Without Sacrificing Security

High-rise commercial building fires are sparking rising concerns over what building owners can do to make stairwells safer for emergency egress without compromising security. In 1980, a fire at the MGM hotel in Las Vegas claimed 84 lives. More recently, four people died of smoke inhalation in a stairwell during a building fire in New York. On October 17, 2003, stairwell smoke claimed the lives of six people when fire broke out in the 35-story Cook County Administration Building in downtown Chicago.

The Chicago fire was typical, with locked stairwell doors that prevented people from re-entering building floors when they encountered heavy smoke in a stairwell. A final report from an investigative panel found that if the building had had sprinklers or stairwell doors that automatically unlocked in a fire, none of the deaths would have occurred.

In high-rise offices, it is a common practice to lock stairwell doors to prevent criminals from entering offices, committing theft and leaving via the stairwells. Sometimes doors are locked only at the end of a business day, but in more buildings today, doors are always locked above the first floor to discourage the use of stairwells as a shortcut and protect against the possibility of criminals lurking in these areas.

The Search for a Solution

One of the earliest approaches, which focused on stairwell security, was to lock all doors to prevent re-access from the stairwell side. Signs were posted that all doors were locked until the ground level. Although this maintains security and works well in theory, stairwells can fill with smoke or create a chimney-like draft when doors are left open during a fire, often with fatal results.

In many localities, codes or ordinances were changed to require that doors be left unlocked at intervals, such as on every fifth floor. While this helped provide a safe emergency escape, it also compromised security.

Some systems make it possible for a person in authority to open the locks on all floors from a central location, although this requires a specific action that may not be possible or practical in all emergencies. Systems now are available that automatically release the locks on stairwell doors of all floors when a fire alarm is sounded, eliminating the human component.

One such solution is an electrified breakaway lever trim recently introduced by Von Duprin as the E996L and also available as a retrofit kit for existing 996L Breakaway lever trim. It incorporates a 24VDC solenoid that can be energized from a distant controller. When the fire alarm system is activated, it acts as an on-off switch for the electrified lever and turns the power off. This unlocks the lever so a person can rotate it and retract the latch bolt, allowing the door to be opened. As an added benefit, the lever is a “breakaway” design that operates normally when unlocked but yields if more than 35 pounds of torque pressure is applied when it is locked. This prevents vandalism or forced entry by breaking the latch, and the lever is easily re-set.

The electrified lever trim on the stairwell (pull) side of the door is paired with a standard mechanical exit device such as the Von Duprin 98 or 99 series on the push side to allow safe egress at all times. When the stairwell doors are locked, anyone entering the stairwell will not be able to re-enter the building areas and generally will have to exit at ground level. For security reasons, the ground level doors typically open to the outside. However, when the fire alarm system is activated, a person can re-enter at any level because the levers all will unlock automatically.

Essentially, it is a fail-safe mode, although the product also can be set up to fail secure where allowed. This might be the preferred option in non-stairwell locations, such as the back door of a jewelry store, where a power interruption would otherwise leave the door unlocked.

This type of system has other applications as well. For instance, a receptionist who is monitoring a stairwell door or other entrance equipped with an electrified lever trim could have a pushbutton on the desk that would shut off power to the lever and allow someone to enter if recognized. Any kind of credential-based switch, such as a keypad, card reader or biometric device also could be mounted near the pull side of the door to allow authorized individuals to enter the locked door. Because it also is available with a mechanical lock cylinder, the lever can be opened with a key, an option often used by support staff such as security or janitorial people.

Codes Govern Usage

In response to the potential for continued high-rise stairwell catastrophes, fire and life safety codes have been changed to tighten regulations governing what can be done with stairwell doors. National codes specify general standards on how structures can be built, with state, county and local codes addressing specific concerns, often with a wide variety of requirements and interpretations. The final decision rests with the authority having jurisdiction (AHJ), so a product that has some flexibility in how it can be configured, applied and controlled stands a good chance of being able to meet the requirements of a specific application.

High rise fires cause an estimated 60 civilian deaths, 930 injuries and \$252 million in property loss each year, according to a U.S. Fire Administration report. Of these, only about 25% of high rise dollar loss is incurred in residential properties, even though the majority of high rise fires occur in residential structures. Clearly, the potential for damage, injury and death in high rise commercial structures is serious. Applying stairwell door controls that provide an effective combination of life safety and security solutions is one step that can be taken to help minimize these risks.

CAPTION INFORMATION:

1. Stairwells can be deadly in high-rise fires such as this one at the 35-story Cook County Administration Building in downtown Chicago.
2. Von Duprin E996L electrified lever trim automatically unlocks when a building's fire alarm system is activated. The breakaway lever design prevents vandalism or forced entry.

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