

## What Makes an Opening Secure?

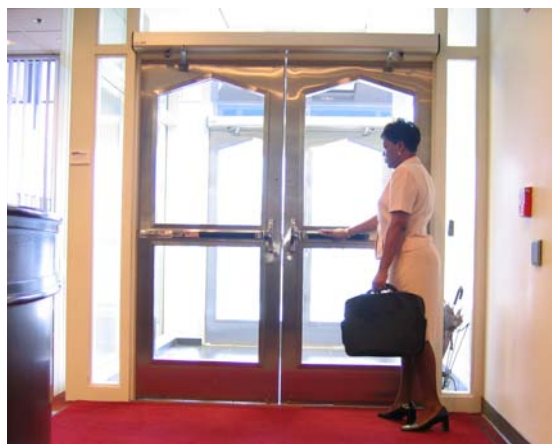
By T.J. Gottwalt, AHC/CDC, CSI, CCPR for *Architectural Record*

Why do we concern ourselves so much with the security of doorways? Because doorways are, after all, the openings in the building through which people and objects must pass. This makes them the ideal focus of unauthorized entry of people, or unauthorized exit of people or assets.

Security in general seems to be a rather “hot” topic these days, and in order to really examine how to make a door opening more secure we ought to define what security means. Webster defines security as: “...protection; measures taken to guard against espionage or sabotage, crime, attack, or escape.” and “freedom from fear or anxiety.”

The real question concerning those who apply products to protect buildings and occupants is: What are you protecting? If it’s valuable artwork in a gallery, the application calls for different products than a custodial closet would require. What is the function of the opening? Does it need to be bulletproof? Windstorm proof? Fireproof? Blast resistant? Keep people out, or keep people in? A security door for protecting patient records in a hospital may be completely different than a security door for an employee entrance.

Security can mean different things to different people. For some, security means “locked down”; you build a fortress and then back down to add convenience. This speaks to the juxtaposition of security and convenience, a conflict which is resolved through the proper use of electronic hardware. For example, the most secure opening in the world would be one through which nothing could pass. Not too convenient. The most convenient opening in the world would be one through which all could freely pass, without having to even break their stride or touch anything. Not too secure. Most people sense this on some level, but let’s examine what this really means in terms of specific product application.



*A properly functioning access control system delivers security, life safety and convenience.*

Various components work together to comprise a secure opening. Think about the security of an opening from a broader perspective than just the door or the lock. What about the surrounding walls or windows? An opening is only as secure as its weakest link. For example, it does no good to have a strong door, frame, and locking hardware if you have removable hinge pins on an out-swinging door. The pins can merely be tapped out and the opening compromised. What if you had a secure opening surrounded with a sidelight containing quarter inch plate glass? Again, not too secure.

## **Steel Doors and Frames**

The components of a secure opening start with a solid foundation, just like a strong building. The foundation of an opening is the frame and the anchoring to the surrounding wall. For a secure opening, a welded steel door frame is recommended. Typical commercial steel door frames are 16 gauge. For extra security, or at exterior openings, 14 gauge frames are recommended. The steel frame can also be filled with grout to more soundly anchor the frame to adjacent wall construction.

Steel doors are among the strongest and most secure and are available in many different gauges and core types that determine their strength. For a more secure application, consider specifying a heavier gauge door than the commercial standard 18 gauge. Standard commercial steel doors are available in 18, 16, 14, and even 12 gauge for bullet resistant and detention type applications. Steel door cores come in a variety of materials and configurations as well, among them, honeycomb, steel truss, polystyrene, polyurethane, and steel-stiffened. For more secure openings, consider specifying truss core or vertically stiffened steel doors. These doors have internal steel “ribs” welded to both face sheets of the door. Generally, this makes the door stronger, stiffer, and more resistant to impact.

## **Security Glazing**

Another thing to consider when achieving a more secure opening is glass. Obviously, glass can be a security breach; however, there are times when glass may be necessary to insure a safer opening. It would be good to see exactly *who* you’re opening that door for, wouldn’t it? When glass is necessary for a secure opening, consider security glazing. Security glazing is available in various classes of resistance, from level A1 through D3, with level C testing bullet resistance. Check with your local glazing contractor for more information regarding security glazing, and which level best suits your particular application.

Door hardware plays an important role in achieving a secure opening. Hardware is the physical element that allows an opening to operate, to lock and unlock, to allow and disallow the passage of people and property. Once a secure foundation has been laid with a strong door and frame, it is important to match this with equally security-minded hardware. In terms of openings, security is like a set of stairs: upgraded hardware can help you climb the steps.

## **Hinges and Pivots**

There are several aspects to hinges that can make them more secure. The most important of these was mentioned earlier, namely, NRP’s or non-removable pins. This feature makes the removal of the hinge pin difficult through the use of a set screw in the hinge barrel. Another less utilized but more secure alternative to NRP’s is the security stud, also known as a safety stud, a small metal cylinder attached to one hinge leaf that rotates into a cavity in the opposite leaf when the door is closed. This feature interlocks the two leaves together, preventing the removal of the door from the frame when it is in the closed position, even if the hinge pins are removed or the hinge barrels sawed off.

## Locking Components – Locksets

Locking components include any device used to hold the door in a closed position, and releases to allow the door to open. These devices include mortise locksets, cylindrical locksets, deadbolts, padlocks, surface bolts, exit devices, electric strikes, magnetic locks, flushbolts, cylinders and many others. Generally speaking, mortise locksets offer better security and more options than cylindrical locksets. Look for ANSI/BHMA Security Grade 1. (Note: Not all locksets called “Grade 1” are *Security* Grade 1.) The Builders Hardware Manufacturers Association (BHMA) rates locks both on operational grade and security grade. To ensure the best security, specify a lockset that meets Operational Grade 1 *and* Security Grade 1.



*A keypad operated mortise lock is ideal for executive offices or other areas that required heightened security.*

To offer better security on pairs of doors with exit devices, consider specifying rim exit devices with a removable mullion, instead of a pair of vertical rod exit devices. This will allow each door to act independent of the other, and securely latch into a center post which mounts behind the doors. As the name suggest, the mullion can be removed to create unimpeded access/egress when both doors are held open. This arrangement is more secure, requires less maintenance, and actually costs less. Also, consider specifying exit devices with a “cylinder dogging” feature. This inexpensive feature (offered for non-fire-rated exit devices only) requires a key to be used to “dog” (hold the push rail in a depressed state) the exit device in an unlatched position in lieu of the standard Allen wrench. This keeps unauthorized people from being able to dog the device, leaving the door unsecured.

Many believe that electrified hardware inherently offers a higher level of security. This is not necessarily true. Electrified hardware allows convenience to marry with security. For example, a door locked electronically can be unlocked by a variety of methods and from a variety of locations. This type of convenience is not possible with mechanical locking devices. Electronic unlocking methods include devices such as card readers, key fobs, cylinder switches, keypads, and biometric readers. Many of these devices offer conveniences and features such as audit trail capabilities that help enable security personnel to determine who used the opening and at what time. This can aid investigators in case of theft and potentially reduce a facility’s insurance rates as well. This aspect of electrified hardware does increase the security of an opening.

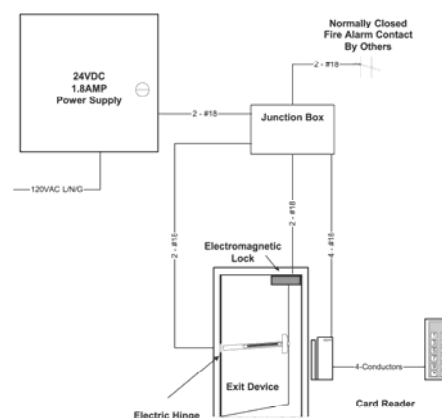
## Locking Components – Magnetic Locks

Magnetic locks can also be applied as the locking method for access controlled openings. These devices hold the door in a closed position by means of a powerful electro-magnet attached to the frame. When energized, the magnet attracts a thick plate of steel called the armature which is mounted on the door. Some of these locks can “attract” the armature to the tune of 1800 pounds or more. Obviously this locks the door in a closed position from either side of the opening, so care must be taken to allow for the free egress of persons from the inside to meet life safety codes. This is normally

accomplished by a motion sensor, a touch sense bar, or a switch inside the lockset or exit device. Life safety codes usually dictate that a second means of releasing the magnetic lock be provided. (See NFPA 101-7.2.1.6.2) This can be one of the devices mentioned above, or an auxiliary switch mounted adjacent to the opening. Since magnetic locks are inherently fail-safe, meaning that when power to them is cut the door becomes unlocked, the assumption is that they can be used safely anywhere. It is very important to follow local building and life safety codes regarding the application of magnetic locks.



*Including access control in the initial building design improves the functionality of the system and helps preserve the building aesthetics. A look at the diagram shows the extent of wiring needed to connect an opening with the building's alarm controls.*



### Locking Components – Electric Strikes

The electric strike is arguably one of the least understood electric locking devices. An electric strike usually works in conjunction with a storeroom function lock (always locked) by allowing the latchbolt to be pulled past the strike. The latchbolt does not retract, nor does the lever unlock, when the strike is released. Electric strikes are used in a variety of applications to allow remote release of doors without the need to run wire to the door. Remember that electric strikes applied to fire-rated openings must be fail-secure to maintain positive latching in case of power failure.

### Locking Components – Cylinders and Keys

One thing that can positively affect the security of an opening, and an entire facility, is a high security key system. Most lock and cylinder manufacturers offer patented high security key systems, but often this relatively low cost upgrade is ignored in the project specifications. A patented high security key system can offer a building owner superior key control, eliminating the possibility of unauthorized persons obtaining keys. How many times have you heard of someone running down to the corner hardware store and having a key duplicated, even if the key is stamped “Do Not Duplicate”? (This stamping on the key offers little or no protection.) High security key systems offer strict control of key blanks, and the inability of anyone to duplicate a key unless authorized. High security cylinders tested to UL437 are designed to resist drilling, picking, pulling, and many other attacks. High security cylinders are recommended at all access controlled openings. Technology can control access, but the entire system is still in jeopardy if you specify low grade cylinders and hardware.

## Ease of Use

Electronic access control offers a variety of features designed to make a secure opening easier to use, as well as providing additional security features such as audit trail capabilities. An audit trail is a record of access through an opening, which can be useful when investigating a loss. A report can be generated indicating whose card or access code was used at what time to access an opening. As mentioned earlier, access control and electronic hardware are usually perceived as higher security, but often times are simply a way to add convenience to a secure opening. Also, when an opening is secured electronically there needs to be some electrical means of unlocking it. This opens up a world of possibilities which can add to the function of the opening. A door such as this can be released from a distant location via the internet or a LAN, or can be controlled from a switch mounted on or near the door such as a card reader, keypad, or cylinder switch. There are many battery operated locks which incorporate such access control features, including new locks that even operate via wireless LAN (802.11b), giving hard-wired functionality to a stand-alone product. The technological advances in this area of door hardware are truly amazing, and are opening up a whole new world of possibilities for secure opening solutions.

Electronic access control also opens up a world of flexibility for the building owner. If an electronic key is lost or stolen, it can be deleted from the system immediately, and a new one issued. Time zone settings can also allow access to certain users at only certain times of the day or days of the week. This is a clear advantage over traditional mechanical keys.

The options available for securing an opening are extensive. The real challenge is choosing the option that delivers the desired level of security with maximum convenience. If you can dream of the application, chances are there are products developed to meet the security need.