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AUGUST 2023

Multifamily, Mixed-use, Retail and Business Occupancies

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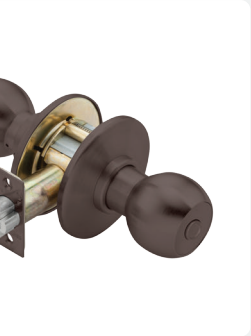








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PROVIDING INDUSTRY GUIDANCE

CEDRIC CALHOUN, FASAE, CAE, is Chief Executive Officer of DHI.
Email: *ccalhoun@dhi.org*.

DHI HAS A HISTORY OF DEVELOPING STANDARDS AND GUIDING THE INDUSTRY TO USE BEST PRACTICES WHEN IT CAME TO APPLICATIONS OF DOORS, FRAMES AND HARDWARE. I AM HAPPY TO REPORT THAT THOSE DAYS ARE RETURNING THROUGH A NEW COLLABORATION PROJECT BETWEEN THE DOOR SECURITY AND SAFETY FOUNDATION (DSSF) AND DHI.

We are currently working with a representative group from our membership and a few industry partners to develop guidance on the elements of secure openings. As there are no national standards, this task force of subject matter experts is working to define levels of security required for building openings.

This guidance will be intended for public use to help educate and provide advice on specifying and furnishing the necessary attributes that define a secure opening on any project. The group has defined three levels that are meant to deter, detect and delay unwanted behavior, to allow time for emergency responders to arrive.

Why is this important? Industry guidelines provide a set of agreed-upon rules and best practices that businesses can follow and their customers can understand. This can help ensure that solutions are consistently of a high standard, that safety and security regulations are met, and that businesses can operate more efficiently and effectively.

Industry guidelines have a number of benefits, including:

- **Identifying and assessing risks:** Industry guidelines can help schools and other public buildings identify and assess the risks to safety and security that they face related to openings. This can help businesses prioritize their safety and security efforts and allocate resources where they're most needed.
- **Implementing preventive measures:** Industry guidelines can offer guidance to implement preventive measures that reduce the risk of accidents, unintended consequences and security breaches. This can include measures such as providing training to employees, conducting regular safety inspections and installing security systems.
- **Promoting a culture of safety and security:** Following industry guidelines and promoting them within your customer base shows your commitment to safety and security, and in turn raises awareness around this issue and provides viable, cost-effective solutions.

This project will culminate in a one-page informational document that will be easy to read and understood by our target audiences, such as end users, architects, first responders, developers, business owners and a myriad of other stakeholders.

The full set of guidelines will be available for download from the DHI and DSSF websites to promote usage. As part of this initiative, the "Find a Professional" registry will also be available for interested parties looking to find a knowledgeable door security and safety professional in their local area to assist them with assessing their security risks and implementing viable solutions.

Keep an eye out for these guidelines as well as future guidelines and standards developed by DHI and DSSF to advance the organization, the industry and your business. Please be sure to distribute them to your customer base. +

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DINA EKLADIOUS, DHT

SPECIFICATION WRITER APPRENTICE, ALLEGION

DHI MEMBER SINCE 2021

WHAT WERE YOUR CHILDHOOD AMBITIONS?

I was interested in reading detective novels and wanted to be a psychologist or a detective. Even now, I like reading psychology as I feel it has impact on our daily interactions. I also liked math, architecture and design. That led me to choose engineering school and major in civil engineering.

WHAT WAS YOUR FIRST JOB?

I started my first job in 2002 right after college graduation. It happened to be in the door industry as a doors, frames and hardware (DFH) estimator.

WHAT LED YOU TO OUR INDUSTRY?

Through my advancement in the DFH field, I had exposure to multiple roles including estimating, detailing, project management and now, specification writer apprentice. All played an integral part in the learning process. The perspective of each role helped to shape and define me and offer a different vision.

WHAT'S YOUR PROUDEST PROFESSIONAL MOMENT?

Earning a new career certificate, finishing a new learning course, having better understanding of the trade. I'm also proud when I supply the best solution for openings with special requirements or deliver a project of a special nature.

WHAT'S BEEN YOUR BIGGEST CHALLENGE?

Working in this fast-paced industry requires deep understanding of complex technical information, which is what makes it interesting.

Every job has its challenges. When I started as an estimator it was challenging to supply correct products and their exact value. Now as a specification writer I have to apply the four Cs (correct, clear, concise and complete) in order to meet code requirements with customers' demands and constraints.

WHAT'S YOUR GUILTY PLEASURE?

Eating ice cream and cheesecake come to mind.

WHAT'S YOUR FAVORITE BOOK/ MOVIE?

Book: "The Elephant in the Brain," by Kevin Simle. Movie: "The Shawshank Redemption."

WHO DO YOU CONSIDER A MENTOR OR HERO?

Family members are my mentors, role models and main support throughout my life.

WHAT'S THE BEST ADVICE YOU EVER RECEIVED?

Fulfill your promises. Fail forward, we all make mistakes. Own up to it, find a way to resolve it the best way you can, learn the lesson and move forward beyond it.

WHAT'S THE BEST ADVICE YOU NEVER RECEIVED?

Listen to the unspoken words.

HOW HAS YOUR INVOLVEMENT WITH DHI SUPPORTED YOUR CAREER?

DHI is the best education resource for anyone in our industry. The courses help in my daily work, especially codes, detailing and project management courses.

DHI and the instructors accompany their students through their education journey, providing guidance, support, tailored courses, updated industry and technology information.

BE A FACE OF DHI

WE'D LIKE TO GET TO KNOW YOU!

Volunteering to be a "Face" of DHI is a great way to expand your professional network. It allows *Door Security + Safety* readers to get to know you better and also gives you a chance to share your accomplishments and career highlights in our industry. Not ready to be a "Face" but know someone who is? Email Alexandra Walsh at *awalsh@dhi.org* with your nominee. We'll take care of the rest!

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Balancing Efficiency, Safety and Style for Multifamily Buildings

A combination of electronic lock solutions and hardware can provide the versatility, convenience and aesthetics that residents desire while ensuring their security and safety.

BY ROBERT GAULDEN

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According to the 2021 World Risk Poll by the LP Foundation, 37% of people in the United States feel less safe than they did just three years ago. COVID-19 and violent crime are just two of the top concerns people have regarding personal safety.

When it comes to security, multifamily buildings present several opportunities and obstacles. They require a balanced, multifaceted approach, beginning at the perimeter of the property, integrated throughout common areas, and implemented seamlessly up to every resident's front door and within the unit itself.

Doors have traditionally been secured using brass keys. Rekeying doors when locks are damaged, or keys are stolen or misplaced can be costly and time-consuming. Hotels and short-term rentals have already evolved to passcodes and proximity credentials to effectively manage turnover. In turn, many multifamily property owners are choosing electronic access control solutions.

Begin With Perimeter Security

In ancient times, as soon as the Trojans let the Greeks bypass Troy's perimeter in a wooden horse, the war was essentially lost. Your property's perimeter is where effective access control begins, but it doesn't end there. Perimeter security is just one layer to your approach.

Building owners can make use of security features including access-controlled parking spaces, external doors, and courtyard entries that only allow residents, staff, service professionals and authorized visitors inside. Key fobs, intercoms, physical keys and mobile credentials are common examples of perimeter access control.

Don't neglect other areas of your property's perimeter. Abundant lighting, secured dumpsters, well maintained landscaping and video cameras can complement locked entrances and help deter crime, theft and tampering.

Managing Perimeter Access Control

By using an access control system, your residents and staff can control several exterior doors and access points with one credential. This makes perimeter access more convenient while providing a high level of security.

Smart credentials in the form of cards or mobile images provide increased security and allow you to include a variety of functions on the same card (cashless vending, security, employee identification and customized access). These are ideal for exterior entry points including perimeter gates, garage access points and building entry doors.

Multitechnology readers provide versatility for properties that have a mix of credential types (i.e., proximity, magnetic stripe, smart). If you're still upgrading your access control, this allows a seamless transition at your own pace.

Door Hardware for the Perimeter

Panic hardware is required on openings in areas that can hold 50 occupants or more (100 occupants or more in some jurisdictions).

A closer on these openings ensures that the door returns to the closed, latched and secured position—a must to adhere to fire codes and prevent unauthorized access.

Whether the opening requires an automatic operator or not, these devices can provide an improved experience for those with disabilities. With a touchless actuator, they can also make an opening contactless to help prevent the spread of germs. Most door handles are made of stainless steel, which provides the perfect environment for bacteria to live.

Thresholds with weather stripping will seal the gap between the floor and door to provide weatherization and improve HVAC efficiency.

Continuous hinges and kickplates provide durability and prevent wear and tear on doors that are heavily used.

Protecting Common Areas and Amenities

Common areas aren't always considered when implementing access control.

Access to package rooms, bike storage, gyms and clubhouses should be restricted to those who need to enter those areas for a specific purpose by using a proximity card, fob or mobile credential.

For example, access to the bike storage room should be restricted to only those who rent a space for their bikes. You can then prevent others from entering the room and potentially tampering with or stealing bikes. In short, the goal is to balance ease of use with access control and proper egress compliance.

Common area access control goes beyond limiting people from accessing certain rooms or information. A huge advantage of using electronic access control for common areas is tracking entry to these otherwise secured areas. In the example of the bike storage room, in the event of tampering or theft, the system can identify who accessed the room and compare it to security footage if available.

Common Area Access Control Options

Access control systems provide single-credential access to common areas, improving user experience and ensuring a high level of security.

In the same vein as perimeter control, smart credentials such as cards or mobile images can limit access to common areas. Residents and staff alike can benefit by using the same credentials to access several areas of the property. By programming customized access, residents can be limited from areas where staff are allowed.

Door Hardware for Common Areas

The panic hardware described earlier is required for large common areas. Equally important is preventing unauthorized access to smaller common areas, such as staff rooms containing sensitive resident information, package rooms and bicycle storage to prevent theft.

Resident Floors and Units

Maintaining residents' sense of safety and security within their unit is

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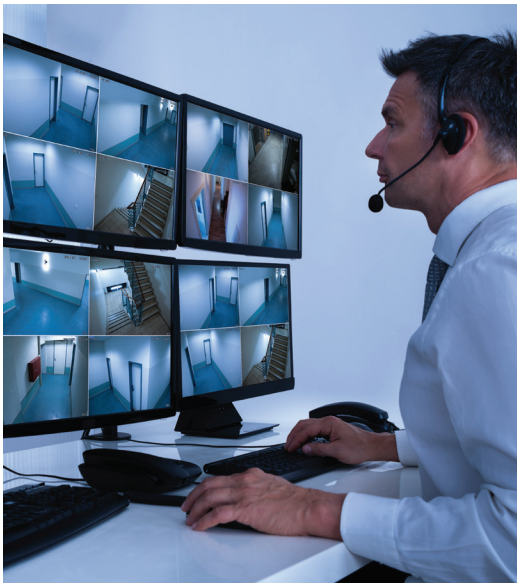


crucial. This entails adequate security not only for front doors and windows, but also the stairwells, elevators and doors leading to each residential floor. Residents are usually willing to pay more to feel safe in their unit.

Residents may need to grant access to their unit to someone other than themselves at some point, whether they are inside their apartment or not. This could include visitors, delivery people or maintenance staff. Electronic access control with keypads on resident doors allows for single-use codes to temporarily grant access without the resident needing to be present.

Electronic Solution Tips

This checklist demonstrates the advantages of electronic lock solutions:

- Electronic locks and deadbolts can provide increased security and convenience.
- Smart credentials are more secure than proximity and magnetic stripe credentials, especially if they're linked to a resident's personal mobile device.
- Increase productivity by managing locks, devices and electronic credentials from virtually anywhere, without having to keep track of several keys or a master key.
- Online controls provide the ability to instantly provide or remove access to units, buildings and amenities.
- Using a single credential to access multiple buildings (main entrance, resident unit, amenity areas, etc.) is more efficient than multiple keys.
- Online access control saves time by eliminating the need to visit locks/devices to make changes.
- Device usage and history can be reviewed and analyzed for detection and diagnostics.
- Mobile credentials provide residents convenience by allowing them to use their mobile device to open their building and unit doors.
- For upgrading existing buildings, wireless locks can be easier to install and less expensive.

Door Hardware Solution Tips

Electronic lock solutions are always accompanied by important door hardware components as described in this checklist.

- Whether electronic or mechanical, Grade 1 deadbolts are recommended for unit entries to provide increased security.
- A closer on door openings ensures that the door returns to the closed, latched and secured position quietly without disturbing other residents.
- Wall and floor stops can prevent damage to walls when the door opens quickly or hard.
- Door knockers and viewers round out the functionality of residential unit doors.
- A zero-perimeter door seal, sweep and threshold can seal the gap between the floor and door to provide weatherization and improve HVAC efficiency.

Blending Style and Security

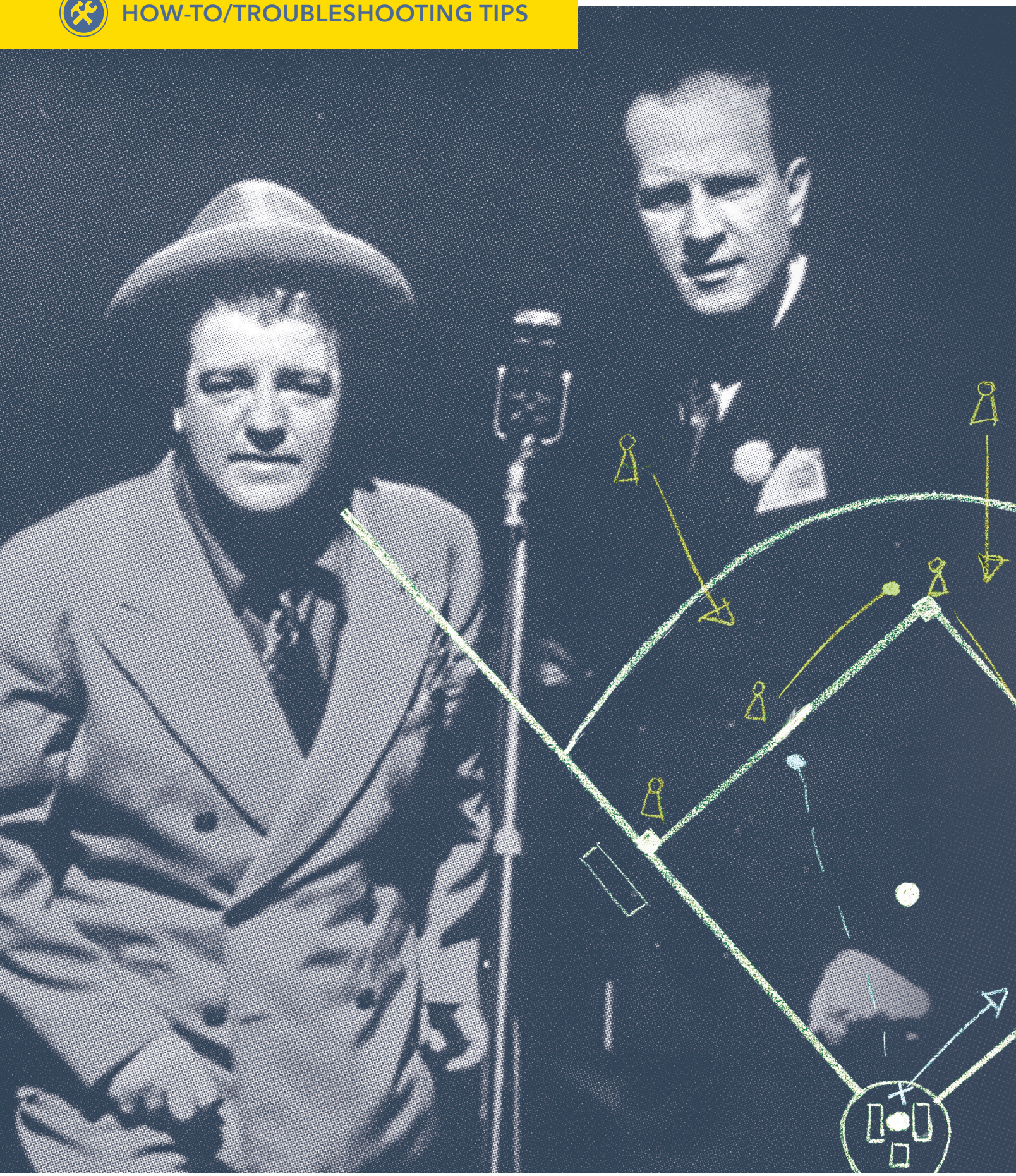
Implementing security solutions does not mean forgoing style or aesthetics. Attractive doors, quality residential hardware and complementary locks can add a stylish touch to the atmosphere. Obvious security measures should be concealed as much as possible; residents may feel more at ease if security equipment isn't constantly in their faces. Concealed security can also prevent tampering with or vandalism of the equipment.

If the budget is limited, look for inexpensive alternatives to maintain the aesthetic appeal of a building while providing adequate security. Regular maintenance and repair of high-traffic touch points, doors, elevators and locks creates a visually appealing atmosphere and keeps residents and staff safe. To enable future upgrades, choose hardware that can easily be switched out for more advanced applications such as electronic access control.

A Balanced Security Approach

A holistic, balanced approach to security is necessary when addressing resident and staff safety issues. It's important to consider a property's perimeter, common areas and resident units. Consider how to enhance current security measures or complement them with sufficient lighting, landscaping and routine building maintenance. +

ROBERT GAULDEN is Go-to-Market Director of Multifamily Access at Allegion. Email: *robert.gaulden@allegion.com*.



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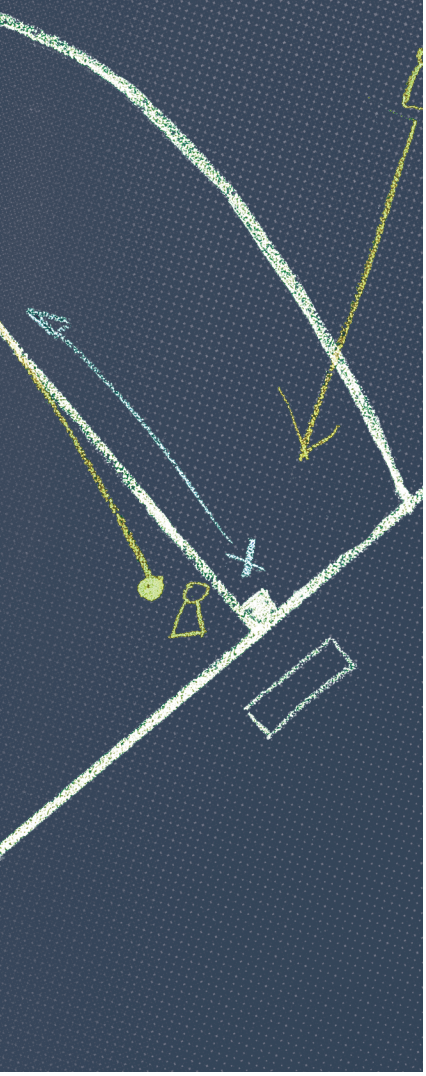
ACCESS CONTROL:

Who's on First and What's on Second?

Unwrapping the challenges between Division 8 and Division 28.

BY ERIN WILSON, AHC, CDC, CFDAI, DHT, DHC, CDT, CCPR



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Once upon a time, access control in a facility was an exception and not the norm. Today, any facility that does not have access control is an exception.

Even though access control has been a normal requirement in the supply of doors, frames and hardware for more than 20 years, there are still gaps that occur. What should be supplied through Division 8 of the Construction Specifications Institute (CSI) MasterFormat? What should be supplied through Division 28? What products are in both or neither? Shouldn't there be coordination? Who else should be included? What codes need to be considered? How does touchless fit in today's world of frictionless needs?

What Is Access Control?

If you Google the definition of access control, the first returns are about accessing data in a computer environment. Further down the list, you finally get to doors.

In the security world, access control is simply controlling who can access a building or space. Granted there are products and software that do all kinds of things. But at its simplest definition, access control is nothing more than controlling who gets in what door and when.

There are three main ways to have access control on a door: hardwired, wireless and standalone. Hardwired and wireless are systems that connect multiple doors together with software. Standalone systems are just that, single openings not connected to any other doors.

Why Do You Need It?

For a hardwired door, a locking device, card reader, power and a connector are necessary. (See Figure 1 on page 14.)

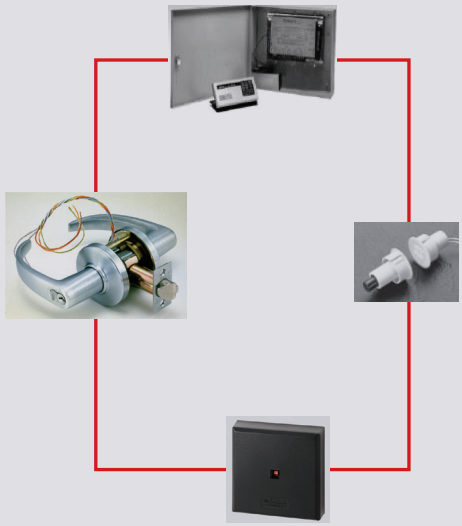
The locking device is your load. It can be an electrified lockset, an electric strike, an electrified exit device or an electromagnetic lock (mag lock) to name a few. The card reader is your switch (reader interface module or RIM). This can be a card reader, a keypad or a keyswitch. The power is supplied by a power supply, and the connector is the wire. Without at least these four items, in whichever configuration, there will not be a hardwired access control door.

The most difficult components are the load and the switch. The load is going to do the work and the switch is telling the load to do something, similar to the way a light switch turns a light on and off.

For a wireless door, the difference is a gateway or access point instead of wires.

FIGURE 1: COMPONENTS OF A HARDWIRED SYSTEM

- Power Source
  - Power Supply
- Load
  - Lock
- Switch
  - Card Reader
- Conductor
  - Wire
- Optional Fifth Component
  - Monitoring



Everything else is the same: load, switch and power. Wireless still needs a power source. The gateway or access point will be connected to power either wired directly or by power over ethernet (POE). The lock will also need power that is supplied by batteries.

Standalone access-controlled doors are not connected to one another. They get their power from batteries. The load and switch are in the same device. The connector is a hand-held unit plugged into the lock, which provides the software knowledge.

Software knowledge is what provides the lock with the information for who can access which lock at what time. The software program is essentially the database of the system. It has all the information for each opening and user.

For more complex systems, time schedules and groups are created to make it easier to add new users. Time schedules allow doors to unlock and lock automatically and not unlock on weekends and holidays. Groups allow the administrator to place users with the same access in one profile, saving time.

For hardwired and wireless systems, this knowledge is sent to the locks through the system. For standalone systems, a handheld unit must be presented at each door to program it.

How Does It All Work?

There's one other component that's usually not talked about but is required. It falls on the integrator side of components. It's between the load and the switch and talks with the software—it's the controller. (See Figure 2 on page 16.)

The controller is the brain of the system. When a credential is presented to the reader or switch/RIM, the switch talks to the controller, which talks to the software. Then the controller talks to the lock if the credential is authorized to unlock the door.

If the credential is not authorized to unlock the door, the controller sends a signal back to the reader. This may signal an LED or a sound to indicate the credential is not authorized. The reader may also signal an LED of a different color when the credential is authorized. This all happens in milliseconds.

Operational Descriptions Are Important

For openings that only have a card reader and an electronic locking device, it's simple: present an authorized credential, and the door unlocks. But complex openings with a time schedule or multiple electronic components must have an operational description. It's the only way the installer knows how to wire the components together.

An operational description is the narrative of the opening's operation. It indicates the opening's normal state, how to enter, how to egress or exit, how other components work, such as lights or auto operators, and any special conditions.

Here's an example of why operational descriptions are so important: The project is a four-story office building with four identical entrances. All four entrances have card readers and auto operators. The owner required some of these entrances to operate differently than the others.

For two entrances, the doors are to be unlocked during business hours. The auto operator should be operational from the inside after hours but not from the outside. One entrance must remain locked all the time with entry only by card reader. The fourth entrance operates like the first two but also has lockdown capability. The only difference in the components is a button at the fourth entrance for lockdown.

Do you think these four doors were installed and wired correctly? If you said "no," you would be correct. No one paid any attention to the operational descriptions in the specifications. The owner discovered the doors were not as requested after all four were installed. The ceiling in the lobby where the first two doors were located was already painted. None of the auto operators were installed with the proper components to allow for independent operation. And all were installed with on/off switches instead of being controlled by the access control software.

GRAPHICS COURTESY OF DORMAKABA

The owner, architect, general contractor, subcontractors and suppliers were all upset—until it was pointed out that the requested operation of the openings was specified in the project manual, and no one had paid attention to it. The operational descriptions were not included in the hardware submittal, so the integrator only had the list of hardware. It was wired like he thought it should be.

It cost the general contractor and many of the subcontractors money and time to correct the problem. To add to the issues, someone decided the auto operator actuators should be wireless. Some auto operator manufacturers require additional components for independent actuator activation, and some do not allow for wireless actuators if independent activation is needed.

Who Supplies What?

One of the biggest issues after knowing how the opening works is who supplies what.

There are three items that cause the most problems: request-to-exit devices (REX), door position switches (DPS) and power supplies. (See Figure 3 on page 18 for an illustration of a door position switch.)

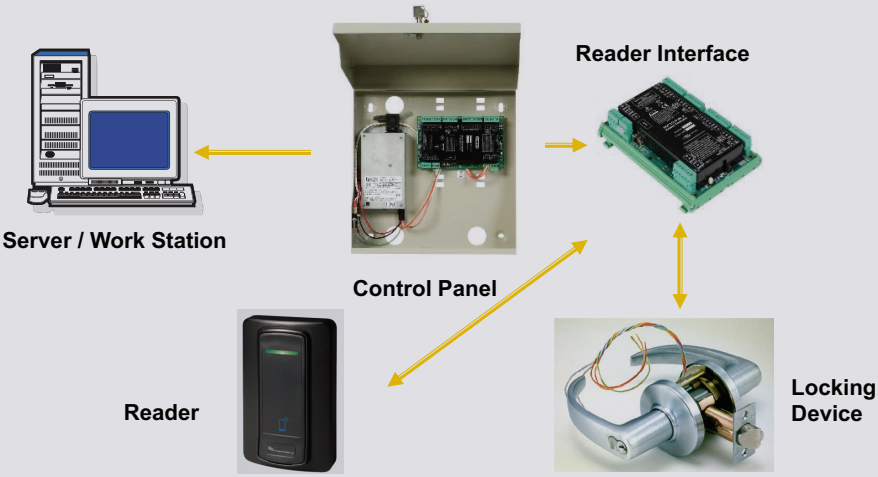
A REX switch should be supplied in most electrified locksets and exit devices. There is no need for an external radio frequency identification (RFID) REX sensor to be installed on openings when the request to exit is part of the locking device.

A DPS is either supplied by both the hardware supplier and the integrator—or neither. This item could go either way, but the door and frame supplier must know what DPS is being provided. It's needed to prep the doors and frames, as well as run wires to the top of the frame in the wall. If the opening is fire-rated, a listed or labeled DPS must also be used. Prepping for a DPS on a fire-rated opening should not be done in the field, as this type of prep is not allowed by code.

As for power supplies, either no one has supplied them or the general contractor is complaining about all the extra power supplies left over after project completion. From a specification point of view, a power supply is specified for nearly every electrified lockset and exit device.

The integrator, on the other hand, wants to use as few power supplies as

FIGURE 2: HOW IT WORKS



possible. This is because the wall real estate in the main distribution frame (MDF), intermediate distribution frame (IDF), electrical or telephone closet is very limited. The integrator will use a power supply that is 10-amp or 20-amp instead of all the 1-amp or 2-amp power supplies specified. This consolidates the power needed in one box instead of 10 or 20 boxes.

There are some exit device functions, such as electric latch retraction and delayed egress, that do require the manufacturer's power supply due to exit device requirements. Failing to use the manufacturer's power supply will result in voiding the warranty and possible damage to the exit device, opening, structure or people.

There are so many items that can be supplied by either a hardware supplier or an integrator. Many items have a specific section designated in Division 28 but are supplied in Section 08 71 00. Or they are listed in the hardware sets as "Supplied by Security Contractor," only to have no matching section in Division 28 for the security contractor.

Coordinated Efforts

The best way to avoid these problems is by having several access control coordination meetings.

The first one should occur during construction document creation. The hardware consultant, security consultant, architect, owner, low-voltage consultant and electrical consultant should all attend. On a large project, it is not a bad idea to have a coordination meeting before submittal creation to make sure the hardware and security suppliers are on the same page.

The last coordination meeting should be prior to installation. The goal is to make sure that all components required are supplied, and everyone understands how the opening will work. How many times have you heard an owner comment that they didn't like how the opening operated? Having these coordination meetings, especially the first one, will mitigate these problems.

Life Safety and Building Codes

What part do life safety and building codes play in access-controlled openings?

When mixed with security needs, it can be difficult to meet the security requirements of an owner and the requirements of life safety and building codes. The codes are going to trump the security needs every time.

Understanding the codes that most often conflict with security needs allows you to provide the best solution to meet both requirements. The most common scenarios involve access-controlled entries, controlled egress openings, delayed egress systems and stairwell doors. The Authority Having Jurisdiction (AHJ) doesn't care how you get into the building. Its concern is how you get out of the building.

Access-controlled entries that involve a lockset or exit device allow for free egress. Entries that use an electromagnetic lock (mag lock) have different requirements since they do not, by themselves, provide free egress.

There are two different requirements depending on whether the mag lock is sensor-released or hardware-released. For sensor-released, the sensor must detect an approaching person and unlock. A push button is also required and must be located within five feet of the opening. For hardware-released, the hardware on the door must be obvious and release the mag lock upon activation. The most common hardware device is an exit device. Both scenarios require the door to unlock during a fire alarm or loss of power.

Delayed egress is often misunderstood and requested for inappropriate openings. The intent of a delayed egress system is to slow down the person trying to egress through the door. There are many requirements that must be met. They include a nuisance alarm to deter egress and an irreversible alarm for 15 seconds before unlocking after the nuisance alarm. Also required is signage explaining the door will release after 15 seconds and unlock during a fire alarm or loss of power to allow for immediate egress.

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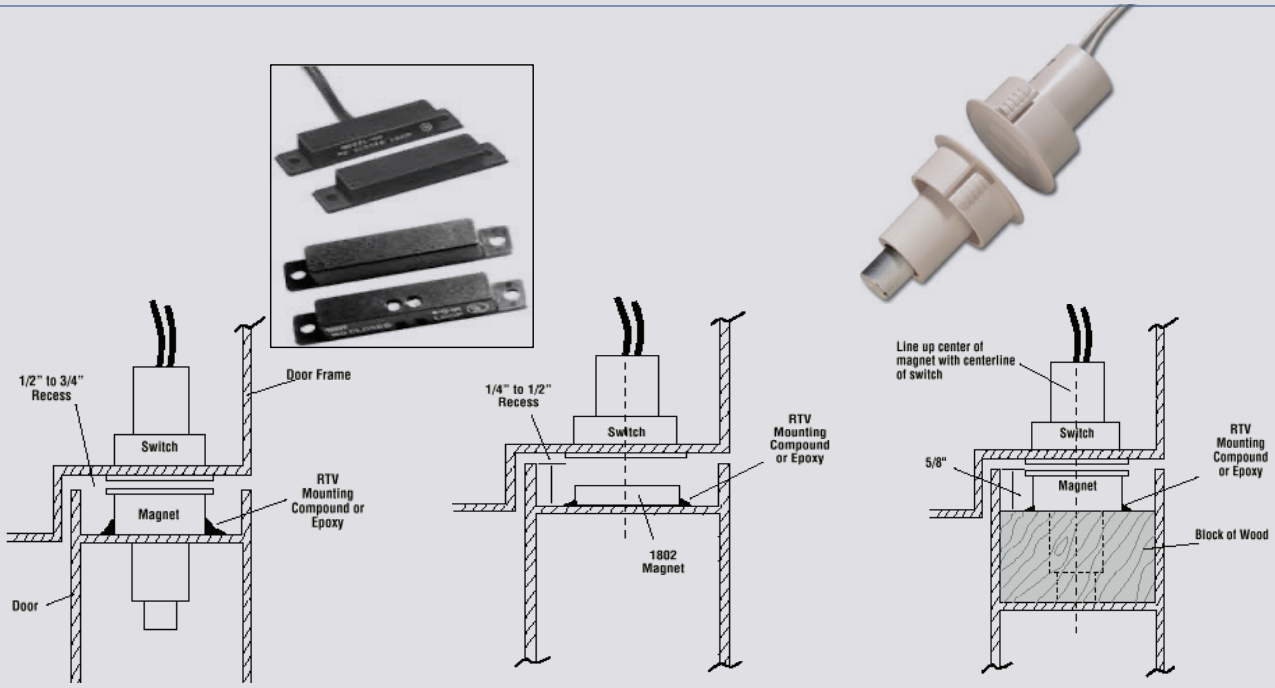
FIGURE 3: DOOR POSITION SWITCH



Controlled egress openings are also misunderstood and requested for inappropriate openings. Controlled egress is most used in the industrial occupancies (I-1, I-2, I-3, and I-4 occupancies in the International Building Code), have specific requirements and are intended to prevent egress for people that may be a danger to themselves or others and maternity wards. Depending on the occupancy type, these openings may or may not be required to unlock during a fire alarm or loss of power.

Stairwell doors are tricky openings when it comes to access control and building codes. Depending on which code was used for the building permit, either International Building Code (IBC) or National Fire Protection Association (NFPA) 101, there are different requirements. How many floors the building has also leads to confusion on what can and cannot be done. If the stair door also has delayed egress, it can be more confusing.

Understanding the codes and the application will allow you to be a trusted resource to owners and architects.

Changing Openings to Touchless

First, what already exists? Knowing what exists is key knowledge required to ensure the correct function of the opening.

Second to know is whether the opening is fire rated. A fire-rated opening must close and latch. Adding an auto operator for touchless achieves the close requirement. For the latch, it depends on the rating of the opening.

For nonrated openings, an electrified lock or latch retraction exit device can be used. For rated openings, since the door and frame cannot be modified in the field, an electric strike can be used. An electric strike is the most cost-effective solution for either rated or nonrated doors. The electric strike must be fail-secure for a rated opening to ensure the latching requirement is met.

Who Really Is on First?

If there's one takeaway, it's that communication will solve many problems and is the key to a successful project.

There are many components to an access control system that involve *many* people from *many* different disciplines and several divisions of the project manual.

Specifications *must* be coordinated.

Supply of components *must* be coordinated.

Installation *must* be coordinated.

Communicating and unwrapping the challenges between Division 8 and Division 28 are no longer challenging when everyone is on the same page. At the end of the day, no one wants the owner or anyone on the project team to feel like they're in a rerun of an Abbott & Costello skit. +

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Water Penetration Resistance at Terrace Doors

HINGES ON THE DETAILS

Exterior doors that experience water infiltration often result in property damage and expensive or disruptive repairs. Learn how to mitigate these situations and options to correct existing problems.

BY KELLY CRONIN, PE; SUZANNE THORPE, PE; AND EMMETT HORTON, PE

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Ask any building engineer, management company or property owner and they'll tell you that one or more of the terrace doors at their property has leaked at some point during a rain event. It's a common occurrence, and one that industry professionals will tell you is to be expected.

Exterior doors that experience water infiltration often result in property damage and expensive or disruptive repairs. Damage can include minor puddles and stains, buckling of high-end interior floor finishes, or even active water leakage into occupied spaces around and below the door.

While water infiltration at terrace doors can lead to significant in-service challenges, it's often a risk that's not given enough consideration during the design and construction phases. Even when the design team focuses on door performance requirements and the contractor establishes quality control programs during installation, water leakage may still occur at terrace doors, particularly at in-swing doors. Although water leakage cannot always be eliminated, there are preventive measures that can limit the amount and frequency of water ingress at and around terrace doors.

This article focuses primarily on side-hinged architectural terrace doors[1] located at upper-level terraces, balconies or penthouses, as these door assemblies are typically exposed to more direct rainwater and higher winds compared to ground-level doors. However, many of the topics discussed in this article can be applied to all exterior doors throughout a building.

The Ins and Outs of Doors

There are many types of doors; they run the gamut from all-glass to hollow metal doors with no perimeter gasketing or weatherstripping, to those with more robust, thermally broken aluminum frames, complete with gaskets and multipoint locking mechanisms. Doors can be hinged to open in or out.

Often, the architect of record has a specific aesthetic for a terrace or amenity area, and the sightlines of the door play a key role in how the area is perceived or enjoyed because it serves as the gateway in and out of the space. For example, an all-glass door with minimal framing may be desired to allow a more seamless visual transition between the interior and exterior environment.

The overall type of door, and operational requirements, should be carefully considered when developing specifications during the design phase. Building code requirements dictate the direction of operation of the door (in-swing or out-swing) for occupant egress.

Additionally, performance requirements associated with (but

Figure 1. ASTM E1105 spray rack assembly positioned above the head of a terrace door, allowing water to sheet over the door assembly at zero pressure differential.

not limited to) structural capacity, thermal resistance, air leakage and water penetration should be evaluated. For example, doors that are located at a penthouse-level, corner terrace with no screen walls or canopies will experience higher wind loads than doors that may be positioned at a third-floor terrace, mid-elevation, under a soffit setback.

Doors can be given a performance rating by the Fenestration and Glazing Industry Alliance (FGIA), formerly known as the American Architectural Manufacturers Association (AAMA); the Window & Door Manufacturers Association (WDMA); and the Canadian Standards Association (CSA). In AAMA/WDMA/CSA 101/I.S.2/A440, *North American Fenestration Standard/Specification for Windows, Doors, and Skylights*,[1] doors are assigned a performance class (residential, light commercial, commercial or architectural) and performance grade.

Performance grades are assigned to a unit based on structural performance, water penetration resistance, air infiltration resistance, uniform load deflection testing, forced entry resistance (if applicable) and operating force (if applicable). These tests dictate the design pressure of the unit. It's important to note that not all doors are created equal, and many are not rated to resist water penetration.

Door Ratings Explained

As outlined in the AAMA 101 Standard,[1] there are four performance classes for windows and doors: residential (R), light commercial (LC), commercial (CW) and architectural (AW). Each of these performance classes has a minimum design pressure they must meet to achieve their designations to be certified as a certain class.

When evaluating a window or door, the laboratory testing parameters for structural performance and water-penetration resistance start with what is referred to as the performance grade, also known as the minimum design pressure. The minimum design pressure is increased by a factor of 1.5 for testing for structural performance. This factor applies to all four performance classes.

For water penetration resistance, the R, LC and CW performance classes are tested with a pressure differential that is 15% of the minimum design pressure. The pressure differential is the difference between the air pressure on the exterior and air pressure on the interior, for the purposes of simulating wind-driven rain. For the AW performance class, the water penetration resistance test pressure is increased to 20% of the minimum design pressure.

There are also minimums for resistance to air leakage. These minimum values are a function of the door type and seals, and whether they are compression or sliding style units.

R performance-class ratings begin at performance grade (PG) 15, LC performance-class ratings begin at PG25, CW performance-class ratings begin at PG30 and AW performance-class ratings begin at PG40. The performance grade represents the minimum design pressure (DP), measured in pounds per square foot (lb/ft^2) for each performance class and grade.

Because water penetration resistance ratings are measured as pressures, the ratings can be converted to values representing the height in inches of water that a door can manage. For example, if a door is designated AW-PG60, it is an architectural-class door with a design pressure of approximately 60 lb/ft^2 (2.9 kPa). The minimum water penetration resistance pressure is then approximately 12 lb/ft^2 (0.6 kPa) or, when converted, approximately 2.31 inches of water head.

Performance Testing

As stated previously, there are various styles of doorframes, gasketing and thresholds that all combine to determine how effective a door assembly is against water ingress and whether it can be rated by AAMA/WDMA/CSA 101/I.S.2/A440.[1]

Rated assemblies are tested in the laboratory using a pressurized test chamber to determine their maximum performance capabilities. They can also be tested in situ within six months of installation to confirm field performance as part of a project's quality assurance program, typically using a reduced air pressure difference in the testing chamber when compared with the lab evaluation.

When door assemblies are tested in the laboratory to obtain the water penetration resistance rating, there are generally two test standards that are followed:

- ASTM E331, *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*[2]
- ASTM E547, *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Cyclic Static Air Pressure Difference*[3]

When rated door assemblies are tested in the field as part of a project's quality assurance program during construction, the following test standards are typically implemented to evaluate ability to resist water penetration:

- ASTM E1105, *Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference*[4]
- AAMA 502, *Voluntary Specification for Field Testing of Newly Installed Fenestration Products*[5]

The tests described by ASTM E1105 include a grid of nozzles providing a horizontal spray of 5 gallons of water per square foot per hour in a

cascading effect. This equates to a vertical rainfall of roughly 8 inches (200 millimeters) per hour. In reality, a typical door assembly would likely not be exposed to this quantity of water during an average rainfall, but it might experience similar intensity during the peak of an extreme rain event.

When performing diagnostic testing of an in-service door more than six months after initial installation, the following test standards are typically utilized:

- ASTM E2128, *Standard Guide for Evaluating Water Leakage of Building Walls*[6]
- AAMA 511, *Voluntary Guideline for Forensic Water Penetration Testing of Fenestration Products*[7]

Terrace doors (not located on hurricane prone coastlines nor localized high wind areas) that are not rated to resist water penetration are common, and many will experience some wind-driven rain event while they are in service, often resulting in water penetration to the interior. When this occurs in residential or commercial spaces, tenants report water leaks and building management is left to clean up the mess.

Manufacturers will not guarantee that these types of unrated doors will resist rainwater and therefore cannot be evaluated using formal AAMA 502 or ASTM E1105 standards. However, evaluating these installed doors in the context of ASTM E2128 and AAMA 511 with a modified, zero air pressure differential, ASTM E1105 water-penetration test can be valuable *(Figure 1)*.

When used as a diagnostic tool, a modified ASTM E1105 zero air pressure differential water-penetration test, where water is allowed to sheet down the full height of the door assembly, can be very informative in assessing the rainwater resistance performance of the door assembly and aid in identifying sources or points of entry for reported water infiltration. Understanding these points of entry can help in selecting after-market accessories that may improve performance of the door in wind-driven rain events, reducing the volume of water leakage.

Figure 2. Vertical masonry cavity closure flashing installed at jamb of terrace door to provide substrate for perimeter sealant.

It is worth noting that when diagnosing water entry points for terrace doors (and operable windows), a handheld spray nozzle is not recognized by FGIA as an appropriate tool, per AAMA 502.1, Note 1, which states, "This field check method is not appropriate for testing of operable components such as operable windows and doors."

If the testing agency elects to use a handheld nozzle for informational purposes only to recreate a known water leak, care should be taken to only use the nozzle under low pressure and never direct the water spray at a gasket or threshold. Best practices for diagnostic testing are outlined in ASTM E2128 and AAMA 511.

Challenges Related to Accessibility and Egress

Aesthetics and performance requirements are only a part of the equation when specifying a terrace door assembly. Applicable building codes must be consulted to determine accessibility and egress requirements. Accessibility and egress requirements have a direct impact on water management capabilities of the door assembly.

ACCESSIBILITY

Americans with Disabilities Act (ADA) requirements[8] can pose a challenge when aiming to ensure that exterior egress doors remain watertight. Thresholds at doorways cannot exceed 1/2 inch (13 millimeters) in height for nonsliding doors, or 3/4 inch (19 millimeters) for exterior sliding doors. Also, landings with a slope are not to exceed 0.25 units vertical in 12 units horizontal (approximately a 2% slope).

In addition to ADA, accessibility is governed by the *International Building Code* (IBC),[9] the Fair Housing Act,[10] and other local standards, codes, amendments and ordinances. A threshold with a 1/2 inch vertical rise can only manage 2.6 lb/ft² (0.1 kPa) of pressure, which is less than the lowest AAMA 101 rated door assembly (that is, a residential performance class, performance grade 15 [R-PG15] door with a laboratory water penetration resistance rating of 3 lb/ft² [0.14 kPa]).

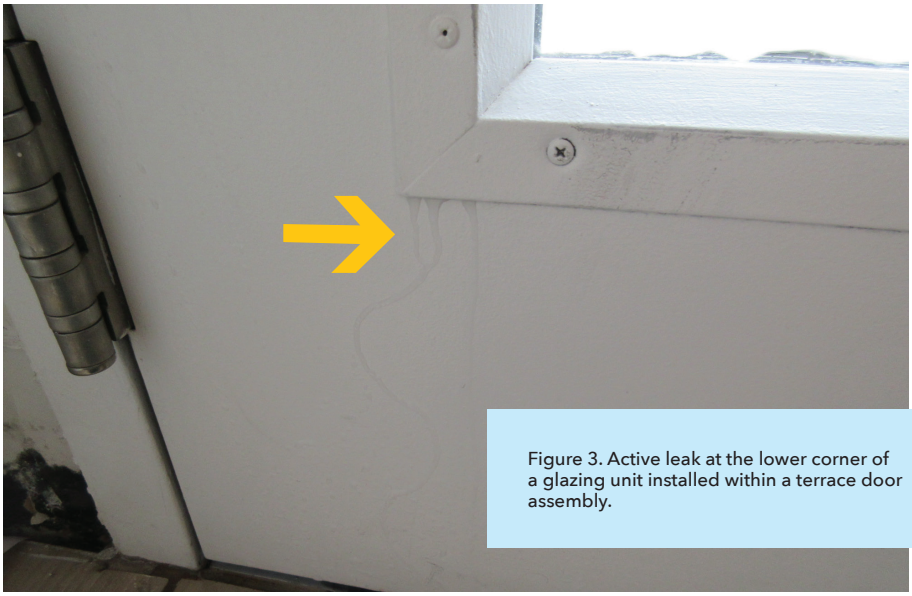

Figure 3. Active leak at the lower corner of a glazing unit installed within a terrace door assembly.

EGRESS

Egress requirements for entrance/exit doors are governed by the applicable building code based on building use, occupancy load and door type (swing, sliding, revolving). Per IBC[9] Chapter 10, "Means of Egress," a means of egress must be provided for all outdoor areas, including patios and terraces.

The number of egress doors is based on occupancy and use of the space. The code stipulates egress requirements, which include minimum door dimensions, maximum door panel width, panic hardware, step-down dimensions to the exterior, requirements for threshold geometry, door swing direction, illumination, operating force, signage and more.

All designated "egress doors shall be of the side-hinged swinging door, pivoted doors or balanced door type" and "shall swing in the direction of egress travel." Doors are required to swing in the direction of egress travel only if any one of the following three conditions exists:

- The door serves a room or area with an occupant load of 50 or more.
- The door assembly is used in an exit enclosure.
- The door opening services a high-hazard contents area.

Typically, upper-level terrace egress doors satisfy the first condition, where in an emergency it would be undesirable for an occupant to take time to pull the door open in the direction they are moving from.

All door opening forces should be applied to the latch side of the door and egress doors should include

Figure 4. Thermally broken door threshold with saddle profile containing vertical element with gaskets that integrate with jamb gasketing.

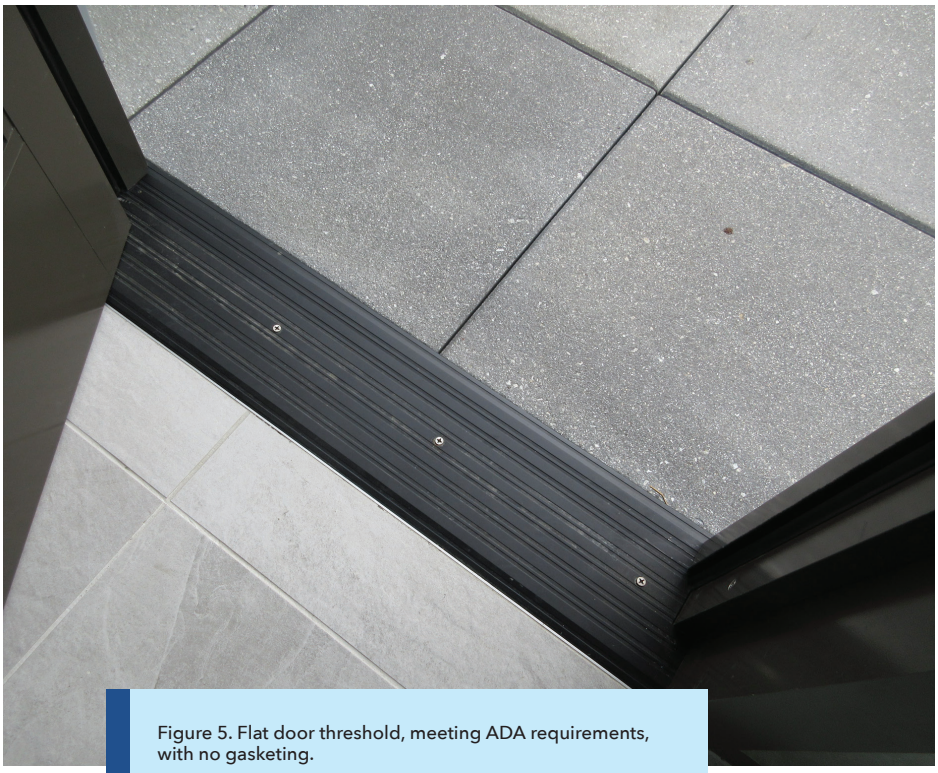

Figure 5. Flat door threshold, meeting ADA requirements, with no gasketing.

exterior, surface-mounted latch-release hardware. Egress doors must also be accessible and shall not exceed "1/2 inch [13 millimeters] above the finished floor or landing for other doors."

These egress requirements result in the use of in-swing doors with low-profile thresholds for terrace applications. This can pose challenges for managing water under storm conditions with sustained positive wind loads that decrease compression at the operable components of in-swing doors.

The reduced compression increases the potential for air and water infiltration around perimeter gasketing between the door panel and frame, resulting in the threshold managing excess water with only a 1/2 inch (13 millimeter) vertical rise. It should be noted that under storm conditions, doors will be exposed to changing positive and negative pressures.

Figure 6. A door with a threshold that meets ADA requirements set atop concrete infill at a terrace. Waterproofing on terrace beneath pedestal pavers was not extended up and onto the concrete fill prior to placement of the threshold. In addition, the threshold is not bed sealed.

WATER MANAGEMENT

High-performance terrace doors rated for water penetration resistance by AAMA/WDMA/CSA 101/I.S.2/A440[1] are designed to prevent exterior air infiltration and water penetration to the building interior.

As briefly noted previously, out-swing doors will typically resist air infiltration and water penetration better than in-swing doors. This is because exterior positive wind pressures tend to compress the door panel against the weatherstripping and the upturned leg of the threshold is on the interior side of the door, acting as a dam for water ingress.

With an in-swing door, the positive wind loads acting on the door panel will result in the door releasing compression against the frame, allowing more water to pass the perimeter gasketing and travel the door jambs vertically to the sill and threshold. Often, the profile of a threshold for an in-swing door will contain either a flat threshold or one with a vertical gasket toward the exterior that can potentially trap water and direct it inward.

The key to designing and installing a watertight terrace door is to understand the most common points of water entry. These common sources of water leakage at terrace doors include, but are not limited to, flashing; perimeter sealant; hardware; weatherstripping, gaskets, shoes, and sweeps; glazing; and thresholds.

FLASHING

The position of the door within the rough opening affects the flashing that surrounds the door. The door assembly must be integrated into the adjacent air/water barriers and terrace waterproofing. While some door assemblies include perimeter flanges that can be integrated into the air/water barrier with flashing membrane, this is not always the case.

If a door assembly does not contain a flange, a full-height cavity closure flashing may be needed to isolate an adjacent rain screen cladding from the wet/dry line of the door assembly and prevent water migration behind primary seals. At the head of the rough opening, there should be sufficient setback of the door assembly from the facade or a drip-edge flashing to promote water drainage away from the top of the operable door panel.

Figure 7. Exposed terrace waterproofing outboard of the threshold is not designed for exposure to ultraviolet light and direct foot traffic.

PERIMETER SEALANT

The placement of the primary perimeter sealant joint is critical and should be located between the doorframe and the surrounding air/water barrier. It is not unheard of for a door to have as many as three lines of sealant at its perimeter: an exterior seal from the doorframe to the cladding, the primary exterior seal between the doorframe and the air/water barrier, and an interior air seal between the doorframe and the air/water barrier.

Figure 8. Door threshold is notched around frame at the jambs and is not sealed to the door frame. There is potential for water ingress at the joint between the jamb and threshold.

Figure 9. Door accessories mounted to the base of a terrace door panel. There are multiple sizes and styles of surface-mounted diverters and sweeps on the market that range in color and material.

Some doors (such as hollow metal doors or those with an open extrusion profile) require a cap or filler element to be installed at the perimeter of the frame to provide a sufficient substrate "bite" for perimeter sealant. Most sealant manufacturers require a minimum 1/4 inch (6 millimeter) bond of the sealant to the substrate *(Figure 2)*.

HARDWARE

Handles, locks, hinges and other hardware can be locations of water entry if they are not watertight. Often, doorframes are modified to include handles and latches, resulting in reduced water penetration performance of the doorframes. Hardware can also inadvertently cause leaks if penetrations in doorframes or door panels are not properly sealed, or if the hardware does not operate as intended (for example, the door does not fully latch and properly engage the door panel to the doorframe).

WEATHERSTRIPPING, GASKETS, SHOES AND SWEEPS

Protecting and limiting air gaps between the operable door panel and the perimeter frame and threshold are critical to the door assembly's water penetration performance. Minimizing this gap and promoting engagement of the door with the frame through adequately sized gaskets, shoes, and sweeps will reduce the volume of water the door assembly is required to manage.

The gaskets should compress appropriately around the door panel, even during wind events, which will impart negative or positive pressure on the door depending on direction of operation. Door shoes and sweeps should engage the selected threshold and not ride above it. Without engagement with the threshold, water that is running down the jamb gaskets or sheeting over the floor toward the threshold may manifest over the top or at the ends of the threshold, resulting in a leak.

The gaps between the operable door panels and the frame, or between dual door panels, typically contain weatherstripping. There are various types, sizes and shapes of weatherstripping.

GLAZING

Operable door panels may include glazing *(Figure 3)*. Some doors contain wet-glazed lites whereas others rely on a gasketed interface between the glass and the frame. Water that enters the glazing pocket must be managed effectively by fully sealed frame joinery and directed to the exterior through weeps in the system, outboard of the threshold gaskets.

THRESHOLDS

Perhaps the most definitive element in determining the performance of in-swing terrace doors with regards to water penetration is the threshold *(Figures 4 and 5)*. Typically, the water-resistance performance of door thresholds can be improved

by increasing the threshold height. However, as stated previously, the vertical height is limited on accessible swing doors to 1/2 inch (13 millimeters) by ADA.

There are numerous sizes and shapes of thresholds, including, but not limited to, flat, saddles, half saddles, offset saddles and latching panic saddles. Designers may select a certain threshold profile to aid in covering an exterior waterproofing or cavity condition or to transition onto an adjacent hardscape. These elongated flat profiles can promote lateral migration of water under the door panel.

Similarly, latching panic saddles contain a small, vertical upturned leg with a gasket that engages the in-swing door panel; if this gasket and the vertical element of the threshold are not fully compressed, they will allow water to enter over the threshold into interior spaces.

Thresholds that are not level can also inadvertently pitch water inward.

In addition to the profile of the threshold itself, there are conditions beneath the threshold that can affect water penetration. Door thresholds should be set in a full bed of compatible sealant to the underlying waterproofing assembly *(Figure 6)*; metal flashing may be necessary to ensure compatible substrates for sealant installation and to conceal waterproofing materials that may not be designed for exposure to ultraviolet light *(Figure 7)*. If the ends of thresholds are not sealed to the doorframe, that can create an avenue for water to enter beneath the threshold *(Figure 8)*.

Additionally, the presence of door pivot boxes, unsealed or erroneous fastener penetrations through the threshold, and/or discontinuous waterproofing beneath the threshold can all lead to water entry under a door threshold.

Possible Solutions

Once the door aesthetics, performance requirements and applicable code requirements are evaluated for operation and an assembly is specified, the design and construction teams should shift their focus to detailing and construction parameters that will limit water infiltration at the door.

The typical components of a door assembly are the frame, gaskets, door, hardware, threshold, sealants and fasteners. The interaction of these components, as well as the preparation of the door rough opening, is critical to the success of the door.

As established previously, water leakage at terrace doors generally occurs when design accommodations for egress or accessibility are overcome by in-service pressure-driven rain events.

Figure 10. Drip edge installed at the head of a door frame located at a roof level terrace.

With only a 1/2 inch (13 millimeter) threshold height allowed, it is not reasonable to expect an accessible door remain watertight in all storms, whether it is a rated assembly or not. Knowing that tenants and building owners do not want to see water ponding on interior floors adjacent to terrace doors, there are options to consider that will improve terrace door performance.

Although the following options may not entirely mitigate interior water penetration during heavy, wind-driven rain events, these options, both individually or when combined, have significantly limited water infiltration when implemented on recent projects. They can be implemented during the design phase as well as during remediation of in-service doors.

Options include:

- Confirm positive slope of the adjacent exterior slabs to drain. Positive slopes away from thresholds specified in the design phase can become flat spots or even negative slopes due to construction tolerances and slab distortion. Pedestal pavers or drainable hardscape located outboard of doors minimizes this effect.
- Provide a curb or slab depression between the exterior and interior beneath the door assembly.
- Install surface-mounted diverters at the base of the door panel. Some diverters contain rubber sweeps that can be beneficial by improving engagement with the threshold. There are multiple sizes and styles of surface-mounted diverters on the market that range in color and material *(Figure 9)*.
- Construct the doors under cover (canopies, awnings, overhangs) or in alcoves to dramatically decrease the amount of water that reaches the doors. If locating the door assembly in a recessed setback from the facade is not possible in the design, a surface-mounted diverter or drip-edge flashing can also be added above the head of the door panel, applied to the frame, to help direct water sheeting down the wall above away from the door panel *(Figure 10)*.
- Select a threshold that will engage the door panel and fully seal it to the jambs of the doorframe. The door threshold should also be fully bed-sealed to the flashing/membrane beneath the assembly. Ensure that the flashing/waterproofing outboard of the door extends into the door rough opening to promote continuity of primary seals. Consider using stainless steel flashing over any waterproofing membrane flashing at the sill of the rough opening to provide UV protection.
- Install trench drains across doorways to help drain water

Additional Resources

AAMA Seeks Code Modification for ADA Threshold Height, April 27, 2012. *https://web.archive.org/web/20160416064239/http://www.aamanet.org/news/1/10/0/all/756/aama-seeks-code-modification-for-ada-threshold-height*

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that could potentially accumulate against the threshold. The trench drains will generally require heel-proof grates. Trench drains can be installed at either the exterior (to limit ingress) or interior (to manage leakage). The trench drain should be sized to be slightly wider than the doorframe and be properly piped to storm drainage.

- Install recessed, waterproofed interior walk-off mats, particularly at locations where the interior finishes inboard of the door are highly susceptible to moisture-related damage (warped wood flooring, stained stone flooring, etc.). Walk-off mats can be evaporation pans or drained assemblies.
- Install larger perimeter gaskets at the full perimeter of the operable panels or doorframe to promote engagement of the panels and frame. Care must be taken to size the gasket such that it engages the door panel and is compressed enough to restrict air infiltration, but not so large as to inhibit proper closure of the door or require increased operable force.
- Provide a door shoe that engages the bottom of the door panel with the threshold.
- Review glazing installation to ensure that glazing gaskets are compressed or glazing seals are continuous. If gaskets are compromised, consideration may be given to the installation of a wet seal (cap seal) over the glazing gaskets, although it should be noted that this seal will require routine inspection and maintenance for continued performance.
- Ensure that perimeter sealants at the interior and exterior of the door assembly are installed continuously. Cap the ends of vertical extrusions, particularly on hollow metal doorframes, to install continuous perimeter sealant at corners of doorframe.
- If a dual, out-swing door is used, consider adding an astragal cover to provide additional protection to the meeting gaskets.

Getting a Handle on Terrace Doors

There are many types of terrace doors. During design, a door should be selected that complies with the owner's performance requirements, with appropriate attention given to the detailing of the door assembly with surrounding construction. If an in-service door is not meeting the expectations of the owner or tenants with respect to water leakage, after-market accessories can be considered to limit water ingress and improve the overall performance of the door assembly. +

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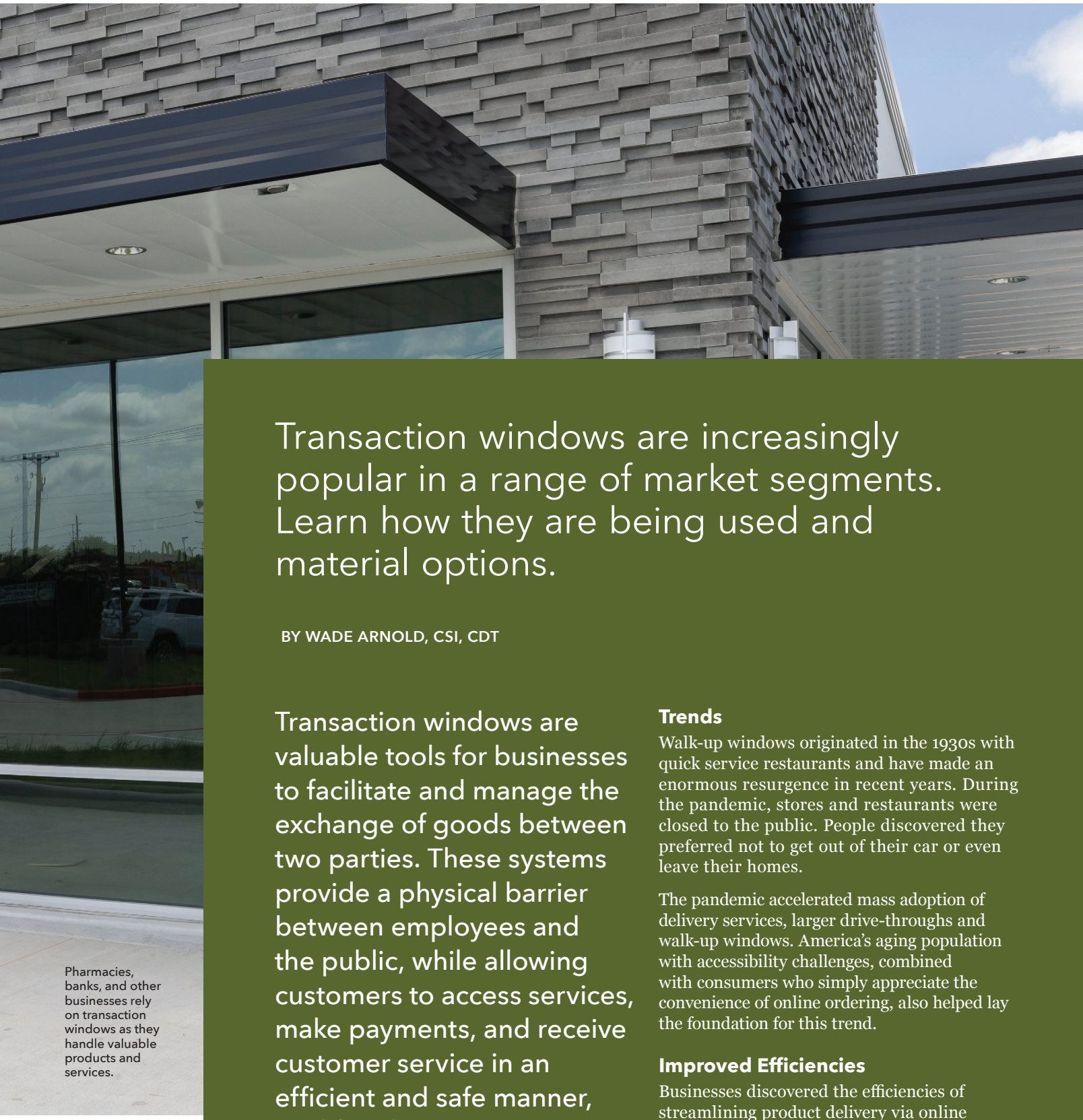
Trends and Best Practices for *Transaction Windows*

PHOTOS COURTESY OF U.S. BULLET PROOFING



Pharmacies, banks, and other businesses rely on transaction windows as they handle valuable products and services.

Transaction windows are increasingly popular in a range of market segments. Learn how they are being used and material options.

BY WADE ARNOLD, CSI, CDT

Transaction windows are valuable tools for businesses to facilitate and manage the exchange of goods between two parties. These systems provide a physical barrier between employees and the public, while allowing customers to access services, make payments, and receive customer service in an efficient and safe manner, enabling businesses to optimize their operations.

Trends

Walk-up windows originated in the 1930s with quick service restaurants and have made an enormous resurgence in recent years. During the pandemic, stores and restaurants were closed to the public. People discovered they preferred not to get out of their car or even leave their homes.

The pandemic accelerated mass adoption of delivery services, larger drive-throughs and walk-up windows. America's aging population with accessibility challenges, combined with consumers who simply appreciate the convenience of online ordering, also helped lay the foundation for this trend.

Improved Efficiencies

Businesses discovered the efficiencies of streamlining product delivery via online ordering. Operating expenses reduced and companies became more profitable. Retailers could focus resources on fulfilling orders and reducing costs of maintaining display areas.

Protecting workers and assets from physical threats is a major concern for businesses handling valuable items and sensitive information.

A range of companies are now exploring different ways they can serve customers on the go through delivery services, drive-throughs, walk-up windows, curbside pickups and secure lockers.

Applications

Transaction windows are not only limited to quick service restaurants. Pharmacies, health care facilities, retirement care centers, casinos, grocery stores, hardware retailers, gas stations, utility companies and banks are seeing the value of transaction systems. Naturally, there is a demand for secure transaction windows in states where cannabis has been legalized.

A fast food window needs to work differently than a window in a school office or a stadium ticket booth. They have different users, applications, expectations and experiences. How the customer receives their goods on the other end is an important function of a transaction system.

Transaction windows can efficiently prevent unauthorized access to a premises and limit exposure to external risks.

Options

Businesses understand customer service is a core aspect of what they do. It's about customer experience and face-to-face interaction, so they install large service openings to pass goods through to their customers.

Pharmacies and financial services providers have a higher risk of robbery and typically require transaction drawers with a window that includes bullet-resistant glazing, ensuring service representatives are secure while still providing a face-to-face interaction. Additional options include custom colors, electric auto locks, hurricane-rated glazing, custom transoms, speakers, intercoms and electric transaction drawers.

Companies with an environmentally friendly brand should consider exterior systems that are self-closing, such as an automatic window. Another solution is air curtains. These are an invisible climate barrier installed over almost any drive-through window. They keep the outside air out, provide better air quality management, and improve heating and air conditioning efficiency.

Air curtains prevent insects and contaminants such as dust or smoke from entering the restaurant. They also keep out toxic emissions from cars idling in the

drive-through lane. Some automatic air curtains will collect usage metrics and automatically turn on and off with the opening and closing of a window.

The Right Window for the Right Building

In fast food environments, drive-through windows are built to be used hundreds of times a day by a diverse group of users. Aluminum-based windows are durable, simple to use and easy to clean. They are intuitive and provide fast face-to-face customer service while withstanding the heat and humidity environment of a fast-food restaurant. Automated and touchless systems operate the windows simply with a motion sensor when the user engages the window.

Delivery Services

For delivery services that implement guaranteed deliveries, such as DoorDash, Uber Eats and Skip, time literally is money. Many retailers are testing allocated drive-through or pick-up windows so drivers can pick up their orders and deliver them in an expedited manner. This is an important item to address for the service delivery company and the retailer, because a negative experience impacts both brands simultaneously. Several brands are installing dedicated delivery driver walk-up windows in their entrance vestibules, especially for late night or after-hours service.

Health Care

In hospitals, transaction windows facilitate a controlled, decontaminated pass-through system between sterile and non-sterile areas. Health care and social service industries also have among the highest workplace violence incidents in North America. Hospitals, public health agencies, needle exchanges and doctors offices are installing reception windows with deal trays to withstand human impact.

Mobile Ordering

Self-checkouts are mainstream. Retail is quickly becoming more automated and system-generated where customers order using an app; the order is processed and delivered or ready for pick up with as few touch points as possible. There are still people preparing orders with transaction points, but human interaction is limited.

Mobile ordering and apps have helped fuel the shift in this area. Whether it's buying concert tickets online or placing a pickup order through an app, this type of consumer behavior has been normalized. The customer orders in advance and picks up after it is ready. The technology balances surge capacity and alleviates wait times. It generates faster throughput in a manner that's mutually convenient to consumers and the business. Advanced online ordering streamlines the ability to receive an order. Detailed metrics can be tracked from ordering until delivery.

Security is a big benefit of transaction windows. Thanks to features such as bullet-resistant glass, stainless steel construction and/or secure locks, the windows at your location can safeguard your facility and your personnel.

Best Practices

Lean on your supplier as a consultant and explain what you're trying to do. Let them guide you through the best solutions that they feel will suit the project. Keep your contractor in the loop so everyone is on the same page, lead times are aligned, pricing is confirmed and there are no unforeseen obstacles once you start the project. This supports a smooth execution that is on time, on budget and meets your business objectives.

New builds are often faster and more affordable to design around a standard transaction window that's in stock. If it's a remodel, a custom window might be necessary to fit the space. Custom transaction windows can differentiate a brand and make it stand out from its competition by creating an inviting aesthetic and providing an easy way to access branded materials such as menus, logos and other visuals.

Volatility in the supply industry remains. Check with your supplier in terms of your cost and your lead time, as things can fluctuate daily. The dynamic field of design and service is changing significantly. +

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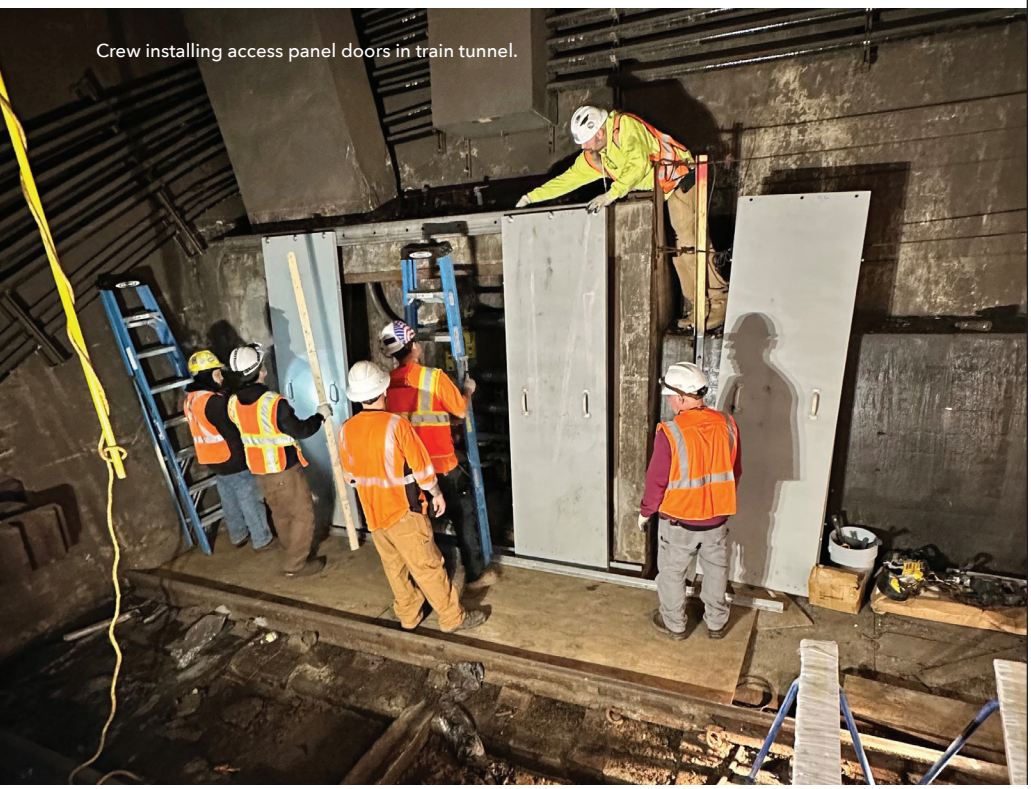
Keeping the Trains Running

Krieger blast-resistant doors installed at Penn Station.

BY BOB MCCLUNEY

If you've ever been on a high-speed train passing through a tunnel, you may have noticed your ears popping due to changes in air pressure. Not only do train compartments need to be engineered properly to protect the safety and comfort of passengers, but so do the tunnels themselves.



Crew installing access panel doors in train tunnel.

Access panel doors installed and awaiting final paint.

For this reason, in 2022, Amtrak commissioned the New York Penn Station Manhole Replacement Project. Accurate Door & Hardware served as the distributor for the project and brought in Krieger Specialty Products to design and manufacture a series of replacement blast-resistant manhole covers. Essentially, access panel doors were needed to protect the electrical cable junctions at Pennsylvania (Penn) Station in New York City.

TUNNEL PHYSICS

What exactly happens to cause these extreme variations in atmospheric pressure? When a train enters a tunnel at a high speed (30 mph or higher), it displaces air and instantly generates pressure waves that move along the tunnel at the speed of sound. Due to this repeated pressure on a daily basis, train tunnels such as those at Penn Station require specialized, durable infrastructure that can withstand the adverse effects and intensity of the aerodynamic pressure.

PENN STATION

Located in Manhattan in New York City, Penn Station is the busiest train station in the United States. Every weekday, approximately 650,000 people and 1,300 trains pass through its network of 21 tracks fed by seven tunnels. The station is completely underground and all of the trains that run through it use electric power supplied from overhead lines or third rail tracks.

PHOTOS COURTESY OF KRIEGER SPECIALTY PRODUCTS

Electric cables inside junction box before access panel doors were installed.

View of finished access panel doors installed in train tunnel.

MANHOLE REPLACEMENT PROJECT

The New York Penn Station Manhole Replacement Project included the replacement of the access panel doors covering the electrical cable junctions. Krieger produced a total of 16 panels—ranging from 2 feet 5 inches by 8 feet, to 2 feet 7 1/2 inches by 8 feet 9 inches—and accompanying securing devices, hoist rings and pull handles.

Krieger oversaw the installation of the door panels, which was performed by Amtrak construction and maintenance personnel.

ACCESS PANEL DOOR DESIGN

The primary design criteria of the access panel doors, associated framing and securing devices is to withstand an ultimate instantaneous load of 300 pounds per square foot (PSF) resulting from an arc blast shock wave. This is the result of a high-pressure sound wave caused by a sudden arc fault.

An arc blast can be strong enough to throw a technician to the ground and potentially cause damage to a person's hearing or brain functions. It can also damage equipment and send loose tools, machinery and debris flying.

Krieger performed a structural analysis to ensure calculations and materials complied with specified performance criteria under blast loading and Occupational Safety and Health Administration (OSHA) guidelines.

All structural steel framing for the access panel doors had to conform to ASTM A36/A572-50. The 3/4-inch diameter hex-head steel bolts conformed to ASTM A325, and all welding was in accordance with the American Welding Society (AWS) specifications, AWS D1.1/D1.3. The perimeter of the door panel is reinforced with 2 inch by 2 inch by 1/4 inch stainless steel tubing to help ensure blast resistance and avoid corrosion.

Because of the enormous aerodynamic pressure in the tunnels, the access panel doors are designed to securely enclose and protect the junction boxes that house the massive 5-foot electrical cables powering the trains and tracks at Penn Station. The doors are equipped with heavy-duty pull handles so that maintenance crews can grab ahold and set them aside while working.

"Only authorized Amtrak maintenance personnel can remove the panels for the purpose of accessing the electrical systems," Richard Cornetto, Jr., Vice President, Accurate Door & Hardware, says. "And because all maintenance work must be completed during the short window of time each day when trains are not running, the doors are designed to be quickly removed and put back in place."

SUPPLY AND DEMAND

"A project of this complexity requires multiple players involved," Cornetto says. As the distributor, Accurate Door & Hardware was tasked with procuring the necessary products and service providers to get the job done to the highest standard within budget.

As the manufacturer, Krieger sells its products directly to the distributor that then sells it to the end customer. "It's an efficient process that relieves Amtrak of the heavy burden of vetting various products and manufacturers," Cornetto adds. "In the end, we went with Krieger because of their exceptional high performance products, which are guaranteed to 'Protect What's Valued.' That is, perform according to the ratings and standards the project required. Plus, they're easy to work with."

While it quietly took place out of the public eye, the New York Penn Station Manhole Replacement Project is one of numerous infrastructure improvement projects at Penn Station. The project gives a peek into the other side of the door world. It's the side that people don't see or even think about, but is vitally important to making sure riders are safe—and the trains keep running. +

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Clear as Glass Curves

University aquatics center achieves LEED Gold.

BY BRIAN TOBIAS, LEED® AP

The new Robson & Lindley Aquatics Center and Barr-McMillion Natatorium at Southern Methodist University (SMU) stands as a gateway for the growing east campus. It builds on a legacy of proud Olympians, world records and 155 national titles.

Earning LEED Gold certification through the U.S. Green Building Council, the project also exemplifies SMU's commitment to sustainability.

To realize the project's aesthetic, performance and sustainability goals, glazing contractor B&B Glass, Inc. turned to Tubelite. It installed Tubelite's high-performance 400CW Series Curtainwall, T14000 Series Storefront and Wide Stile Entrance systems. Contractor and LEED consultant The Beck Group led the project's 20-month construction.

GEORGIAN ROTUNDA

Home to SMU's internationally recognized men's and women's swimming and diving teams, the 42,000-square-foot center provides

PHOTO BY JOE HERNANDEZ PHOTOGRAPHY; COURTESY TUBELITE

The new Robson & Lindley Aquatics Center and Barr-McMillion Natatorium at Southern Methodist University earned LEED Gold certification through the U.S. Green Building Council.

RESOURCES

- Owner: Southern Methodist University; Dallas; *www.smu.edu*
- Architect: Brinkley Sargent Wiginton (BSW) Architects; Dallas; *www.bsw-architects.com*
- Contractor and LEED consultant: The Beck Group; Dallas; *www.beckgroup.com*
- Curtainwall, storefront, entrance systems – glazing contractor: B&B Glass, Inc.; Dallas; *www.bbglasstx.com*
- Curtainwall, storefront, entrance systems – manufacturer: Tubelite; Walker, Michigan; *www.tubeliteinc.com*
- Curtainwall, storefront, entrance systems – glass: Tristar Glass, Inc.; Catoosa, Oklahoma; *www.tristarglass.com*
- Curtainwall, storefront, entrance systems – finishing: Linetec; Wausau, Wisconsin; *www.linetec.com*

facilities for practice and competition. Brinkley Sargent Wiginton Architects designed the new aquatics center to reflect the traditional Georgian architecture associated with the university.

The center's grand rotunda features a Tubelite curtainwall in three towering, two-story-tall sections to enclose the distinctive, curved corner. Between each curtainwall section, full-height, half-circle Tuscan columns in pale cast-stone add dimensional drama to the façade.

Bridging the light-colored masonry with the dark brown brickwork, round portal-inspired windows punctuate the walls that bookend the rotunda and extend along one wall as clerestory units. Along the street level of both walls, the center showcases more traditional, rectangularly shaped Tubelite storefront and entrance systems.

According to the SMU Office of Facilities Planning and Management, "Occupants in more than 90% of all regularly occupied spaces have a direct line of sight to the outdoors, which enables them to maintain a visual connection to the surrounding environment."

ENERGY REDUCTION

Tubelite's high-performance window systems also played a key role in the integrated strategies. They reduced the building's energy usage while providing a greater comfort level for occupants. A computer-simulated model predicted the potential for 31% energy use reduction overall.

RECYCLED PLUS LOW EMITTING

The building team also made a conscious effort to use products that have a high recycled content and low volatile organic compound (low-VOC) content levels.

Tubelite's aluminum framing members can be manufactured with recycled content and finished in low-emitting paints and coatings. For SMU's Aquatics Center, the aluminum contains up to 70% recycled content and was finished by Linetec in Class 1 Clear Anodize.

Linetec's no-VOC, eco-friendly anodize produces a frosty, matte finish that helps hide small imperfections sometimes seen in recycled aluminum. These qualities have helped Linetec's anodize earn a Declare Label as Living Building Challenge™ Red List Free, which is recognized by LEED and other sustainable building programs.

Because anodize is the most durable finish available, Tubelite's aluminum-framed curtainwall, storefront and entrance systems further support SMU's goals of creating "attractive, low-maintenance spaces."

At the end of its useful life on the building, Tubelite's aluminum framing can be reused and recycled. The Aquatics Center's building materials totaled more than 27% of recycled content by cost, and over 90% of all construction waste was recycled.

LEED THE WAY

Further supporting its LEED Gold certification, the project is convenient to transit and pedestrian paths. It uses low-flow plumbing fixtures and employs high-efficiency mechanical and lighting systems. Plus, SMU has purchased green power to help offset its energy use. The university also completed enhanced commissioning to ensure all systems ran as designed.

Meeting or exceeding expectations, the Aquatics Center features an Olympic-sized, eight-lane indoor pool with a platform diving area, including four springboards and a 10-meter tower for training and competition. Coaches' offices, locker rooms, and a classroom and meeting area are located adjacent to the pool. Spectator seating for 800 is on the mezzanine level.

A permanent exhibit in the Aquatics Center honors former swimmers, divers and coaches who have built SMU's program and reputation.

"SMU swimmers and divers have a legendary record of success, both in the pool and in the classroom," SMU President R. Gerald Turner says. "The facilities at the Aquatics Center will help student athletes continue the Mustang swimming legacy, and enable fans to enjoy the highest levels of competition at a premier venue."

BRIAN TOBIAS, LEED® AP, is Senior Manager of Product Strategy at Tubelite Inc. and its aluminum-framed storefront, curtainwall, entrances and daylight control systems. Phone: 800-866-2227. Email: *dependable@tubeliteinc.com*.

DHI conVe

UNLOCKING A DOOR FOR EGRESS

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ONE OF THE CARDINAL RULES THAT APPLIES TO DOOR OPENINGS IN A MEANS OF EGRESS IS THAT THE DOOR MUST BE UNLATCHED FOR EGRESS WITH ONE MOTION. THERE ARE SOME EXCEPTIONS TO THIS RULE THAT I WILL COVER IN THIS ISSUE'S DECODED QUESTION.

QUESTION: WHEN IS IT PERMISSIBLE FOR AN EGRESS DOOR TO HAVE HARDWARE THAT REQUIRES MORE THAN ONE RELEASING MOTION TO UNLATCH THE DOOR?

The first thing to consider is that the egress requirements of the I-Codes apply to doors that are required for egress and also to doors that are provided for egress purposes. For example, if an assembly space is required to have three exits in order to accommodate the occupant load but four exits are provided, it is likely that all four doors will have to meet the requirements of the I-Codes.

The National Fire Protection Association (NFPA) codes may be interpreted differently. The requirements of that code apply to door assemblies in a means of egress without a specific reference to additional doors.

The requirements of the I-Codes and the NFPA codes related to unlatching an egress door are very similar:

I-Codes: Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices.

NFPA 101: The operation of the releasing mechanism shall release all latching and all locking devices of the door leaf with not more than one motion in a single linear or rotational direction, unless otherwise specified in 7.2.1.5.3.4, 7.2.1.5.3.5, 7.2.1.5.3.7 or 7.2.1.5.3.8.

Note that the requirements for one releasing motion/operation apply to the act of unlatching the door. The act of opening the door can be a separate operation. To clarify the requirements for the releasing methods, the Builders Hardware Manufacturers Association (BHMA) created a standard called A156.41 – Standard for Door Hardware, Single Motion to Egress. This standard addresses the single motion in more detail.

Each of the model codes includes several exceptions to the unlatching requirements where hardware that requires more than one releasing motion is allowed.

The I-Codes exempt the following locations from a single motion to unlatch the door:

1. Places of detention or restraint. This typically applies to facilities classified as Institutional Use Group I-3, such as jails and prisons. Specific requirements for these occupancies are addressed in the codes.

2. Locations where manually operated bolt locks (flush bolts and surface bolts) are allowed on the inactive leaf of a pair of doors. The I-Codes allow manual bolts on doors that are not required for egress in individual dwelling units or sleeping units and on pairs of doors serving storage or equipment rooms.

In business (Group B), factory and industrial (Group F), and storage (Group S) occupancies, the I-Codes allow manually operated bolts on the inactive leaf when the pair of doors serves an

ASK YOUR MOST PRESSING QUESTIONS!

Decoded now features a new question-and-answer format. We are selecting some of the most pressing questions that readers have about codes and answering them here. Submit your questions at *idighardware.com/decoded-qa* and we'll answer as many as we can in future Decoded columns.

One of the locations where both sets of model codes allow a second releasing motion to unlatch the door is entrance doors serving individual dwelling units and sleeping units in residential occupancies.

occupant load of less than 50 people in buildings that do not have a sprinkler system.

In buildings that are equipped throughout with a sprinkler system, manual bolts are allowed for these same use groups if the active leaf of the pair accommodates the occupant load of the area served by the doors. When manual bolts are installed, no hardware may be present on the inactive leaf that would indicate that the door could be used for egress. In Group I-2 health care occupancies, pairs of patient room doors can be equipped with self-latching bolts. The same prohibition on dummy hardware applies to the inactive leaf.

3. Pairs of doors equipped with automatic flush bolts. Again, no hardware is allowed on the inactive leaf that would lead a building occupant to believe that the inactive leaf is operable.

4. Entrance doors serving individual dwelling units and sleeping units in Residential Use Group R occupancies where the occupant load of the unit is 10 or less. These doors may be equipped with a night latch, dead bolt or security chain in addition to the latching hardware, if the security device is openable from the inside without the use of a key or tool.

NFPA 101 includes the following exceptions to the one-motion unlatching requirement:

1. Egress doors serving individual living units and guest rooms of residential occupancies. These doors may have a separate security

PHOTOS COURTESY OF ALLEGION, INC.

The 2018 and 2021 editions of NFPA 101 allow a second (non-simultaneous) releasing motion for existing classroom doors in existing schools. The IBC and IFC do not include this exception.

device that requires no more than one additional releasing motion if the device is operable from the inside without the use of a key or tool. The additional security device must be mounted no more than 48 inches above the floor. Existing security devices are permitted to have two additional releasing motions.

2. Doors serving an area with an occupant load of three or less. For these doors, the existing hardware may be of a type that requires two releasing motions, as long as those two motions are not required to be performed simultaneously. Note that the I-Codes do not include a similar exception for rooms with a low occupant load.

3. Existing educational occupancies and existing day care occupancies. NFPA 101 allows these doors to have hardware that requires two non-simultaneous releasing motions if all of the other criteria stated in the code are met.

The criteria include a mandate for hardware that is capable of being engaged from the egress side of the door without opening the door. Egress must be accomplished without the use of a key, tool, special knowledge or effort. The releasing mechanisms to unlatch the door must be located between 34 and 48 inches above the floor. The door must be able to be unlocked and opened from outside of the room with a key or credential.

Refer to the Life Safety Code for additional requirements. This exception only applies to locations where NFPA 101 is the adopted code. This is because the I-Codes do not permit hardware that requires a second releasing operation to be installed on classroom doors.

As you can see, there are very few locations where hardware that requires a second releasing motion to unlatch the door is allowed in a means of egress. For the vast majority of doors, the model codes require doors to

unlatch for egress with one motion, without the use of a key, tool, special knowledge or effort.

The codes do not prohibit more than one locking or latching device installed on a door. However, the latches must be released simultaneously with one motion unless there is a specific exception that applies to the door opening.

There are additional requirements related to accessibility that apply to latching hardware. For example, hardware must be operable without tight grasping, pinching or twisting of the wrist.

The allowable mounting height range for the releasing hardware is 34 to 48 inches above the floor for most jurisdictions. Note some state code requirements vary.

The force to operate the hardware is also limited by the codes and standards. Currently, the I-Codes limit the operable force to 15 pounds of pushing or pulling motion, or 28 inch-pounds of rotational motion. The ADA Standards for Accessible Design require door hardware to be operable with a maximum of five pounds of force.

Before specifying, supplying or installing hardware that requires more than one releasing motion, it is important to verify that the second releasing motion is allowed by the adopted code. State and local codes may include modifications to the model codes, and the Authority Having Jurisdiction can assist with interpretations. +

The vast majority of doors in a means of egress are required to unlatch with one releasing motion. This limitation does not apply to opening the door. It is specific to the motion required to release the latch.

HOW TO CLEAN ARCHITECTURAL GLASS

WADE ARNOLD, CSI, CDT is the Commercial Sales Director at U.S. Bullet Proofing. Email: *warnold@usbp.com*. Website: *www.usbp.com*.

GLASS IS A POPULAR BUILDING MATERIAL FOR A VARIETY OF REASONS. IT PROVIDES NATURAL DAYLIGHT, ACCESS TO VIEWS, REDUCES ENERGY COSTS AND CREATES LARGE OPEN SPACES WITH MINIMAL STRUCTURAL MATERIALS. GLASS WITH LOW EMISSIVITY COATINGS WILL ALSO REDUCE COOLING COSTS IN WARMER CLIMATES BY REFLECTING SOLAR HEAT.

Additionally, glass minimizes the need for artificial lighting, provides access for ventilation, is infinitely recyclable, and can reduce noise pollution levels inside buildings. Glass designs add aesthetic value to any structure because they are visually appealing and reflect light in interesting patterns. When people gaze at a building, they are often immediately viewing the glass components.

WHY PROPER CLEANING IS IMPORTANT

In addition to its many advantages, glass is easy to clean, sanitize and maintain over time. This makes it an ideal choice for high-traffic public areas that require frequent cleaning and maintenance attention.

Glass surfaces do require special care. Many glass types have a reflective coating or heat-treated surface which can be scratched. Since glass products can also be permanently damaged if infrequently or improperly cleaned, glass producers and fabricators recommend strict compliance with the National Glass Association's (NGA) Glass Technical Paper FB01-00 (2020), "Proper Procedures for Cleaning Architectural Glass Products."

Regularly cleaning interior and exterior glass surfaces is essential for maintenance and upkeep.

NGA QUICK-REFERENCE GUIDE TO CLEANING GLASS PRODUCTS

According to the dedicated member volunteers and subject matter experts at NGA, the following are things to do:

- Do protect glass during all stages of construction.
- Do determine if coated glass surfaces are exposed.
- Do exercise special care when cleaning coated glass surfaces.
- Do start cleaning at the top of the building and continue to lower levels.
- Do soak the glass surface with a clean water and soap solution to loosen dirt and debris.
- Do use a mild, non-abrasive commercial window cleaning solution.
- Do use a window cleaning squeegee to remove all of the cleaning solution.
- Do clean one representative window and check to see if procedures have caused any damage.
- Do be aware of and follow the glass supplier's specific cleaning recommendation.
- Do caution other trades against allowing other materials to contact the glass.
- Do watch for and prevent conditions that can damage the glass.
- Do read the following NGA Glass Technical Papers before cleaning any heat-strengthened or tempered glass products: 1) FB15-07, "Describing Architectural Glass Constructions," 2) FB02-02, "Heat-Treated Glass Surfaces are Different," 3) FB03-03, "Construction Site Protection and

Tech Tips highlights useful technology tips for door installation and service. If you have an idea for a Tech Tips article you want to submit, contact *Door Security + Safety* Editor Al Rickard, CAE, at *arickard@dhi.org*.

Maintenance of Architectural Glass" (in collaboration with International Window Cleaning Association (IWCA), and 4) FB19-08, "Guidelines for Handling and Cleaning Decorative Glass."

The National Glass Association states the following are things not to do:

- Do not allow dirt and residue to remain on glass for an extended period of time.
- Do not begin cleaning glass without knowing if a coated surface is exposed.
- Do not clean tinted or coated glass in direct sunlight.
- Do not allow water or cleaning residue to remain on the glass or adjacent materials.
- Do not begin cleaning without rinsing excessive dirt and debris.
- Do not use abrasive cleaning solutions or materials for maintenance cleaning.
- Do not ever use razor blades on coated glass surfaces.
- Do not allow metal parts of cleaning equipment to contact the glass.
- Do not trap abrasive particles between the cleaning materials and the glass surface.
- Do not allow other trades to lean tools or materials against the glass surface.
- Do not allow splashed materials to dry on the glass surface.

To ensure the longevity of glass, it is crucial for building managers and owners to take proactive measures in preserving the integrity of glass products. To prevent extensive damage, it is essential to be attentive to conditions that may lead to wear and tear, and follow the proper cleaning protocols provided by NGA/IWCA and glass supplier.

Additionally, regular maintenance cleaning is critical, with bi-annual cleaning typically sufficient. Certain regions may require more frequent cleaning due to environmental factors and atmospheric pollutants. Consult with professional window cleaners such as IWCA members to determine the optimal cleaning frequency tailored to the needs of each building. +

THE VALUE OF HUMILITY, PATIENCE, KINDNESS AND DILIGENCE

BENJAMIN MARKIEWICZ is a Fabrication Layout Engineer at Long Island Fireproof Door. He enjoys travel and is shown here at a restaurant in Budapest, Hungary. Email: *benm51@yahoo.com*.

The rich history of the door and hardware industry is highlighted by people and companies that drove innovation for decades. This column commemorates many notable achievements.

If you have a historical story to share, please contact *Door Security + Safety* Editor-in-Chief Al Rickard, CAE, at *arickard@dhi.org* or 703-402-9713.

EVER SINCE BENJAMIN MARKIEWICZ WENT TO WORK IN 1973 AS AN ARCHITECTURAL DRAFTSMAN, HE HAS FOLLOWED WHAT HE CALLS THE FOUR COMMANDMENTS OF LIFE: HUMILITY, PATIENCE, KINDNESS AND DILIGENCE.

He embraced these commandments through studying martial arts, Chinese Kung Fu Wu Su. "Martial arts is a way of life; it is not just the physical aspect," he explains. "It is your day-to-day life."

Those principles have served him well during his career journey, which has taken him through several companies and positions across the United States and even into Tijuana, Mexico.

"When I was interviewed at Williamsburg Steel Products in Brooklyn for the architectural draftsman position, they gave me a test where I had to create isometric drawings and a math test that included fractions," Markiewicz says.

He passed those tests and began that position as a detailer at Williamsburg Steel Products in Brooklyn, New York, where his schedule sheet and details had to be drawn manually on large architectural drawings. After six months he was put in charge of the Office Buildings Division of the company with no training after a longtime employee resigned. His trainer pointed to the phone and six cabinets filled with customer files and told him to deal with them.

"Contractors were calling me asking about hollow metal doors and frames with preparation for hardware such as cylindrical locks, flush bolts, etc." Markiewicz recalls. "I didn't know what they were talking about, so I went to the manager and asked to attend the lectures the company was giving on hollow metal doors and hardware so I didn't sound stupid on the phone."

A few years later his career led him back to architecture, then to hollow metal doors with Fire Doors Corporation in Florida and American Steel Products in Long Island, New York.

Opportunity knocked again when the co-owner of American Steel Products moved to California to launch his own hollow metal company, Security Metal Products, and asked Markiewicz to work for him in the engineering department.

"As I drove from New York to California, I was thinking, 'Is this exactly what I want to do? Since this is my business, I'll try to get the most out of it,'" Markiewicz says.

At Security Metal Products, he began to use computers for the first time to create architectural drawings and managed a team of people. The transition wasn't easy, but his humility and persistence helped him forge a key relationship with a colleague who trained him on the computer system and programing.

"No one will come and hand you knowledge," Markiewicz notes. "You have to learn it, either from others or go to college and take courses.

"When I approached my boss one day and informed him that I was interested in knowing more about the manufacturing aspect of the business, he put me in the shop for two hours a day," Markiewicz recalls. "One of the tasks I had to do was track jobs and see if there could be a better flow of production. I noticed that the worker on the door assembly line was going back and forth as necessary to cut parts for the vision preparation. I set up a procedure where the miscellaneous

This shop drawing that Markiewicz created decades ago at Firedoor Corporation of America shows what work product looked like before the advent of computers.

parts would be provided to that person in advance, bundled up with the job number, and put on the bin ready when the job gets to him. My boss felt that as long as this process benefited the company and that did not affect my regular duty, then why not."

Much of the company's business was coming from Mexico, so his boss asked him to open and manage a new office in Tijuana, Mexico. This presented another challenge, but Markiewicz succeeded, was named Vice President of Engineering, and ran the office while commuting over the U.S.-Mexico border each day.

"This job was a positive for me because it forced me to learn and do new things," Markiewicz says.

Eighteen years later he returned to New York and worked for Independent Steel, Acme Steel and now Long Island Fireproof Door, which is now part of Unified Door & Hardware Group.

Over the years Markiewicz has seen many changes in the industry, moving from smaller specialized companies into larger entities that now provide more integrated services.

His belief in humility has led him along the way to always ask questions, which is how he learned the business in an era when training was not as prevalent as it is today.

"People are afraid to ask questions because they feel if they do so, management will think they are not knowledgeable and they will get fired," Markiewicz says. "But in this business, you have to ask. When I trained people I always encouraged them to ask questions. It makes me more confident that if there is an issue my team member will ask about it. Every question is important and you can't discourage that because sometimes it may be very valuable for the company"

He also believes in giving employees the flexibility to succeed.

"At Security Metal Products, I gave members of my team the freedom to operate, express their opinion—and soon we went from delivering 1,000 doors to 3,000 doors," Markiewicz recalls. "If you give people space and an open mind, they'll produce for you and they will be more eager to step up and help you. But if you try to control them by feeding them negative criticism without explanation, they will not cooperate with you when their opinions or services would be required; they will not step up for the task because they will be afraid to be put down." +

PHOTOS COURTESY OF BEN MARKIEWICZ

CONGRATULATIONS!

The following door security + safety professionals recently received DHI credentials, certifications and certificates.

(List current as of July 1, 2023)

DOOR + HARDWARE CONSULTANT (DHC)

This certified consultant has advanced product and code application knowledge and expertise, and skills proficient to detail, estimate and project manage large and complex projects and existing facility renovations. They are qualified to provide technical consultation to architects, contractors and building owners on the most complex building projects, but do not provide specification writing services.

Joe Graves, DHC, DHT
Midwest D-Vision Solutions

DOOR + HARDWARE TECHNICIAN (DHT)

This credential is earned by demonstrating the competence to provide product and code application, detailing, estimating, and project management skills on projects with an intermediate level of complexity of occupancy type. This is the first level of technical credential earned for technical competence to assist contractors and building owners with basic construction project issues.

Alexander Boren, DHT
Arconic Kawneer Inc.

Ryan Casement, DHT
Alpine Lock and Safe, Ltd.

Christopher John Eaton, DHT, CFDAI
Allmar

Vishal Kachchhi, DHT
Knell's Door & Hardware

Bryan McDougall, DHT
CP Distributors, Ltd.

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Spalding

Spencer W. Nelson, AHC, DHT
ASSA ABLOY Americas

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Nathalie Saumur, DHT
Quincaillerie Capsol

Steven R. Schwab, DHT
William S. Trimble Co., Inc.

Nina Starkova, DHT
CP Distributors, Ltd.

Kevin Torres, DHT
AccessSMT Holdings Ltd.

Kevin Zeiger, DHT
Knell's Door & Hardware

For more information on DHI education, certifications, credentials and certificates, contact *education@dhi.org*.

DOOR + HARDWARE INDUSTRY ASSOCIATE (DHIA)

The DHIA certificate recognizes individuals who have achieved a basic technical understanding of product and code applications. Recipients have completed two online, self-paced classes and passed the exams.

James Alexander A Stewart
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AccessSMT Holdings Ltd.

Ivan Gonzalez

Hunter Graves
National Custom Hollow Metal

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CAN AI HELP DISTRIBUTORS BECOME MORE EFFICIENT?

JASON BADER is Principal of The Distribution Team. He is a holistic distribution adviser who is passionate about helping business owners solve challenges, generate wealth and achieve personal goals. His podcast, "Distribution Talk," can be found at *www.distributiontalk.com* and through most podcast applications.
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SINCE CHAT GPT AND OTHER ARTIFICIAL INTELLIGENCE (AI) TOOLS CAME ON THE SCENE, I'VE BEEN FASCINATED WITH THEIR POTENTIAL USE IN DISTRIBUTION. IN FACT, I'M IN AWE AT THE POTENTIAL. I HAVE THE ABILITY TO SEE SOME LOGICAL APPLICATIONS, BUT I STILL FEEL LIKE MY EXPERIMENTS AND QUERIES ARE JUST THE TIP OF THE ICEBERG.

You might be thinking, "AI? Isn't that the thing that's going to steal our jobs and take over the world?"

Not exactly. I believe AI tools can be incredibly useful in wholesale distribution. We just have to be willing to get past the fear and find our curiosity.

WHAT IS AI?

Let's define what we mean by AI tools. AI is the simulation of human intelligence in machines that are programmed to think and learn like humans. In the context of wholesale distribution, AI tools are software programs that use machine learning algorithms to analyze data and make predictions or recommendations.

Regardless of what media might have you believe, this is not an overnight phenomenon. A number of companies have been building tools using machine learning for the past few years.

INVENTORY MANAGEMENT

One area where AI tools can be particularly helpful is inventory management. By analyzing sales data, customer demand and other factors, AI tools can predict which products are likely to sell well and which ones risk becoming obsolete. This can help distributors optimize their inventory levels and avoid overstocking or understocking.

PRICING

Another area where AI tools can be useful is in pricing optimization. By analyzing market data and customer behavior, AI tools can help distributors set prices that are competitive and profitable. For example, they can analyze customer purchase histories to identify patterns and trends. Then AI tools use that information to recommend pricing strategies that are likely to be effective.

CUSTOMER SERVICE

These tools can also be used to improve customer service. By analyzing customer data, AI can identify patterns and trends in customer behavior and preferences. Distributors can effectively personalize their interactions with customers. For example, they can use chatbots to provide customers with quick and helpful answers to common questions. Distributors can use predictive analytics to anticipate customer needs and offer targeted promotions.

Some of the items on our shelves are the best kept secret to our longest-standing customers. We've evolved, but forgot to spread the word. AI powered customer relationship management solutions can help sales people suggest items that fit specific customer profiles.

MARKETING

When it comes to marketing, AI tools can be particularly useful in analyzing customer data to identify patterns and trends. For example, they can analyze social media activity and website traffic to identify which products or services are generating the most interest, and then use that information to recommend targeted marketing campaigns.

With the help of AI tools, you can analyze customer data to identify which customers are most likely to be interested based on factors like age, location and previous purchase history. You can then use that information to target those customers with personalized marketing messages.

You want to make sure your marketing materials are up to date and visually appealing. With the help of AI tools, you can analyze customer preferences and behaviors to identify which design elements and messaging strategies are most effective. Then you can use that information to create marketing materials that really resonate with your target audience.

ENDLESS POTENTIAL

Like any technology, AI tools are not a magic bullet. They require careful implementation and ongoing maintenance to ensure they're effective.

As with any technology, it's important to remember that AI tools are only as good as the data they are fed. If the data is inaccurate or incomplete, the AI tool's predictions and recommendations will be similarly flawed.

This emerging technology has the potential to revolutionize the wholesale distribution industry. It can help distributors make more informed decisions, streamline operations, identify new markets and provide better service to customers. And, hey—if it does lead to a robot uprising, at least we can say we were ahead of the curve.

The most important thing is to be curious. No one can tell you exactly how these tools will fit in your business. Experiment and have some fun with this technology. Test the boundaries and work smarter, not harder. Find the balance between what can only be accomplished by the human mind and what would be better left to the machines.

Before I let you go, ask yourself one question. Did Bader write this, or did he leave it in the hands of an AI bot? The world may never know.

Remain curious and seek more information when needed. +

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ARON FLEISCHMANN OF NATIONAL GUARD PRODUCTS SPEAKS TO DHI BUCKEYE CHAPTER

Aron Fleischmann, Director, Product Management and Design at National Guard Products, spoke to the DHI Buckeye Chapter in June.

He spoke about how to solve door problems in the field while complying with fire door assembly codes. Fleischmann has taught many classes on this topic across the United States, with many focused in the health care industry.

DHI Buckeye Chapter President Gary Link presented Fleishmann with an Award of Excellence for outstanding service in continuing education to the DHI Buckeye Chapter.

National Guard Products also covered the cost of the event.

Aron Fleishmann (left) receiving an Award of Excellence from DHI Buckeye Chapter President Gary Link.

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Contact info@doorsecuritysafety.org to learn more about the DSSF Ambassador Program. It takes all of us to make a difference.

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EARN YOUR DHIA:

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Refreshed and updated!

The Fundamentals of Opening Assemblies and Related Codes Bundle — *Now With Improved Features!*

DHI has refreshed its COR101 and COR102 self-study courses with needed changes, from improved imagery and narration to a cleaner, sleeker look that will aid you in the learning process.

New to the industry? Make the most of these refreshed resources:

- COR101 – *Fundamentals of Architectural Doors and Hardware – 12 lessons / approx. 30 hours*
- COR102 – *Introduction to Building Codes – approx. 8 hours*

PRICE: $250

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VISIT WWW.DHI.ORG FOR DETAILS.

CHALLENGE OF THE DECADE: PART TWO

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IN THE LAST ISSUE, WE EXPLORED THE BIGGEST INDUSTRY CHALLENGE OF THE DECADE–THE LACK OF SKILLED AND EXPERIENCED PERSONNEL.

As we travel around North America and speak to distributors and subcontractors, at least nine out of 10 companies cite this as their biggest challenge.

ON-THE-JOB TRAINING

The most common approach to this issue is on-the-job training. This may or may not be the answer to developing competent fabricators and installers, as well as other support personnel.

For example, experienced installers are not always good trainers. In some cases, they don't feel training is part of their job description. Others may not want to engage in training because they feel they could be supporting their replacement. As a result, they don't do it.

SEE FOR YOURSELF

Consider this: What a fabricator or installer does is highly visible to the public. They have an inherent sense of pride in showing their family and friends the completed project. We need to promote this idea to the industry's next generation.

CO-OP PROGRAMS

Co-op programs (or intern programs) have been tried over the years with a considerable degree of success. A co-op with local high schools will help identify and attract interested and capable young people to this industry.

ATTRACTING AND RETAINING EMPLOYEES

Attracting and retaining quality employees has been noted time and again as a key challenge. Luckily, DHI offers a number of resources that allow you to grow a skilled workforce.

The Door + Hardware Industry Associate (DHIA) certificate is the first step of DHI's new credential and certification program. It recognizes individuals working in a variety of positions in our industry who have achieved a basic technical understanding of product and code applications.

To obtain the DHIA certificate, recipients must have completed COR101 – Fundamentals of Architectural Doors and Hardware and COR102 – Introduction to Codes and Standards, and passed the exams.

There is also a higher level of certification, as well as dozens of online DHI courses and continuing education initiatives available to members.

Companies that hire and retain good employees find it usually takes two to four years for an employee to advance from entry level to a fully performing employee. However, it's time and money well spent that translates into success.

We've assisted many clients not large enough to have a training department to develop training templates. It's a relatively easy way to make sure that training gets done on a consistent basis. Training templates also make it possible for you to avoid reinventing the wheel whenever you hire a new employee. It's available for the asking, just reach out to us at the emails listed in the left column. +

Door Security & Safety Foundation

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(UP TO $2,000)

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DHI Iowa Chapter

DECLINE IN INSTITUTIONAL PLANNING DROPS DODGE MOMENTUM INDEX DOWN 3% IN JUNE

THE DODGE MOMENTUM INDEX (DMI), ISSUED BY DODGE CONSTRUCTION NETWORK, DECLINED 2.5% IN JUNE TO 197.3 (2000=100) FROM THE REVISED MAY READING OF 202.4.

Over the month, the commercial component of the DMI rose 3.1%, while the institutional component sunk 10.5%.

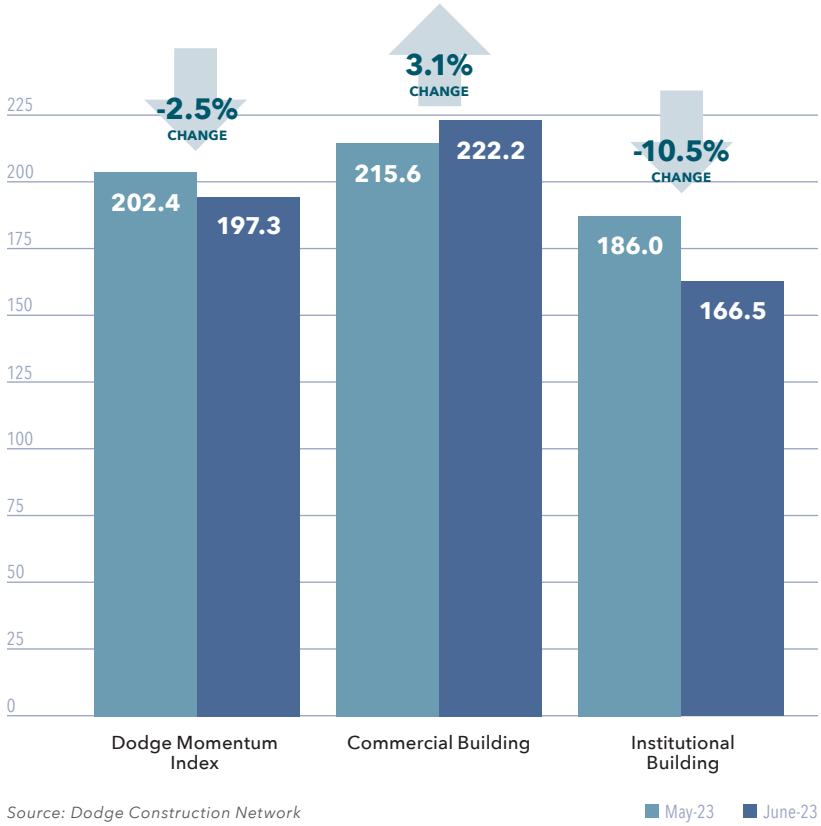
"A deceleration in institutional planning caused the Momentum Index to decrease in June," said Sarah Martin, Associate Director of Forecasting for Dodge Construction Network. "Project activity in this segment pulled back from the robust highs of the last three months but continued to dwarf year-ago levels. In contrast, growth in the commercial segment may be fleeting, as the continued elevation in interest rates and increasingly tight lending standards weigh down the sector in the latter half of the year."

Commercial planning in June remained afloat alongside an uptick in data center and hotel planning projects. Institutional planning, on the other hand, was driven lower by a decrease in education and health care activity. Year over year, the DMI remains 25% higher than in June 2022. The commercial and institutional components were up 17% and 39% respectively.

The DMI is a monthly measure of the initial report for nonresidential building projects in planning, shown to lead construction spending for nonresidential buildings by a full year.

DODGE MOMENTUM INDEX

(2000=100, Seasonally Adjusted)



Source: Dodge Construction Network

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