

DeCoded *Codes for Electrified Hardware*

Lori Greene, AHC/CDC,
CCPR, FDAI, FDHI



Flexible | Convenient | Affordable

Welcome!

Notes about today's webinar...

- 4th in DHI Webinar series
 - Recording of first three *Decoded* webinars available
 - On DHInteractiv in Members Only
 - Handout for today's webinar available now
- 1 hr. 15 min. presentation
- 15 min. Q & A at the end
 - Submit questions via Chat/Question box
- All attendees muted



Welcome!

Notes about today's webinar...

- 5 DHI CEP pts. are available for each 1 ½ hr. webinar.
- A recording of today's webinar will be available on DHInteractiv for members
 - Handouts and additional information available now
 - Notified via email when recording is available
 - Go to **DHInteractive**
 - Click on **Membership** on top left
 - Click on **Members Only**

Session 4 – Electrified Hardware

- Electric Latch Retraction
- Access-Controlled Egress Doors (2015 IBC: Sensor Release of Electrically Locked Egress Doors)
- Electromagnetically Locked Egress Doors (NFPA 101: Electrically Controlled Egress Door Assemblies)
- Delayed Egress Locks
- Elevator Lobbies
- I-2 Special Egress Locks
- Stairwell Reentry

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Session 4 – Electrified Hardware

- Electric Latch Retraction Panic Hardware
- Electromagnetic Lock
- Fail Safe Lock or Panic Hardware Trim
- Fail Secure Lock or Panic Hardware Trim
- Fail Safe or Fail Secure Electric Strike
- Delayed Egress Lock
- Alarm

Fail Safe vs. Fail Secure

Electrified Locks and Electrified Exit Device Trim

- Fail Safe
 - When power fails, access-side lever is unlocked.
 - Lock is latched.
- Fail Secure
 - When power fails, access-side lever is locked.
 - Lock is latched.
- Both types typically allow free egress.



Fail Safe vs. Fail Secure Electric Strikes

- Fail Safe
 - When power fails, keeper is free.
 - Latch can be pulled through keeper.
- Fail Secure
 - When power fails, keeper is secure.
 - Latch is captured behind keeper.
- Both types typically allow free egress.
- Electric strikes used on fire doors must be fail secure.





*

Door #101

Fine Dining

- Existing kitchen
- Need new doors due to 20-minute fire rating
- Restaurant manager does not want doors to latch because of the noise and inconvenience
- No locking required
- One door will swing into kitchen, one door will swing out
- Which code-compliant product should we use to provide positive latching?



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Electric Latch Retraction Fire Exit Hardware
Electromagnetic Lock
Fail Safe Lock or Panic Hardware Trim
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Electric Latch Retraction Fire Exit Hardware

Electric Latch Retraction Panic Hardware / Fire Exit Hardware

- Latch can be held retracted electrically.
- Must project upon fire alarm for fire rated doors so doors are latched to deter smoke and flames - refer to NFPA 80.
- EL/QEL may also be used to release latch for automatic doors (latch may be held back indefinitely and only projected on fire alarm).



Coordinate auto operator actuators with the access control system!



What's wrong with this picture?





Electric Latch Retraction

Apply Power –
Latch Retracts

Remove Power –
Latch Projects

Fire alarm can
initiate latching.



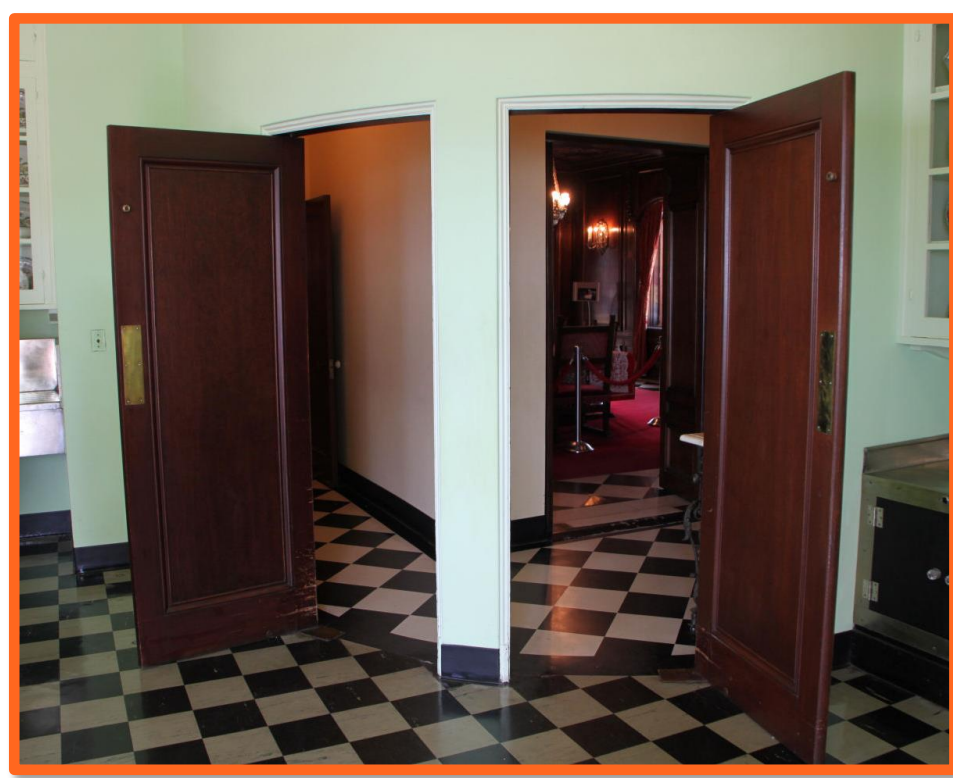




Door #101

Fine Dining

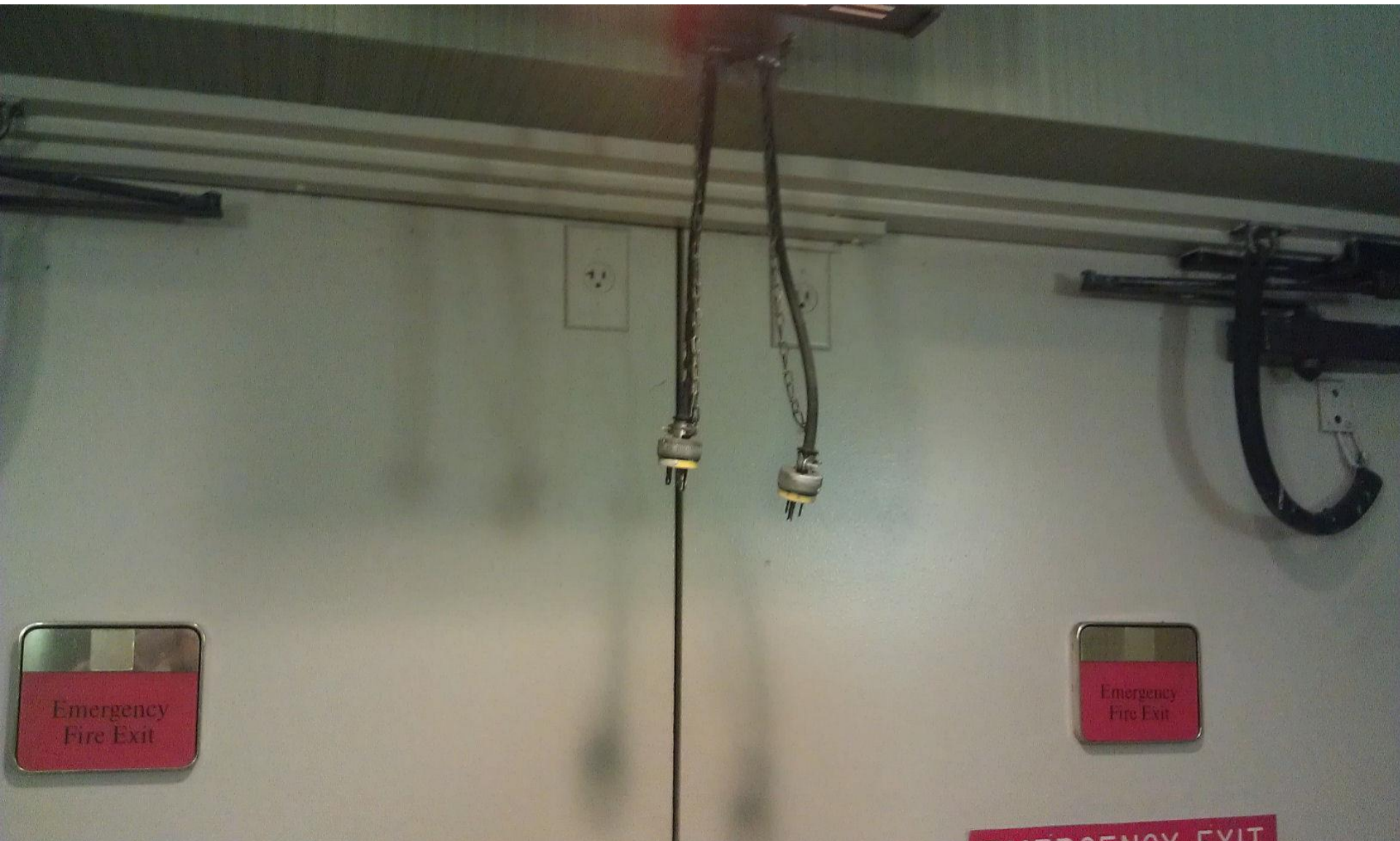
- Existing kitchen
- Need new doors
- Fire Rating: 20 minutes
- Restaurant manager does not want doors to latch because of the noise
- One door will swing into kitchen, one door will swing out
- 4 components for a circuit – load, switch, power supply, and conductors



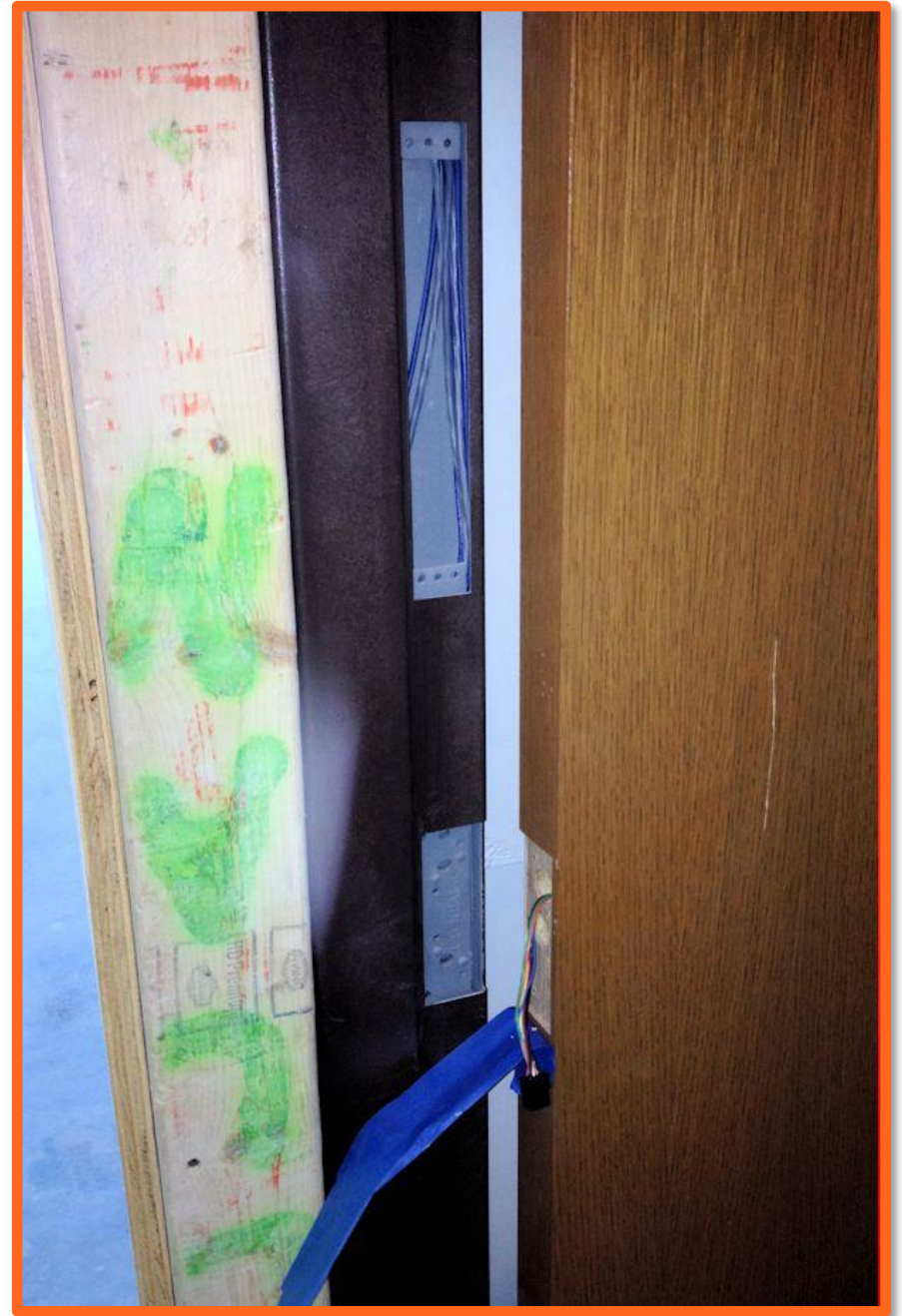
Don't forget your conductors...



Don't forget your conductors...



And the
coordination...



Door #102

All Glass

- Existing glass door – no stiles or rails
- Access control system will lock/unlock door on a time schedule
- Free egress is required



- Which code-compliant product should we use?

Door #102

All Glass

- Existing glass door – no stiles or rails
- Access control system will lock/unlock door on a time schedule
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Door #102

All Glass

- Existing glass door – no stiles or rails
- Access control system will lock/unlock door on a time schedule
- Free egress is required



Electromagnetic Lock

Access-Controlled Egress Doors

- Used to control and monitor access.
- Must also provide life safety.
- Typically an electro-magnetic lock, access control device, and required release devices.
- A door with a powerbolt may also be considered an Access-Controlled Egress Door



Not all doors with access control are Access-Controlled Egress Doors!

- Controlled Access / Free Egress – hardware allows egress independent of access control system
- Delayed Egress – 15-second delay
- Stairwell Reentry – fail-safe lock
- I-2 (Hospitals / Nursing Homes) – fail-safe lock
- Elevator Lobby (NFPA 101 only) – fail-safe lock
- Electromagnetically Locked Egress Door – mag-lock with door-mounted release
- Access Controlled Egress Door – mag-lock with motion sensor release

Access-Controlled Egress Doors

Now called Sensor Release of Electrically Locked Egress Doors in the 2015 IBC!

- Entrance doors & tenant entrance doors
- IBC Groups A, B, E, I-2, M, R-1 or R-2 (2015: A, B, E, I-1, I-2, I-4, M, R-1 or R-2)
- NFPA 101 – where allowed by occupancy chapter
- A sensor unlocks the lock.
- Power loss to lock unlocks the door.
- Manual release device (with sign) unlocks door for 30 seconds, independent of access control system.
- Actuation of fire/sprinkler system (if provided) unlocks door.

EXIT



**STAIR
1**

**DOOR LOCKED
CARD ACCESS ONLY
IN EMERGENCY
LIFT COVER
PUSH BUTTON**

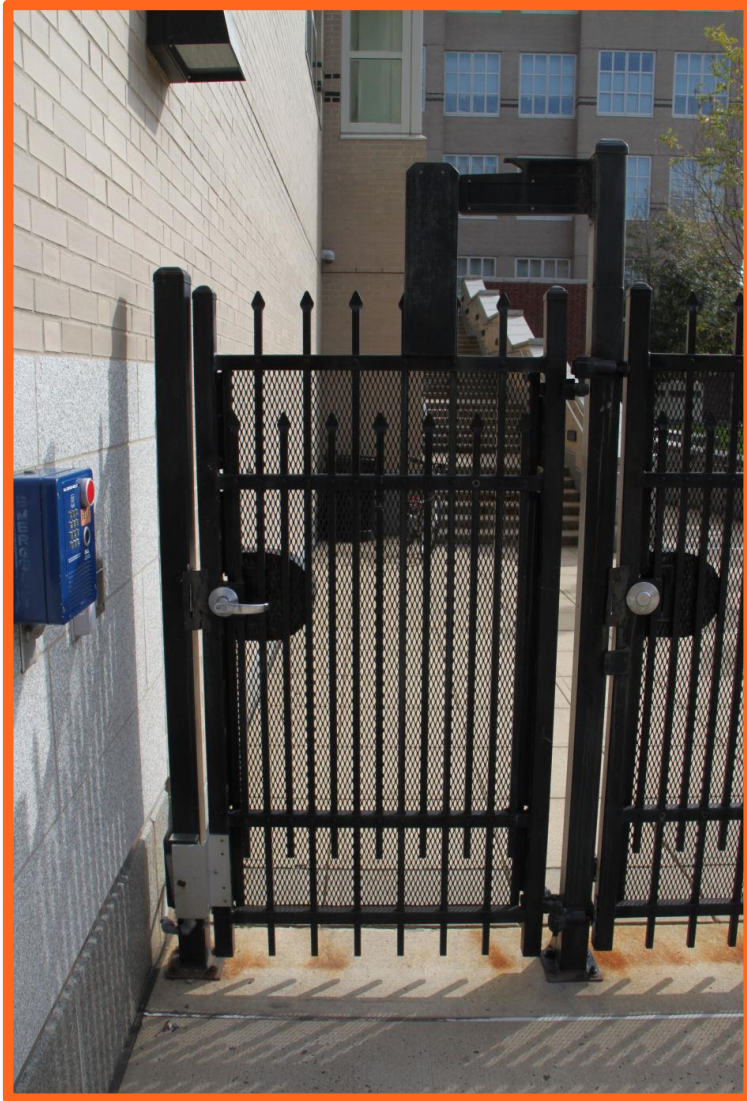
**Please Close
Door Behind
You**

99
HIGH
RISER





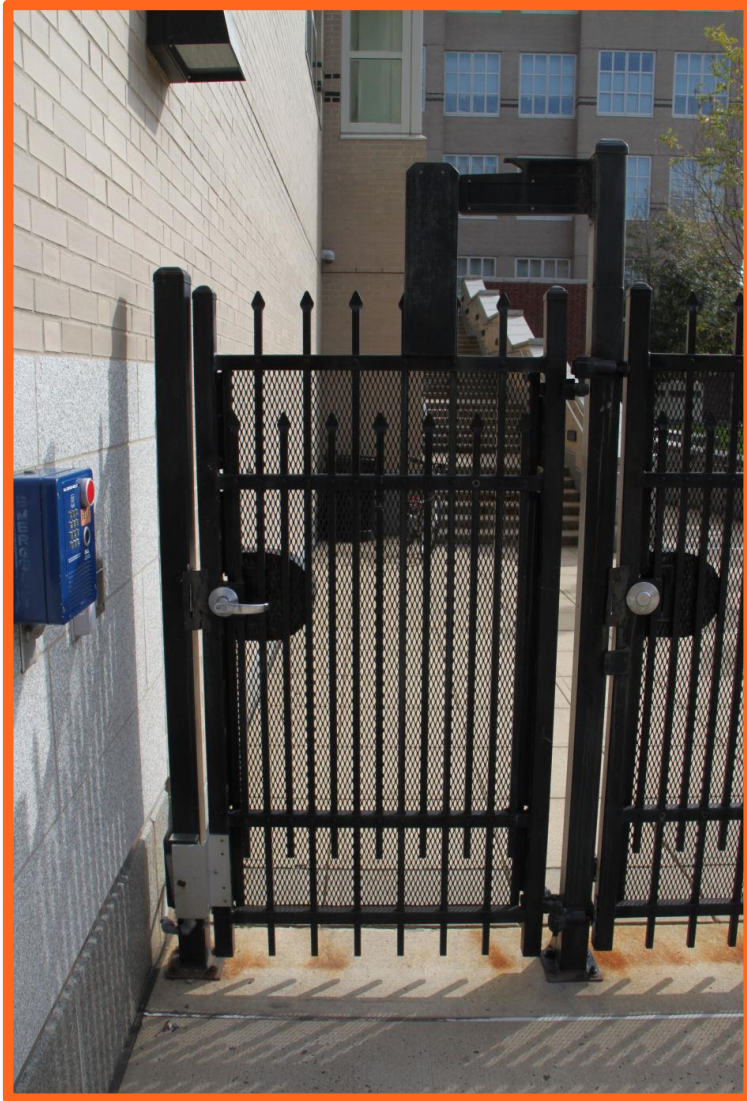
Mag-Locks can be an option for gates, but you may need a variance for the release devices.



TJ Bracket



With gates, you also need to think about conductors, closers, and access to hardware.







Is battery backup allowed?

- Codes require mag-locks to unlock upon loss of power, but “loss of power” is not defined.
- Is this loss of normal building power?
- Can the lock be powered by the emergency generator along with the rest of the building?
- NFPA 72 Interpretation - if the fire alarm system and mag-locks are on the same back-up power, this would meet the intent of the code.
- Do not specify separate battery back-up in the power supply for the locks.

Door #103

No Sensor

- The owner wants a mag-lock and card reader.
- A motion sensor won't work because it will be accidentally actuated by the room's occupants.
- Door has very narrow stiles.
- Free egress is required.
- What's the best option?



Electric Latch Retraction Panic Hardware
Electromagnetic Lock
Fail Safe Lock or Panic Hardware Trim
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Delayed Egress Lock
Alarm

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Electromagnetic Lock

Mag-Lock with Door-Mounted Release (RX Switch)

- 2009/2012/2015 editions of NFPA 101: Electrically Controlled Egress Door Assemblies
- 2009/2012/2015 editions of IBC: Electromagnetically Locked Egress Doors



Mag-Lock with Door-Mounted Release (RX Switch)

- Release device affixed to door leaf
- Obvious means of operation in direction of egress
- Operable with one hand
- Interrupts power supply and unlocks door
- Loss of power unlocks door
- No requirement for fire alarm release.



Direct-Hold Mag-Locks vs Shear Locks







LISTED
US 2559

AUXILIARY LOCKS

TESTED IN ACCORDANCE
WITH UL 10C



Interlocks (AKA man-traps), which often involve maglocks, are not addressed in the IBC or NFPA 101.





Door #104

Library Egress

- Library emergency exit
- Librarian wants to lock the door and only allow egress if there is a fire alarm.
- Code is **NFPA 101**
- Given that we're using NFPA 101, what's the best product application?



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- Given that we're using NFPA 101, what's the best product application?



Delayed Egress Lock

Delayed Egress Devices



Delayed Egress

- Designed to delay egress to prevent unauthorized use of the door.
- Must allow egress for life safety.
- Typically a delayed egress exit device or magnetic lock with delayed egress controller.



Delayed Egress Locks (NFPA 101)

- Approved, listed, delayed egress locks
- Must be allowed by occupancy chapter
- Automatic sprinkler system or smoke/heat detection
- Quantity of delays per egress path varies by occupancy
- Immediate release by fire alarm, smoke detection system, or power failure
- Capability of releasing from fire command center
- 15 lbs. applied for 3 seconds begins 15-second timer (30-second if approved by AHJ)
- Audible local alarm
- Manual rearm
- Signage - “Push until alarm sounds. Door can be opened in 15 seconds.” (+ additional requirements)

Delayed Egress Locks (NFPA 101)

- Some occupancy chapters have restrictions on the use of delayed egress locks:
- For example:
 - New and Existing Assembly Occupancies: *Delayed-egress locks complying with 7.2.1.6.1 shall be permitted on doors other than main entrance/exit doors.*
 - Lodging or Rooming Houses: *Delayed-egress locks complying with 7.2.1.6.1 shall be permitted, provided that not more than one such device is located in any one escape path.*
 - New and Existing Residential Board and Care Occupancies: *Delayed-egress locks complying with 7.2.1.6.1 shall be permitted on exterior doors only.*





EMERGENCY EXIT ONLY
PICK UP PHONE FOR EMERGENCY EXIT

Not OK!



 **KEEP PUSHING**
THIS DOOR WILL
OPEN IN 15 SECONDS
ALARM WILL SOUND

EMERGENCY EXIT ONLY
→ EXIT THROUGH
MAIN LOBBY



Push until alarm sounds.
Door can be opened in 15 seconds.

 **KEEP PUSHING**
THIS DOOR W
OPEN IN 15 SECONDS
ALARM WILL SO

EMERGENCY EXIT ONLY
→ EXIT THROUGH
MAIN LOBBY



Push until alarm sounds.
Door can be opened in 15 seconds.

NOT AN EXIT
Alarm will
sound

EXIT
→

**PUSH UNTIL ALARM SOUNDS
DOOR CAN BE OPENED
IN 15 MINUTES**

Door #104

Library Egress

- Library emergency exit
- Librarian wants to lock door and only allow egress if there is a fire alarm.
- ~~Code is NFPA 101~~
- **Code is the IBC.**



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- Librarian wants to lock door and only allow egress if there is a fire alarm.
- ~~Code is NFPA 101~~
- Code is the IBC.



Alarm

Delayed Egress (IBC)

- Allowed in all occupancies except Assembly, Educational, and High Hazard
- One delay before entering an exit
- 15 lbs. applied for **1 second** (2012 and prior) or **3 seconds** (2015) begins 15-second timer (30-second if approved by AHJ)
- BOCA option (automatic rearm) is not required for IBC compliance.

DECODED:

Delayed Egress Hardware—Code Comparison



From the well-known blog idighardware.com, Lori Greene brings some much-needed clarity to codes.

Delayed egress hardware prevents a door from being opened from the egress side, usually for a period of 15 seconds. This type of device is often used to prevent theft while maintaining life safety. The system is most commonly comprised of a smart device, incorporating delayed egress features, or an electronic panic lock and power supply, one of which contains delayed egress circuitry. When the device is activated, the door remains locked on the egress side for 15 seconds and then releases to allow egress.

Before specifying or supplying delayed egress hardware, you must verify that it is allowed to be used in the applicable occupancy classification, and be aware of the other code requirements that pertain to the use of this product. The requirements vary depending on whether you are referring to the International Building Code (IBC) or NFPA 101, The Life Safety Code. There may be additional local requirements as well.

NFPA 101 allows the use of delayed egress hardware in all occupancy types (low or ordinary hazard), with some conditions that must be met if it is used (see Table 2). Conversely, the IBC does not allow the use of delayed egress hardware on doors serving assembly, educational, or high hazard occupancies. This means that for jurisdictions enforcing the IBC, delayed egress hardware is not allowed in schools or in assembly occupancies like libraries, which would otherwise be prime locations for this type of hardware. In this case, a local alarm can be used to deter use of the door, but no delay would be allowed by code. A variance may be granted for certain types of assembly occupancies, such as museums, but the process for obtaining the variance must be followed and documented.

Refer to the following tables for the requirements pertaining to delayed egress hardware, and note the subtle differences between codes. When specifying or supplying delayed egress hardware, verify which code and edition are to be used and the occupancy classification of the project, then apply the appropriate requirements to ensure that your installation is code-compliant.

46 **DOORS & HARDWARE** ■ JANUARY 2013

Sometimes an alarm is the most secure solution you can offer.



FIRE EXIT ONLY

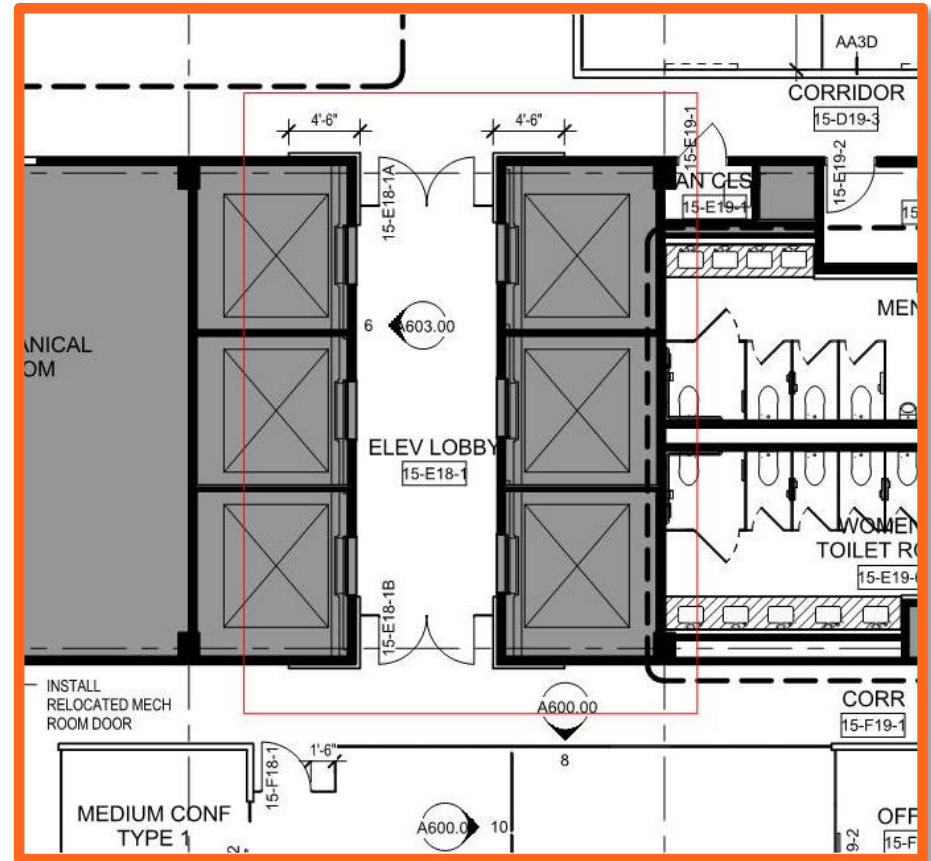


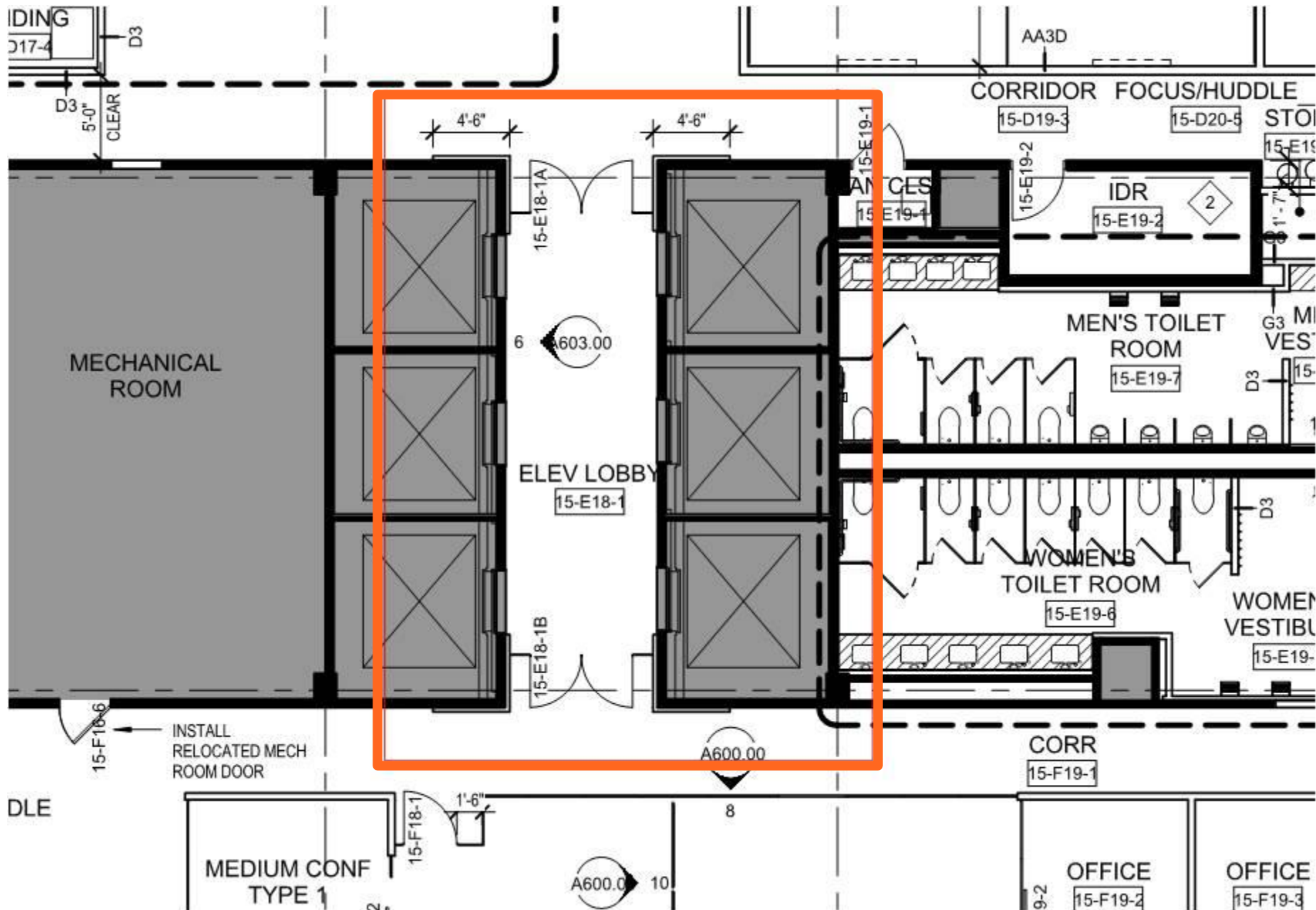


Door #105

Elevator Lobby

- Means of egress from the elevator lobby is through the tenant space

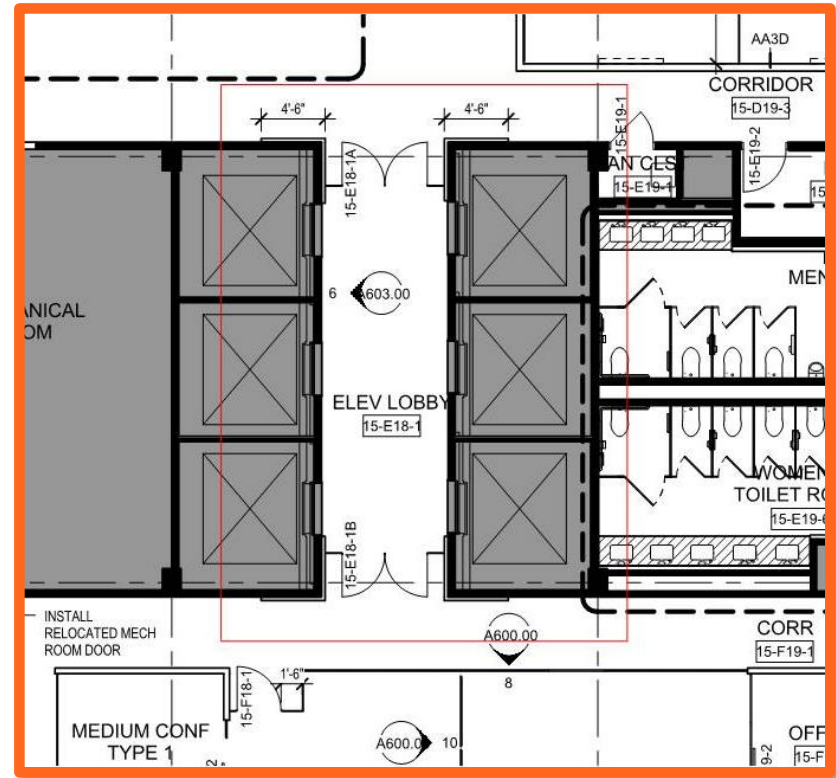




Door #105

Elevator Lobby

- Means of egress from the elevator lobby is through the tenant space
- How can you provide security from the elevator lobby into the tenant space?



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Elevator Lobby Egress

- **IBC:** *“Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.”*
- **NFPA 101 (2009/12/15):** *Elevator Lobby Exit Access Door Assemblies Locking.*
 - Fail safe lock – unlocks on fire alarm and power failure (battery backup not allowed)
 - Must be allowed by occupancy chapter
 - Switch listed per UL 294 Access Control System Units
 - Two-way communication system in elevator lobby
- *Some state codes also have modifications for elevator lobby doors.*

Door #106

Memory Care Unit

- What product can you offer to allow the hospital to secure the doors on the egress side if the code is the 2009 IBC or 2009 NFPA 101 (or later)?



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Door #106

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Electromagnetic Lock
Fail Safe Lock or Panic Hardware Trim

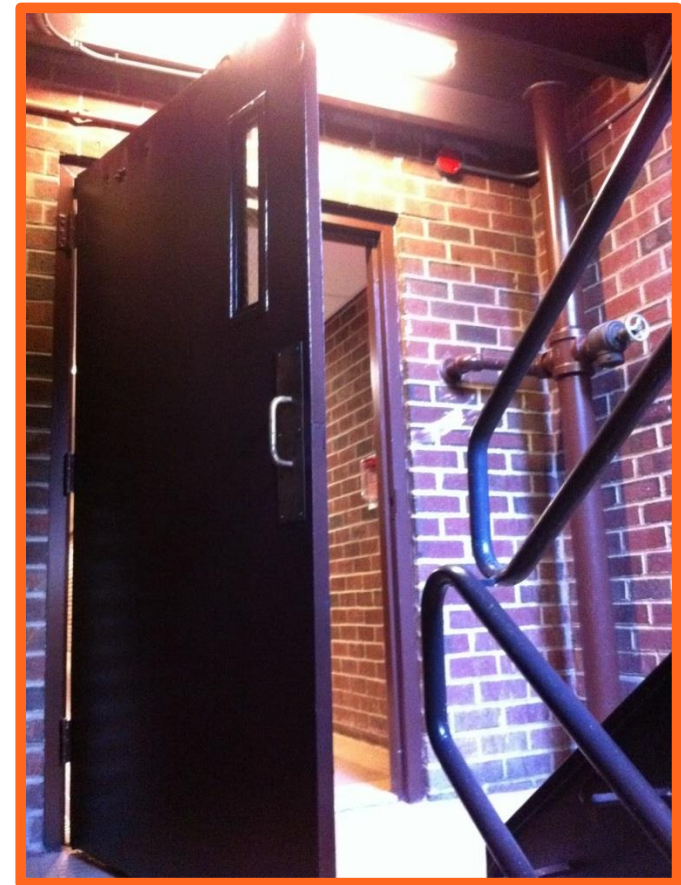
[Modified] Delayed Egress Lock

I-2 Special Egress / Controlled Egress Locks

- Must have fire protection/detection system
- Doors unlock upon activation of sprinkler/fire alarm and loss of power controlling lock
- Capability of remote unlock
- One special egress lock max. before entering an exit
- Procedures must be part of emergency planning and preparedness
- All clinical staff carry keys/code/credentials to operate locks
- Emergency lighting at the door
- Protective needs (maternity, pediatrics, emergency, dementia) vs. security measures (detention, forensics)

Door #107 Stair Door

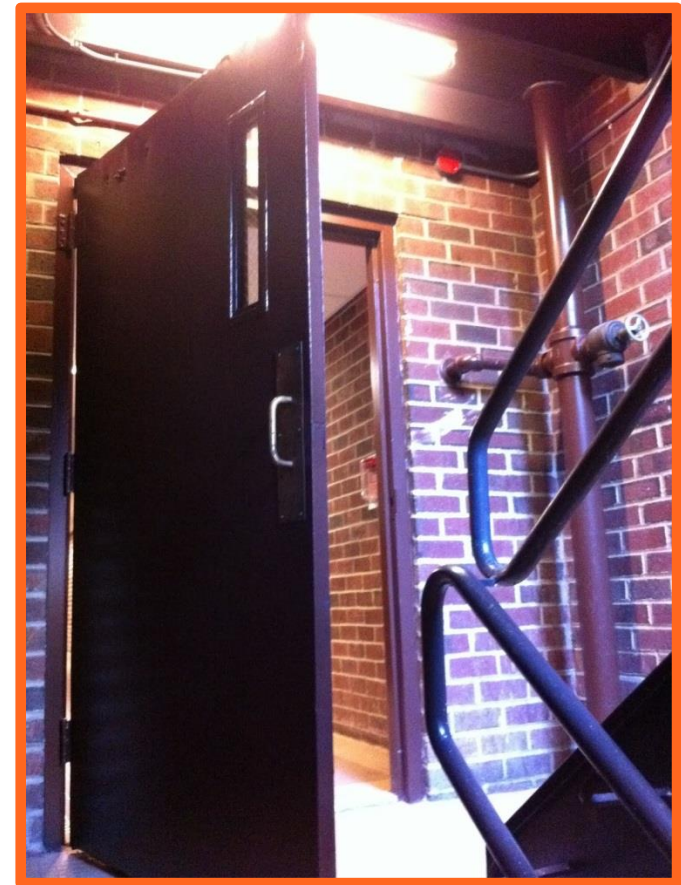
- Replacing existing stair doors
 - High-rise building
 - Multi-tenant
 - Card readers on stair side
 - Code is the IBC
-
- We need a product that meets requirements for fire door assemblies and stairwell reentry.



Electric Latch Retraction Panic Hardware
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Door #107 Stair Door

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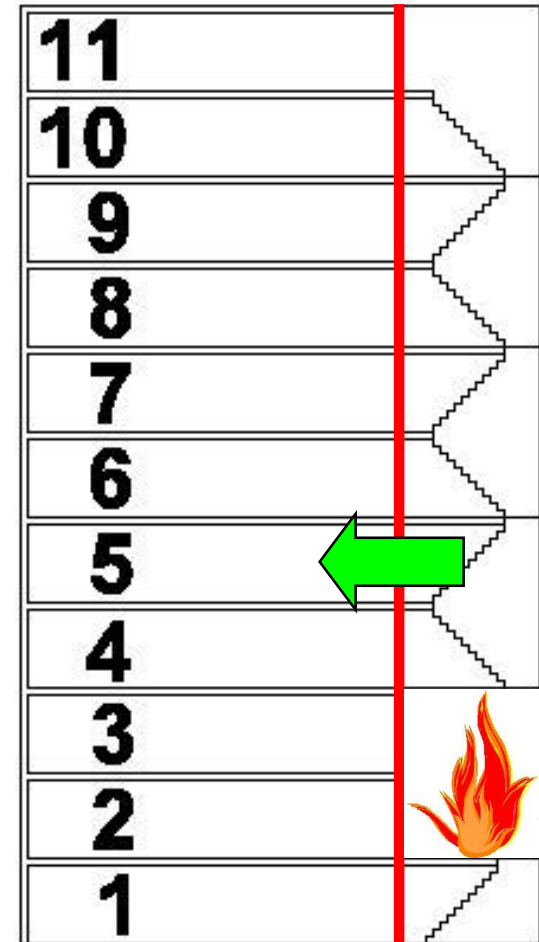
Electromagnetic Lock
Fail Safe Lock or Panic Hardware Trim





Stairwell Reentry

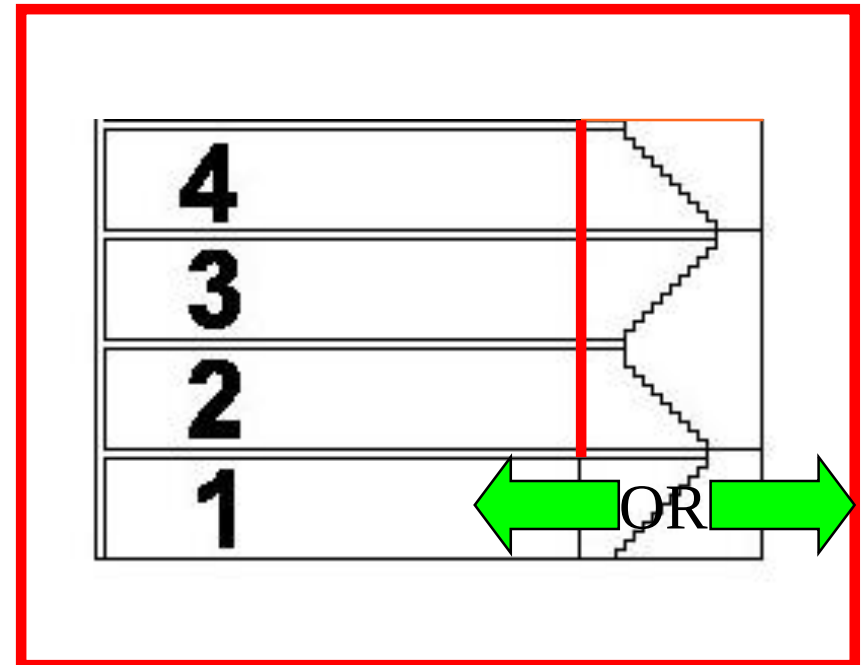
- Stairwell doors are often locked to prevent entry to restricted floors.
- During a fire, occupants must be able to move from the stairwell onto floors through doors that are normally locked.



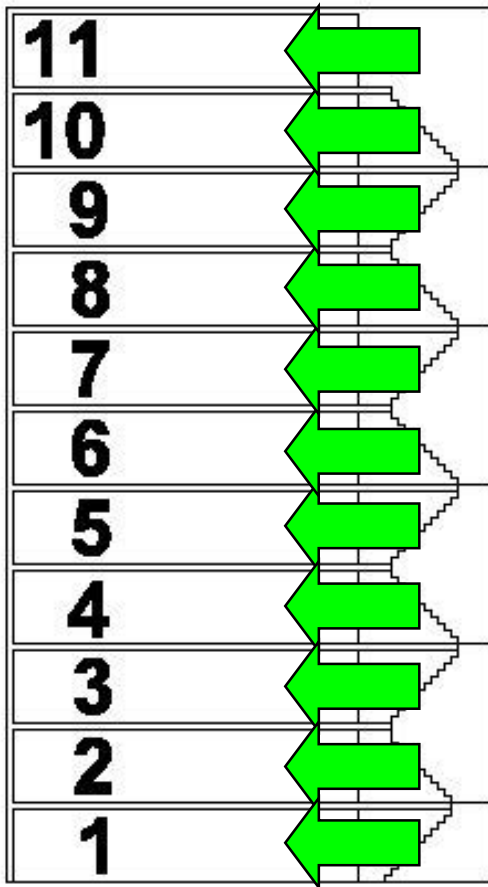
Stairway Doors - IBC

- Stairway discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
- Interior stairway means of egress doors must be openable from both sides without a key or special knowledge or effort (passage sets), or
- In high-rise buildings:
 - Stair doors must be unlocked without unlatching by a signal from the fire command center
 - Stairway communication system required
- Stairs serving 4 stories or less...

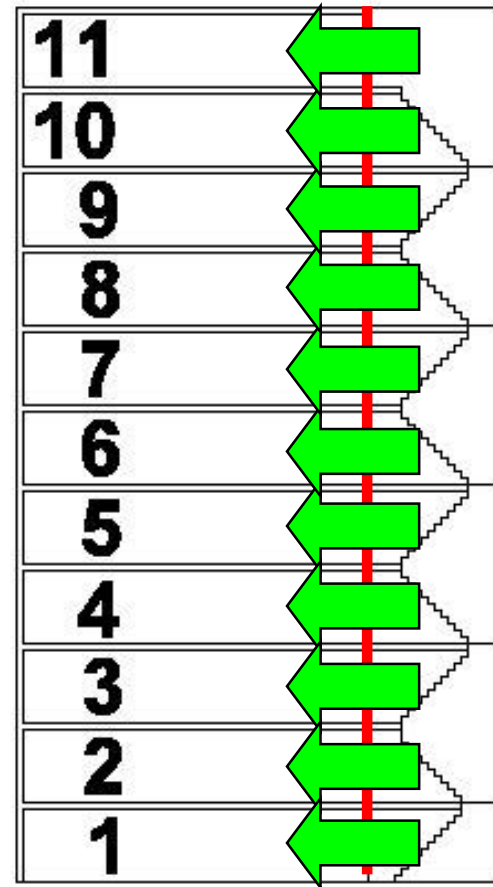
- The 2003 edition of the IBC allowed stairs serving not more than four stories to have mechanical locksets on the stair side of doors other than the stair discharge.
- Later editions require fail safe locks controlled remotely, even on stairs serving 4 stories or less.



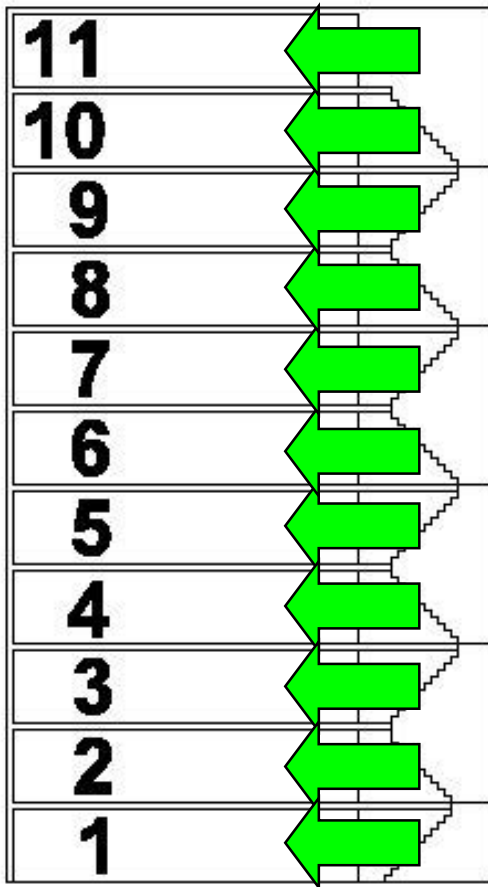
Free Access



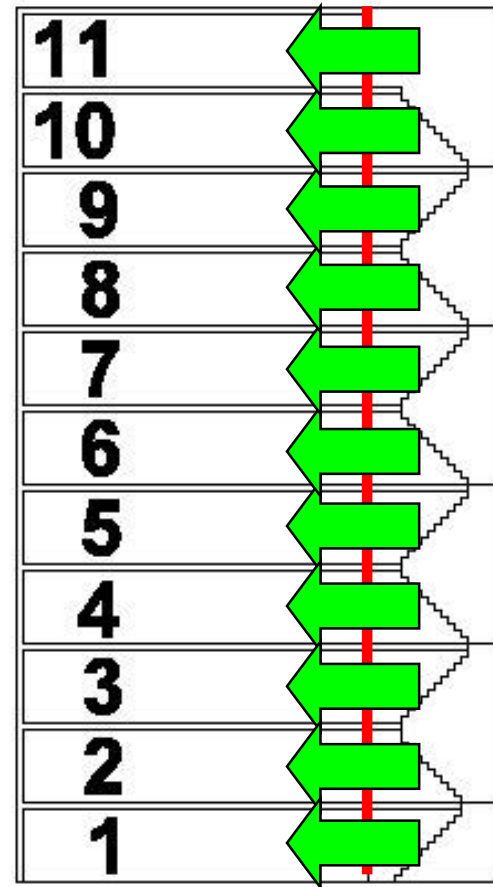
Unlock on Fire Alarm



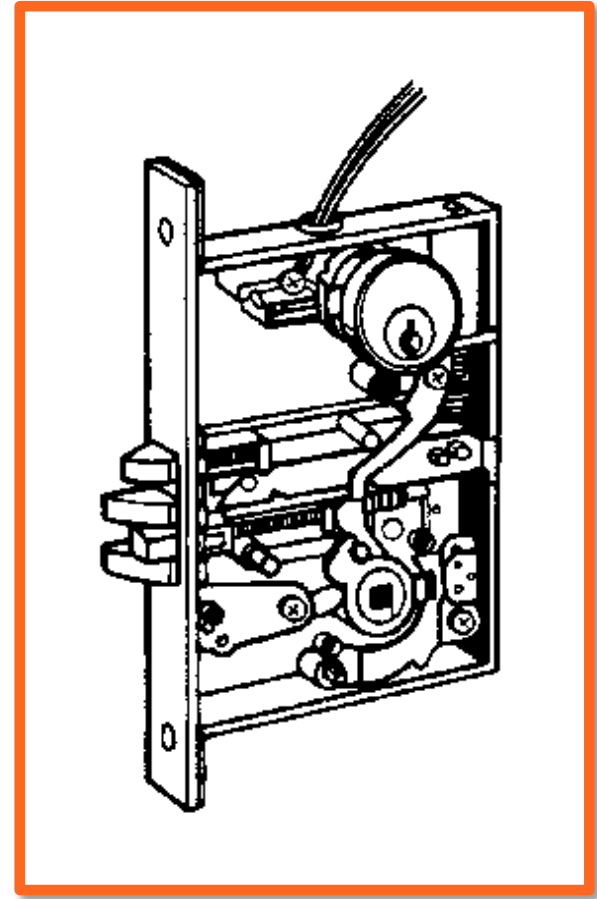
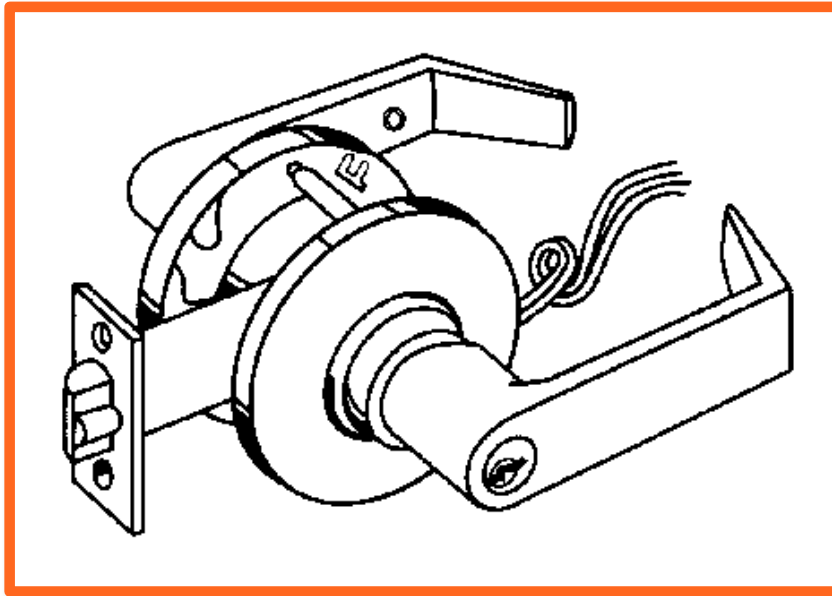
Free Access



Unlock on Fire Alarm



Electrified Locks

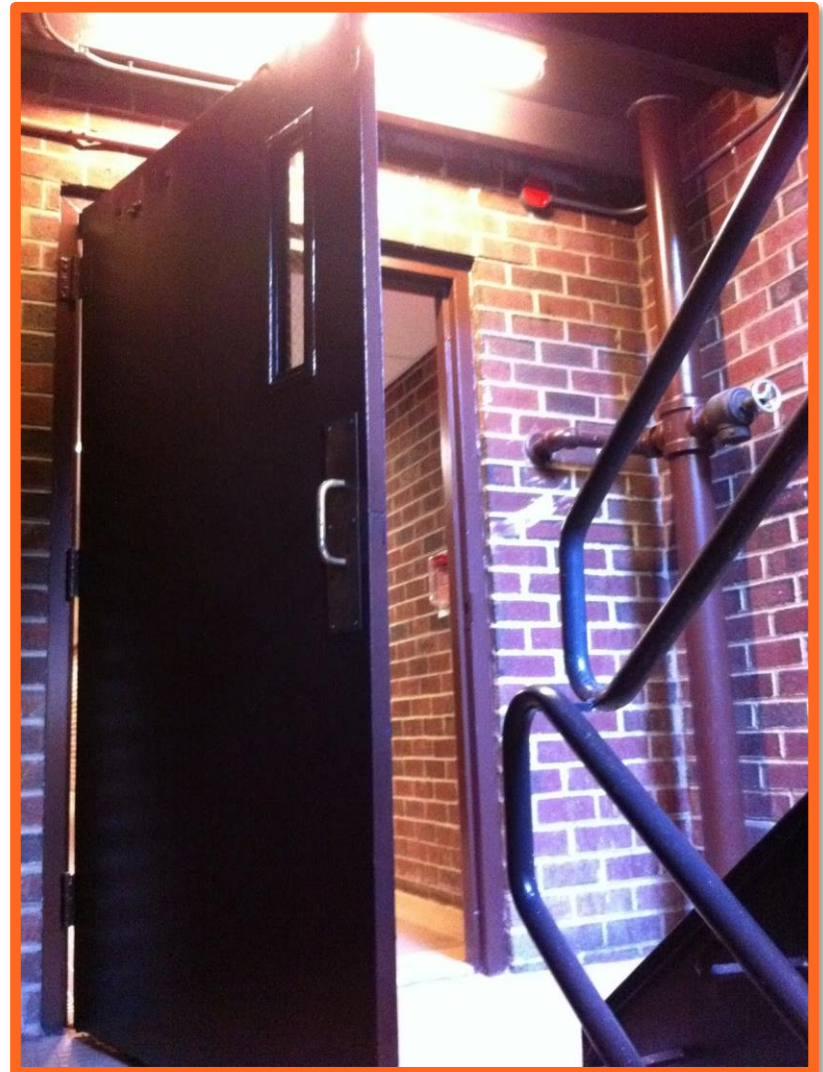


Fail Safe vs. Fail Secure

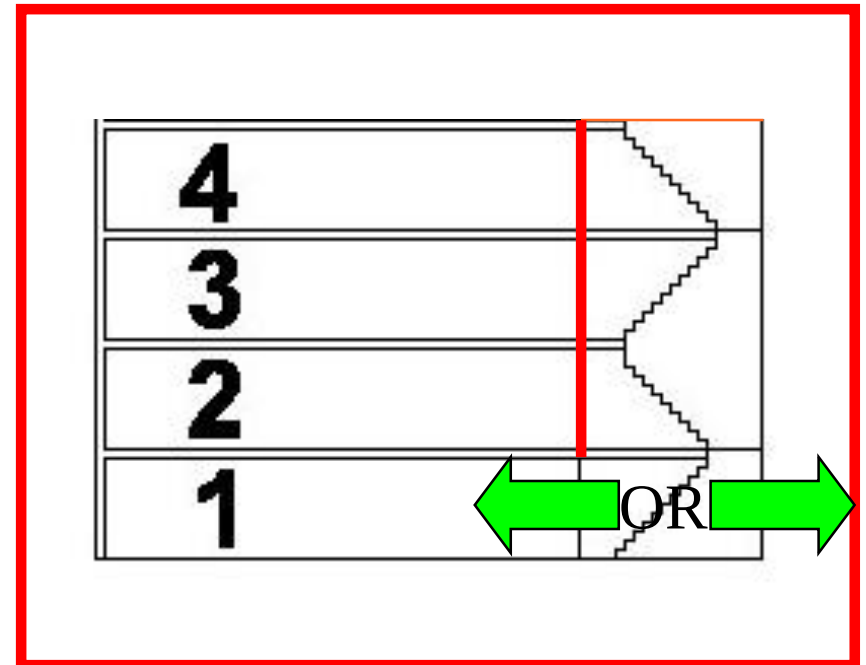
- Fail Safe - When power fails, lock is unlocked.
 - Lock is still latched.
- Fail Secure - When power fails, lock is locked.
 - Lever on secure side is locked.
 - Lever on egress side is not locked.
- Fail safe locks are required for stairwell reentry.
- Fail safe electric strikes may not be used because they are not listed for use on a fire door.

Door #107 Stair Door

- Replacing existing stair doors
- High-rise building
- Multi-tenant
- Card readers on stair side
- ~~Code is 2009 IBC~~
- If the code is NFPA 101, selected reentry is an option.

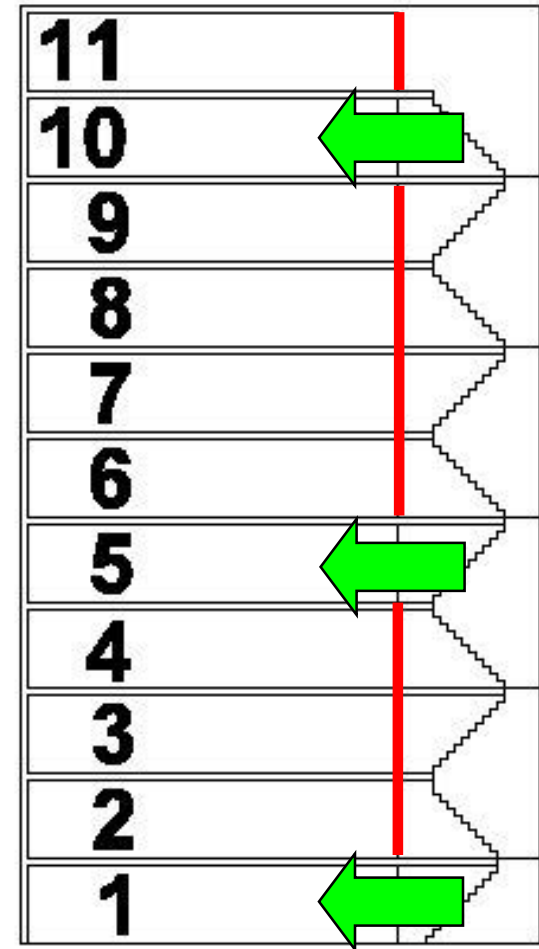


- NFPA 101 allows stairs serving not more than four stories to have mechanical locksets on the stair side of doors other than the stair discharge.



Selected Reentry

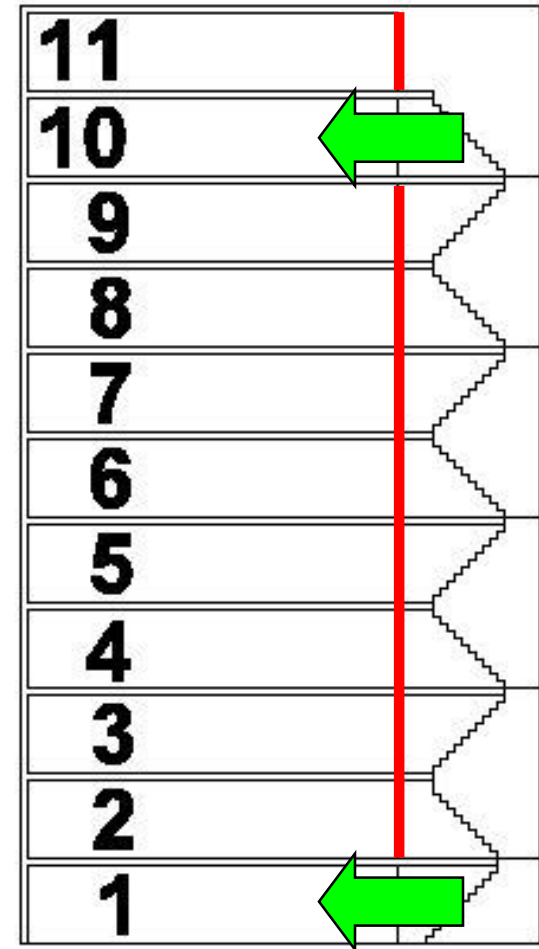
- Allows mechanical locking of some doors
- Selected reentry is not covered in the IBC



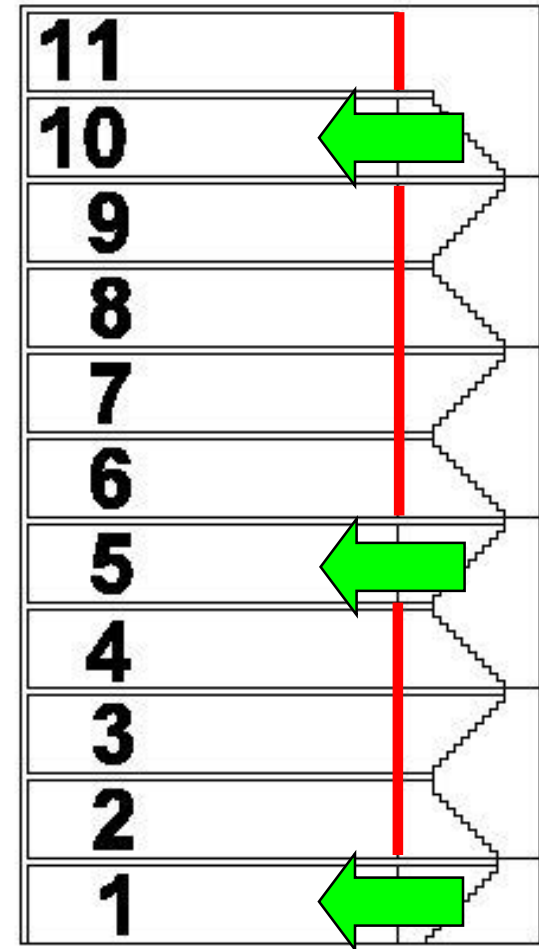
Selected Reentry

- **NFPA 101** - Door assemblies on stair enclosures shall be permitted to be equipped with hardware that prevents re-entry into the interior of the building, provided that the following criteria are met:

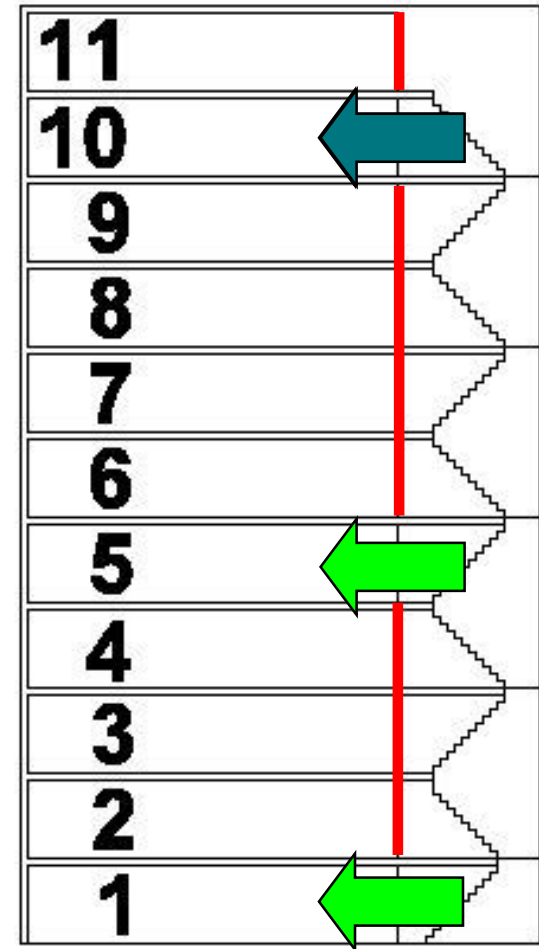
- (1) There shall be not less than two levels where it is possible to leave the stair enclosure to access another exit.



- (2) There shall be not more than four stories intervening between stories where it is possible to leave the stair enclosure to access another exit.



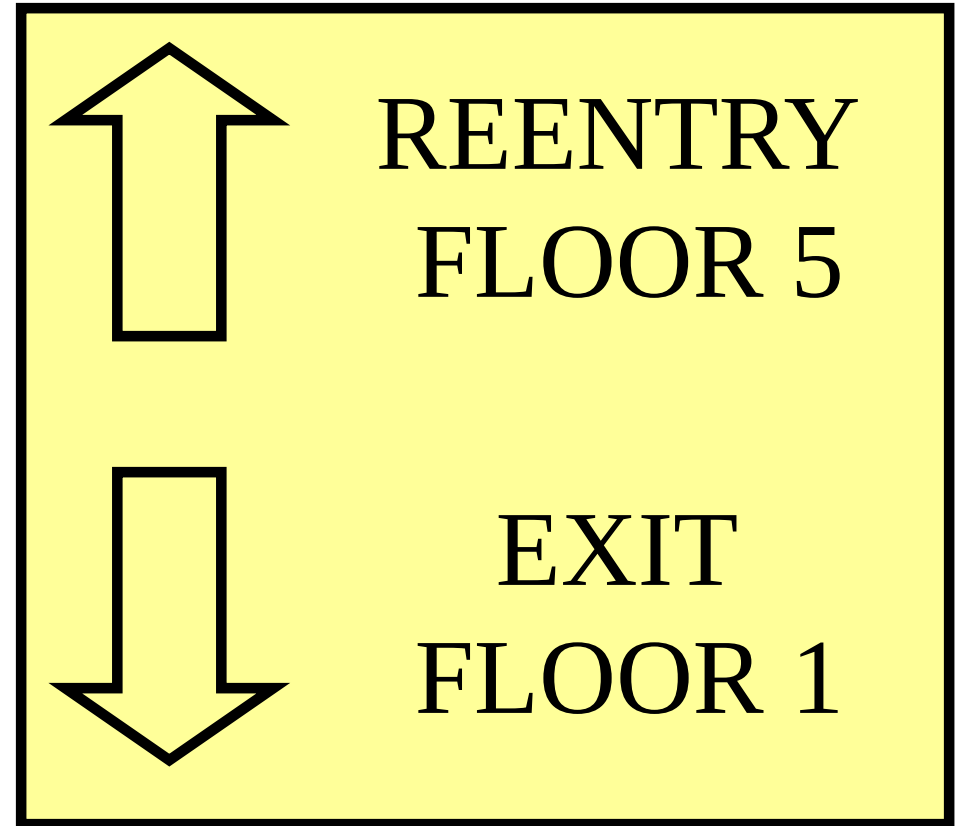
- (3) Re-entry shall be possible on the top story or next-to-top story served by the stair enclosure, and such story shall allow access to another exit.



- (4) Door assemblies allowing re-entry shall be identified as such on the stair side of the door leaf.

REENTRY
PERMITTED
ON THIS
FLOOR.

- (5) Door assemblies not allowing re-entry shall be provided with a sign on the stair side indicating the location of the nearest door opening, in each direction of travel, that allows re-entry or exit.

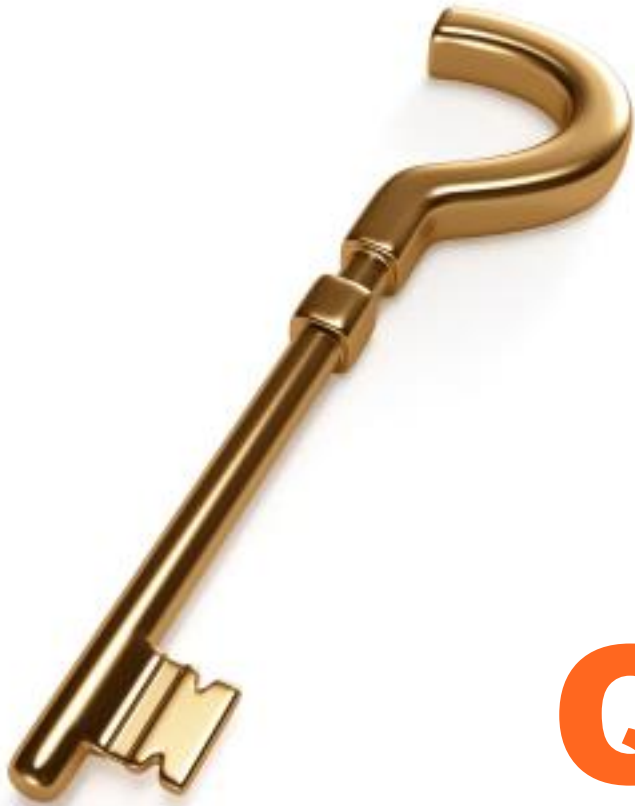


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- Access-Controlled Egress Doors
- Electromagnetically Locked Egress Doors
- Delayed Egress Locks
- Elevator Lobbies
- I-2 Special Egress Locks
- Stairwell Reentry

More information on codes for electrified hardware:

- [Decoded: Electrified Hardware Refresher](#)
- [Doors with Access Control](#)
- [Fail Safe vs. Fail Secure – When and Where?](#)
- [Code Requirements for Electromagnetic Locks](#)
- [Elevator Lobby Egress](#)
- [Electromagnetically Locked Egress Doors](#)
- [Stairwell Reentry – Myths and Facts](#)
- [Delayed Egress Hardware – Code Comparison](#)
- [Special Egress Locks in I-2 Occupancies](#)
- [NFPA 72 on Access Control](#)



Questions?

www.iDigHardware.com/decoded-dhi

PLEASE fill out the evaluation form to help me
improve this course!

THANKS FOR ATTENDING!

- Recording and handouts will be available by the end of the week at DHInteractive
- Handouts are available now at DHInteractive!



14150 Newbrook Drive, Ste. 200, Chantilly, VA 20151
703.222.2655 | Fax: 703.222.2410
education@dhi.org | www.dhi.org