NFPA 80 AND CODE CHANGES TO FIRE RATED DOORS

CSC CONFERENCE 2013 - CALGARY ALBERTA
MAY 22 - 26, 2013
Introduction

• Industry Member since 1984
• Architectural Hardware Consultant 1989
• Fire Door Assembly Inspector 2010
• Instructor of the FDAI-600 Course 2012
• Committee Chairperson of the Canadian FDAI Program
DHI, in conjunction with The Door Security & Safety Foundation, works to raise public awareness of door safety and security issues. Working with the individuals and organizations that design the life safety specifications for the architectural openings of schools, nursing homes, hospitals and commercial buildings, the goal is to create and maintain a safe environment for all occupants entering, exiting and residing within these facilities.
Foundation’s Mission

• “To promote secure and safe openings that enhance life safety”
• To be a source of information through awareness campaign that targets:
  • Code Officials
  • Fire Officials
  • AHJs
  • Architects and Building Owners
  • School Officials/Administrators (K-12, college campuses)
- Not Familiar with Code Requirements
- Belief that frequency of use ensures proper operation
• An emergency exit in a structure is a special exit for emergencies such as a fire: the combined use of regular and special exits allows for faster evacuation, while it also provides an alternative if the route to the regular exit is blocked by fire, etc.

• Knowing where the emergency exits are in buildings can save your life.

• Some buildings, such as schools, have fire drills to practice using emergency exits.
Many disasters could have been prevented if people had known where fire escapes were, and if emergency exits had not been blocked or in proper working order.

For example, in the September 11, 2001 attacks on the World Trade Center, some of the emergency exits inside the building were inaccessible, while others were locked.

In the Stardust Disaster and the 2006 Moscow hospital fire the emergency exits were locked and most windows barred shut.

In the case of the Station Nightclub, the premises was over capacity the night fire broke out, the front exit was not designed well (right outside the door, the concrete approach split 90 degrees and a railing ran along the edge, and an emergency exit swung inward, not outward as code requires).
“This is an important step in helping local officials understand what to look for when they are approving the installation and on-going maintenance of fire-rated doors.”

- Bert Polk, retired South Carolina State Fire Marshal.
Annual Inspection of Fire Door Assemblies...

• **Who Is Going To Do These Inspections and When?**
  
  – Paragraph 5-2.3, Functional Testing
    • Individuals who are KNOWLEDGEABLE about the openings being inspected
  
  – Paragraph 5-2.1, ‘…not less than annually, and a written record of the inspection shall be kept for inspection by the AHJ.’
• NFPA 80 Chapters 1, 2, 3, 4 & 6 – Background information
• Fire-Rated Doors and Labels
• Fire-Rated Glass and Glazing
• Overview of Fire-Rated Door Hardware
• Annual Inspection Requirements of NFPA 80 Chapter 5 – Care and Maintenance
WHY THE REQUIREMENT?
Setting the Stage for Major Change - Why?

• **Station Night Club -- 2003**
  – Warwick, RI -100 died

• **MGM Grand -- 1980**
  – Las Vegas – 85 killed, 700 injured

• **Villa Ste Genevieve - 1996**
  – Ste. Genevieve, Que. - 7 killed
10 deadliest public assembly fires in U.S. history

1. Iroquis Theater, Chicago, IL - December 30, 1903 - Deaths: 602
2. Coconut Grove Nightclub, Boston, MA - November 28, 1942 - Deaths: 492
3. Conway's Theater, Brooklyn, NY - December 5, 1876 - Deaths: 285
4. Rhythm Club dance hall, Nathez, MS - April 23, 1940 - Deaths: 207
5. Rhoads Opera House, Boyertown, PA - January 13, 1908 - Deaths: 170
8. The Station Nightclub, W. Warwick, RI - February 20, 2003 - Deaths: 100
10. Richmond Theatre, Richmond, VA - December 26, 1811 - Deaths: 72
Locked exit during fire alarm scares library patrons

CBC News  Posted: May 9, 2012 6:36 AM MT  |  Last Updated: May 9, 2012 6:34 AM MT  

Mindy Kettner stands in front of the sliding glass door that would not open during a fire alarm at the downtown library last week.
CODES & STANDARDS
Codes vs. Standards

- **Codes are Intended to be Adopted as Legal Documents**
  - Enforceable as Laws

- **Standards are Intended to be Used to Meet the Requirements of Codes**
  - Unenforceable until REFERENCED by a CODE.
NFPA 80 – 2007 Edition

- Establishes Basic Requirements for New Fire-Rated Door Assemblies
- Establishes Care and Maintenance Requirements
Fire Door Inspection

Background

- Fire Doors are governed by the building code and NFPA throughout design, specification, installation and occupancy permitting.
Other Codes and Standards

- NBCC – Section 3.8 Barrier Free Design, 3.8.3.3 7) & 8)
- May Exceed 5 lb. Opening Force to Achieve Positive Latching
- Ontarians with Disabilities Act
- Other provinces and local jurisdictions have their own standards
Fire Door Inspection - Background

• Once a Certificate of Occupancy has been issued, the building code is closed. The National Fire Code of Canada or the version in force provincially is now in effect for the operation and maintenance of the facility.

• The NFCC contains specific requirements for fire door inspection and maintenance but does not specify record keeping requirements (see 2.2.2.4)
Fire Door Inspection
Background

• Once a Certificate of Occupancy (CO) has been issued, the building code is closed.

• The National Fire Code or Life Safety Code is now in effect for the operation and maintenance of the facility.

• Formerly, the NFC did not contain
  – language for post-occupancy
  – inspection of fire-rated doors.
National Fire Code of Canada

• 2.2.2 Closures
• 2.2.2.1 – Openings in Fire Separations
  – 1) Openings in fire separations shall be protected with closures in conformance with the NBC
  – 2) Where closures in fire separations are replaced, the replacements shall be in conformance with the NBC
National Fire Code of Canada

• 2.2.2.2 – Damage to Closures
  – 1) Where closures are damaged so as to affect the integrity of their fire-protection rating, such damaged closures shall be repaired so that the integrity of the closures is maintained in conformance with Article 2.2.2.1
National Fire Code of Canada

• 2.2.2.4 – Inspection & Maintenance
  – 1) Defects that interfere with the operation of closures in fire separations shall be corrected, and such closures shall be maintained to ensure that they are operable at all times by………. 
National Fire Code of Canada

• 2.2.2.4 1) – Inspection & Maintenance
  – a) keeping fusible links and other heat-actuated devices undamaged and free of paint or dirt
  – b) keeping guides, bearings, and stay rolls clean and lubricated.
National Fire Code of Canada

• 2.2.2.4 1) – Inspection & Maintenance
  – c) making necessary adjustments and repairs of door hardware and accessories to ensure proper closing and latching, and
  – d) repairing or replacing inoperative parts of hold-open devices and automatic releasing devices.
National Fire Code of Canada

• 2.2.2.4 2) – Inspection & Maintenance
• Doors in fire separations shall be inspected at intervals not greater than 24 h to ensure that they remain closed unless the door is equipped with a hold-open device conforming the NBC.
2.2.2.4 3) – Inspection & Maintenance

Doors in fire separations shall be operated at intervals not greater than one month to ensure that they are properly maintained in accordance with Sentence (1) as specified in the fire safety plan prepared in accordance with Section 2.8.
National Fire Code of Canada

• 2.2.2.4 4) – Inspection & Maintenance

• Closures in fire separations shall not be obstructed, blocked, wedged open or altered in any way that would prevent the intended operation of a closure
National Fire Code of Canada

• 2.2.2.4 5) – Inspection & Maintenance

• Fire dampers and fire stop flaps shall be inspected at intervals not greater than 12 months to ensure that they are in place and are not obviously damaged or obstructed.
PICTURES OF FIRE DOORS
Existing Fire Doors Today
Existing Fire Doors Today
Existing Fire Doors Today
Existing Fire Doors Today

Heat Release Mechanism
Existing Fire Doors Today
Existing Fire Doors Today
Existing Fire Doors Today
Existing Fire Doors Today
Confused?
CHANGES IN NFPA 80-2007
NFPA 80 – Chapter 4

• What Modifications Can Be Done in the Field? *(By a licensed shop)*
  – Function Holes for Mortise Locks/Latches
  – Holes for Labeled Door Viewers
  – Round Holes for Surface Applied Hardware (up to 1” in Diameter)
    • Throughbolts
  – Wood/Composite Doors Trimmed to Maximum 3/4” Undercutting
  – [4.1.3.2, 4.1.3.3 and 4.1.3.4]
NFPA 80 - Chapter 4

• **Field Modifications that cannot be done in the field**
  
• **Doors**
  – No Vision Panel Cut Outs
  – No Louver Cut Outs
  – No Mortise Lock Pockets
  – No Face or Edge Bores for Bored Locks
  – No Mortise Hinge Preparations

• **Frames**
  – No Mortise Hinge Preparations
  – No Cut Outs
NFPA 80 – Chapter 4

• Clearances Under Doors

  – Swinging Doors with Builders Hardware
    • Maximum Clearance of 3/4” Under Door Bottom

[4.8.4.1]
ABOUT DOORS & TESTING
Fire Resistance Classifications

• Hourly Ratings
  – 1/3 = 20-Minutes
  – 3/4 = 45-Minutes
  – 1 = 60-Minutes (Wood Doors)
  – 1-1/2 = 90-Minutes
  – 3 = 180-Minutes
  – Note: This information is listed under Annex D “Fire Doors and Fire Window Classifications.”
  – The hourly designation indicates duration of the fire test exposure; known as the fire protection rating.
Fire Resistance Classifications

- Class A – 180 Minutes
- Class B – 60 and 90 Minutes
- Class C – 45 Minutes
- Class D – 90 Minutes (Exterior)
- Class E – 45 Minutes (Exterior)
- --------- -- 20 Minute
- Note: Alphabetical letter designation – one method for classifying the opening.
Swinging Doors with Builders Hardware

CHAPTER 6
NFPA 80 – Chapter 6

• **Builders Hardware Consists of:**
  – Hinges & Pivots
  – Door Bolts
  – Locks or Latches
  – Fire Exit Hardware (a.k.a. Exit Devices)
  – Door Closers
  – Protection Plates
  – Astragals
  – Gasketing
Over View of Door Hardware

• **Purpose**
  – Hang the Door
  – Lock the Door
  – Close the Door
  – Protect the Door

• **Application**
  – Grade 1, 2 or 3
    – Mechanical or Electromechanical Security

• **Life & Fire Safety** – Self Closing and Latching, Free Egress

• **Barrier Free** – Ease Of Operation

• **Climate and Environment Protection** – Correct Product
Electronic-Hold Open
Fire Labels for Frames

UNDERWRITERS LABORATORIES INC.®
LISTED
FIRE DOOR FRAME
NO.

UNDERWRITERS LABORATORIES INC.®
LISTED
FIRE DOOR FRAME
WITH PANELS
NO.

UNDERWRITERS LABORATORIES INC.®
LISTED
FIRE DOOR FRAME
FOR LIGHTS
NO.

UNDERWRITERS LABORATORIES INC.®
LISTED
FIRE WINDOW FRAME
NO.

WARNock HERSEY
LISTED FIRE DOOR FRAME
WHI-
3 HOUR RATING

WARNock HERSEY
LISTED FIRE DOOR FRAME
WITH TRANSOM AND/OR SIDE PANEL
WHI-
1 1/2 HOUR RATING

WARNock HERSEY
LISTED FIRE DOOR FRAME
WITH TRANSOM AND/OR SIDELIGHT
WHI-
3/4 HOUR RATING

WARNock HERSEY
LISTED FIRE WINDOW FRAME
WHI-
3/4 HOUR RATING
Fire Labels for Doors

- Underwriters Laboratories Inc.
  - Classified
  - Swinging Type Fire Door
  - Fire Rating: [ ] Hr. [ ] Min. Latch Throw: [ ]
  - Fire Door to Be Equipped with Fire Exit Hardware

- Warnock Hersey
  - Listed Fire Door
  - WHI-
  - 3 Hour Rating
  - Min. Latch Throw
  - Singles: 1/2", Pairs: 3/4"

- Underwriters Laboratories Inc.
  - Classified
  - Swinging Type Fire Door
  - Fire Rating: [ ] Hr. [ ] No.
  - Temp. Rise 30 Min. [ ] °F Maximum

- Underwriters Laboratories Inc.
  - Classified
  - Swinging Type Fire Door
  - Fire Rating: [ ] Hr. [ ] Min. Latch Throw: [ ]
  - Temp. Rise 30 Min. [ ] °F Maximum
  - Fire Door to Be Equipped with Fire Exit Hardware
Label should be attached to the hinge edge of the door.
Fire-Rated Openings

• Labels for fire doors with latching hardware have minimum latch throw dimensions
Fire-Rated Openings

- Labels for fire doors that will have fire exit hardware installed on them
FIRE RATED GLAZING
NFPA 80 – Chapter 4

• **Glazing Material (Glass) in Fire Doors**
  – Labeled Fire-Resistance Materials [4.4.1]
  – Installed in Labeled or Tested Frames [4.4.3]
  – Permitted in 3 Hour Interior or 1-1/2 Hour Exterior in Severe Fire Exposure -- Limited to 100 sq. in. as tested in accordance with NFPA 252 [4.4.4], Standard Methods of Fire Tests of Door Assemblies.
Glazing in Doors

- Glazing can be categorized into three major groupings:
  - Fire-Rated Only (walls, transoms, borrowed lights)
  - Safety/Impact Rated Only (non-fire rated doors and other hazardous or security applications)
  - Fire & Safety Rated (fire rated doors or any application deemed a hazardous location)
Glass Label
(Permanent etching, per NFPA 80)

SAFE-Wire™
FROM Anemostat
FIRE & SAFETY GLAZING
R13236 48S1
D-NT-H
CAT II
UP TO 90 MIN.

FireLite® Plus
from Anemostat
GLAZING MATERIAL
CLASSIFIED BY UL
CAT II R13236 48S1
UP TO 90 MIN.

D – Door
NT – Not Temperature Rise
H – Hose Stream Tested

Product Name
UL File Number
Minutes of Rating
Cat II – Safety Rating

Cat II – Safety Rating
Annual Inspection Requirements – NFPA 80

Swinging Doors with Builders Hardware
Chapter 5 Care & Maintenance

5.1.1.2 The requirements of this chapter shall apply to new and existing installations.
NFPA 80 2007
Standard for Fire Doors

• Chapter 5 Care & Maintenance

• 5.2.1* Fire door assemblies shall be inspected and tested not less than annually, and a written record of the inspection shall be signed and kept for inspection by the AHJ.
• Chapter 5 Care & Maintenance

• 5.2.3.1 Functional testing of fire door and window assemblies shall be performed by individuals with knowledge and understanding of the operating components of the type of door being subject to testing.
Annual Inspection of Fire Door Assemblies

• **What Do Inspectors Need to Know?**
  – Immense product application and installation knowledge
    • Hollow metal doors and frames
    • Wood fire doors
    • Builders Hardware Application
  – Thorough understanding of NFPA 80 requirements
  – FDAI, AHC and/or CDC or approx. 5 years of industry experience
Annual Inspection of Fire Door Assemblies

• Inspector’s Responsibilities
  – Status of door openings on date of inspection
  – Recommend necessary corrections
  – Providing written inspection reports
Annual Inspection of Fire Door Assemblies

• **Inspectors Are Not Responsible For:**
  – Making sure openings are repaired
  – Determining the correct fire-rating of door openings
  – Alert AHJ of problems
Chapter 5 Care & Maintenance

5.2.2 Performance-Based Option

5.2.2.1 As an alternate means of compliance with 5.2.1, subject to the AHJ, fire door assemblies shall be permitted to be inspected, tested, and maintained under a written performance-based program.
NFPA 80 2007 Standard for Fire Doors

• Chapter 5 Care & Maintenance
• 5.2.2 Performance-Based Option.
• 5.2.2.2 Goals established under a performance-based program shall provide assurance that the fire door assembly will perform its intended function when exposed to fire conditions.
• 5.2.2.3 Technical justification for inspection, testing, and maintenance intervals shall be documented.
• Chapter 5 Care & Maintenance
• 5.2.2 Performance-Based Option.

• 5.2.2.4 The performance-based option shall include historical data acceptable to the AHJ.
Preparing for the Inspection
Identifying Fire Door Assemblies

• Maintenance personnel–access to the ‘as built’ floor plans.
• AHJ’s office archived copies of floor plans
• No plans available–should physically check each door opening looking for labels.
Locating Fire Doors in Buildings

- Interior doors opening into and out of stairwells and corridors.
- Door openings placed at building separations.
- Identify fire labels on frame and hinge side of door.
Original Building, Fire and Life Safety Requirements

• Inspectors should be cognizant of the building, fire and life safety codes that were applicable at the time of installation.

• Should not apply the capabilities, limitations and requirements for modern products to assemblies installed years ago.

• NFPA 80 standard is applicable to all existing fire door assemblies, regardless of when they were installed.
Cataloging Fire Doors

- Door Number (Code or Symbol)
- Location of Assembly in Building
- Type of Door Assembly
- Fire-Protection Rating
- Comments/Remarks
11 Inspection Steps

Swinging fire doors with builders hardware will be inspected to verify the following:

1. No open holes or breaks exist in surfaces of either the door or frame.
2. Glazing, vision light frames, and glazing beads are intact and securely fastened in place, if so equipped.
3. The door, frame, hinges, hardware and non-combustible threshold are secured, aligned, and in working order with no visible signs of damage.
4. No parts are missing or broken.
5. Door clearances at the door edge to the frame, on the pull side of the door, do not exceed clearances listed in 4.8.4 and 6.3.1.
6. The self-closing device is operating by verifying that the active door will completely close when operated from the full open position.
7. If a coordinator is installed, the inactive leaf closes before the active leaf.
8. Latching hardware operates and secures the door when it is in the closed position.
9. Auxiliary hardware items, which interfere or prohibit operation, are not installed on the door and frame.
10. No field modifications to the door assembly have been performed that void the label.
11. Gasketing and edge seals, where required, are inspected to verify their presence and integrity.
Items to be Verified During Fire Door Inspection
Three Main Operational Requirements

• Swinging Fire-Doors with Builders Hardware Must:
  – Swing Freely
  – Be self or automatic closing or power operated
  – Positively latch when in the closed position.
# Top Ten Deficiencies

The following items are the most commonly observed deficiencies found on swinging fire doors with builders hardware:

1. Painted or missing fire door labels
2. Poor clearance dimensions around the perimeter of the door in the closed position
3. Kick down door holders
4. Auxiliary hardware items that interfere with the intended function of the door (*barrel bolts and dead bolts, etc.*)
5. Fire doors blocked to stay in the open position
6. Area surrounding the fire door assembly blocked by furniture, equipment and/or boxes
7. Broken, defective or missing hardware items (*latch bolts and/or strike plated, closer arms, cover plates, etc.*)
8. Fire exit hardware installed on doors that are not labeled for use with fire exit hardware
9. Missing or incorrect fasteners
10. Bottom flush bolts that do not project ½" into the strike
11 Inspection Steps

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9. Auxiliary hardware items, which interfere or prohibit operation, are not installed on the door and frame.
10. No field modifications to the door assembly have been performed that void the label.
11. Gasketing and edge seals, where required, are inspected to verify their presence and integrity.
5.2.4.2 As a minimum, the following items shall be verified:

• No open holes or breaks exist in surfaces.
• (2) Glazing, vision light frames, and glazing beads are intact.
• (3) The door, frame, hinges, hardware, and noncombustible threshold are secured, aligned, and in working order.
• (4) No parts are missing or broken.
• (5) Door clearances do not exceed the clearances listed.
5.2.4.2 As a minimum, the following items shall be verified:

(6) The self-closing device is operational.
(7) If a coordinator is installed, the inactive leaf closes before active leaf.
(8) Latching hardware operates and secures the door when it is in the closed position.
5.2.4.2 As a minimum, the following items shall be verified:

- (9) Auxiliary hardware items that interfere or prohibit operation are not installed.
- (10) No field modifications to the door have been performed.
- (11) Gasketing and edge seals are inspected.
Properly Closed Fire Door Prevented Fire Damage To This Entire Section of The Building
Protect Your Investment

As a building owner, you have made a major investment in your facility and it is important to put in place the proper maintenance program to secure this investment.

Doors are one of the most active components of a building and with normal wear and tear need to be maintained. In addition, there are ongoing requirements that you must adhere to on many of your doors. Failure to maintain these openings can result in NOV (Notice of Violation); substantial fines, and potential closure of your building by the Authority Having Jurisdiction (AHJ).

Life Safety Requirements

Providing for the life safety and security of occupants in today’s buildings is the primary purpose that drives the development of our ever-evolving building, fire and life safety codes and standards. The inspection requirement for fire door assemblies and other key doors are the sixth item in a building which requires periodic inspections to ensure life safety. The other five items are: burglar alarm systems; sprinkler systems; elevators; fire extinguishers; and fire dampers.
Summary

• Many swinging fire door assemblies can be:
  – Complicated.
  – Contain sophisticated hardware products.
  – These assemblies require an immense level of expertise to coordinate their functions with their fire-protection properties.
Summary

- **New fire-rated products are:**
  - Continually being developed.
  - Requires inspectors to stay current on their knowledge and understanding of these product’s applications, capabilities and limitations.
KEY REQUIREMENTS

- Ongoing efficient maintenance program to avoid NOVs (Notice of Violations);
- Ongoing effective testing of fire door assemblies;
- Corrective action of all violations upon occurrence;
- Annual inspection by a knowledgeable professional;
- Produce paperwork of the inspections and proper corrective action on file and available to the Authority Having Jurisdiction (Fire or code official);
- Meet with the Authority Having Jurisdiction to review inspection results and maintenance program;
- Application/management of the Performance Based option to extend inspection requirement to three years.
Annual Fire Door Assembly Inspection Program (AFDAIP)

- DAI 600 - Fire Door Assembly Inspection
- Fire Door Assembly Inspector (FDAI)
- Intertek’s certification program for FDAIs:
  - Certified Fire Door Inspector Program
FDAI Class
Eligibility Requirements

• DHI Professional Consultants
  – Architectural Hardware Consultants (AHC)
  – Certified Door Consultants (CDC)
  – Electrified Hardware Consultants (EHC)
  – Architectural Openings Consultants (AOC)

• May register for the FDAI class
Eligibility Requirements

• Individuals who do not hold one of DHI’s Professional Certifications, must complete:
  – SSC100 – Fundamentals of Architectural Doors and Hardware Self-Study Course
  – COR110 – Basic Architectural Hardware
  – COR115 – Hardware Applications
  – COR140 – Using Codes and Standards

• Prerequisites must be completed prior to registering for the FDAI class
FDAI Class Overview

• Three day class
  – NFPA 80 requirements
  – Inspection guidelines
  – Owner’s responsibilities
  – AHJ’s responsibilities
  – Inspector’s responsibilities
  – Perform inspections
  – Document inspections
  – Four hour examination
• Students must achieve a minimum score of 80.00%

• Upon passing DAI 600, students/inspectors will be eligible to enroll in Intertek’s certification program:
  – Certified Fire Door Inspector Program
Certification

– Intertek’s Certified Fire Door Inspector Program
– Through its Warnock Hersey Mark
– Certify FDAIs
– Authorize inspecting companies
Advocacy

- Intertek
- Underwriters Laboratories (UL)
- National Fire Protection Association (NFPA)
More Information Contact:

– The Foundation or
– Door and Hardware Institute
  • Phone (703) 222-2010, Fax (703)222-2410
– Online at:
  – www.doorsecuritysafety.org
  – www.dhi.org
Thank You