Code Requirements for Tall Buildings in New York State

Presented by:
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Agenda

- Objectives
- History lesson
- What is a high-rise?
- Common challenges regarding high-rise construction
- Code review process
- BCNYS Chapter 4
- BCNYS Chapter 5
Agenda (cont.)

- BCNYS Chapter 9
- BCNYS Chapter 33
- FCNYS Chapter 5
- FCNYS Chapter 6
- FCNYS Chapter 14
- In review
- Closing
Objectives

• Terminal
  – Utilizing the New York State Building and Fire Codes correctly classify and apply fire protection requirements for high-rise occupancies.
Objectives (cont.)

• Enabling
  – Develop an understanding of the code review process and the requirements regarding high-rise buildings.
  – Develop an understanding of the challenges regarding high-rise construction and code compliance
  – Develop a basic understanding of the requirements in Chapters 4 and 5 of the BCNYS for the construction of high-rise buildings.
  – Develop a basic understanding of high-rise requirements peppered throughout the FCNYS.

Develop a basic understanding of construction and demolition operations for high-rise buildings.
History lesson

- MGM Grand Hotel Fire
  - Nov. 21, 1980 – Las Vegas Nevada
  - 650 injured, 85 dead
  - Openings in vertical shafts and seismic joints acted as chimneys spreading smoke and heat all the way up to the 26th floor
  - 68 people died on 23rd floor from asphyxiation
  - Fire alarm system destroyed before alarms could be activated
  - Exempted from sprinklers due to 24 hour occupancy
What is a high-rise?

• BCNYS Section 403 High-rise Buildings
  – 403.1 Applicability. The provisions of this section shall apply to buildings with an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.
  • Exception: The provisions of this section shall not apply to the following buildings and structures:
    – ATC’s in accordance with Section 412
    – Open parking garages in accordance with Section 406.3
    – Buildings with an occupancy in Group A-5 in accordance with Section 303.1.
    – Low-hazard special industrial occupancies in accordance with Section 503.1.1.
    – Buildings with an occupancy in Group H-1, H-2 or H-3 in accordance with Section 415.
What is a high-rise? (cont.)
Common challenges regarding high-rise construction

- Egress
- Sheltering
- Occupancy types
- Notification
- Fire and smoke separation
- Security
- Manual firefighting
- Performance based design alternatives
- Progressive collapse
Code review process

• Input from stakeholders on required features
• Determine prescriptive code requirements
• Meet with authority having jurisdiction
• Determine gaps between required features and prescriptive code
• Can a performance based design alternative be implemented?
• Apply for variance and present case to variance board
BCNYS Chapter 4

• Special detailed requirements based on use and occupancy
  – 401.1 Detailed use and occupancy requirements. In addition to the occupancy and construction requirements in this code, the provisions of this chapter apply to the special uses and occupancies described herein.

• Section 403 High-rise buildings
  – 403.1 Applicability. The provisions of this section shall apply to buildings with an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.
  Exception: .........................
• Section 403 High-rise buildings (cont.)
  – 403.2 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 903.3.5.2.

• Exception: An automatic sprinkler system shall not be required in spaces or areas of:
  – 1. Open parking garages in accordance with Section 406.3.
  – 2. Telecommunications equipment buildings used exclusively for .........
Section 403 High-rise buildings (cont.)

- 403.3 Reduction in fire-resistance rating. The fire-resistance-rating reductions listed in Sections 403.3.1 and 403.3.2 shall be allowed in buildings that have sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.
BCNYS Chapter 4 (cont.)

• Section 403 High-rise buildings (cont.)
  – 403.3 Reduction in fire-resistance rating. (cont.)
    • 403.3.1 Type of construction. The following reductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.3:
      – 1. For buildings not greater than 420 feet in height. Type IA construction shall be allowed to be reduced to Type IB. Exception: The required fire-resistance rating of columns supporting floors shall not be allowed to be reduced.
      – 2. In other than Groups F-1, M and S-1, Type IB construction shall be allowed to be reduced to Type IIA.
      – 3. The height and area limitations of the reduced construction type shall be allowed to be the same as for the original construction type.
• Section 403 High-rise buildings (cont.)
  – 403.3 Reduction in fire-resistance rating. (cont.)
    • 403.3.2 Shaft enclosures. For Buildings not greater than 420 feet in height, the required fire-resistance-rating of the fire barriers enclosing vertical shafts, other than exit enclosures and elevator hoistway enclosures, shall be reduced to 1 hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels.
• Section 403 High-rise buildings (cont.)
  – 403.4 Emergency escape and rescue. Emergency escape and rescue openings required by Section 1026 are not required.
  – 403.5 Automatic fire detection. Smoke detection shall be provided in accordance with Section 907.2.12.1
  – 403.6 Emergency voice/alarm communication systems. An emergency voice/alarm communication system shall be provided in accordance with Section 907.2.12.2.
• Section 403 High-rise buildings (cont.)
  – 403.7 Fire department communications system. A two way fire department communications system shall be provided for fire department use in accordance with Section 907.2.12.3.
  – 403.8 Fire command. A fire command center complying with Section 911 shall be provided in a location approved by the fire department.
  – 403.9 Elevators. Elevator operation and installation shall be in accordance with Chapter 30.
Section 403 High-rise buildings (cont.)

- 403.10 Standby power. A standby power system complying with Section 2702 shall be provided for standby power loads specified in Section 403.10.2.

- 403.10.1 Special requirements for standby power systems. If the standby system is a generator set inside a building, the system shall be located in a separate room enclosed in 2-hour fire barriers constructed in accordance with Section 706 or horizontal assemblies constructed in accordance with Section 711, or both. System supervision with manual start and transfer features shall be provided at the fire command center.
• Section 403 High-rise buildings (cont.)
  – 403.10 Standby power. (cont.)

  • 403.10.2 Standby power loads. The following are classified as standby power loads:

    – 1. Power and lighting for the fire command center required by Section 403.8;
    – 2. Electrically powered fire pumps; and

    – Standby power shall be provided for elevators in accordance with Sections 1007.4 and 3003.
• Section 403 High-rise buildings (cont.)
  – 403.11 Emergency power systems. An emergency power system complying with Section 2702 shall be provided for emergency loads specified in Section 403.11.1.
  • 403.11.1 Emergency power loads. The following are classified as emergency power loads:
    – 1. Exit signs and means of egress illumination required by Chapter 10;
    – 2. Elevator car lighting;
    – 3. Emergency voice/alarm communications systems;
    – 4. Automatic fire detection systems; and
    – 5. Fire alarm systems.
BCNYS Chapter 4 (cont.)

• Section 403 High-rise buildings (cont.)
  – 403.12 Stairway door operation. Stairway doors other than the exit discharge doors shall be permitted to be locked from stairway side. Stairway doors that are locked from the stairway side shall be capable of being unlocked simultaneously without unlatching upon a signal from the fire command center.

• 403.12.1 Stairway communications system. A telephone or other two-way communications system connected to an approved constantly attended station shall be provided at not less than every fifth floor in each required stairway where doors to the stairway are locked.
BCNYS Chapter 4 (cont.)

• Section 403 High-rise buildings (cont.)
  – 403.13 Smokeproof exit enclosures. Every required stairway serving floors more than 75 feet above the lowest level of fire department vehicle access shall comply with Sections 909.20 and 1020.7.
  – 403.14 Seismic considerations. For seismic considerations, see Chapter 16.
BCNYS Chapter 5

- General building heights and areas
- Table 503
  - Type IA and B typically UL
- Height modifications
- Area modifications
- Mixed uses
  - Nonseparated
  - Separated
BCNYS Chapter 9

• Fire protection systems
• Section 903 Automatic sprinkler systems
  – 903.3.1.1 – Sprinkler systems in high-rises have to be NFPA 13 systems
  – 903.3.5.2 – High-rise buildings in seismic design category C, D, E, or F need to have a secondary water supply
  – 903.4.3 – Each floor of a high-rise requires floor control valves wherever connections to the riser occur
BCNYS Chapter 9

- Section 905 Standpipe systems
  - 905.3.1 – Class III standpipe system required in any building where floor level of highest story is more than 30 feet above (or below) the lowest level of fire department vehicle access
    - Class I standpipe systems allowed in fully sprinklered buildings
BCNYS Chapter 9

• Section 907 Fire alarm and detection systems
  – 907.2.12 – High-rise buildings
    • Automatic fire detection required in many areas
    • Voice system with specific notification area requirements
    • Live message capabilities
    • Fire phones between FCC and several areas
  – 907.8.2 – High-rise building zone requirements by floor
    • Smoke detectors
    • Sprinkler flow
    • Manual pull stations
    • Other approved detection or suppression devices
Section 911 Fire command center

- Location approved by FD
- 1 hour fire barrier
- 96 SF minimum (minimum dimension of 8 feet)

Comply with NFPA 72:
- Voice communication system
- FD communication unit
- Fire detection and alarm annunciator
- Elevator annunciator
- Air handling system status and controls
- FSCP
- Stairway door locking controls
- Sprinkler valve and flow display annunciator
- Emergency and standby power status
- Telephone
- Fire pump status
- Building plans
- Table
- Generator status and controls
- Public address system
BCNYS Chapter 9

FIRE COMMAND CENTER CONTROL EQUIPMENT ELEVATION ROOM G-20

1/2" = 1'-0"

PROVIDE HEAVY DUTY VANDAL RESISTANT RED WALL PHONE, BY REDHOTPHONES.COM (ABLECOMM, INC.), MODEL ASI-ARMOR-2554

FIRE COMMAND CENTER STATUS/CONTROL ANNUNCIATOR

20 STATION AREA OF RESCUE ASSISTANCE ANNUNCIATOR

PROVIDE 2'X3', SLIM FRAME, PORCELAIN DRY ERASE BOARD

PROVIDE FIREFIGHTER TELEPHONE STORAGE CABINET, ATLAS SOUND, MODEL TCS-6

EDGE OF NEW METAL STUD WALL

DOOR TO ROOM G20A

EMERGENCY POWER ANNUNCIATOR

SMOKE CONTROL ANNUNCIATOR SUPPLIED BY OTHERS UNDER ALTERNATE M1. ELECTRICAL CONTRACTOR TO INSTALL, POWER, AND INTERFACE WITH BUILDING FIRE ALARM SYSTEM

PROVIDE MAYLINE DRAFTING TABLE, MODEL 7732 (37-1/2"X42") AND MAYLINE DRAFTING CHAIR MODEL 2610

PROVIDE MAYLINE VERTICAL ROLLING DRAWING STAND, MODEL 9325 (42") WITH 12 HANGARS AND CLAMPS

6" MAXIMUM AFF
BCNYS Chapter 33

- Safeguards during construction
- Section 3311 Standpipes
  - Buildings four stories or more in height need to have at least one standpipe
  - Needs to be within one floor of the highest point of construction having secured decking or flooring
FCNYS Chapter 5

• Fire service features
  – Section 504 Access to building openings and roofs
    • Building more than four stories required to have stair access to roof (1009.11)
  – Section 507 Hazards to firefighters
    • Shaftways need to be appropriately labeled
  – Section 509 Fire command center
    • Same as outlined in Chapter 9 of BCNYS
FCNYS Chapter 6

• Building services and systems
• Section 604 emergency and standby power systems
  – 604.2.15 High-rise buildings
    • Minimum 2 hours worth of fuel at full load
  – 604.2.19 Elevators
FCNYS Chapter 14

• Fire safety during construction and demolition
  – Enforcement teeth
  – Section 1408 – Owner’s responsibility for fire protection
  – Section 1412 – Water supply for fire protection
  – Section 1413 – Standpipes (same as Chapter 33 in BCNYS)
In review

• What height does a building have to be to be considered a high-rise by code?
  – Greater than 75 feet from LLFDVA

• Are air traffic control towers considered high-rises?
  – No, however they have their own section in Chapter 4

• What type of fire alarm/detection system is required in a high-rise?
  – Voice communication
In review (cont.)

• What is a fire command center required to be equipped with?
  – Emergency voice/alarm communications system unit
  – Fire department communication system
  – Fire-detection and alarm system annunciator
  – Elevator annunciator
  – Status and controls for air-handling equipment
  – FSCP
  – Controls for unlocking stairway doors
  – Sprinkler valve and flow switch indicator panel
  – Emergency power system annuciator
  – Telephone
  – Fire pump status indicators
  – Building plans
  – Work table
  – Generator supervision annuciator with manual start and transfer features
  – PA system (maybe)
Closing

• Questions
• Comments
• Open discussion
• Thank you

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