COMMISSIONING FIRE PROTECTION SYSTEMS (PART 2)

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Learning Objectives

1. Identify that the concepts applied to commissioning of fire protection systems are similar, if not identical, to those taken for commissioning other building systems.
2. Identify importance of commissioning fire protection systems in all building design, including those using performance based designs or "engineered solutions".
3. Identify the importance of re-commissioning in the life cycle and function of fire protection systems.
4. Identify applicable Standards or other resources for use as reference in developing commissioning protocols for fire protection systems, depending upon the type of system they are commissioning.
First, Need A Good Set of Directions…

...or else.....
The Missing Piece

Verification that everything actually works...
Why?

Much like needing to confirm that mechanical systems are performing as intended to achieve LEED certification....

...fire life safety systems need to be verified they are actually performing as designed...

...functional testing is not enough!!
Commissioning Is NOT...

- Substitute for good engineering effort
- Substitute for good construction practices
- An opportunity to demean the AE or contractor
- An unnecessary task to check off a box for LEED
- AHJ acceptance testing
Commissioning ≠ Device Testing

Functional Test – Smoke Detector

• FACP descriptor appropriate?
• Auxiliary functions work properly?
  ○ Fire doors close
  ○ Smoke dampers close or open as intended
  ○ Smoke control fans initiate
  ○ Make up air openings open
  ○ Release fire suppression system
• FACP transmit alarms to receiving station?
• Tested under back-up/battery power
Commissioning – Smoke Detector

Functional Test, “plus”…

Circuit performance

- Verify redundant paths (when required)
- Operational capability through 1 or more opens
- System annunciates conditions affecting operation
- Operational capability verified thru end-to-end communications
- Supervision is wired properly
Performance Based Design

Unusual application of FP systems outside of code required deployment
Performance objectives that often exceed code required operations
Cx is to verify the systems are performing as intended by the owner/designer – not only as intended by the applicable codes
Prime target for Cx
Casino Gaming Floor Area Too Large to Meet Travel Distance

CFD Used to Justify Extended Travel Distances

Smoke Control System Designed to Maintain Smoke Layer Within Tenability Limits

This scenario demands Cx of systems…
Special Inspection

Team approach utilizing:

- Fire Protection Engineers
- Mechanical and Electrical Engineers
- Various Contractors
- Air Balance Personnel

Responsible to certify that the system has been installed in accordance with the approved design documents

Does not redesign the system
Special Inspector

Special inspector requirements

• IBC 909
• IBC 1704
Fire Protection Systems Include…

Fire Suppression
• Sprinkler
• Standpipes
• Fire Pumps

Fire Detection

Alarm Signaling
• Voice Alarm

Mass Notification

Smoke Barriers

Spray Fireproofing

Smoke Control
• Stair Pressurization
• Zoned Smoke Control
• Atrium Exhaust
• Elevator

Emergency Power

Elevator Emergency Operations

Fire Barriers

Fire Walls
How Do I know What is Supposed to Happen?

BOD and OPR
Rational Analyses or FP Reports
Specifications
Building, Fire and Mechanical Codes
NFPA Codes and Standards
  • NFPA 12, 13, 14, 15, 20, 70, 72, 90 A & B, 92A & B, 110, 409, 2001
ASME Standards
Manufacturers’ Installation Instructions
Passive Systems

Fire Walls – IBC 706
Fire Barriers – IBC 707
Smoke Barriers – IBC 710
Opening Protection – IBC 714, 715 and 716

Other Resources
• IBC Section 719, 720 and 721
• UL Fire Resistance Directory
Fire Suppression Systems

IBC Section 903
NFPA 13 (2010), Chapter 26
NFPA 14 (2010), Chapter 13
NFPA 20 (2010), Chapter 14
NFPA 25 (2011)
UL Fire Protection Equipment Directory
Fire Detection & Alarm

IBC Section 907
NFPA 72 (2010), Chapter 14
Matrix (Sequence) of Operations
UL Fire Protection Equipment Directory
Smoke Control System

IBC “Exhaust Method” and NFPA 92B -
Open spaces, smoke exhaust to maintain smoke layer above people on highest occupied level.
Smoke Control Systems

IBC Section 909
Rational Analysis
NFPA 90A (2009), Chapter 7
NFPA 92A (2009), Chapter 8
NFPA 92B (2009), Chapter 8
Matrix (Sequence) of Operations
UL Fire Protection Equipment Directory
Smoke Control Cx Considerations

UUKL?
Duct Pressure Testing
FA System Functional Testing
Smoke Control Component Testing
Does It All Work Together?
Test Smoke?
Recommended Practice for the Commissioning of Fire Protection Systems

- Approved by NFPA membership at Annual meeting in June
- Published in early 2012
Knowledgeable and experienced in application of Cx practices
Advanced understanding of the installation, operation, and maintenance of all FP and LS systems, with particular emphasis on integrated testing
RetroCx and ReCx

Life safety systems are required, but offer no payback on investment costs. Often ignored when it comes to maintenance. Tech Committee argued about required period of time between ReCx.
Proper Cx of Fire Protection Systems…

…will result in on-time CofO!!!
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Thank-you for your valuable time!!

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