Course Objectives

Recognize the benefits of properly commissioned fire and life safety systems relating to NFPA 3 (Recommended Practice on Commissioning and Integrated Testing of Fire Protection and Life Safety Systems).
What is the Big Deal?

Various individual standards dealing with acceptance of new and/or modified protective systems that are connected to one another:

- NFPA 13: Standard for the Installation of Sprinkler Systems
- NFPA 14: Standard for the Installation of Standpipes and Hose Systems
- NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 24: Standard for the Installation of Private Fire Service Mains and Their Appurtenances

Reasonable Confusion

Recent Contractors BLOG: Does NFPA 13 require as-built drawings?

NFPA 25: 12.3.2

YES: As-built drawings, original acceptance test records, and device mfg. bulletins shall be retained to assist in the proper care of the system and its components.

NO: NFPA 25 can say what they want, NFPA 13 does not.

BUT: They adopted NFPA 25 too.

SO: Per title, NFPA 25 is only for testing, all other info is just recommended.

I GET IT: It is saying IF there are as-builts, they must be stored.

YES: And, NFPA 13 only talks about working plans- which are only to be used in the installation phase.

MAKES SENSE: As-builts are supposed to combine working plans with fitters field notes. And, fitters notes are rough and who has the money to note every change any way.

AGREE: What really changes other than a few heads anyway.
What are “Project Plans”

NFPA 3:
- Construction documents
- Record (plan) drawing
- Working (plan) drawing
- Shop drawing

NFPA 13:
- Preliminary plans
- Working plans> shop drawings
- Approved plans> AHJ deviation approvals
- Owners Certificate

NFPA 25:
- As-built system installation drawings

NFPA 72:
- Shop drawings
- Scaled floor plans
- Approved plans
- Floor plans (and “as-built plans cabinet)
- Outline plans
- System Record of Completion

...... Anyway we have a project team that has been doing these kinds of things for years ......
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Commissioning

What is it? (NFPA 3)**
A systematic process that provides documented confirmation that specific and interconnected fire protection and life safety systems function according to the intended design criteria and satisfy the owner’s operational needs, including compliance requirements of any applicable laws, regulations, codes and standards.

** Will be voted on by the NFPA Membership the week of June 13, 2011.

What is the scope of NFPA 3?
The minimum requirements for procedures, methods, and documentation in commissioning and the integrated testing of active and passive fire protection and life safety systems.

What is the purpose of NFPA 3?
The purpose of this standard shall be to provide a reasonable degree of assurance that fire protection and life safety systems function in accordance with the basis of design (BOD) and the owner’s project requirements (OPR) through standardization of the processes for commissioning and integrated testing.
BOD & OPR

**Basis of Design (BOD):**
A document that shows the concepts and decisions used to meet the owner’s project requirements and applicable standards, laws, and regulations. Document describes initial design decisions and system descriptions.

**Owner’s Project Requirements (OPR):**
The documentation that provides the owner’s vision for the planned facility, integrated requirements, expectations for how it will be used and operated, and benchmarks and criteria for performance.

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Previewing the TOC of NFPA 3

- Chapter 1: Administrations
- Chapter 2: Referenced Publications
- Chapter 3: Definitions
- Commissioning
- Integrated Systems
- Interconnected Systems
- Passive Systems
- Re-commissioning
- Retro-commissioning
- Periodic Integrated Testing
- Qualifications of Commissioning Personnel
- Commissioning Documentation and Forms
What is the NFPA 3 Application?

Integrated testing shall verify and document the following:

1) Performance in accordance with applicable codes and standards
2) Compliance with BOD and OPR
3)* Sequence of operation
4) New technology, devices, or equipment
5) Installation in accordance with manufacturers' requirements
6) Accuracy of diagrams of system interconnections and device locations prior to final acceptance
Integrated System
A combination or group of systems either interconnected or separate, but required to operate together as a whole to achieve the fire protection and life safety systems.

Integrated Testing
Assessment of fire protection and life safety systems function and operation using direct observation or other monitoring methods to determine the correct interaction and coordination of multiple systems in conformance with owner’s project requirements and the basis of design.

Periodic Integrated Testing
Fire protection and life safety systems that have been commissioned upon installation in accordance with the commissioning process of this standard shall have integrated testing in accordance with the commissioning plan.

Commissioning Team
- Owner
- Construction Manager/General Contractor
- Commissioning Authority (CxA)
- Owner’s Technical Support Personnel
- Fire Commissioning Agent (FCxA)
- Third Party Test Entity
- Installation Contractors
- Facility Manager/Operations Personnel
- Manufacturer Representatives
- AHJ
- Registered Design Professional (RDP’s)
- Insurance Representative
The Benefits

The National Institute of Building Sciences (NIBS)

Owners of commissioned systems

“Organizations that have researched commissioning claim that owners can achieve savings in operations of $4 USD over the first five years of occupancy as a direct result of every $1 USD invested in commissioning—an excellent return on investment.”

Owners who did not invest in commissioning practices

“The cost of not commissioning is equal to the costs of correcting deficiencies plus the costs of inefficient operations. For mission-critical facilities, the cost of not commissioning can be measured by the cost of downtime and lack of appropriate facility use.”
The Benefits

**Contractors who practice commissioning**
- Report reduced change orders
- Better project pre-planning
- Deeper partnership with owners
- Increased opportunity for future routine and compliance inspections and/or testing

**Local maintenance teams who were given commissioned systems**
- Realize fewer false alarms and/or disruptions
- Lower maintenance costs
- Better documentation for procedural changes
- Enhanced team training opportunities

What Does A Real Commissioned Installation Look Like?
- An approved/reviewed set of drawings were created
- Approved set of drawings were compared to the Installer’s as-built set:
  - Location of additional devices and circuit layout were identified
  - Monitoring service (UL Central Station Service) was able to label alarms as owner sees them and could later **certify** the system
- Pre-test documentation were created validating owners wishes:
  - That only UL Approved equipment be used
  - That only qualified and/certified installers complete work
- Incremental and pre-acceptance testing was conducted and documented
  - Ten percent of the smoke detectors on every initiating-device circuit and signaling line circuit should be removed from their bases, one at a time
What Does A Real Commissioned Installation Look Like?

Continued

— Break one connection on 10% of the initiating devices (manual pull boxes, heat detectors, sprinklers flow switches, valve supervisory switches, spot smoke detectors, duct smoke detectors)
— Break one connection on 10% of the devices on signaling line circuits (trouble alarms)
— Remove one connection on 10% of the appliances on each notification-appliance circuit
— Functional testing yielded high success ratio
— Voice, Horns/Speakers and Strobes were tested only when planned and during agreed upon times
  — Sound measurements were recorded
  — Documentation was honored by AHJ
— Synchronization of initiating devices and auxiliary devices were coordinated for elevator returns, smoke doors, etc. using floor plans

What Does A Real Commissioned Installation Look Like?

A very well documented project!

Samples
Want More?

- SFPE FPEmag.com
  - Commissioning Buildings for Fire & Life Safety - T. Brown
  - Commissioning Smoke Control Systems - K. Elowitz
  - FP Engineering: Issue No. 48, Q4, 2010
- NFPA 5000
- NFPA Commissioning Fire Protection Systems - D. Hague
- ASHRAE Guideline 1.1 - HVAC&R Technical Requirements for the Commissioning Process
- NIBS Whole Building Design Guide
- U.S. GSA PBS-P100 & The Building Commissioning Guide

Want More?

- AS 1670.1-2004 Fire detection, warning, control and intercom systems - System design, installation and commissioning – Fire
- BS 5839-1 The Design, Installation, Commissioning, and Maintenance of Fire Detection and Fire Alarm Systems
  
Thank You

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CERTIFICATE OF COMPLIANCE

THIS IS TO CERTIFY that the installation of the above listed equipment has been installed in accordance with the manufacturer's installation instructions and the National Electrical Code. The equipment is listed and labeled for the use shown and is listed as a "Listed for the UL System Certificate".

LISTED SERVICE FROM: CHICAGO, IL

Sample

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XL Global Asset Protection Services
Presentation Evaluation Evaluation Form

Date: ________________________

Evaluator’s Name: _______________________________________

Course Name: __________________________

1. Overall, how satisfied were you with this course?

☐ Very Satisfied
☐ Satisfied
☐ Neither satisfied nor dissatisfied
☐ Dissatisfied
☐ Very dissatisfied

2. Would you recommend this course to another person?

☐ Definitely would
☐ Probably would
☐ Might or might not
☐ Probably would not
☐ Definitely would not
3. What did you like best about this course?

4. What did you like least about this course and how could this course be improved?

Please rate the course in the following areas:

Response Definitions:  E = Excellent  VG = Very Good  G = Good  F = Fair  P = Poor

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<td>5. Met its stated objectives</td>
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XL Global Asset Protection Services
Presentation Evaluation Form

10. Do you plan on using any or parts of this course information when you return to your site……………………………………..□ □ □ □ □

11. Will course materials be useful references for you (or others) when you return to your site……………………………………..□ □ □ □ □

12. Other comments?