



Addressable Fire Alarm - Materials and Enactment

An Online Continuing Education Course for Engineers

Course Number: H-7001

Credit: 7 Hours / 7 PDH / 7 CPD

Addressable Fire Alarm - Materials and Enactment

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"Proprietary Supervising-Station Fire-Alarm Systems (in-building)" of the modern addressable type are the focus of this course.

The owner wants the fire alarm system to FUNCTION, function WELL, and ENDURE. This course provides a big picture of many aspects toward those purposes.

Presented are some codes, fire alarm principles, fire alarm manufacturers, fire alarm equipment, other systems' connected equipment, fire alarm testing, some of this engineer's experiences, and a view of fire alarm relative to BMS.

Intended Audience

This author wished that owners, architects, and engineers of non-electrical disciplines understood something about fire alarm systems.

He imagined writing a course, "What an engineer wishes that architects knew."

It dawned on him: project managers of many sorts could become cognizant and conversant on the subject and acquire enhanced appreciation for fire alarm.

For fire alarm engineers and NICET designers, and technicians for construction or maintenance, it's easy to get lost in code details and manufacturers' equipment offerings. There are many big-picture tips for perspective in this course.

Excluded

Your work and application of information remain your authority, responsibility, and outcomes. This presentation is for "education" and is not "commands" or "instructions", whatever the wording. For fire alarm engineers, NICET designers and technicians are responsible for detailed system design, construction, testing, and maintenance. Each specialty has its own extensive, detailed difficult path.

Excluded are project-specific layouts, drawings, or specifications. Excluded are manufacturer-specific products or product details, or manufacturer-specific wiring, or manufacturer-specific connections; these vary and often change.

Course Outline

This course covers the following subjects, and more.

Part 1 INTRODUCTION

- Three types of fire alarm systems teach us principles: code box, zoned, and addressable.
- A firefighter's command center list reveals many building system interfaces located there.
- A chart, "Where are they now," shows buy-outs of well-known names into present companies.
- Multiple NFPA® codes and International Fire Code® are listed and excerpted to let you know that they exist as they pertain to fire alarm systems.

Part 2 MATERIALS

- 2025 NFPA72 National Fire Alarm and Signaling Code® and 2020 CSI MasterFormat® are related to each equipment and device in Part 2. This may be a unique feature.
- Described are addressable fire alarm panels, signals, 18 initiating devices, 5 notification devices, and other items, many with pictures.
- Photos of this engineer's projects show fire alarm equipment among other systems, as installed.
- Get an idea of how emergency communication and fire alarm interconnect.

Part 3 ENACTMENT

- About 32 other systems' interconnections to the fire alarm are listed.
- Learn how the fire alarm designer can get paid for adequate design, inspections, and testing.
- Know why inspections must be frequent and thorough.
- Specify materials, function, inspection, and testing to make them enforceable by the Owner.
- A view of control systems relative to fire alarm systems and Building Management Systems

General Notes

About Codes

- NFPA 72® has a note entitled "Additional Important Notices and Disclaimers." That note states that these NFPA® documents may be superseded at any time. Therefore, it is wise to study the updated codes that apply to your work.
- Herein, some code ideas are selected, condensed, and paraphrased. Some ideas are quoted, as indicated by quotation marks.
- This course's comments are not the official position of the respective code organization. Do not rely upon this work as a code substitution. Don't rely upon this work as a formal interpretation of a code organization. Do your homework for your work.

About Manufacturers

Where manufacturers granted permission to utilize their images, those manufacturers are named. Other manufacturers are listed in the "Where Are They Now" study. Other manufacturers are named in equipment descriptions.

Terms

Walter W. Henry, P.E., designed and wrote this original presentation. He refers to himself as "this engineer" or "this author."

"This work" refers to this presentation by this author.

"Your work" refers to the activities of the student, the reader, or one who selects to utilize some of this information in their activities.

Part 1 - INTRODUCTION

- Part 1 covers three types of fire alarm systems and what each system taught us about principles. Those principles still apply to modern addressable fire alarm and EC systems.
- The firefighter's command center list exposes the many building system interfaces located there.
- A chart features many manufacturers' names and tells "Where are they now?"
- National Electrical Code, NFPA 72 National Fire Alarm and Signaling Code, and International Fire Code are given a big picture as they pertain to fire alarm.



Credit: photo by Walter W. Henry, P.E., 2004

This electrical engineer and a mechanical engineer met with the project managers of the general contractor, electrical contractor, mechanical contractor, and perhaps a system subcontractor. This room was part of a renovation project inside a sizeable building.

Clarifications

"Design team" refers to some or all of the following parties to agreements: Owner, Owner's project manager, registered professional architect, registered professional engineer, system designer, manufacturer representatives, general contractor, or contractor Project Manager.

"Authority having jurisdiction" bears responsibility to "the public" for safety in construction. The AHJ possesses the authority to review design documents, to inspect, and to offer comments. The design team is wise to contact the AHJ early on before the final inspection. The AHJ appreciates the respect and recognition of its AHJ authority and responsibility. You really don't want to get cross-wired with the AHJ. They really want to help you conform to code as they understand it, and they are trying to be helpful. When the AHJ makes a suggestion, hey, just do it unless it creates some big problem; then discuss it and work it out.

The term "addressable" indicates that each device possesses an INDIVIDUAL address and is INDIVIDUALLY supervised.

"Device" is a generalized term for a small Fire Alarm equipment that mounts on a junction box and performs a specialized function. Function can be an input to the fire alarm system or an output from the fire alarm system.

"Panel" is a general term for a "box" or "enclosure" large enough to contain multiple devices. The main fire alarm panel or emergency communication panel will probably contain panel-front indicators or controllers.

Some sub-panels serve as large junction boxes for the connection of cables, wires, conduits, and circuits. Some sub-panels contain equipment to convert one type of signal to another type of signal, such as copper wire to fiber optics or vice versa. Some sub-panels contain batteries, battery chargers, or other power supplies.

A Brief History of CSI MasterFormat®

Before about 1960 and into the 1980s, a Project Manager faced multiple formats from each bidding company. In 1962, the **Construction Specifications Institute** began a format of divisions (such as Mechanical, Electrical) and sections within each division (such as Conductors, Conduits, Boxes).

About 1972, Construction Specifications Canada (CSC) and CSI merged their systems. Before November 2004, MasterFormat® had 16 divisions, and now has at least 50 divisions.

This outline is designed ONLY for this presentation. Design your format for your work.

NFPA 1 - Fire Code®

NFPA 1® provides a comprehensive, integrated approach to fire code regulation and hazard management. Existing and new facilities are addressed. Most persons and parties involved with facilities become involved with the scope of NFPA 1®: Owners, users, employees, Designers, constructors, maintenance persons, emergency responders, and even the general public.

NFPA 3 - COMMISSIONING OF FIRE PROTECTION AND LIFE SAFETY SYSTEMS®

3.3.20.2 Fire Protection System detects fire and its by-products (including smoke, for example) and activates the alarm. Some systems also suppress or control fire and its by-products.

3.3.20.4 Life Safety Systems facilitate or enhance evacuation, smoke control, isolation, or compartmentalization.

3.3.21.1 Integrated System contains systems that operate together to achieve fire protection and life safety objectives. (Some systems are designed for Fire Alarm plus emergency communications.)

3.3.21.2 Interconnected System is an integrated system containing systems or devices connected to achieve fire protection and life safety objectives. (A stand-alone Fire Alarm system and a stand-alone emergency communication system might connect to work together.)

NFPA 3 then applies to both Fire Alarm Systems and Emergency Communications Systems. This is a 59 or 60-page book that addresses the commissioning of new or existing systems.

NFPA 4 - STANDARD FOR INTEGRATED FIRE PROTECTION AND LIFE SAFETY TESTING®

4-1.1, 4-1.2, 1.3 NFPA 4 provides a minimum testing protocol for the referenced systems.

3.3.3 Commissioning is a systematic process. Confirm that systems, materials, and functions conform with the criteria shown in the contract documents and conform with applicable codes.

A wise specifier lists specific applicable codes in PART 1 - GENERAL for each specifications section.

Under PART 3 of the specifications, detail the test methods.

NFPA 4® can help you plan your test method.

Also, detail your expectations for a Contractor and helper persons to be present, access, safety escort, tools the Contractor shall bring, who shall walk-through and who shall operate the central equipment, "TESTING" announcements, and so on.

Go to Part 3 - ENACTMENT to read the testing system utilized by this engineer.

NFPA 70 - National Electrical Code®

What does NFPA 70® have to do with Fire Alarm?

Fire Alarm Systems require these.

- Conduits and electrical boxes to hold power
- power conductors and signal
- surge sup
- circuit bre
- normal (ut

NFPA 70 90.2

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The NFPA states tha
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(B) states that NFPA 7
BUT such a system ma
expansion.

- For example, or "NFPA 70 Code" now because the circuit is adequate for the present load. The circuit may NOT be adequate for the load in the future.
- For another example, the wire or cable in conduit, as shown in the NFPA 70 chart, might work in a twenty-foot straight conduit between two large boxes. But the NFPA 70 allows multiple bends in a conduit between boxes. A 100-foot conduit with three bends of ninety degrees each, packed full of wires, can require huge pulling tensions that scrape insulation off of conductors. A trained designer would upsize the conduit a few sizes.

(C) explains the application situations of NFPA 70.

NFPA 70 applies to the "Installation and removal of

- electrical conductors, equipment, and raceways;

