
Advanced Fire Alarm Systems Training
Program Outline (5 Day)

Day 1

**Prescriptive and Performance-Based Design**

Understand the methodology in accessing the threat of fire within a structure. Know the difference and application between prescriptive and performance based design. Topics include hazard analysis, fire signatures and heat growth rates**.**

**Building Codes and Standards**

Understand building codes and how they determine building classification which governs type of system installed. Review building codes to determine special requirements for fire alarm systems. Know the difference between codes and standards and when and how they are applied.

**Insurance Agencies and Organizations**

Become familiar with the role of insurance agencies and organizations and how they influence fire alarm design and installations. Know the requirements for acceptance and system approval, and the protocols of each agency.

**Occupancy Classifications**

Understand the codes that govern the occupancy classifications of buildings and structures. Know the fire protection standards of various occupancy classifications and the requirements. Be familiar with documentation requirements for fire protection and detection systems.

**Project Specifications**

Project specifications consist of the body of information that should guide designers, installers, and Authority Having Jurisdiction (AHJ) through all phases of the project. Understand the purpose, definitions, and types of specifications.

Day 2

**Combustion - Theory and Principles**

Develop and understanding of the chemical reaction in the combustion process and the signature produced. Understand the stages of material heating and thermal particulates. Know advantages of various methods of detection.

**Smoke Propagation Principles in Buildings**

Develop an understanding of the properties and characteristics of smoke movement. Know the effects of pressure, temperature and partitions affecting the expansion of heated gases produced by combustion.

**Prevention of Nuisance and False Alarms**

Know the proper selection and placement of automatic detectors and maintenance programs for reliable and proper operation of fire alarm systems. Understand system program features to reduce unwanted alarms from utilizing alarm verification, positive alarm sequencing, cross zoning and pre-signal. Also electronic and pneumatic retard mechanisms for sprinkler water devices.

**Hazard Protection Analysis**

Understand the methods used to determine the risk for a particular facility. Know the factors that influence a design and inputs from insurance agencies, stakeholders and authority having jurisdiction. Determine suitable detection methods and technologies to satisfy performance requirements.

**Hostile Environment Design Considerations**

Discuss various environmental hazards and conditions associated with fire alarm system installation. Know the proper device selection or installation method to reduce or prevent damage. Be able to apply codes determined by environment.

Day 3

**Reliable and Survivable Systems**

Types of design and installation methods to allow for continuous operation of systems. Location and protection of equipment and wiring depending on environment. Understand equipment listing, system reliability, system survivability, installation methods and environmental considerations.

**Detector Spacing**

Review the various smoke detection principles and the advantages of their application. Know the code requirements for location and spacing of smoke detection. Be able to lay out detectors within a given space. Know the code requirements for location and spacing of thermal detection. Understand how elevations affect response and detection principles. Be able to lay out thermal detectors within a given space.

**Systems for Smoke Control**

Know the requirements, purpose and methods of smoke control in buildings. Discussing placement of detectors and building functions controlled by the fire alarm system. Understand smoke movements and how it is purge or contain for occupant relocation and egress.

**Sprinkler System Interface**

Understand the operation and interconnection to a fire alarm system of various sprinkler wet and dry pipe alarm devices such as water flow, pressure, temperature, and level, retarding devices, gate valve supervisory switches, and fire pumps.

**Ancillary Systems**

Understand the function of ancillary systems permitted by the code, such as fan shutdown, elevator capture, and smoke management systems. Know their purpose, location, operation, restrictions, circuit and supervision requirements.

**Special Hazard Protection Systems**

Be able to lay out a fire detection system for protection of special hazards. Facilities discussed shall include data centers, telecom and server rooms, document storage and critical processes. Know the proper location and spacing of smoke detectors, manual release and abort stations. Understand the interconnection to the building fire alarm system and HVAC equipment interface of.

**Interconnection of Systems**

Discuss the interconnection of systems associated with fire alarm functions. Know the purpose, operation and connection requirements. Covers extinguishing systems, to include sprinkler, clean agent, co2, dry/wet chemical and foam. Also detector selection and system configurations

Day 4

**Voice Systems**

Understand how factors that affect intelligibility determine the selection and placement of speakers. Know the operation of big audio and arrays for outdoor applications and proper tapping of speakers for indoor operation. Basic understanding of *Mass Notification Systems* (MNS) and *Emergency Communication Systems* (ECS).

**Intelligibility Standards**

Know the approved methods to demonstrate adequate intelligibility of voice systems. Understand the factors that affect intelligibility and acoustically designated spaces. Understand intelligibility methods (CIS, STI), materials and acoustic properties and acoustically designated spaces (ADS).

**Surge and Transient Protection**

Understand the principles of induction and sources of disruptive energy on fire alarm systems. Know the types and methods of protection to minimize those effects. Be able to apply type of suppression methods for the anticipated hazard.

**Electricity and Electronics**

Understand the difference between DC and AC circuits, and know the characteristics of each. Be able to identify series and parallel circuits, as well as calculate current, voltage and resistance. Become familiar with electronic components and their usage.

**NFPA 70**

Understand how the *National Electric Code* (NEC) governs the installation methods and materials required for fire alarm systems. Know how to use box and conduit fill, conductor characteristics and other tables.

**Tactile Notification**

Understand the operation, selection, location, spacing, mounting, and use of tactile and alternate visible alarm notification appliances. Topics include digital signage, LED, text messaging and distributed recipients

**Shop and Riser Drawings**

Know the requirements that govern the need for shop drawings and what is included. Understand the purpose of plans, wiring diagrams, riser diagram and matrix, to include sequence of operation. Become familiar with information required to show the number and size of conductors, tagging conventions, conduit and the location of each system component.

Day 5

**Project Management**

Be familiar with project timelines and the installation of fire alarm and protection systems. Demonstrate ability to communicate with agencies and coordination of general trades to meet project deadlines. Know the methods of tracking progress and characteristics of each.

**Contract Documents**

Understand the various agencies that govern the content of contract documents and when they are used. Be familiar with terms and purpose of site programs. Know procedures for contract administration and coordination of communication during a project.

**Construction Plans and Drawings**

Acquire a working knowledge of various types of plans used in the construction industry. Use standard plans to determine dimensions, types of materials, elevations, locations, and other information needed for a building fire alarm system. Be able to generate a bill of material listing symbol, description, manufacturer and part number of all equipment used.

**Project Correspondence**

Utilize common rules of grammar and punctuation to form clear sentences and paragraphs in composing project documents. Adhere to industry accepted guidelines for routing and distribution. Be familiar with common forms and methods of communication in the construction industry. Know the purpose and application of standard documents submitted.

**Proposal Generation**

Determine the proper selection of systems and components to satisfy customer specifications. Understand how local, state and agency requirements affect the selection and design of fire alarm systems.

**Project Close-Out**

Know the various documentation that is required to for project close out. Understand the proper distribution of materials and archive procedures of documents. Understand the Record of Completion, test reports, and as-builts.

**Course Evaluation**

An Exam will be administered at the conclusion of the course. Students will be limited to one-hour and the exam will consist of 60 questions. References allowed during exam will be NFPA 72, the *National Fire Alarm Code* (2007), NFPA 70, the *National Electric Code* (2008), NFPA, 101 the *Life Safety Code* (2006) and the *International Building Code* (IBC) (2006).

Sincerely,

Paul J. Inferrera, SET