Fire Alarm Systems: Detection Design, Installation, Commissioning and Maintenance

17 – 21 May 2027
Dubai - Five-star CBD venue



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Introduction:

Fire alarm systems in offices, hospitals, hotels, malls and data halls often fail in service for reasons set at the drawing board: detectors sited where airflow carries smoke away, loops without isolators, undersized standby batteries, sounders that cannot be heard, and interfaces to fans, lifts and doors that were never tested. The result is late warning, nuisance alarms and occupants who stop responding. This Core Concept course trains engineers, contractors and inspectors to design, install, commission and maintain detection and alarm systems for buildings. Participants produce a Fire Alarm Design and Commissioning Plan for a case building.

Course Objectives:

- Select the system category and coverage level for a building from its occupancy, evacuation strategy and property protection objectives
- Choose and site point smoke, heat, multi-sensor, flame, optical beam and aspirating detectors and manual call points for each room type and ceiling condition
- Design conventional, addressable and analogue addressable panel architectures with loop isolators, cabling routes and standby battery capacity
- Specify sounders, visual alarm devices and voice evacuation zoning, and write a cause-and-effect matrix for HVAC, lift, door and suppression interfaces
- Plan installation checks, commissioning tests and acceptance witnessing, then set an inspection, testing and maintenance schedule with service records
- Reduce unwanted alarms through detector choice, alarm verification, investigation delays and a false alarm log

Target Audience:

- Fire protection and building services designers who prepare detection layouts, riser diagrams and specifications
- Facilities engineers who operate fire alarm panels and manage service contractors in occupied buildings
- Installation and systems integration contractors who wire, programme and hand over fire alarm systems
- Inspectors and third-party reviewers who check drawings, witness acceptance tests and audit service records
- Commissioning engineers who verify interfaces between the fire alarm panel and mechanical, lift and access control systems

Course Outline:

Day 1: Fire Alarm System Functions, Categories and Building Survey

- Fire Alarm Control Panel Role: Monitoring Inputs, Supervising Circuit Integrity and Driving Outputs
- BS 5839-1 System Categories M, L1 to L5 and P1 to P2 Compared with NFPA 72 Coverage Terms
- Evacuation Strategies: Simultaneous, Phased and Staff Alarm and Their Effect on Alarm Design
- Occupancy Profiles: Offices, Hospitals, Hotels, Shopping Malls, Warehouses and Data Halls
- Existing System Condition Survey Checklist and Zone Chart Review

Day 2: Detector Technologies, Manual Call Points and Panel Architecture

- Point Optical Smoke, Heat, Multi-Sensor and Carbon Monoxide Detector Response Principles
- Optical Beam, UV/IR Flame and Aspirating Smoke Detection with Pipe Network Sampling
- Manual Call Point Types, Mounting Height and EN 54-11 Product Requirements
- Conventional Zone, Addressable and Analogue Addressable Panel Architectures
- EN 54 Product Series and Listed Equipment Compatibility Checks

Day 3: Detection Layout, Loop Design, Power and Notification

- Detector Spacing, Ceiling Height, Beams, Voids and Airflow Siting Rules
- Loop Topology Class A and Class B, Short Circuit Isolators and Device Loading Calculation
- Fire-Resistant Cable Selection, Segregation and Voltage Drop Check on Sounder Circuits
- Standby Battery Capacity Calculation for Quiescent and Alarm Load
- Sounder Audibility, Visual Alarm Device Coverage, Temporal-3 Pattern and Voice Evacuation Zoning

Day 4: Interfaces, Documentation, Testing and Unwanted Alarm Control

- Cause-and-Effect Matrix for HVAC Shutdown, Smoke Dampers, Lift Recall, Door Release and Suppression Release
- Design Documentation Set: Layout Drawings, Riser Schematic, Zone Plan and Loop Schedule
- Installation Inspection, Commissioning Tests and Acceptance Witnessing Records
- Inspection, Testing and Maintenance Frequencies Following NFPA 72 at Overview Level
- False Alarm Root Causes, Alarm Verification, Investigation Delay and False Alarm Log Analysis

Day 5: Case Building Design Review and the Design and Commissioning Plan

- Mixed-Use Tower Case: Category Selection and Detector Layout Mark-Up
- Hospital Ward Case: Phased Evacuation, Voice Message Zoning and Staff Alarm Logic
- Data Hall Case: Aspirating Detection Thresholds and Gaseous Suppression Release Interlock
- Loop Schedule, Battery Calculation and Cause-and-Effect Matrix Build for the Case Building
- Fire Alarm Design and Commissioning Plan Presentation and Peer Challenge

Skills You Will Gain:

- System Category Selection
- Detector Siting
- Loop and Panel Design
- Battery Capacity Calculation
- Voice Evacuation Zoning
- Cause-and-Effect Programming
- Commissioning Witnessing
- Unwanted Alarm Reduction

Why Attend This Course:

- Return with a Fire Alarm Design and Commissioning Plan built for a case building and ready to adapt to your own project
- Check a designer's layout or a contractor's loop schedule and spot missing isolators, poor detector siting and undersized batteries
- Run acceptance tests and interface checks with mechanical, lift and access control teams on equal terms
- Compare design and maintenance practice with peers from healthcare, hospitality, commercial, logistics and data centre buildings

Conclusion:

A fire alarm system protects occupants only when the category, detectors, loops, power, notification and interfaces are designed as one and proven in testing. The course moves from system functions, categories and evacuation strategies, through detector technologies and panel architecture, to detection layout, loop design, batteries and notification, then interfaces, documentation, commissioning, maintenance and unwanted alarm control. The final day applies these methods to case buildings and produces a Fire Alarm Design and Commissioning Plan ready for review.