Fire Alarm Systems 101

Presented By:
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OBJECTIVE

The students will be able to describe the basic components of fire alarm systems.

The students will be able to describe basic types of systems.
SYSTEM ELEMENTS

Fire Alarm Control Panel

Initiating Devices (Inputs)

Notification Appliances (Outputs)

Auxiliary Functions (Outputs)

Primary Reliable Power Supply

Secondary
MANUAL INITIATION

- Require human interaction
- Activated by pull station or from central point
- May be multi-hazard
AUTOMATIC INITIATION

- Require no human interaction
- Employ detection devices
- May set a sequence of events in motion
FIRE ALARM CONTROL PANEL

- Contains all electronic controls
- Processes signals
- Identifies alarm location
- Shows alarm status
- System’s Brain
FIRE ALARM CONTROL PANEL

- Panel
- FACP
- Dialer
- Releasing Panel
- Red Box
- Edwards Panel
- Radionics panel
- Simplex Panel
FIRE ALARM CONTROL PANELS
INTERPRETING SIGNALS

- Red: Fire
- Yellow: Supervisory/Trouble
- Green: Normal
SIGNALS

- **Red**: Fire or emergency condition.
- **Yellow**: Trouble or supervisory.
  - Trouble: electrical problem.
  - Supervisory: tamper or mechanical problem.
- Visual signals are backed by audible.
POWER SUPPLIES

Primary:
- Normal Building Power

Secondary:
- Batteries, uninterruptible power supply (UPS), and generators
- 24-hour supply (2002 NFPA72)
  - 5-minute alarm capacity
BATTERIES

Batteries

BAT / BATT/ BATTS

Standard Types

- Gel cell
- Lead Acid
- Sealed Lead Acid

Normal Sizes

12V 7AH / 12V 10 AH / 12V 18 AH
12V / 33 AH
AH / Ahrs / AHRS
FIRE ALARM SYSTEM TYPES

- Zoned systems:
  - Addressable
  - Analogue Addressable
  - Combination Systems
  - Burg Dialer systems
Manual or automatic devices that initiate an alarm:
- Pull stations
- Automatic detectors
MANUAL PULL STATION

**Single Action**

- FIRE ALARM
- PULL DOWN

**Dual Action**

- PUSH HERE
- THEN
- PULL DOWN

**Dual Action**

- FIRE
- PULL DOWN
AUTOMATIC DETECTOR FEATURES

- **Restorable:**
  - Respond to heat rise/smoke
  - Reset when temperature drops or smoke clears

- **Nonrestorable:**
  - Single use
  - Must be replaced by qualified person
HEAT DETECTORS

- Fixed temperature
- Continuous line/Thermistor
- Fixed Temp.
- Rate-of-rise
- Pneumatic
- Heats / HD / H Det / FT
- FT / ROR
- Fire wire / Protectowire
FIXED TEMPERATURE HEAT DETECTOR

Circuit Contact

Contact

Spring

Diaphragm

Plunger

Heat Collector

Fusible Element
LINE DETECTOR--TWO WIRES

- Actuators
- Heat Sensitive Material
- Protective Tape
- Outer Covering

INTERMEDIATE PROTECTOWIRE
LINE TYPE HEAT DETECTOR
FIXED TEMP. 190°F
30V RMS 42.4VDC AT 1A MAX.
MAX. ROOM TEMP. 150°F.
DATE
DO NOT PAINT
PHOTOELECTRIC
SMOKE DETECTION PRINCIPLES

LIGHT OBSCURATION

REFRACTED LIGHT
PROJECTED BEAM
IONIZATION SMOKE DETECTION

- Clear Air
- Smoke Present

Diagram showing the process of ionization smoke detection.
DETECTOR PLACEMENT PROBLEMS

- Recess mounting
- Air velocity
- Mounting security
- Fluorescent lights
- Heating equipment
- Dust/Dirt/Insects
- Age/Sensitivity shifts
SMOKE DETECTORS

- Duct Detectors
  - Ducts / DD / D Det

- Spot Detectors
  - Photos / PSD / PHSD / SD-p
  - Ionization Detectors ISD / SD-i
INFRARED AND ULTRAVIOLET FLAME DETECTORS
WATER-BASED FLOW/PRESSURE SWITCHES

In-Line Vane
SUPERVISORY
NOTIFICATION APPLIANCES

- Location--inside/outside
- Signal--sound or light
- Alarms all or part of occupancy
- Tailored to local codes
NOTIFICATION APPLIANCES (cont'd)
REMOTE ANNUNCIATORS

- Locations: indoors/outside
- Graphic layouts
- Mark on preincident plan
REMOTE ANNUNCIATORS (cont'd)
OCCUPANT ALERTING

- Immediate notification
- Selective evacuation/relocation
- Presignal
- Positive sequence
VOICE SYSTEM ONE-WAY

Public address system
VOICE SYSTEM TWO-WAY

Firefighter phones

EMERGENCY TELEPHONE HANDSETS
HARDWARE RECOMMUNICATION
REMOTE PHONE JACKS
SUMMARY

- Alarm types
- Initiation Differences
- Notification Differences
- Different terms mean the same thing
- If unsure “ask” to confirm you are both talking about the same thing.