

Fire Alarm Systems 101

Presented By:

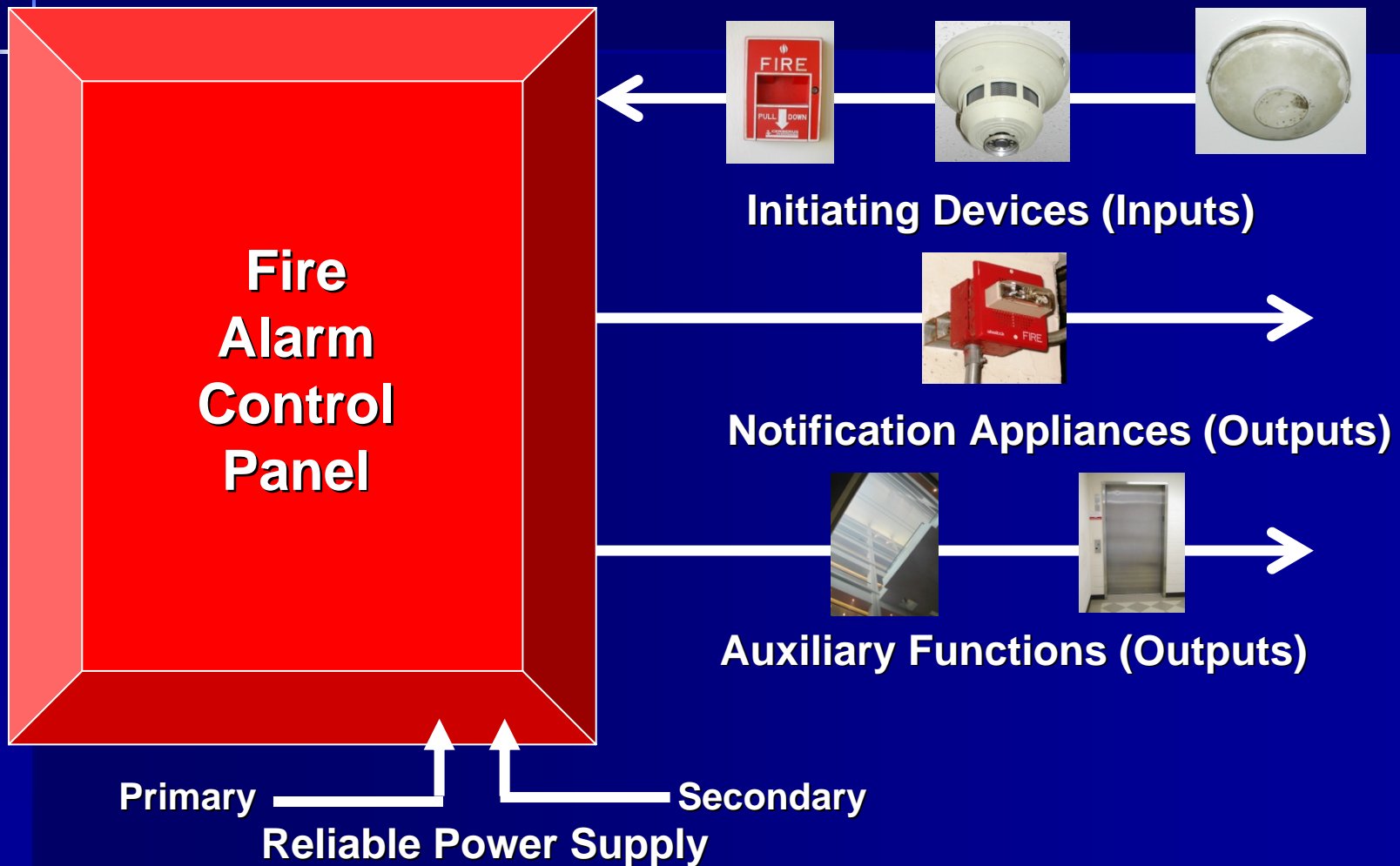
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OBJECTIVE

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



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



Zone module

Visual signals

Operational controls

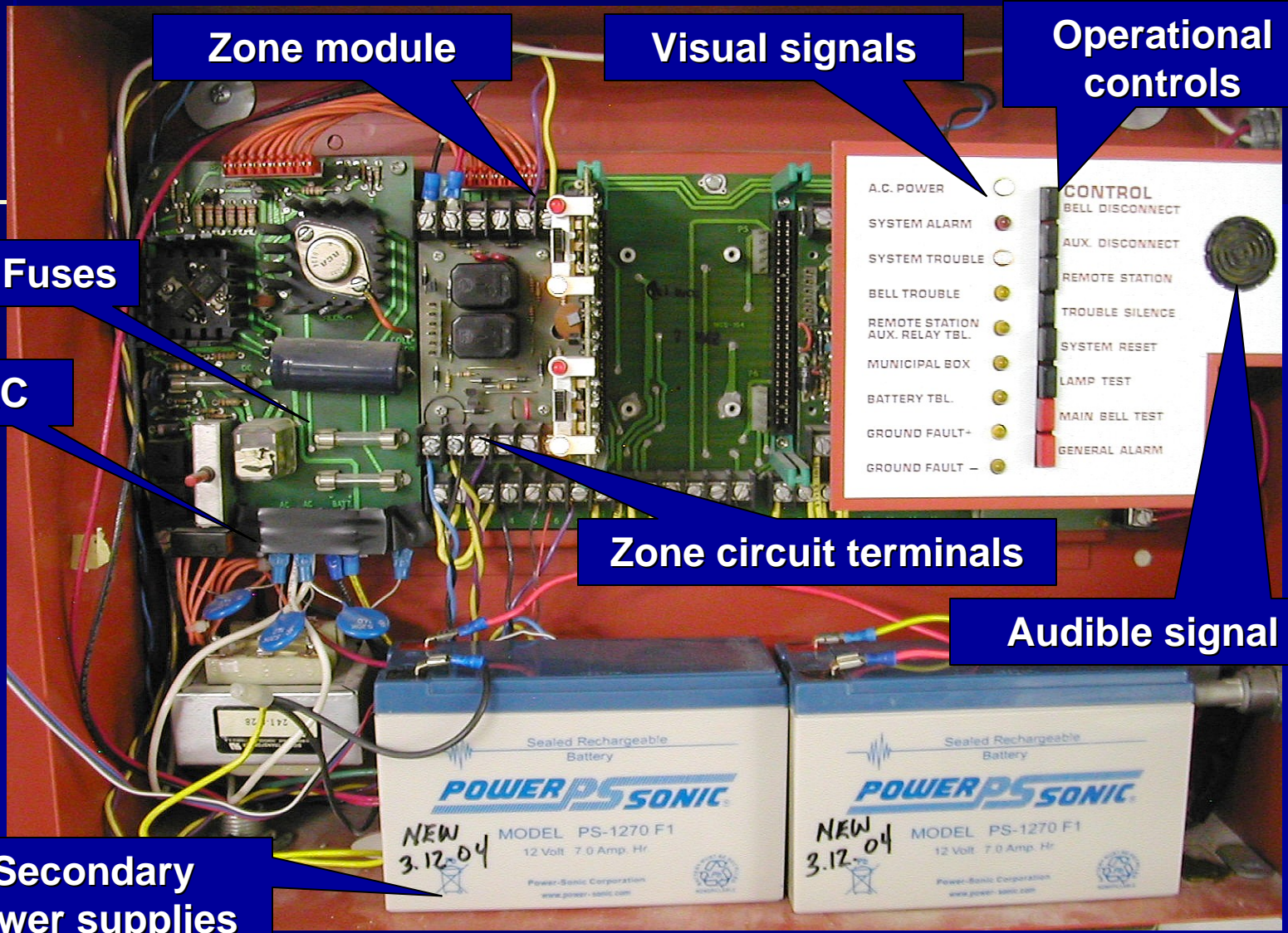
Fuses

AC

Zone circuit terminals

Audible signal

Secondary power supplies

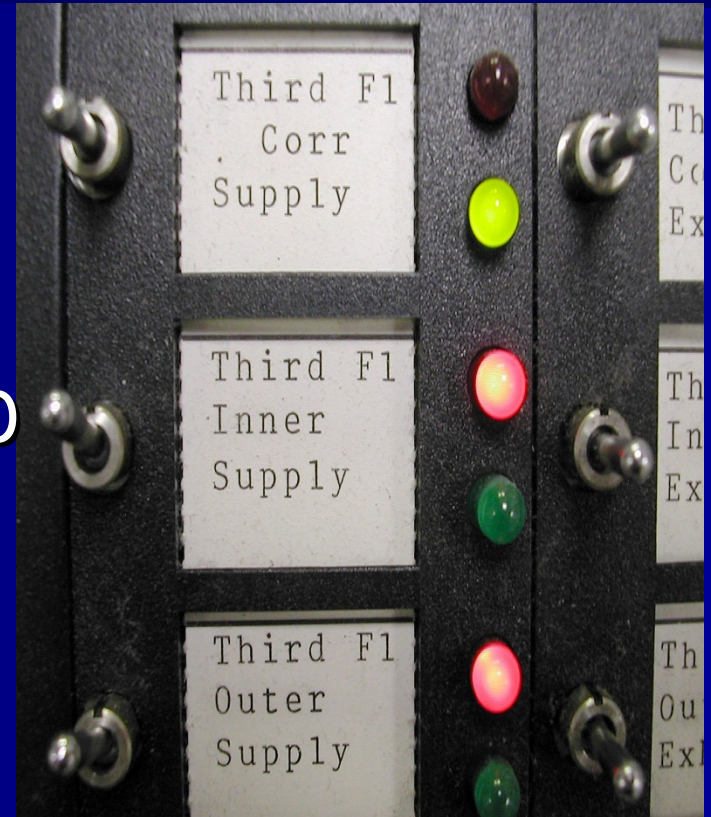


- A.C. POWER
- SYSTEM ALARM
- SYSTEM TROUBLE
- BELL TROUBLE
- REMOTE STATION AUX. RELAY TBL.
- MUNICIPAL BDX
- BATTERY TBL.
- GROUND FAULT+
- GROUND FAULT -

- CONTROL
- BELL DISCONNECT
- AUX. DISCONNECT
- REMOTE STATION
- TROUBLE SILENCE
- SYSTEM RESET
- LAMP TEST
- MAIN BELL TEST
- GENERAL ALARM

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

INITIATING DEVICES

- Manual or automatic devices that initiate an alarm:
 - Pull stations
 - Automatic detectors

MANUAL PULL STATIONS



Single Action



Dual Action

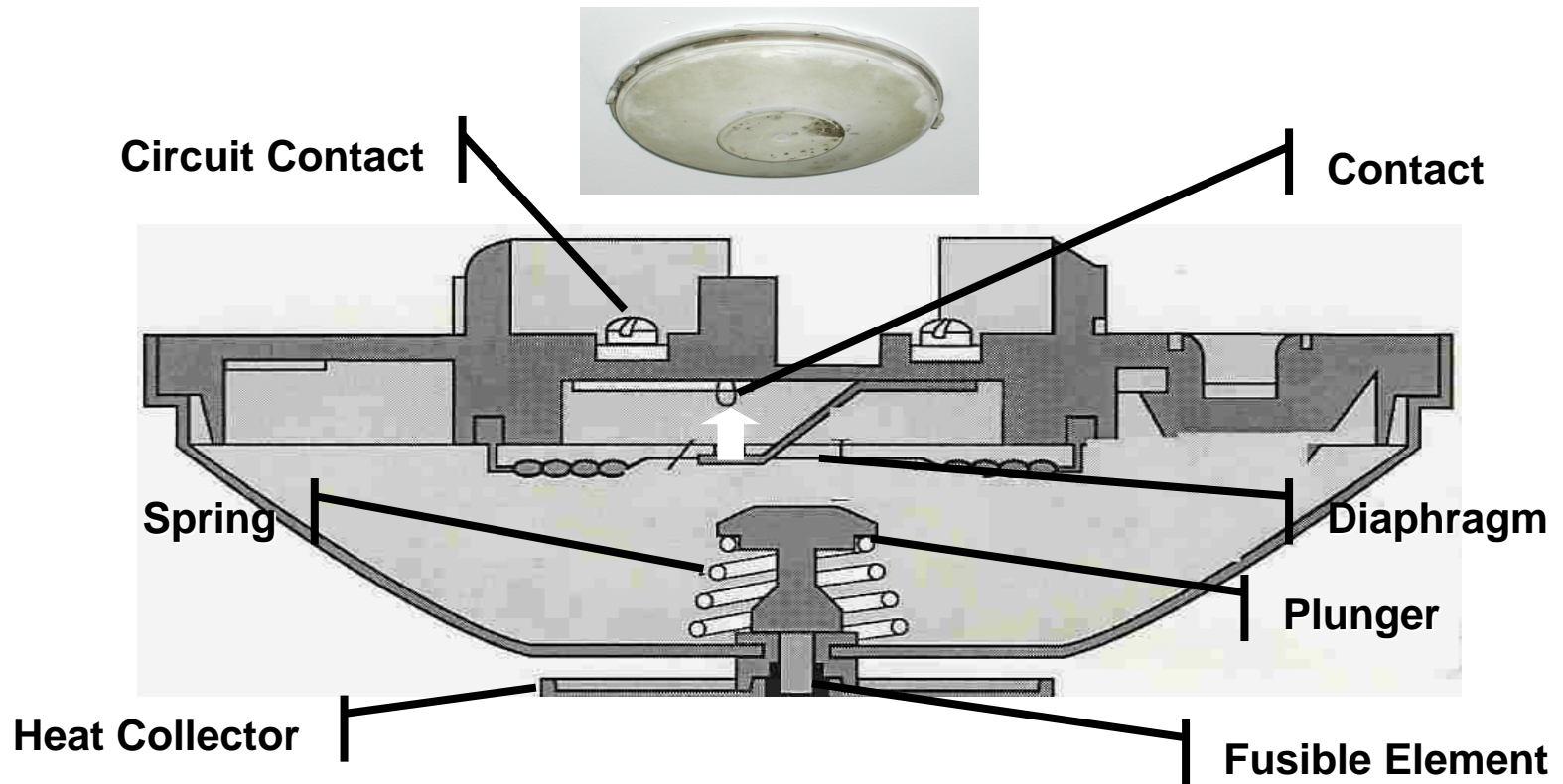
AUTOMATIC DETECTOR FEATURES

- Restorable:
 - Respond to heat rise/smoke
 - Reset when temperature drops or smoke clears
- Nonrestorable:
 - Single use
 - Must be replaced by qualified person

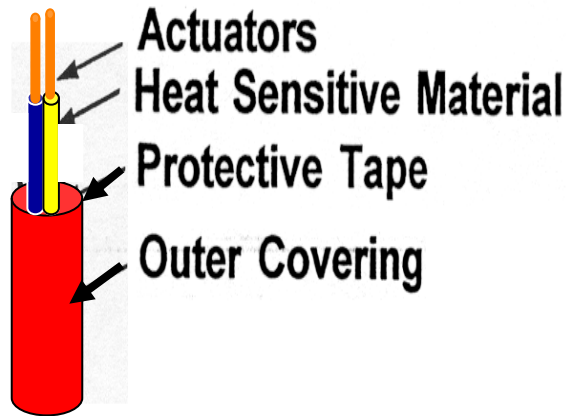
HEAT DETECTORS

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

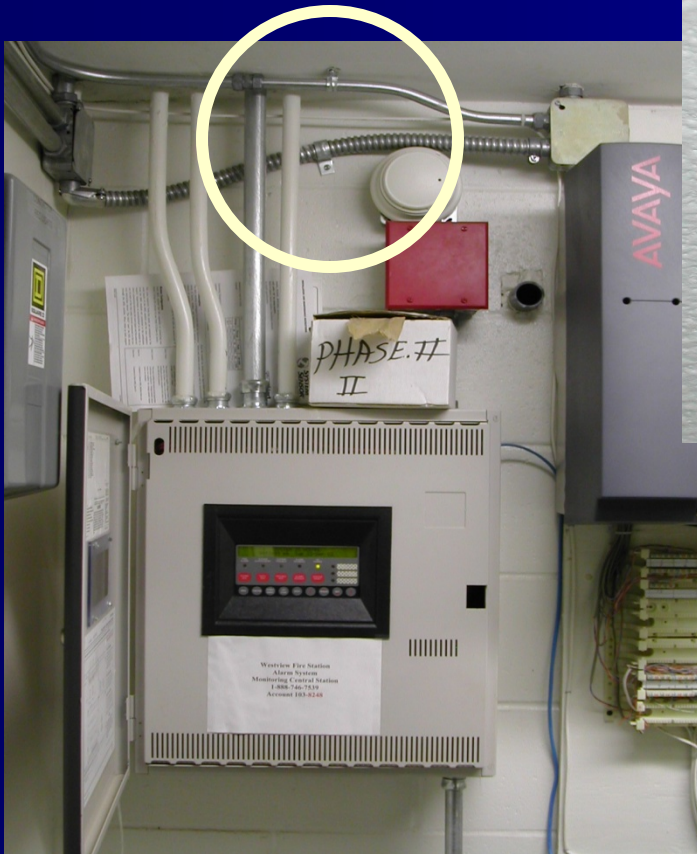
FIXED TEMPERATURE HEAT DETECTOR



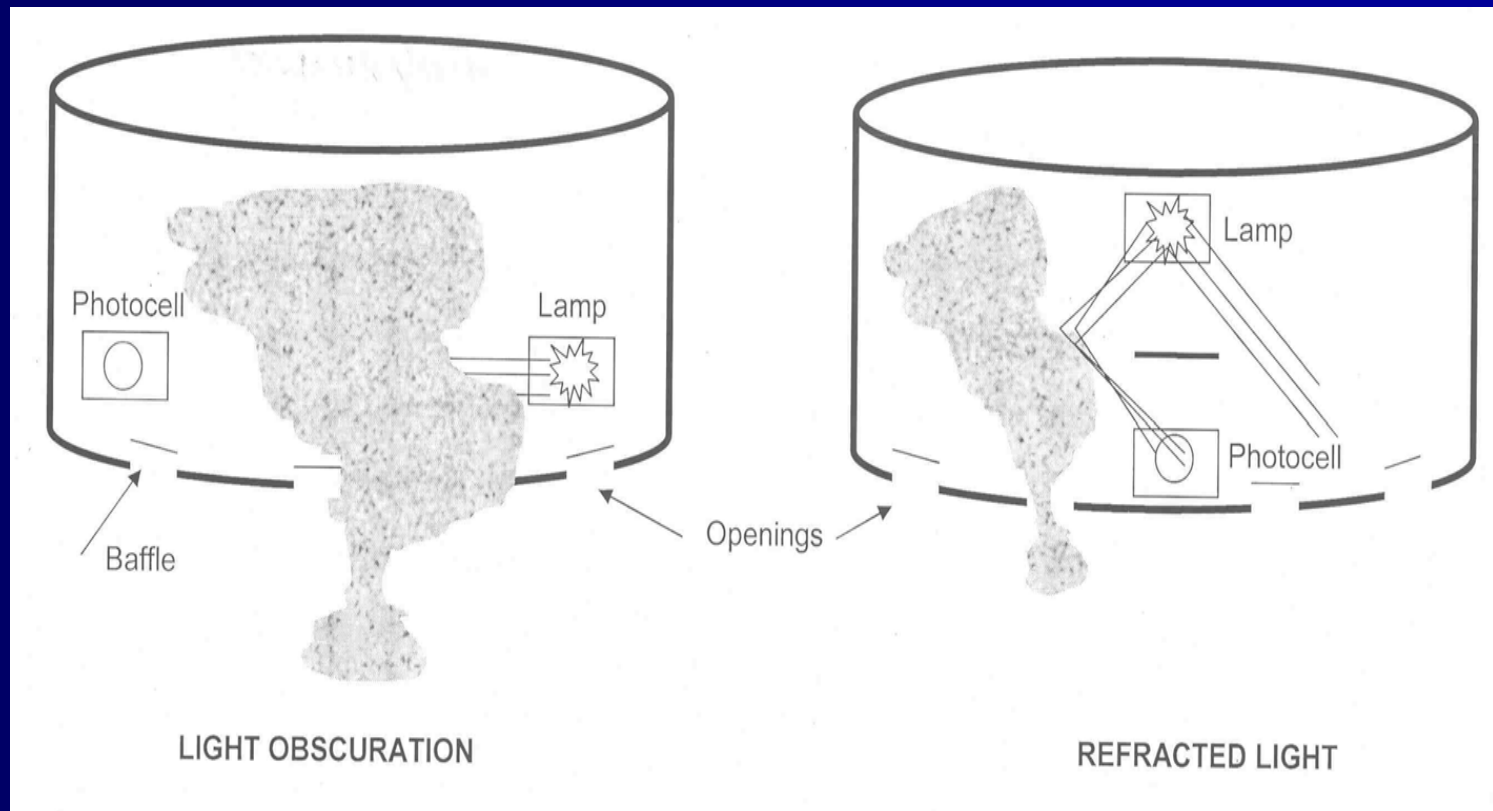
LINE DETECTOR--TWO WIRES



PHOTOELECTRIC SMOKE DEVICES



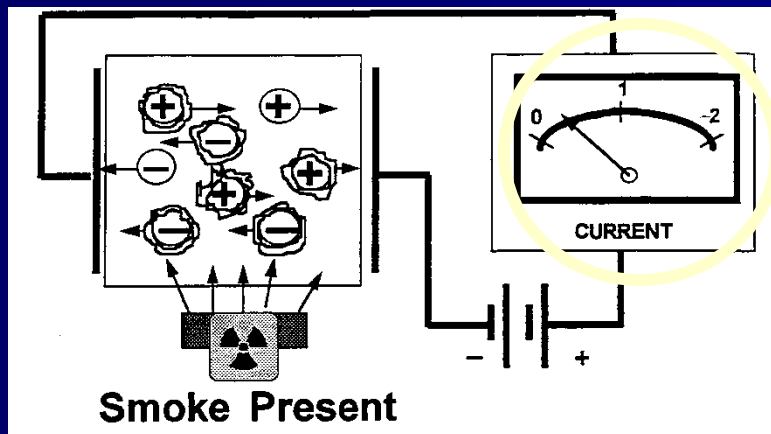
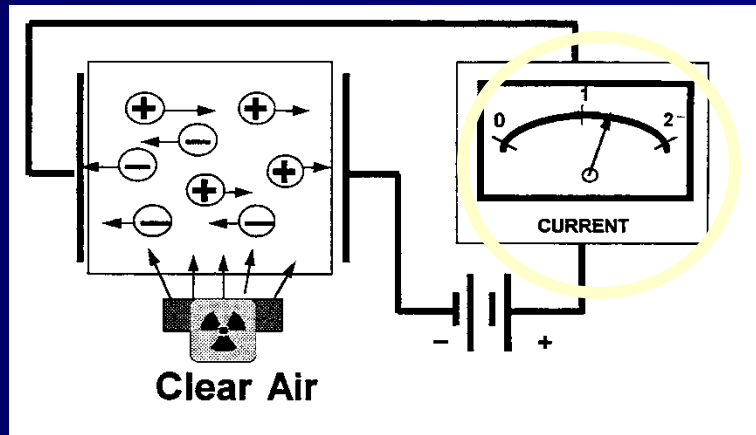
PHOTOELECTRIC SMOKE DETECTION PRINCIPLES



PROJECTED BEAM



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

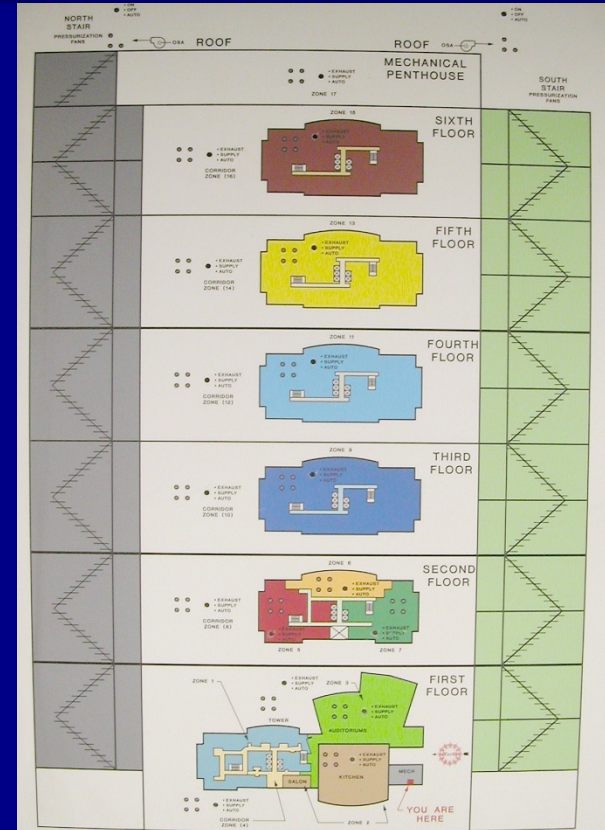
- Location--inside/outside
- Signal--sound or light
- Alarms all or part of occupancy
- Tailored to local codes

NOTIFICATION APPLIANCES

(cont'd)



REMOTE ANNUNCIATORS (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



HARDWIRED COMMUNICATION



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.