



إدارة السلامة والصحة المهنية - الأوشا

# Fire Safety Basics II: Detection & Warning Systems

يتم تدرس هذا الموضوع في دورات أوشا التالية:



سبتمبر 2011  
جزيرة تاروت، السعودية

- ☐ OSHA 510: Occupational Safety and Health Standards for the Construction Industry.
- ☐ OSHA 511: Occupational Health and Safety Standards for General Industry.
- ☐ OSHA 2015: Hazardous Materials

## دورات الاوشا

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إذا أردت دورات الاوشا بصيغة بوربوينت، عليك ترجمة  
موضوعين للغة العربية من دورات المقدمة في موقع "هندسة  
الإطفاء والسلامة".

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# **Fire Safety Basics II: Detection & Warning Systems**

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# Fire Detection Systems

The detecting part of a fire protection system has two main tasks:

- (1) giving an early warning to enable building occupants to escape and
- (2) starting extinguishing procedures.

# Detection and Warning Systems

- **Smoke Detectors:** respond to the particles of combustion, both visible and invisible which occur during the second fire phase; conventional operates on a light principle (less or more light trigger); smoke scatters or absorbs light;



# Detection and Warning Systems

- **Photoelectric detectors (line powered w/ annunciation - warning - in case of lamp failure); esp. for smoldering fires**
  - beam type- obscuration- light directed at a photocell, smoke obscures beam, decreasing transmission

# Detection and Warning Systems

- **Photoelectric detectors (line powered w/ annunciation - warning - in case of lamp failure); esp. for smoldering fires**
  - reflected beam - uses a beam of light in a chamber w/ a photocell normally in darkness. Smoke particles enter and scatter light and reflect to the cell



# Detection and Warning Systems

- ionization detectors (sense both visible and invisible products of combustion). System contains a chamber w/ positive and negative plates and a small amount of radioactive material (Am, Ir) that ionizes air in the chamber; the potential btwn the plates causes ions to move across the chamber, setting up a current;

# Detection and Warning Systems

- when aerosols from a fire enter the chamber, they cling to the moving ions, which slows them and increases the voltage necessary to keep the current moving and make contact; hence, an alarm;

# **Ionization Detectors**

- single chamber - current flows btwn 2 poles and detects increased voltage from combustion aerosols**
- dual chamber - 2 identical sources of radiation, one sealed chamber, the other open to the air. The inner chamber monitors ambient conditions and compensates for changes due to BP, temp, and RH.**

# Ionization Detectors

- low voltage - (24 v) less costly to operate, more costly to install;

## **Flame detectors:**

- **Respond to the optical radiant energy of combustion, usually at IR area of spectrum; 5-30 Hz range, can be sensitive to bright sunlight; fast responding; UV types insensitive to sunlight;**

# Alarm Systems

- **Local- building notification**
- **Auxiliary - local with circuitry to a master box**
- **Remote - as defined**
- **Proprietary - supervisory system**
- **Central station - service system**

## Local Alarm

- A local alarm consists of warning devices right in the building.
- Local alarms are generally used for life protection—, to evacuate everyone
- can be tied in with another system to summon the fire department.
- Inexpensive

## Auxiliary

- less expensive than local alarm system
- ties a fire detector to a nearby fire call box
- In effect a relay station triggered by fire detectors inside the building.



# Central Alarm

- available in most major cities
- continually monitors a number of establishments
- in case of an alarm, calls a nearby fire station and alerts the building's personnel
- May provide maintenance, inspection and follow up to alarms.

# Proprietary Alarm

- feed alarms to the building's own fire watcher or maintenance force
- Optionally to the fire department as well



# Signals

- **Trouble**
- **Notification**
- **Evacuation**
- **Waterflow**
- **Voice**
- **Visual**



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