SISTEM PENGAMANAN BAHAYA KEBAKARAN PADA BANGUNAN

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PENDAHULUAN

Api merupakan salah satu alat penting dalam filosopi kuno dan bersifat religius pada beberapa tempat di dunia ini.

Bangsa yunani kuno percaya bahwa api, tanah, air dan angin merupakan empat komponen penting untuk menghidupkan dunia.

Kita dapat merasakan api sebagaimana kita merasakan angin, tanah dan air dan juga ke empat komponen tersebut dapat kita pindahkan dari satu tempat ke tempat lain.

Akan tetapi api berbeda dengan komponen air, angin dan tanah, dimana api dapat berubah bentuk sebagai akibat dari reaksi kimia

Energi cahaya dan panas yang dilepaskan akan mengakibatkan terjadinya reaksi kimia dan tercipta nya api.

Api dapat juga bermanfaat ketika dapat di kontrol, seperti untuk penerangan, memasak dan bahkan untuk keagamaan / religius.



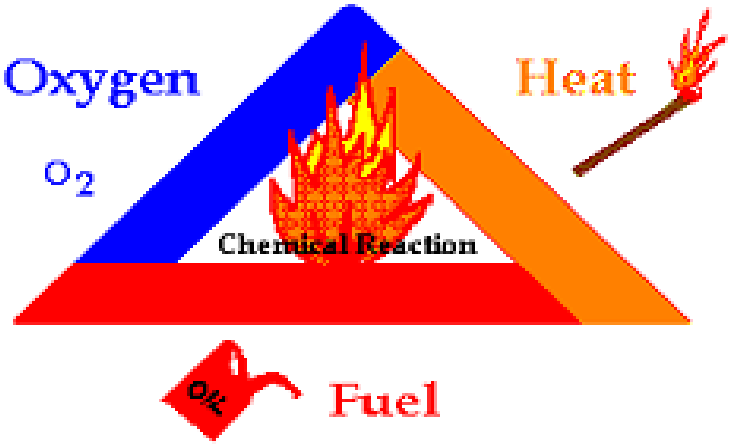

Namun, ketika tidak dapat di kontrol, api akan merusak dan menghancurkan








Faktor Dasar Api



Fire Triangle

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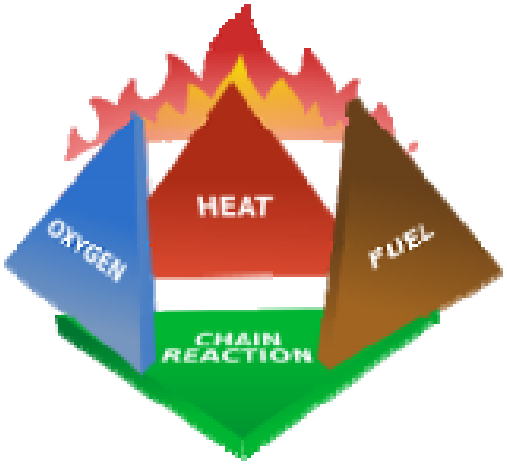
Chemical reaction between the three main components



Fire Tetrahedron

Ketika sumber panas mendekati/mengenai bahan yang mudah terbakar, akan terjadi reaksi kimia dan tercipta nya api

Sumber Panas

Sumber panas dapat menyebabkan pengapian

1. Komponen Elektrikal
2. Komponen Mekanikal
3. Percikan cahaya (kilat)
4. Gesekan
5. Reaksi kimia
6. Gas yang di kompres
7. Nuklir
8. Cahaya
9. Rokok, lighters dan matches

MATERIAL YANG MUDAH TERBAKAR (FUELS)

	Fuel	Example
1	Combustible solids	Wood, table, chair, paper, etc.
2	Combustible liquids	Petrol, kerosene, diesel, methanol, ethanol, etc.
3	Combustible gasses	Hydrogen, methane, butane, carbon monoxide, etc.
4	Combustible metals	Kalium (Potassium), Natrium (Sodium), Calcium, Magnesium, etc.

KEBAKARAN DAPAT TERJADI KARENA 3 HAL :

1. Kecelakaan (Penyalahgunaan alat-alat rumah tangga, dll)
2. Sengaja di bakar
3. Rusak nya peralatan, seperti penyalahgunaan listrik, kelebihan panas dll.



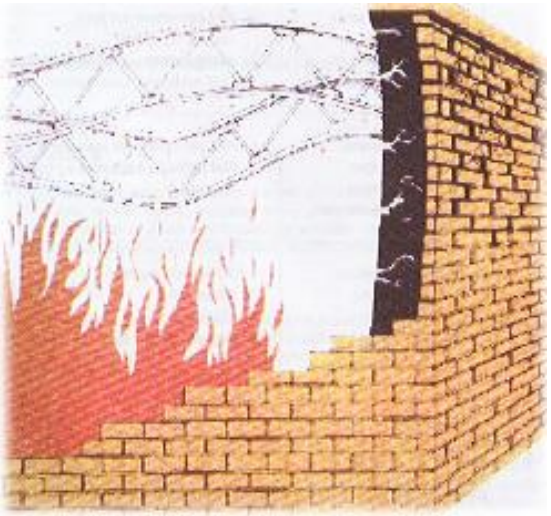



Metode api berkembang

1. Konduksi panas pada material bangunan

2. Konveksi panas gas

3. Radiasi panas



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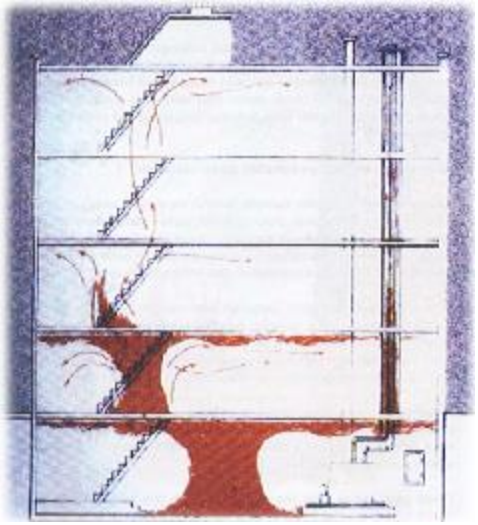

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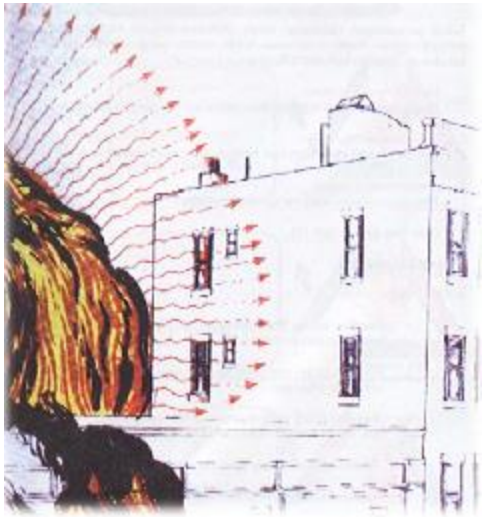

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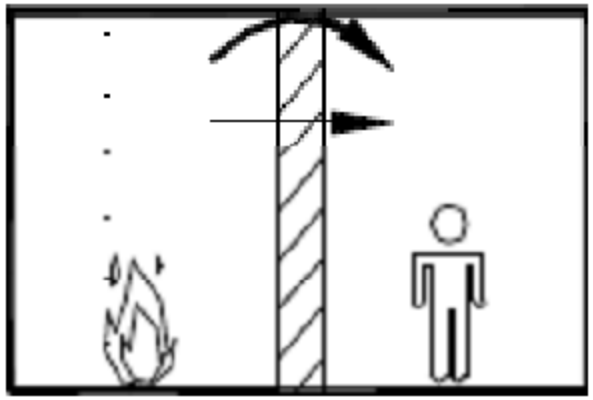
Tipe api berkembang

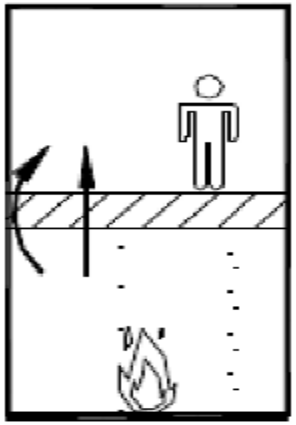
1. Langsung

2. Tidak Langsung

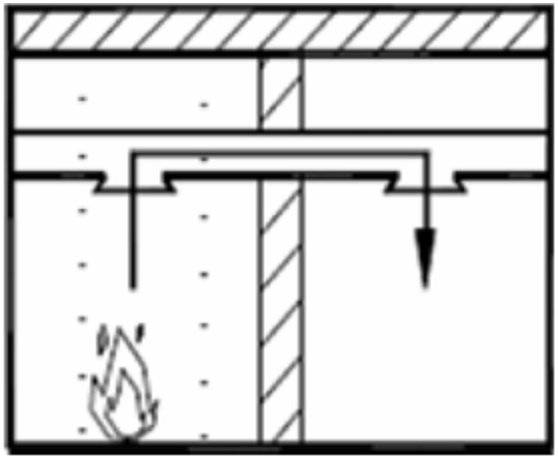
Tipe Langsung



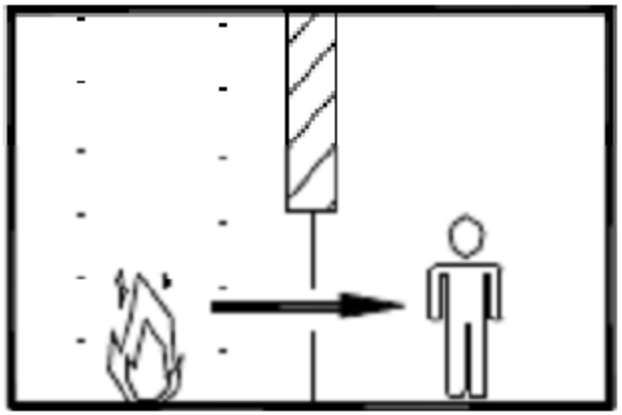
Melalui Dinding atau bukaan pada dinding



Melalui Lantai

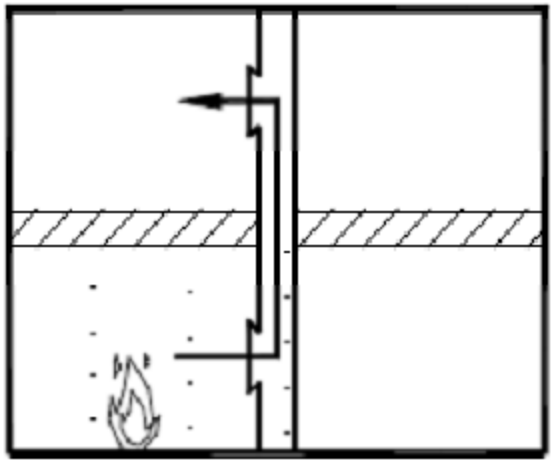


Melalui Pipa duct horizontal

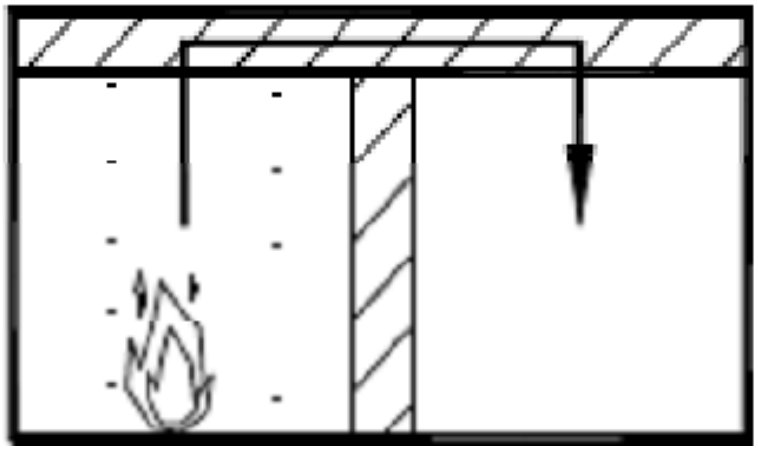


Melalui bukaan jendela/pintu

Tipe Langsung

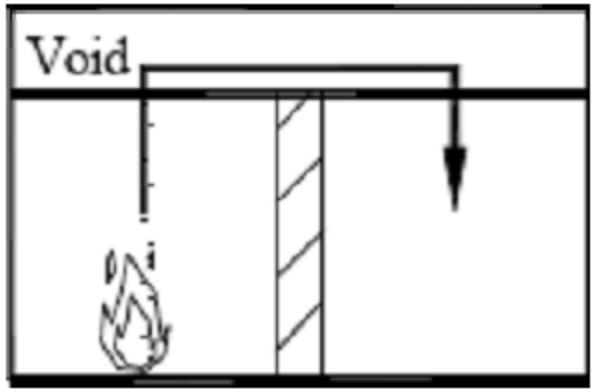


Melalui Pipa Duct Vertikal

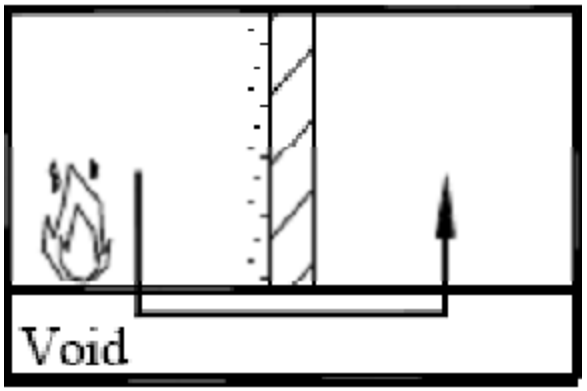


Melalui Atap

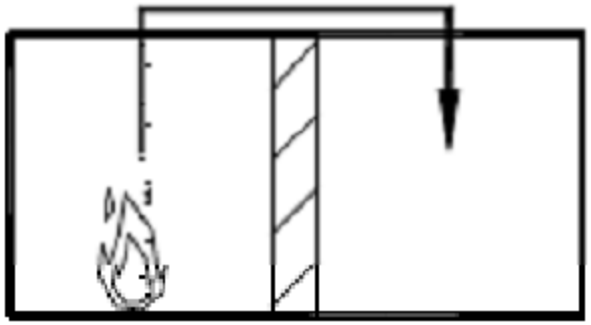
Tipe Tidak Langsung



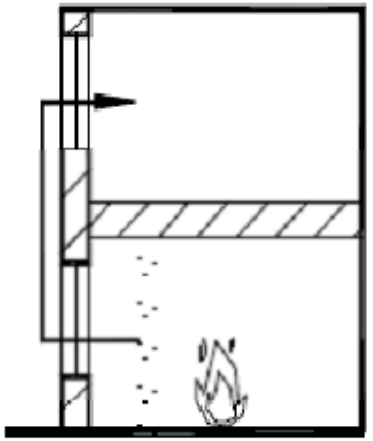
Di Atas Plafond



Di Bawah Lantai



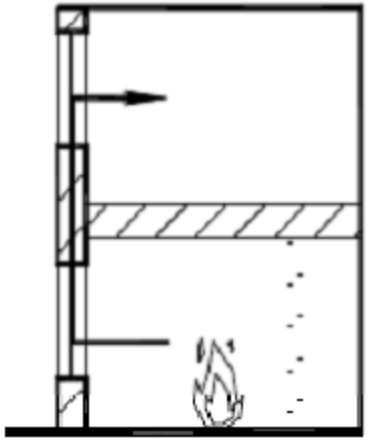
Dari luar atap



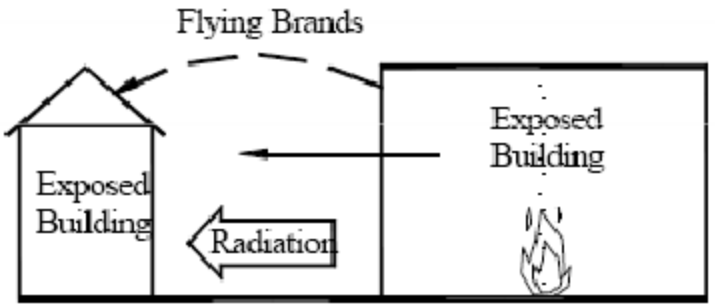
Dari jendela

Tipe Tidak Langsung

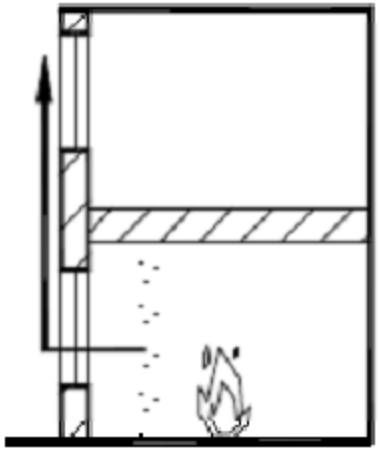
Melalui fasade bangunan



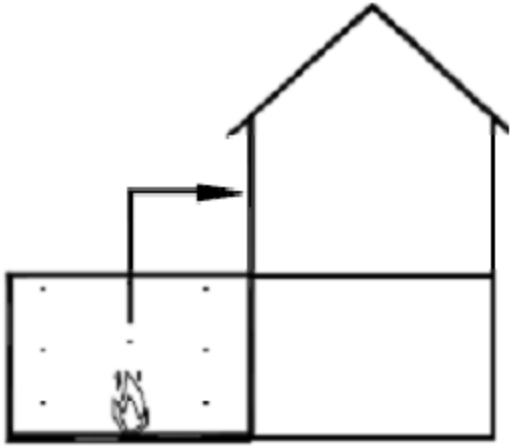
Melalui radiasi



Melalui permukaan fasade



Dari rute luar



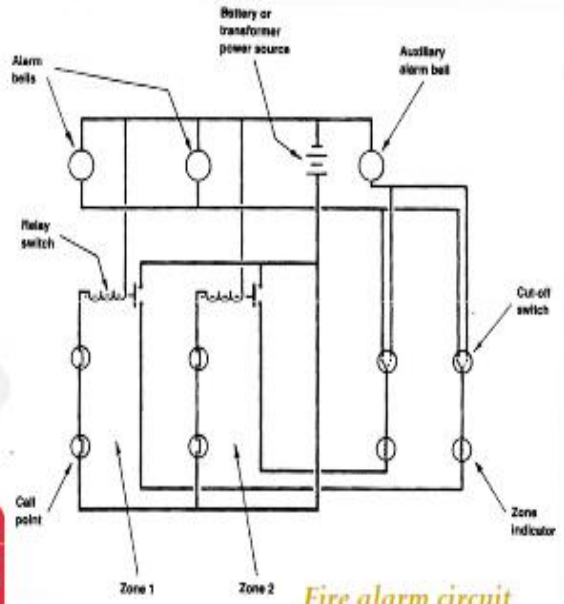
Components of Fire Prevention & Control System

PASSIVE	ACTIVE
1. Design of buildings 2. Structure 3. Fabric 4. Components & their installation	1. Portable extinguishers 2. Alarm detection 3. Hose reels 4. Automatic extinguishers 5. Pressurised escape route 6. Smoke extraction & ventilation

Portable Fire Extinguishers

- Colour coded cylinders containing compressed liquids and gasses appropriate to various sources of fire
  - Standard fire fighting equipment in all commercial & public buildings
  - Objective of portable fire extinguishers
    - To remove or sufficiently reduce at least one component of the **fire triangle**

Alarm Detection



Fire alarm circuit

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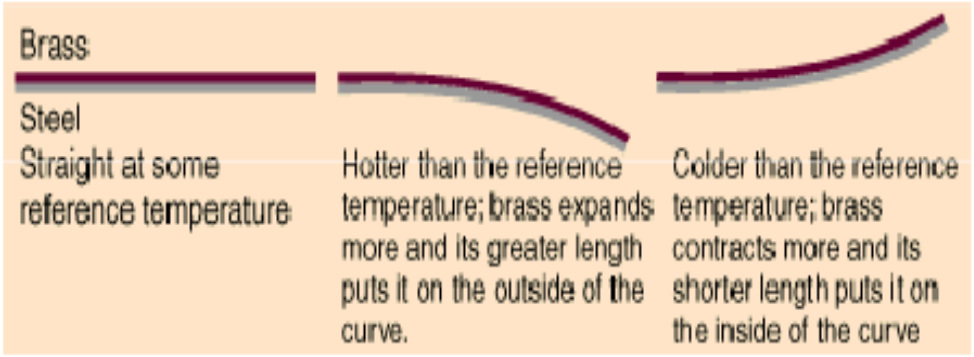
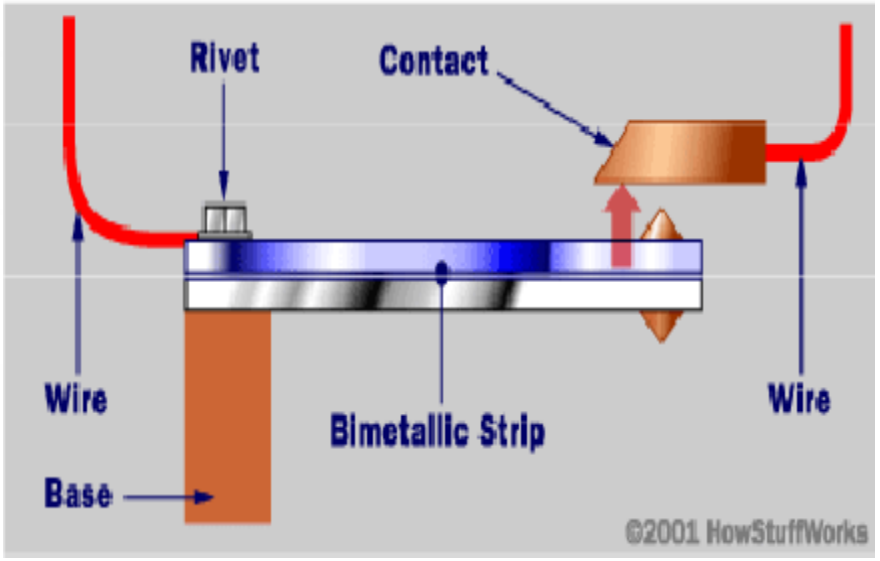
Automatic Fire Detectors

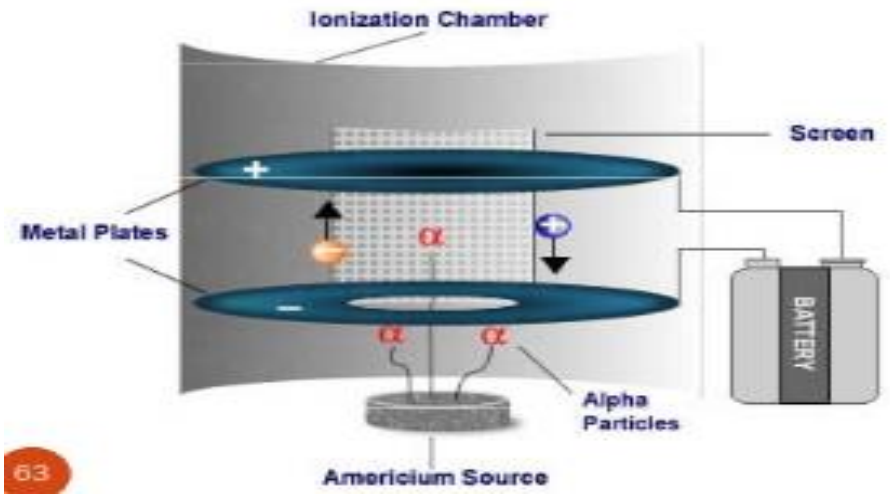
- Objectives of automatic fire detectors
  - To indicate location of the outbreak of fire
  - To operate alarm bells, and
  - To communicate with the local authority
- Various types of operating characteristics:
  - A bimetallic strip
  - An ionisation chamber
  - Light scattering devices
  - A laser beam

Bimetallic strip



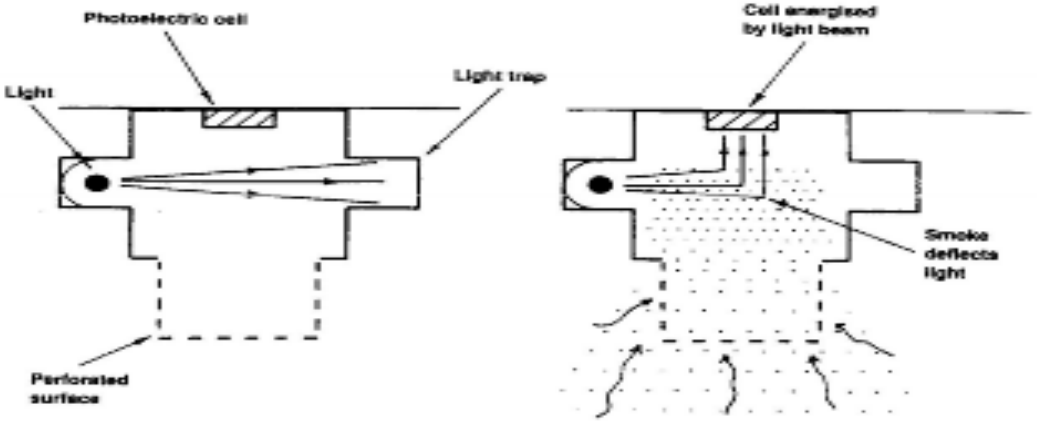


Ionisation chamber



Ionisation smoke detector

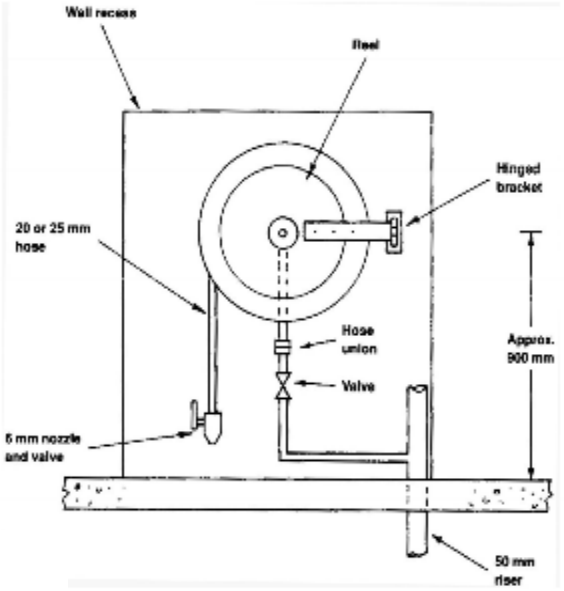
Light-scattering devices

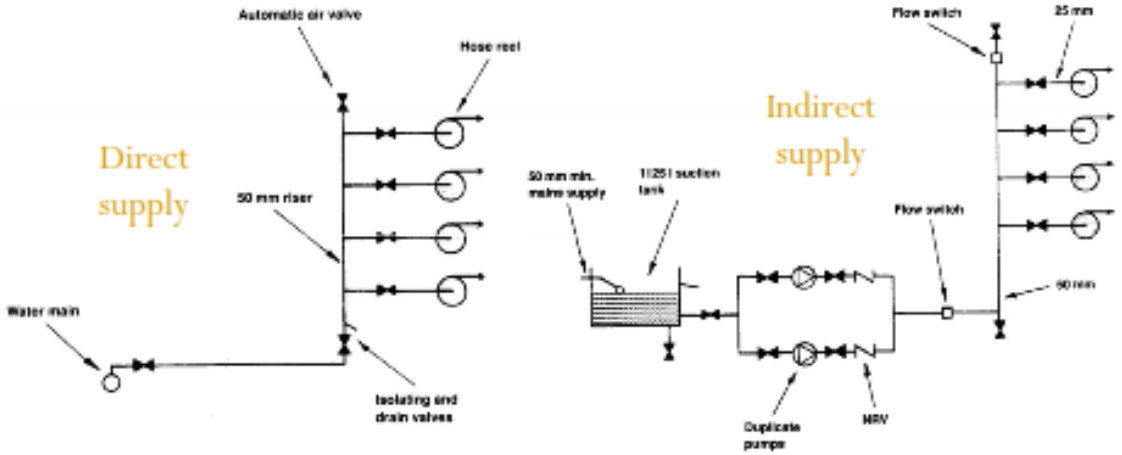


Light-scattering smoke detector

Hose Reels

- Another first aid to fire fighting, intended for use by the building occupants





Hose reel installation

Hydrants

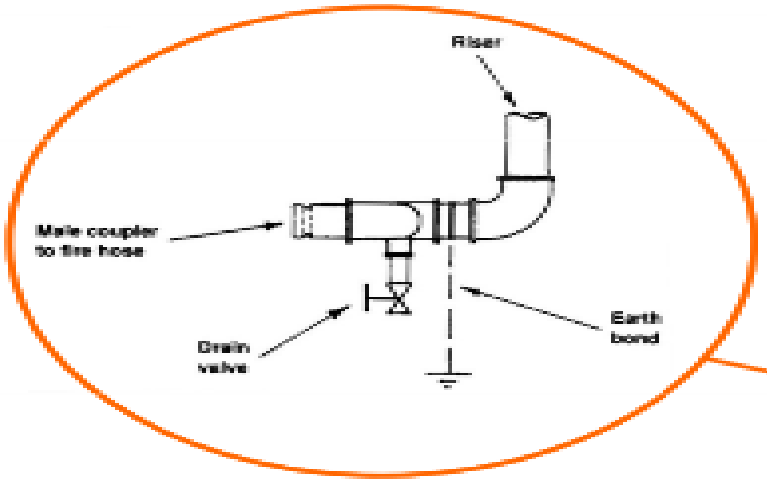
External hydrants

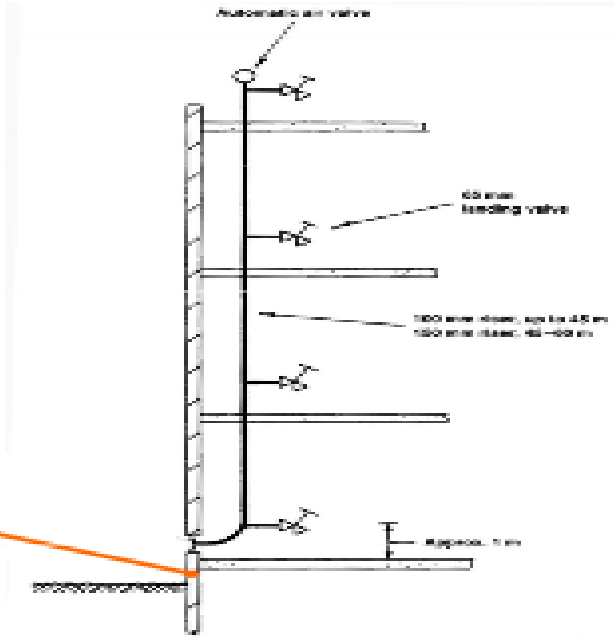
- Recommendations for installation of external hydrants:
  - The hydrant valves should attach to a ring system of supply with more than one source from the water authority's main
  - Maximum spacing of 150 m apart, next to road
  - Maximum 70 m distance from building entry
  - A maximum distance of 6 m to a building

Internal hydrants

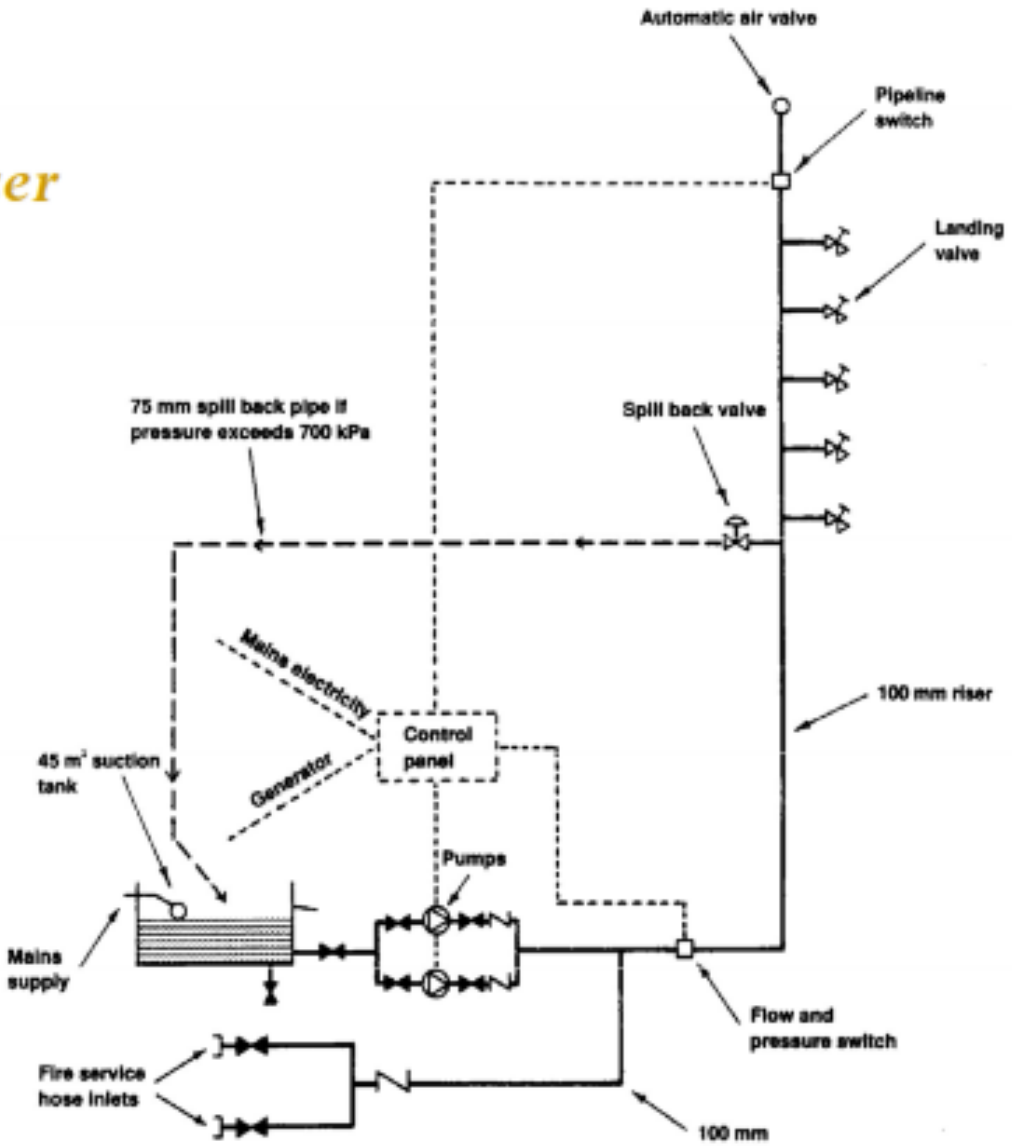
- Installation guide
  - One rising main (wet or dry) must be provided for every 900 m^2 of floor area
  - Where more than one riser is required, they should be less than 60 m apart
  - No part of floor must exceed 60 m from a landing valve

Internal hydrants: Dry riser





Internal hydrants: Wet riser



UPON DISCOVERY OF FIRE OR SMOKE

R.A.C.E

1. **R**emove persons from immediate danger!
2. **A**lert others in near vicinity and Administration
3. **C**ontain Fire and Smoke (close doors)
4. **E**vacuate and/or Extinguish

WHEN EVACUATING

- Do not panic.
- Follow instructions of fire wardens.
- Ensure everyone gets out of building in an orderly manner.
- Proceed to designated assembly area.
- Do not use the lift.
- Do not return to the building.

IF YOU ARE TRAPPED...

- Stay calm.
- Enter a safe room.
- Shut the door behind you and cover the bottom of the door.

- Shout for help to alert passers-by/others and wait for rescue.
- Don't jump out of a building.

TERIMA KASIH