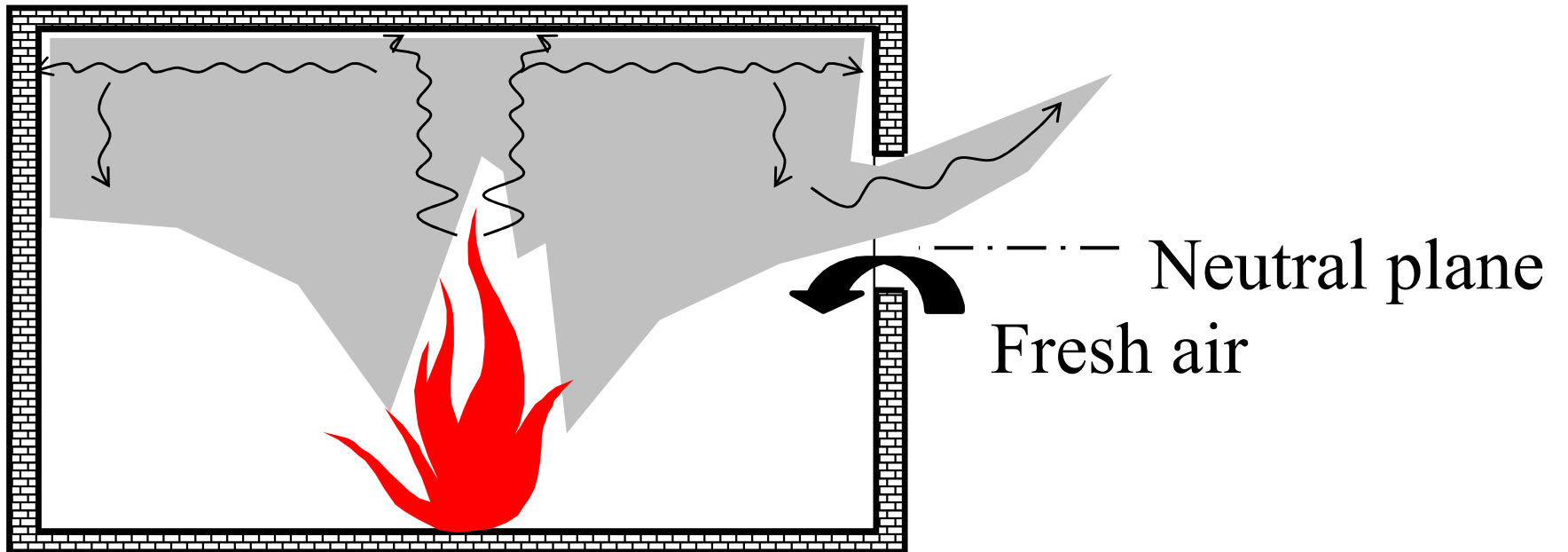
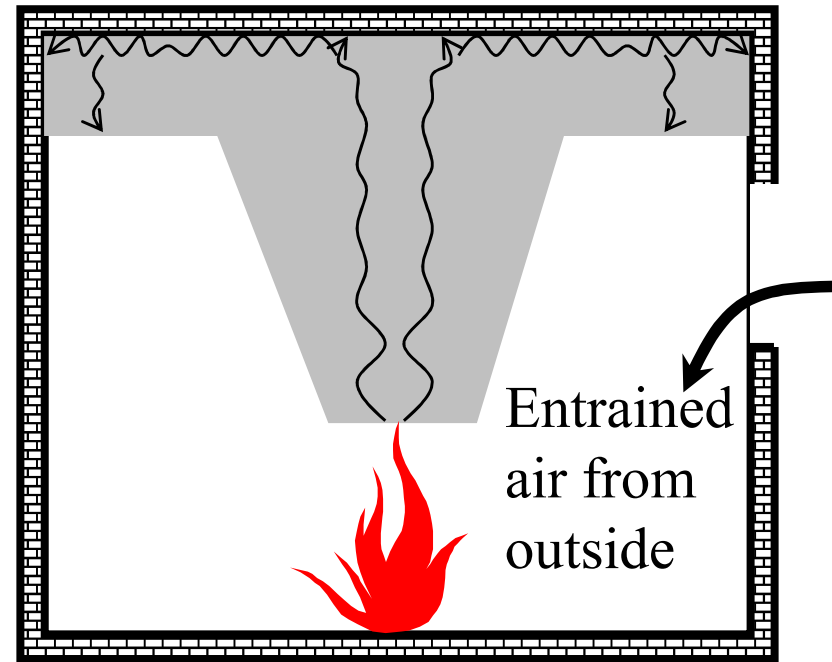
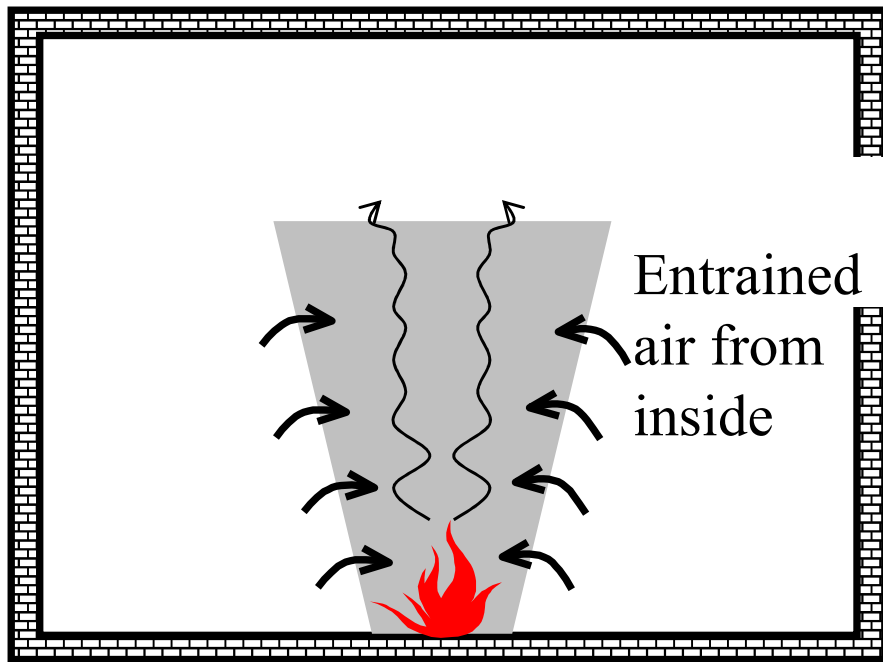
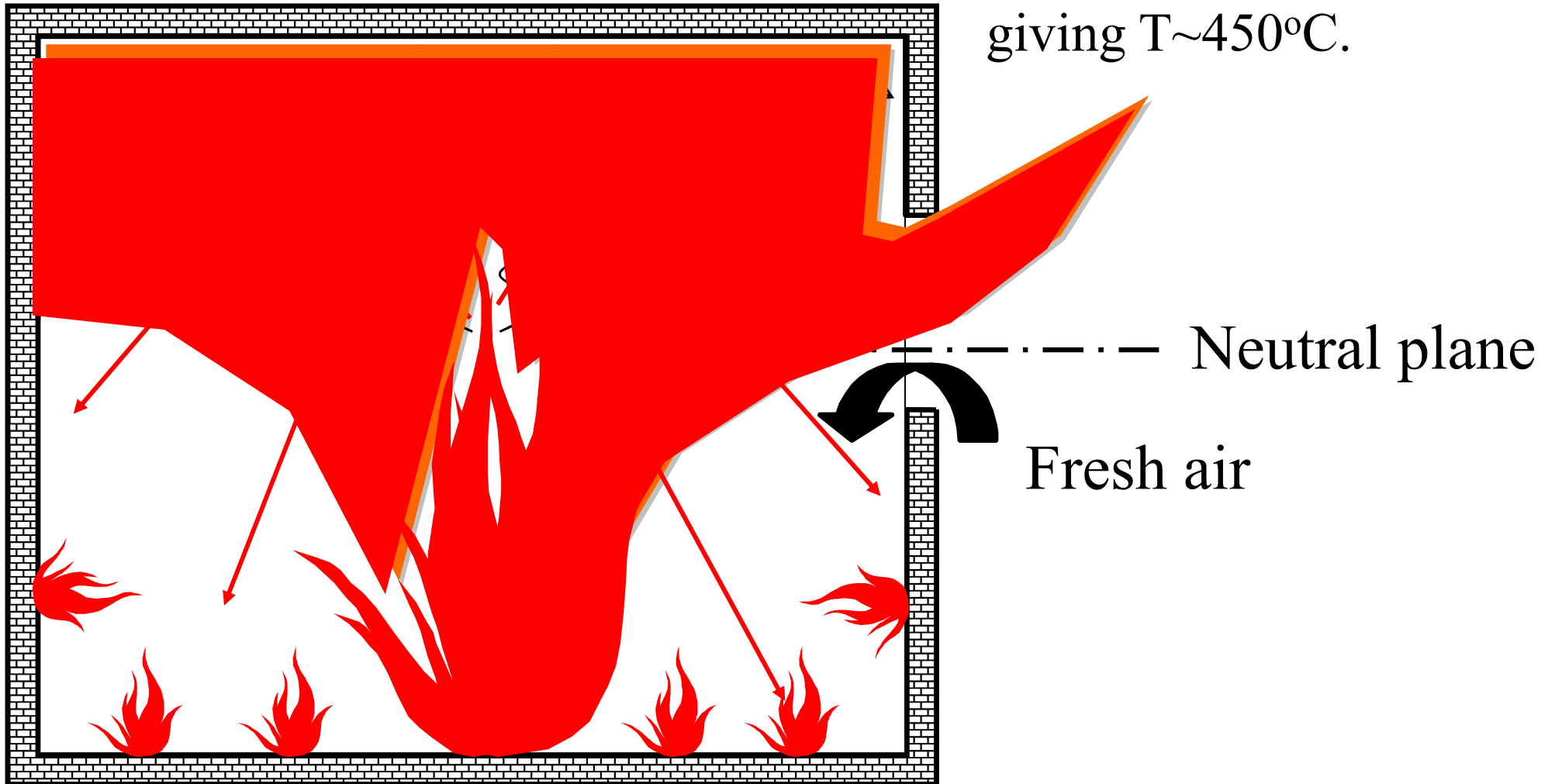


Fire behaviour



Flashover: transition from localised burning to burning involving all combustible materials.

Flashover temperature:
approximately:
 $\epsilon\sigma T^4 = 12\text{kW/m}^2$,
giving $T \sim 450^\circ\text{C}$.



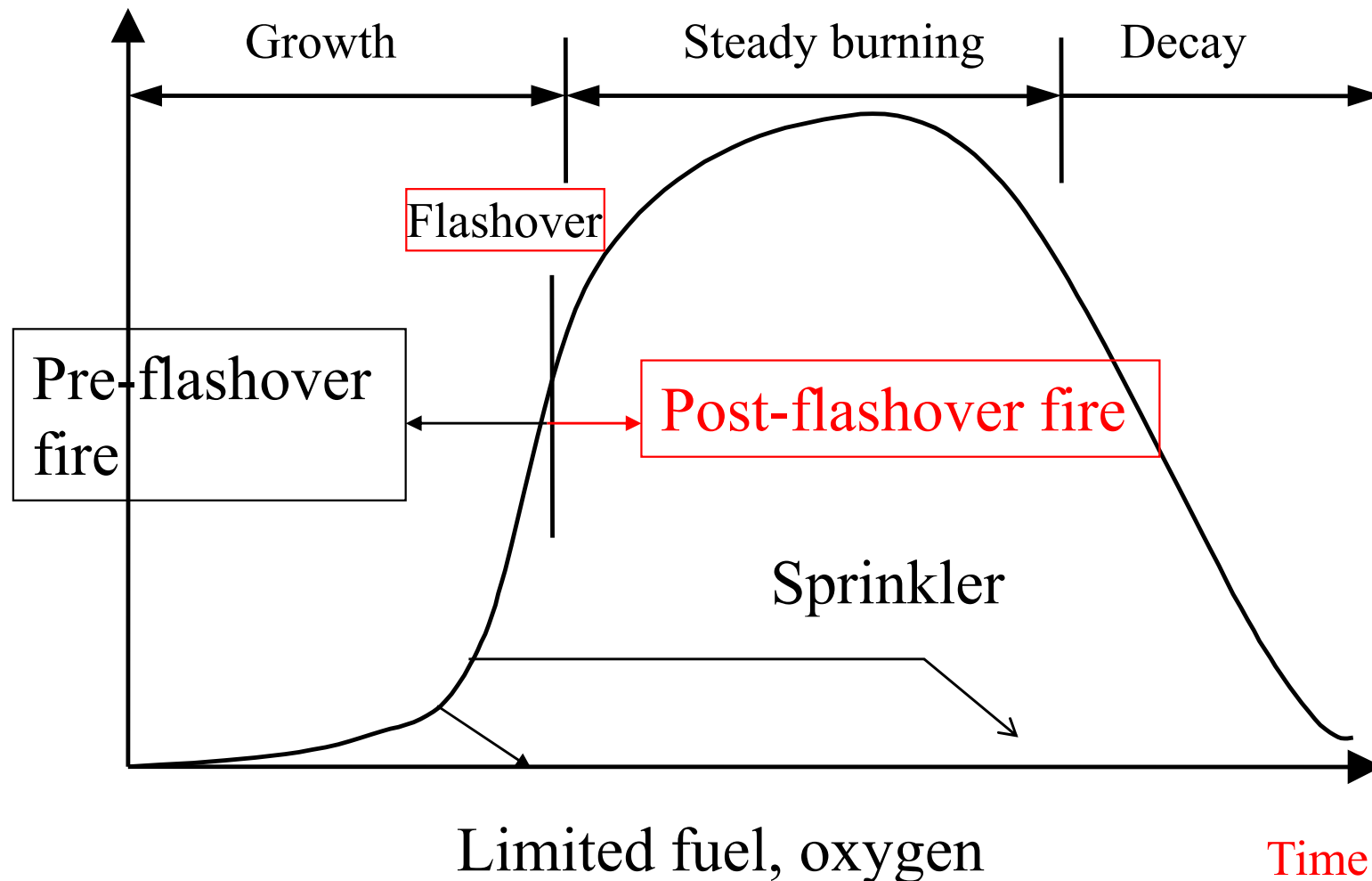
In flashover fire, the fire may be assumed to be at uniform temperature.

Enclosure T-t Relationship: if interrupted, the fire may

not develop into the flashover phase. Fire safety design aims to prevent/delay flashover.

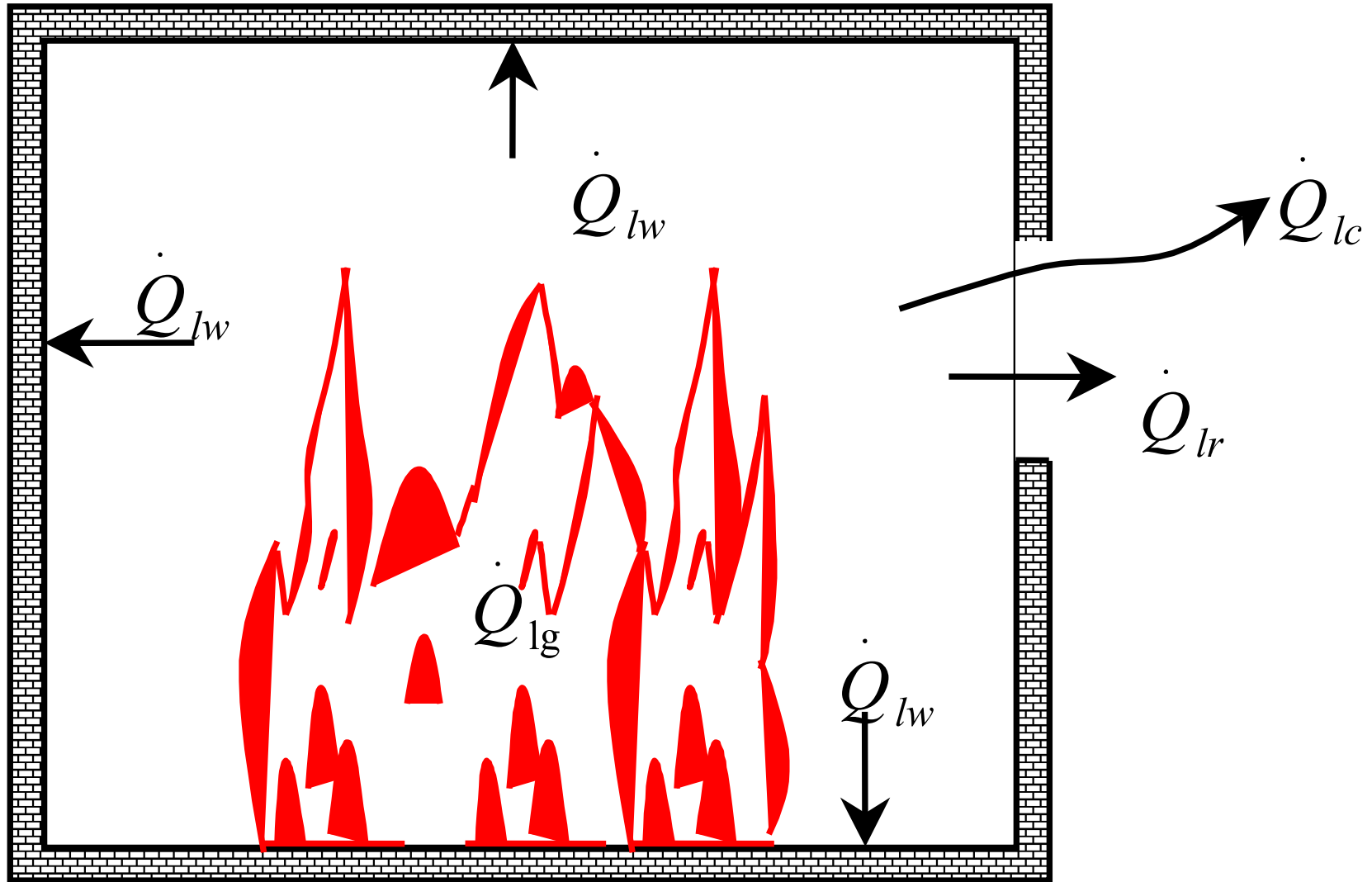
However, the eventuality of flashover fire should be considered for structural resistance. The temperature-time relationship is the key parameter.

Temperature



Modelling of Post-Flashover Fires – One Zone Model:

Fire modelling is based on heat balance: heat generated in fire = heat loss.



$$\dot{Q}_{fi} = \dot{Q}_{lc} + \dot{Q}_{lw} + \dot{Q}_{lr} + \dot{Q}_{lg}$$

Heat Terms: the heat input is from heat released from combustion (**rate of heat release**). The heat input is balanced by heat losses (heat outputs). The four modes of heat loss are identified below.

- Convection by hot smoke
- Radiation through opening
- Conduction through construction
- Gas temperature rise
- **Rate of heat release (related to hot smoke production)**