Fire prevention strategy

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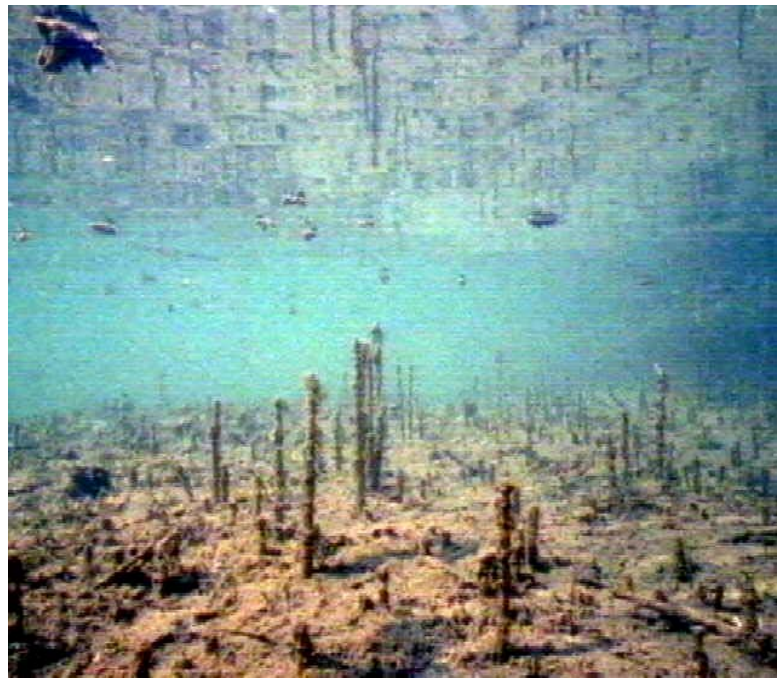
3 November, 1986: Explosion causing a large fire-outbreak at Sandoz in Switzerland, where substances harmful to water (chlorinated pesticide and toxic products of combustion) flowed into the Rhine.

Fire prevention strategy



The Rhine was considerably damaged as a result and this led to the destruction of the whole living organism in the Rhine and the supply of portable water for the whole region had to be suspended.

Fire prevention strategy

ICPR recommendations

1.1 Collecting basins for spilled dangerous substances must be adequately dimensioned and must be liquid-proofed and resistant to the substances

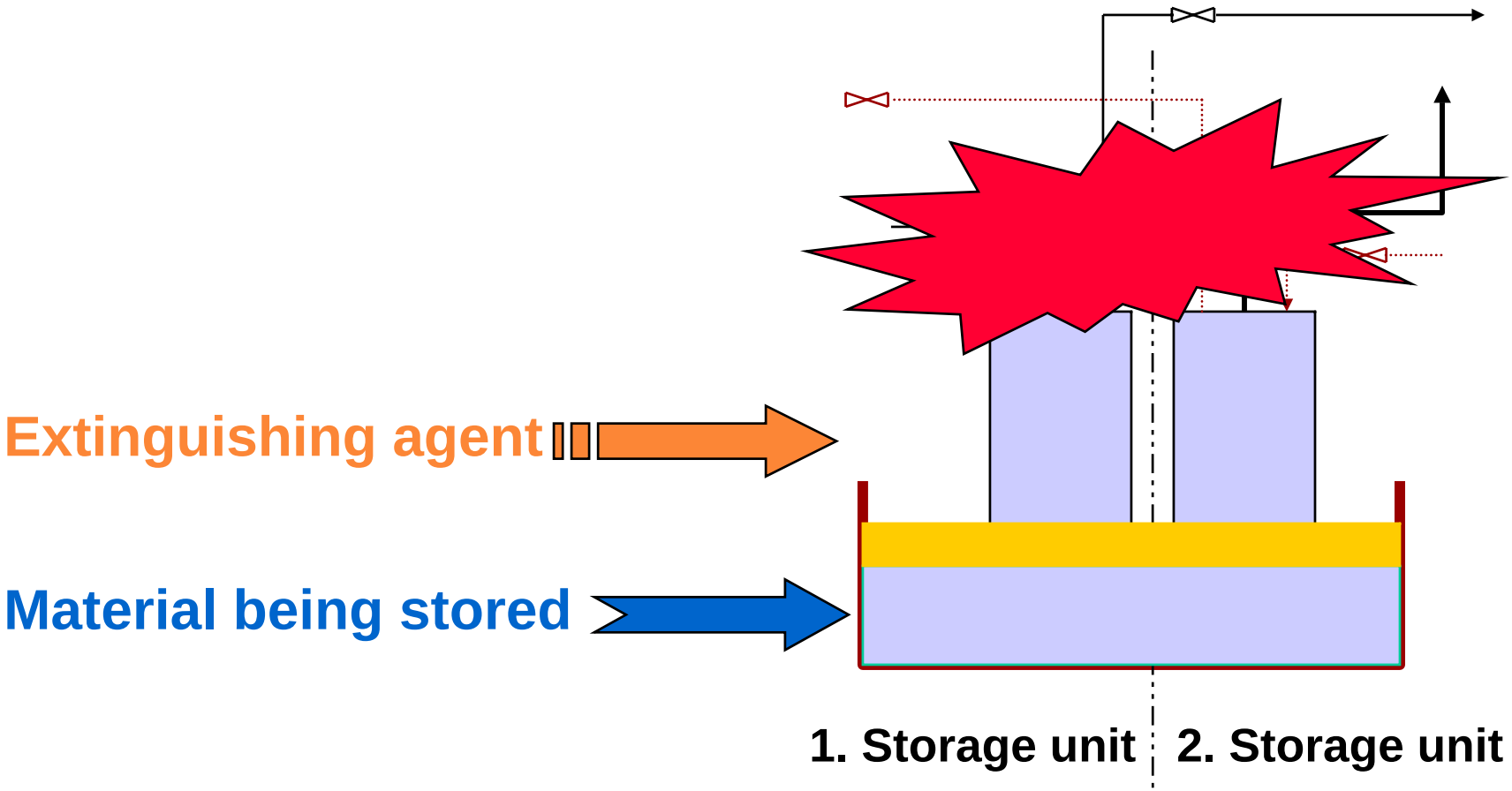
1.2. Retention facilities for fire fighting water must be liquid-proofed and resistant to the fire fighting water.

Are these volumes the same but only named otherwise?

If they are not the same, are they maybe of the same quantity?

If not, how can it be estimated?

Fire prevention strategy



Fire prevention strategy

Containment capacity for available medium

(storage unit consisting tanks, Production plant)

For the calculation of the capacity, see the paper on „storage“

+

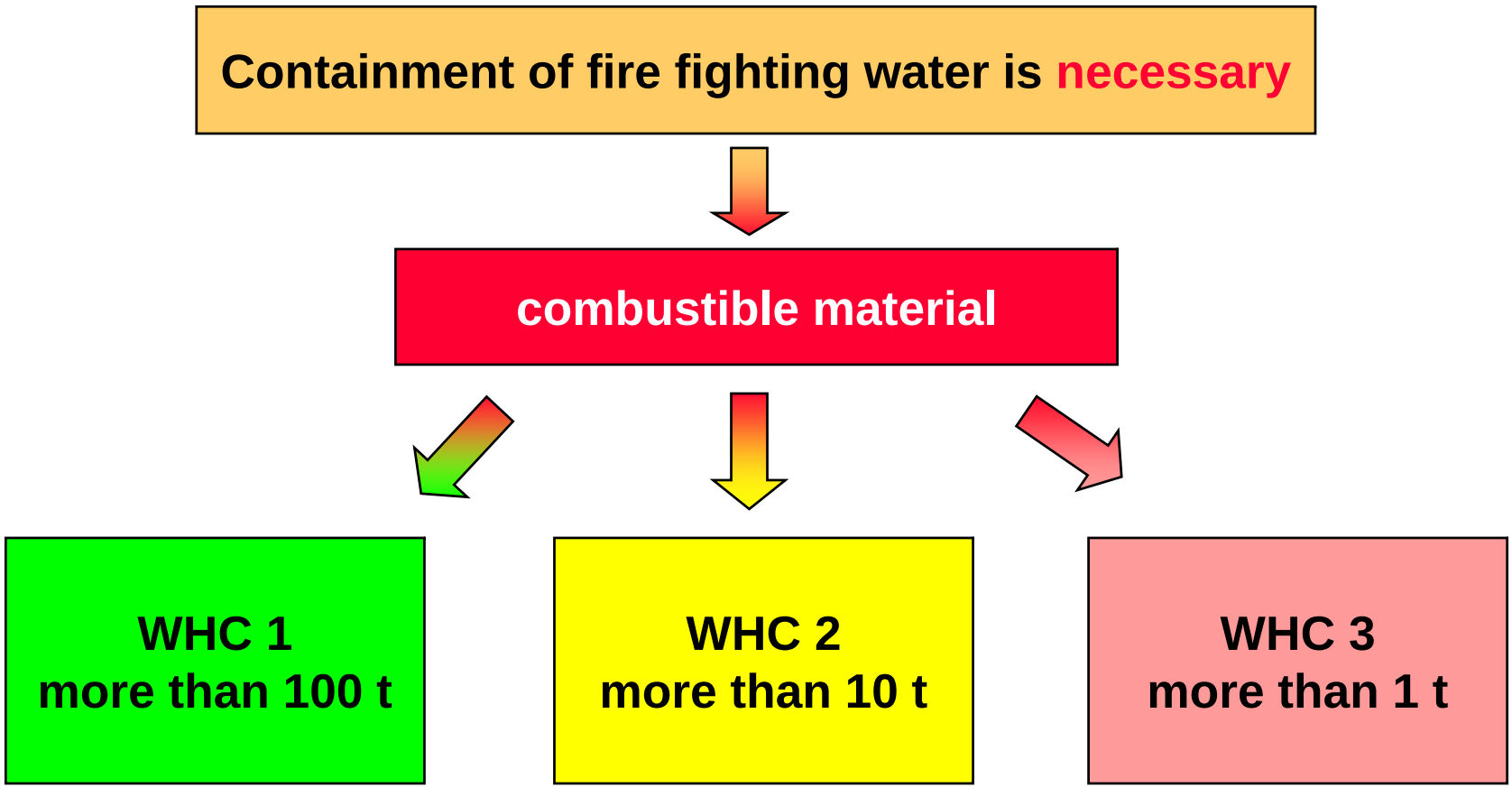
Rainwater

50 l/m²

To simplify
Add a freeboard of about 5 cm

Fire prevention strategy

Containment capacity for extinguishing agent:



Fire prevention strategy

Containment capacity for extinguishing agent not necessary:

Containment of fire fighting water is not necessary

for non-combustible material

for container installed totally beneath the earth surface

for double shell container made of steel with a volume of up to 100 m^3 , equipped with an approved Leakage indicator (LAG)

Fire prevention strategy

Containment capacity for extinguishing agent:
(For combustible liquids)

$$V_G = V_p + W_L + W_B + V_{Sch} - P - E$$

V_G = Total capacity

V_p = capacity for combustible liquid in m^3

Fire prevention strategy

Containment capacity for extinguishing agent:

(For combustible liquids)

$$V_G = V_p + W_L + W_B + V_{Sch} - P - E$$

W_L = Amount of water from the extinguishing agent in m^3
multiply with the assessment factors F_G, F_L und F_F

Assessment factor F_G for the capacity of the containment (F_G von 0,8-1,1)

Assessment factor F_L for the type of extinction/extinguisher (F_L= 1,1 for mobile fire fighting equipment, up to 0,8 for stationary automatic extinguisher including automatic fire alarm unit

Assessment factor F_F for fire fighting by fire brigade (F_F = 1,0 for internal fire brigade and 1,1 for public fire brigade

Fire prevention strategy

Containment capacity for extinguishing agent:
(For combustible liquid)

$$V_G = V_p + W_L + W_B + V_{Sch} - P - E$$

W_B = Amount of water in m^3 from the sprinkler (cooling), as long as it got mixed with the fire fighting water W_L, multiply with the assessment factors F_G, F_L und F_F

V_{Sch} = volume of extinguishing foam in m^3 when a 50 percentage decomposition of the foam is assumed after being applied

Fire prevention strategy

Containment capacity for extinguishing agent:
(For combustible liquid)

$$V_G = V_p + W_L + W_B + V_{Sch} - P - E$$

P = combustible liquid being pumped to a neighbouring secondary containment or into a different container

E = fire fighting water and/or water from extinguishing foam or not contaminated water in m^3 being pumped apart from the stored material into a different containment for fire fighting water

Fire prevention strategy

Containment capacity for extinguishing agent:

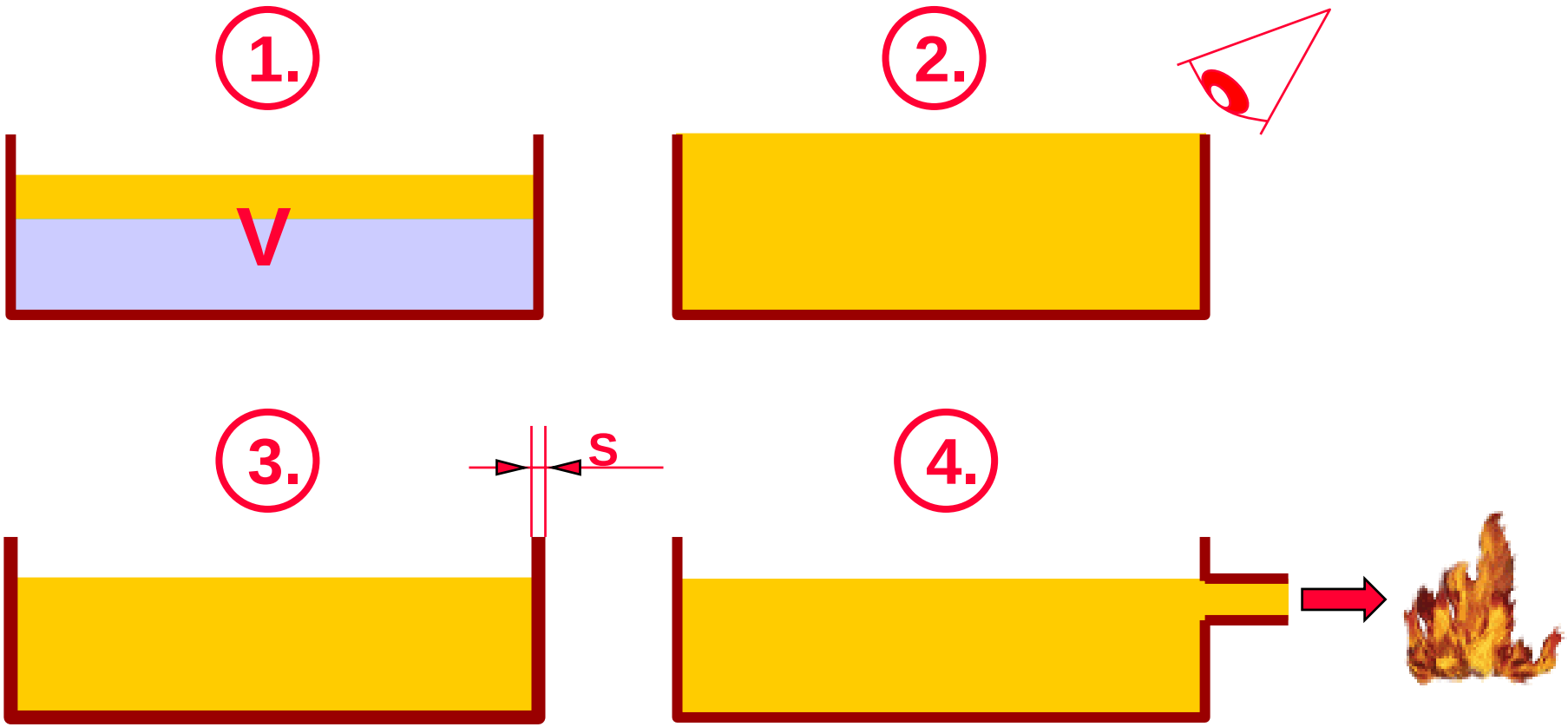
(Storage for solid substances and smaller barrel storage)

The required volume depends on:

- **the safety category of the storage unit (internal fire brigade, public fire brigade, type of fire alarm device)**
- **the storage capacity and/or space for storage,**
- **the water hazard class (WHC),**
- **the storage height of substance and**
- **the type of storage (within a building, outdoors)**

Fire prevention strategy

General requirements on a containment unit for fire fighting water:

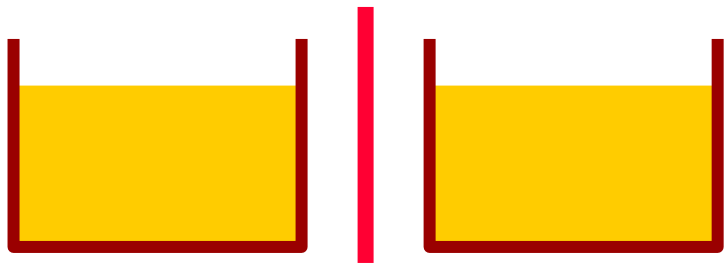


Fire prevention strategy

General requirements on a containment unit for fire fighting water:

5.

6.



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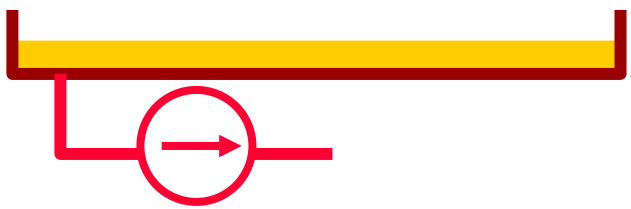
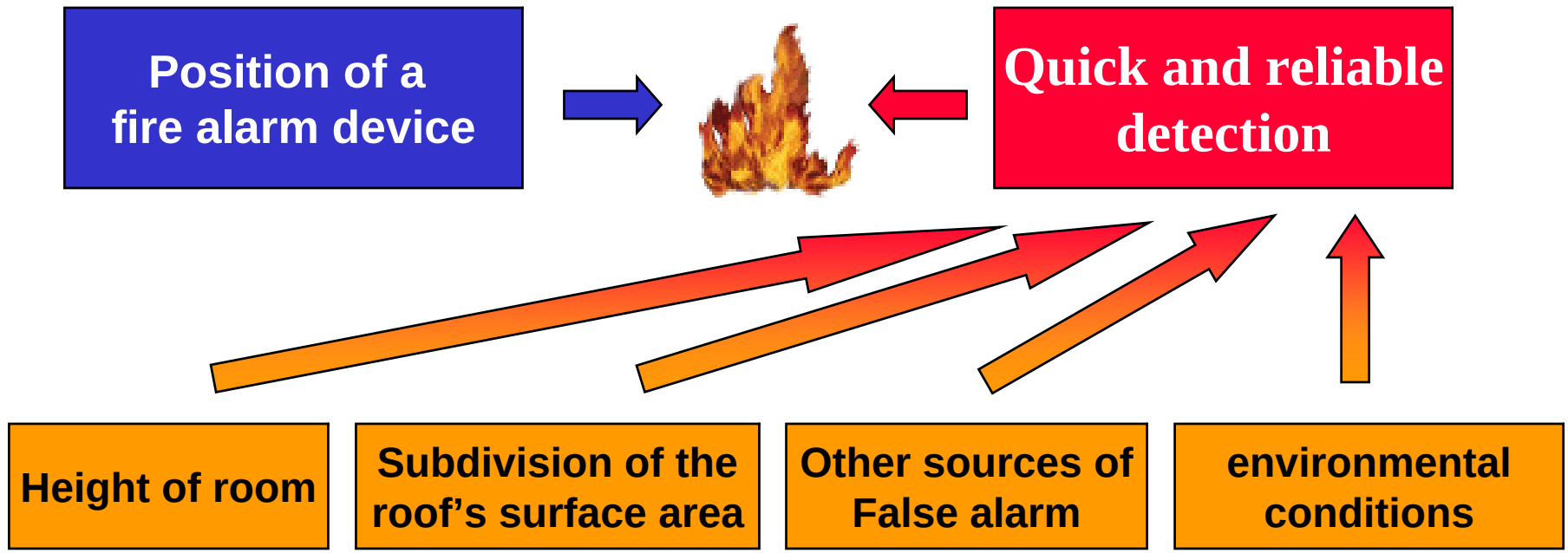


8.

Fire prevention strategy

General requirements on a containment unit for fire fighting water:



Fire prevention strategy

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Barrier for fire fighting water acting as a seal for the gate.

Fixed to a support in the wall.

Installing of a pile to protect the stretching elements