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FIREX
INTERNATIONAL

HIGH RISE FIREFIGHTING CONFERENCE

On-Line | Wednesday 7 October 2020

FireFighting

Smoke Control in High Rise Fires

Basics Principles and Tactics
*Rescue vs. Firefighting
depend on Smoke Spread*



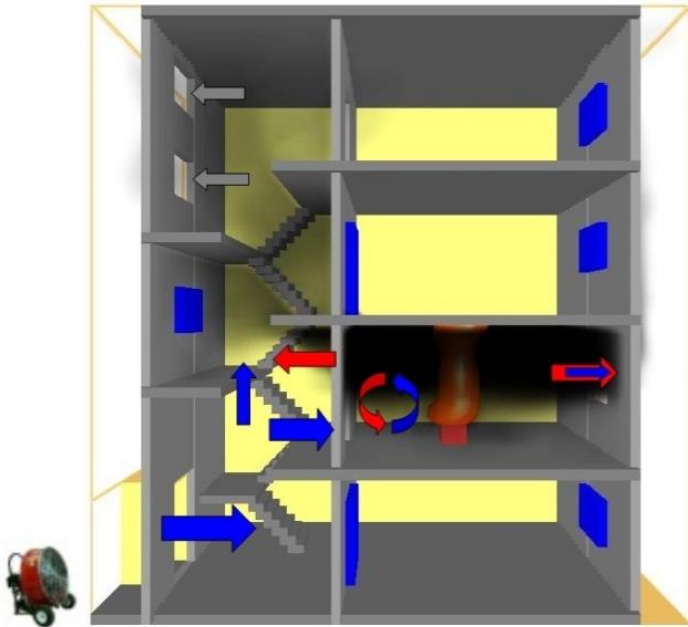
Prof. Dr.-Ing. Michael Reick

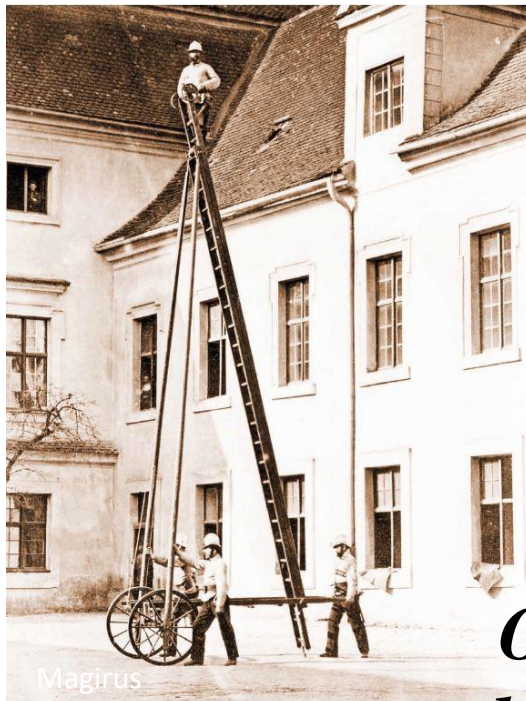


OBJECTIVE
FACTS

WHAT YOU
SEE

FACTS
CONFIRMING
YOUR BELIEFS





BSPP Paris



Our Fire Fighting Experience is influenced by our equipment, tactic, training, members, built environment and tradition



Successful Fire Fighting

Tactical Decision



Rescue People

Extinguish the Fire

Air/Smoke Flows

or

Defend in Place

Safe Place Concept

Fire Ventilation

Fire Dynamics

Hazardous Areas / Safe Attack & Egress Routes

(Smoke = Toxic Gases + High Temperature + Low Visibility)

=> Stairway Protection / Smoke Flow Control is a key factor

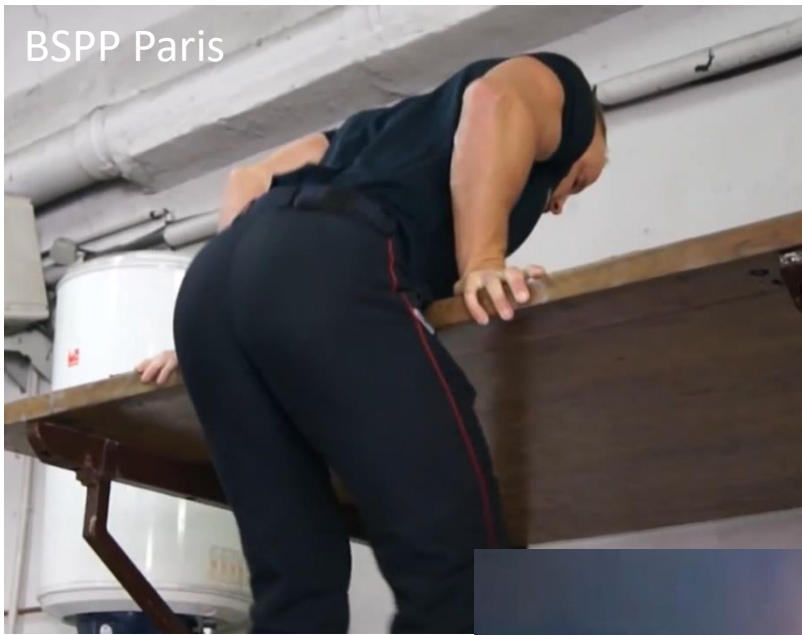
**New York
Manhattan
John Street
Nov. 2016**



View from a Civilian:

<https://www.youtube.com/watch?v=GqozRpx9Bl8>

BSPP Paris



Paris, France:
***You can fight the way
you are trained!***



BSPP Paris

Fire Spread to Top of East Face

01:29



Two of many lessons learned !?



Rescue through smoke!
=> smoke hoods

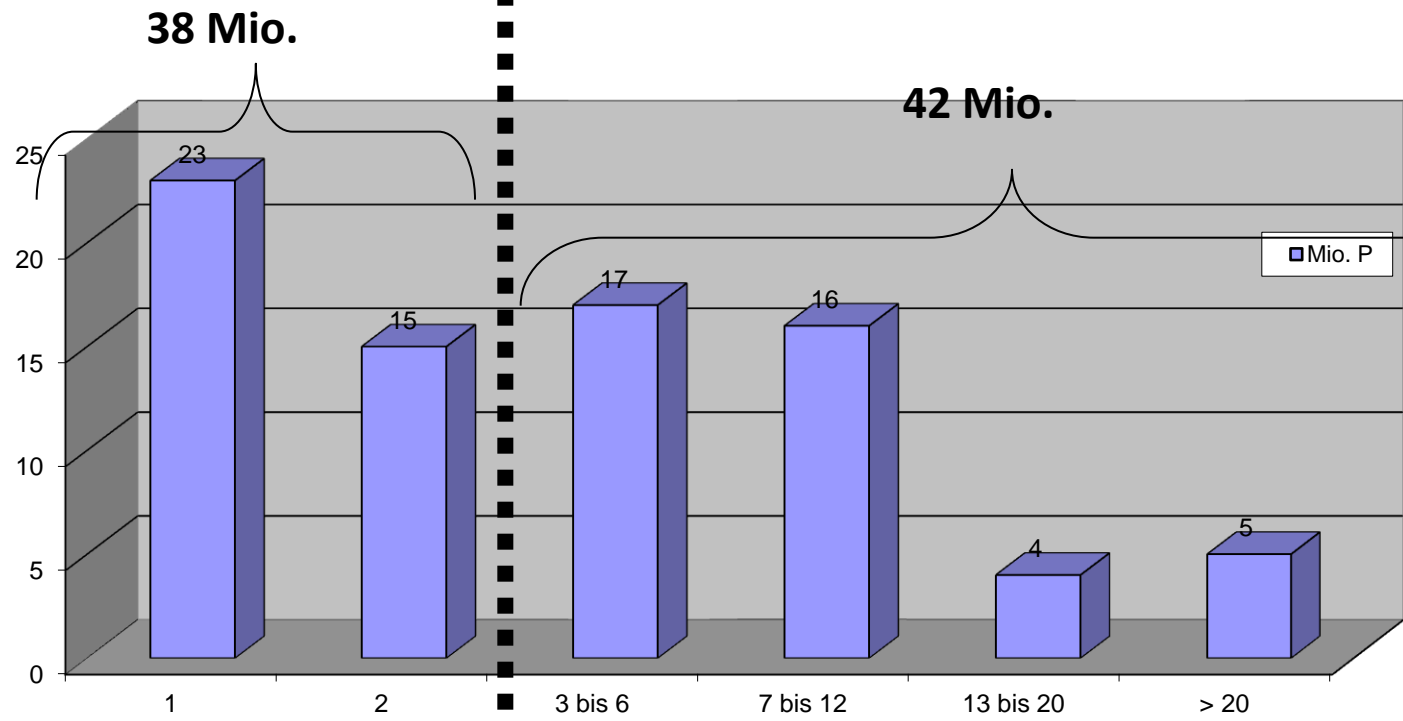


Stairway protection!
=> smoke curtains

Housing Situation in Germany

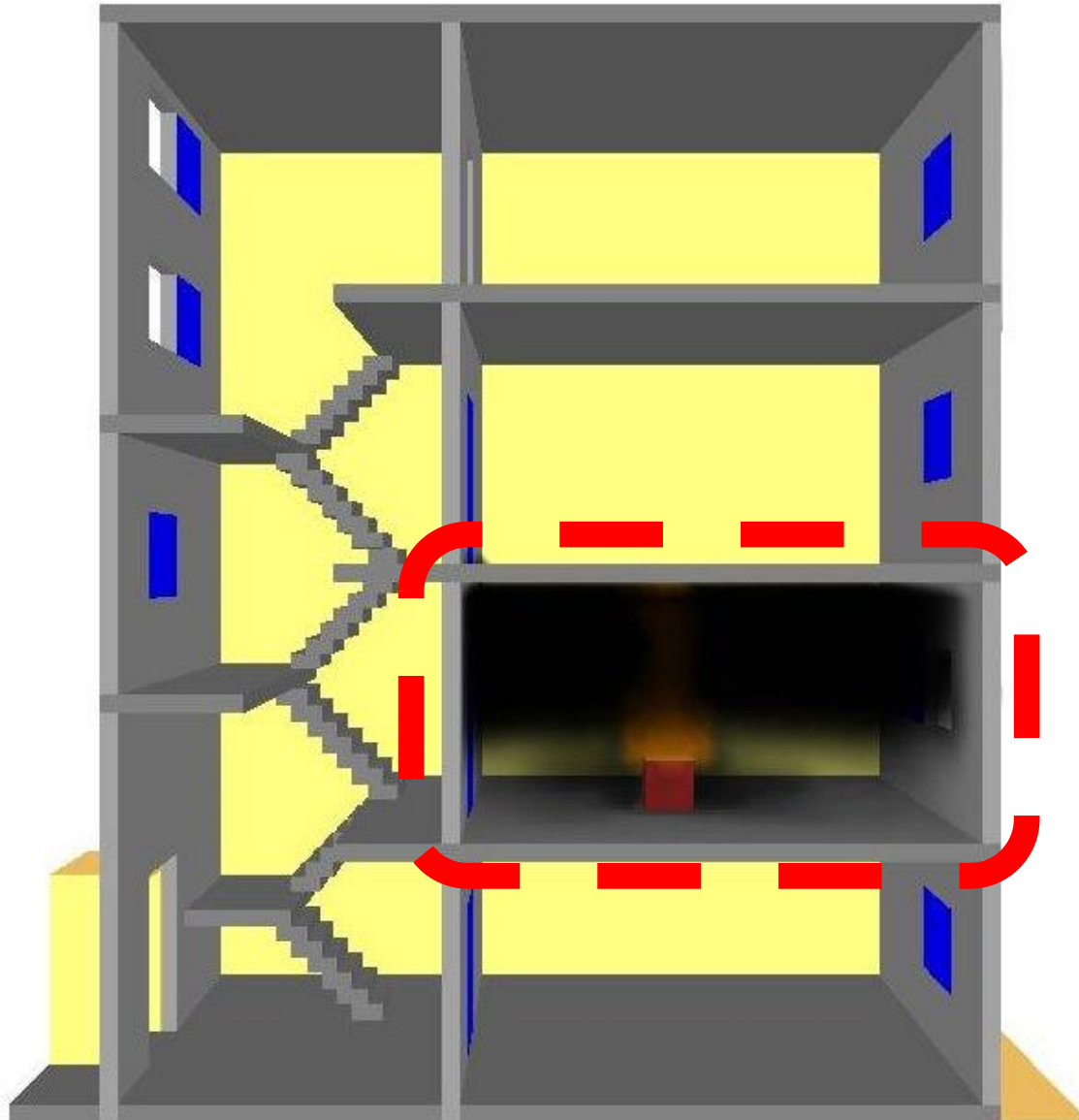


Mio. of people living in these houses



Number of Apartments per House

Flow Path Control

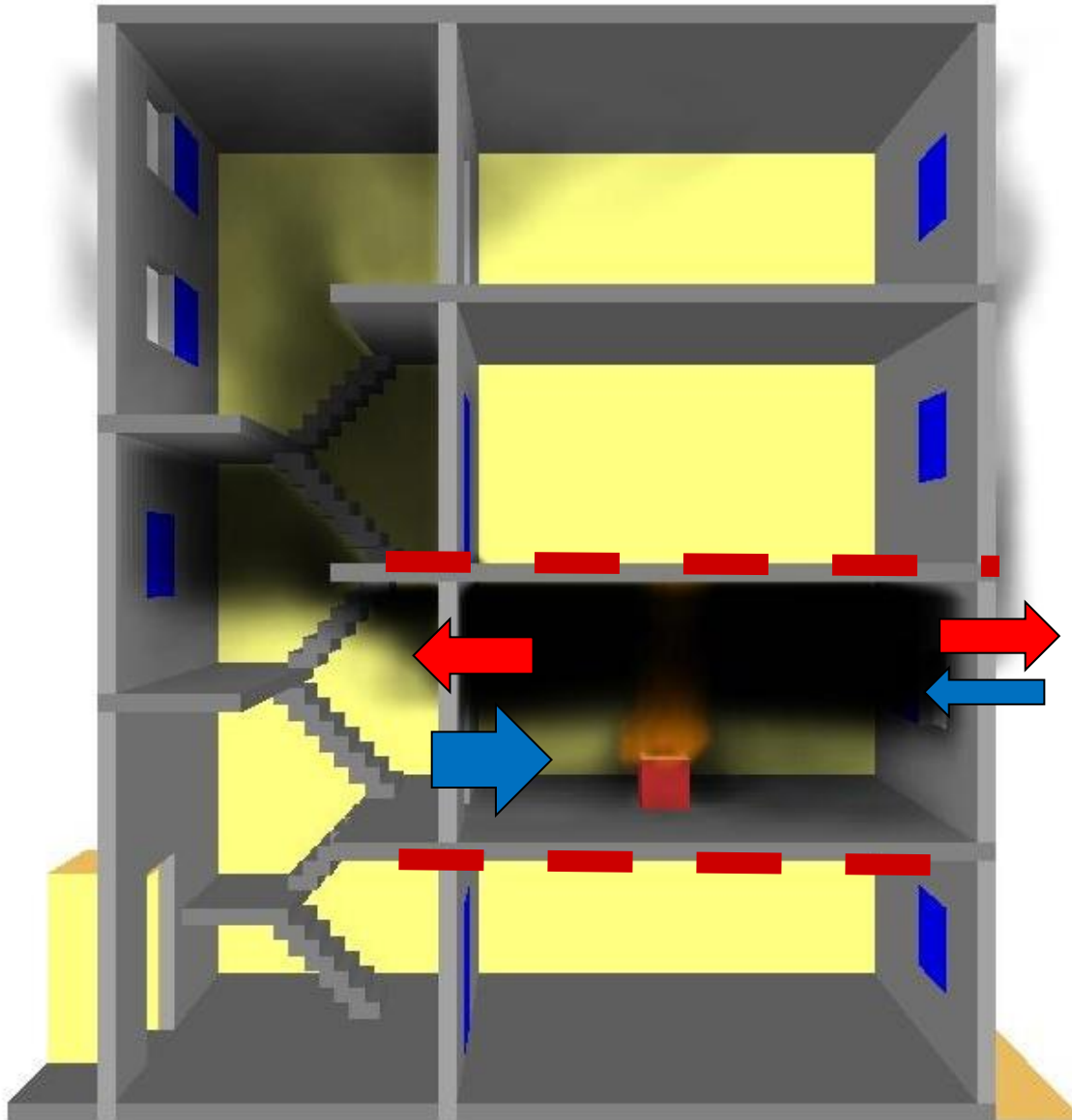


*Fire in a closed
compartment
vs.
Fire with flows ?*

*Extinguishment
vs.
Containment ?*

SOPs?

Multiple Flows / Bi – or Uni-Directional Flows



*Fire can exchange
gases within the
building and/or
to the outside:*

*Flow of Smoke
Flow of Air*

Fire in a multi-story building:

The stairway is the most important room !





Interior attack:
open doors allow
a) smoke spread
b) air flow to the fire

Interior attack:

**First hoseline
interferes with the
safety design of
the building!**

Door squeezes
the first line!

***Train in these
buildings!***



7 possibilities to do “Door Control”

- 1) Keep the door closed
- 2) Close the door behind you
- 3) Control the door with staffing
- 4) Control the door with a chock, ..
- 5) Cut the door partially
- 6) *Prepare all doors for that purpose*
- 7) ***Control openings as needed with a tool***



6



1



2



3

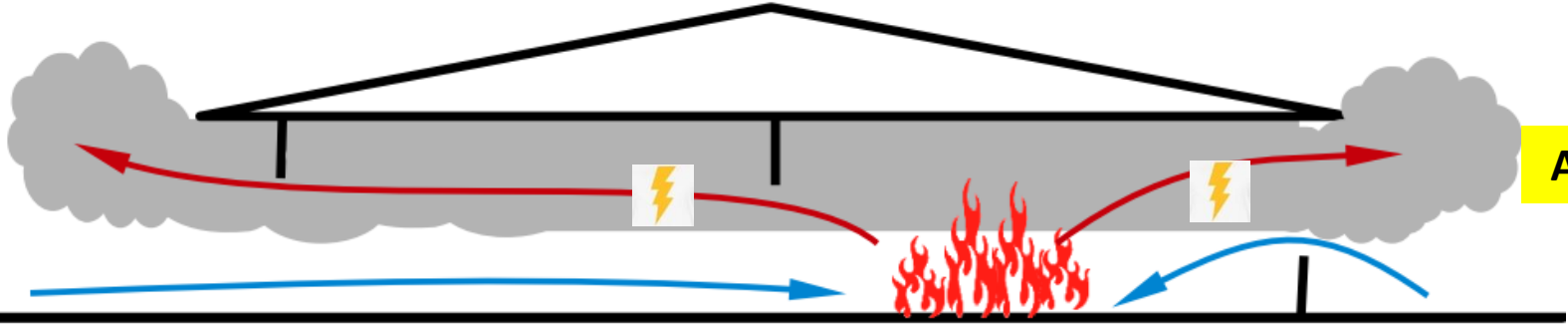


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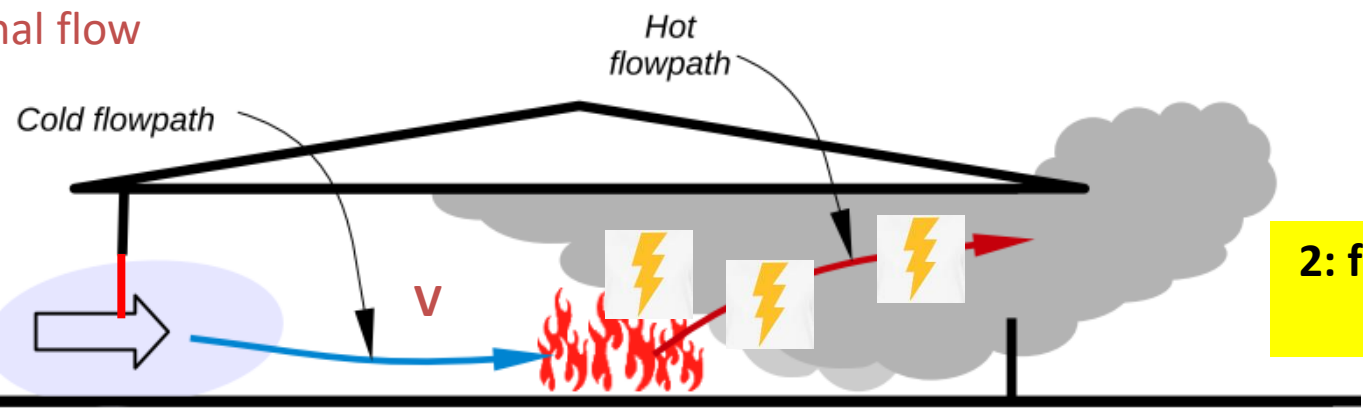
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Bidirectional flow



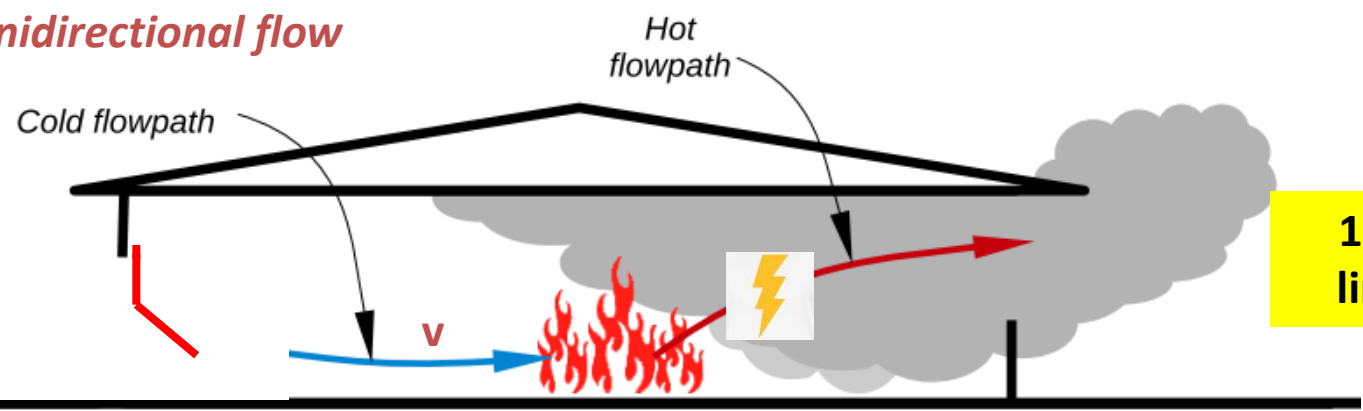
A
Always avoid:

Unidirectional flow



B
**2: fire controlled:
 ventilate!!**

Improved unidirectional flow



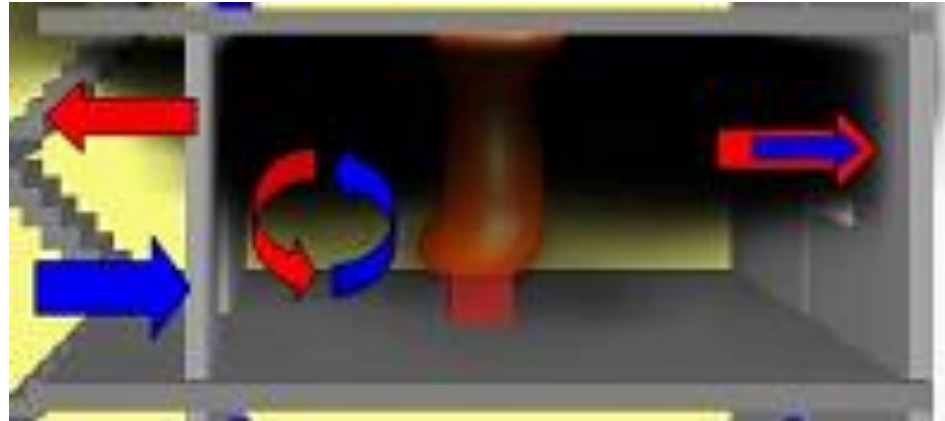
C
**1: Start safe:
 limit air flow**

Improved unidirectional flow

Bidirectional flow

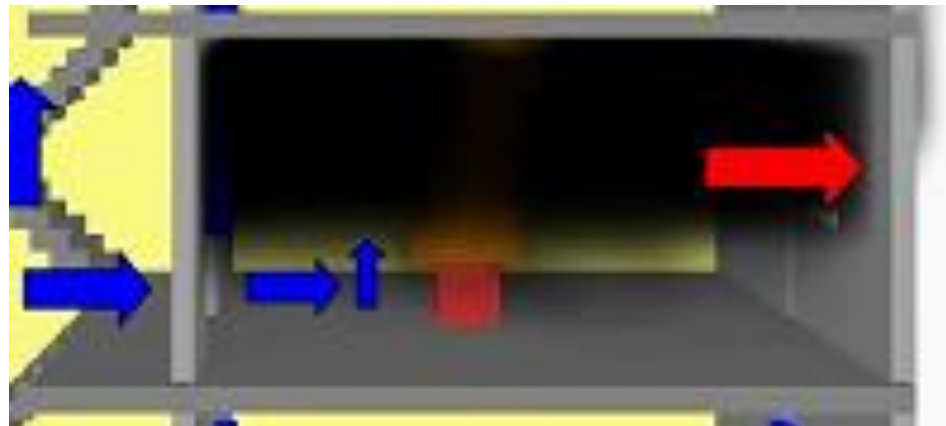
creates a lot of turbulence

increases volume of ignitable gases

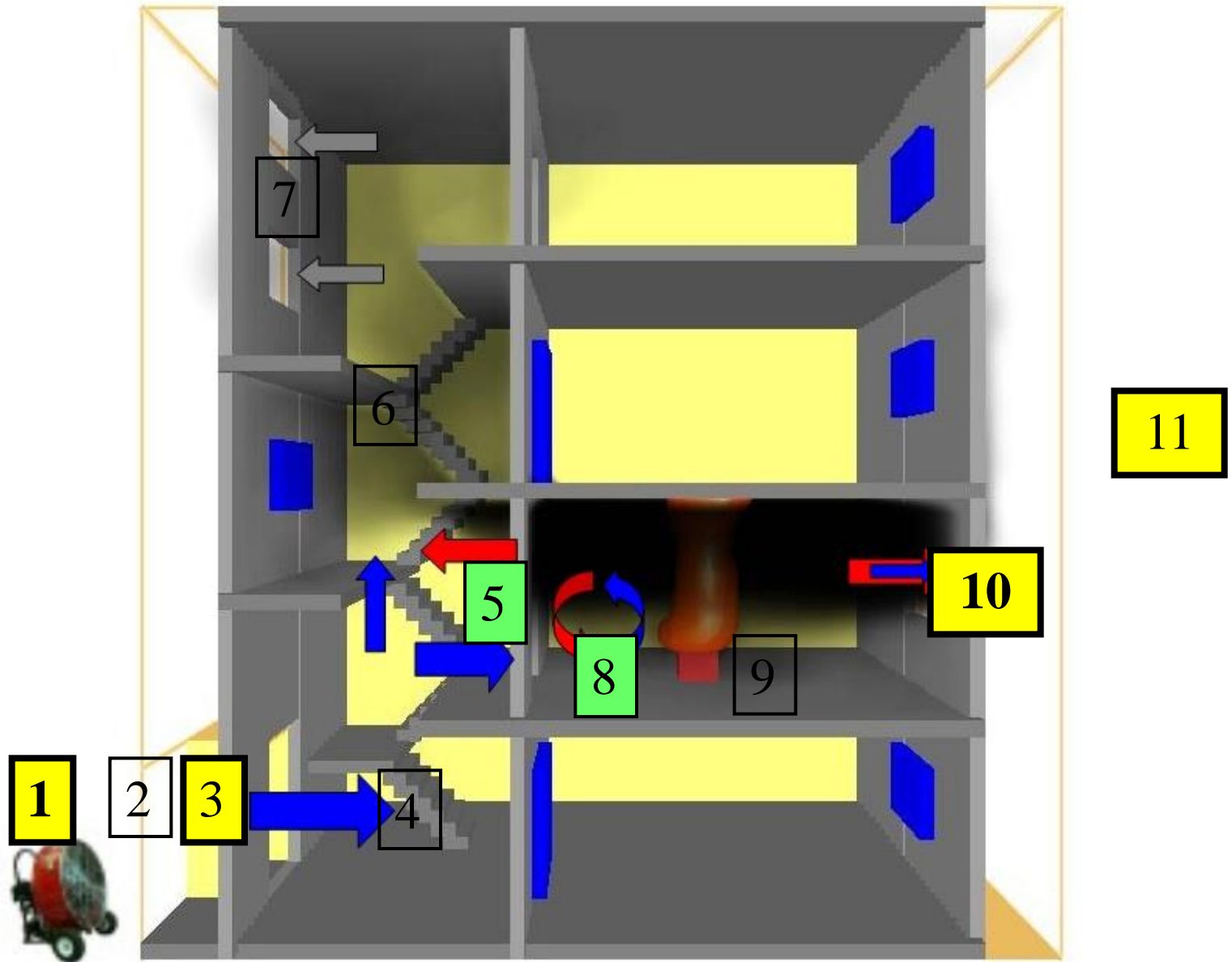


Improved unidirectional flow !

Just with blocking the upper part of the entrance door!

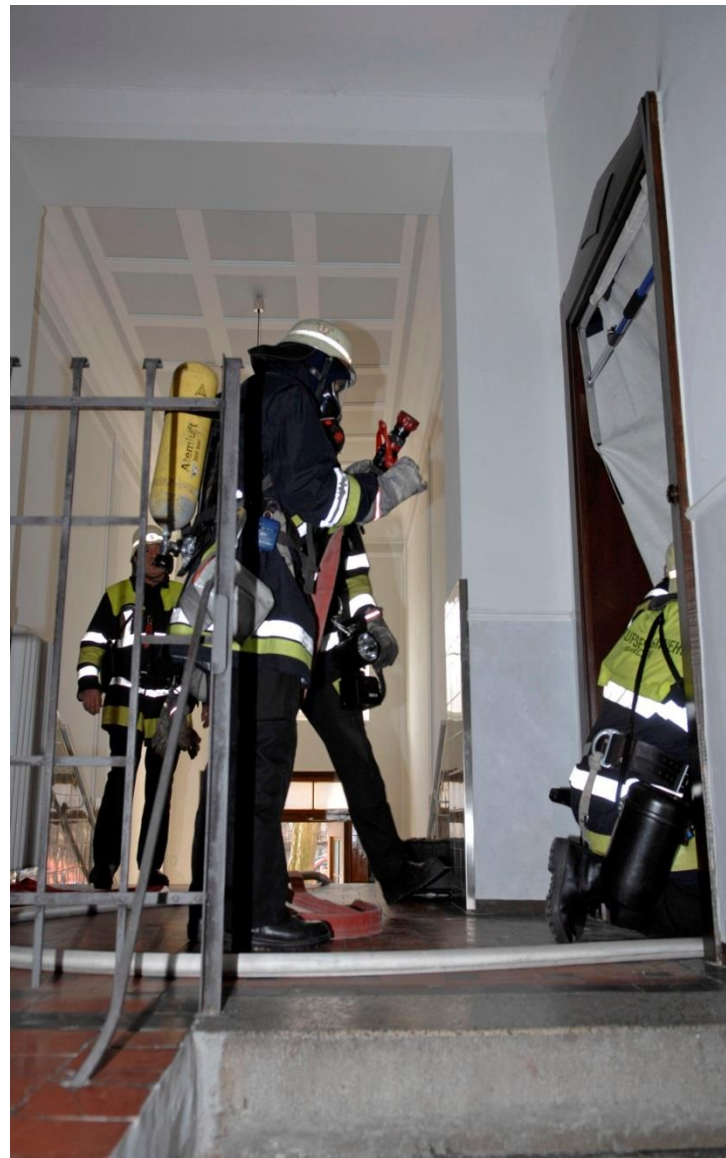


Major influences on fire ventilation





Apartment fire in Heilbronn - 2006



Apartment fire in Munich – 2008



26.10.2009 – Würzburg
Fire in Hospital



Foto: S.Rasch



Foto: S.Rasch

Berlin 2013



Apartment fire in Vienna – 2014

Hongkong 2015 highrise





 **Pompiers de Paris**
5. Juli um 16:15 · 🌐

Retour en images sur le violent feu d'appartement au Blanc-Mesnil (93).

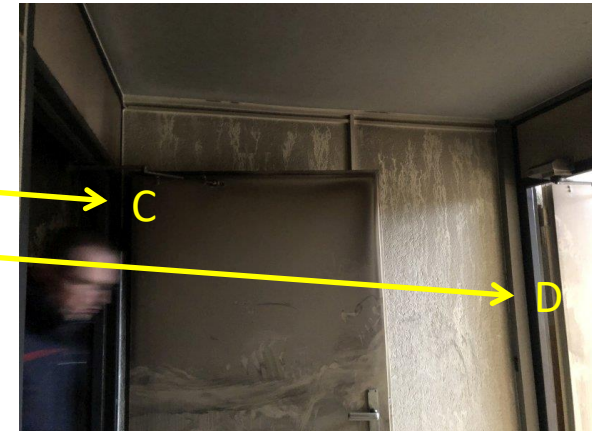
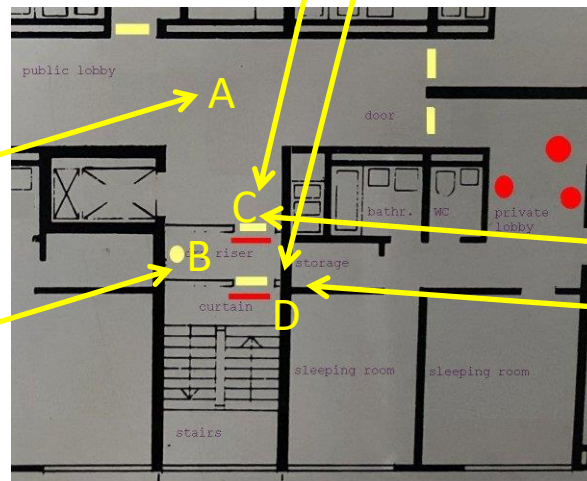
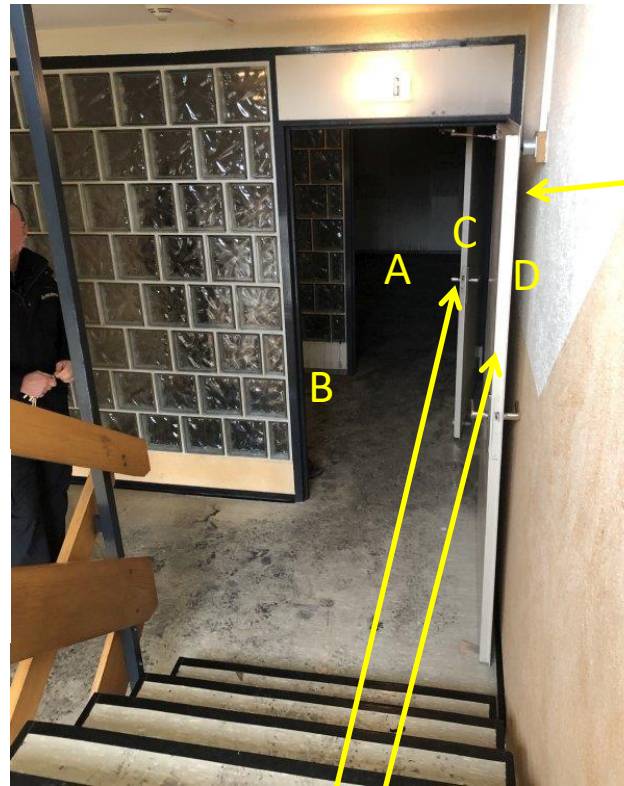
#Intervention 🚒 Retour en images sur le violent feu d'appartement au Blanc-Mesnil (93)...



Paris
July 4, 2020



Highrise Fire in
Göppingen, Germany,
Nov. 21, 2019



Fully developed apartment fire with 1 person inside; A: lobby / B: dry riser / C+D: double door system double door system to stairs with dry riser water supply between the doors; smokestopper used!

some universal statements

**The experience of the fire service
all around the world is limited to ...**

- “... how we have always done it”
- ... the equipment we used so far
- ... how we trained and fought so far

some universal statements

Be aware of yourself and your environment

- *Buildings*
- *Society*
- *Fire service*
(tradition, strength, experience)
- *What others do differently and why*



some universal statements

Know your strategy:



“Rescue”

vs.

“Extinguishment”

a) **“Full Evacuation”**

a) **aggressive**

b) **“Defend in place”**

b) **defensive**

(confinement)

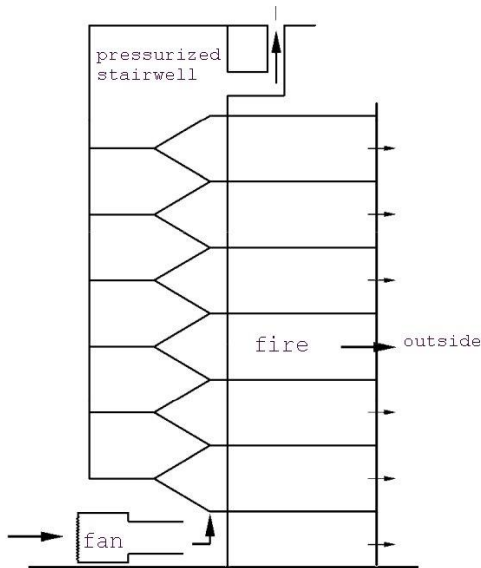
Know the basics:

- **Tactics**
- **Fire dynamics**
- **Skills for Extinguishment**
- **Smoke spread control**

some universal statements

Smoke spread control is essential

- Know your environment regarding building ventilation and that you interfere with it!
- Nearly every action on the fire ground can influence smoke spread!
- Smoke is killing people!



some universal statements

Be able to do basic things that are common around the world!

- **Protect the stairway!**

Given building systems / smoke curtains

- **Get water on the fire – fast!**

But do not encourage fire and smoke spread

- **Rescue through smoke filled areas!**

Smoke hoods (filter and air supply)



Attack-Team:
Equipped to rescue one
person with smoke hood
(filter vs. air supply)

RIT-Team:
Equipped to rescue one
unconscious person up to
four cooperating civilians



some universal statements

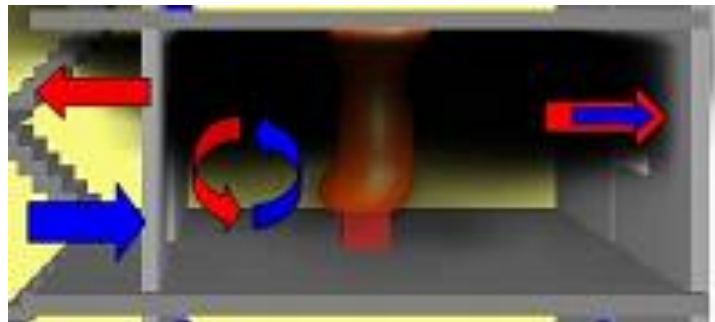
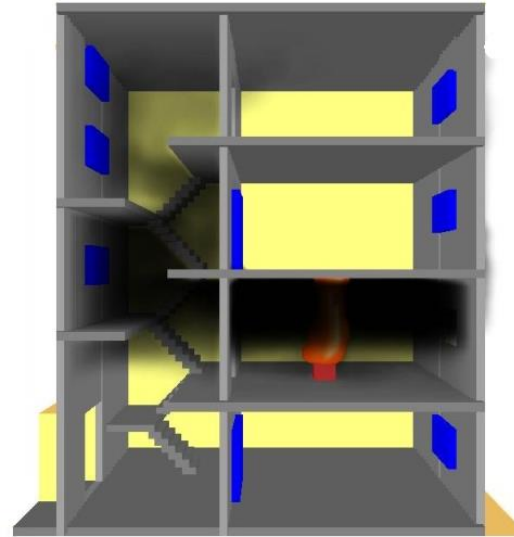
Stabilize the situation first
(do not make it worse!)
Do not allow smoke spread



Protect egress routes (stairways!)
Especially if you use a “stay in place” tactic



Smoke Control and Stairway protection is essential (especially in highrise fires!)



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10/2020