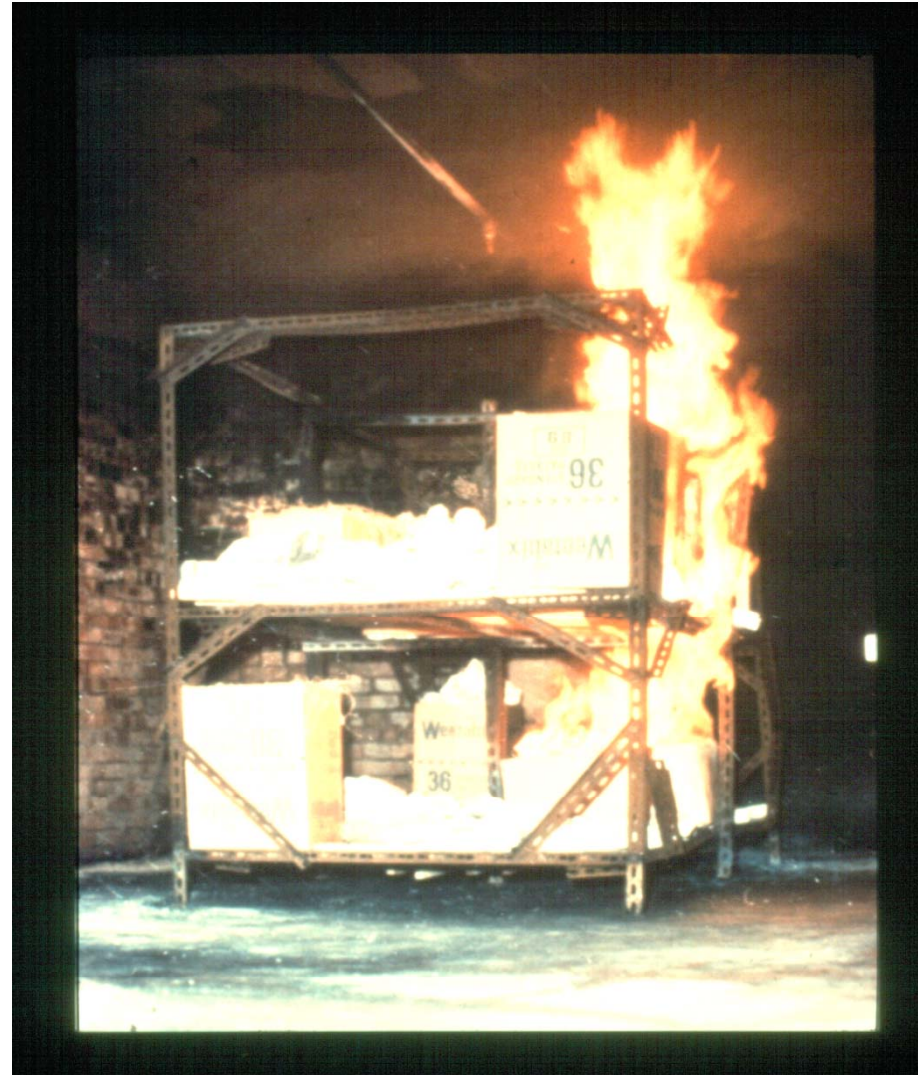




# IMPROVING FIRE SMOKE CONTROL IN HIGH-RISE RESIDENTIAL BUILDINGS





## Methods of Smoke Control (Approved Document B)

- Natural – Smoke Shafts & Vents
- Powered – Pressurisation / De-pressurisation



# Building Research Establishment (BRE)

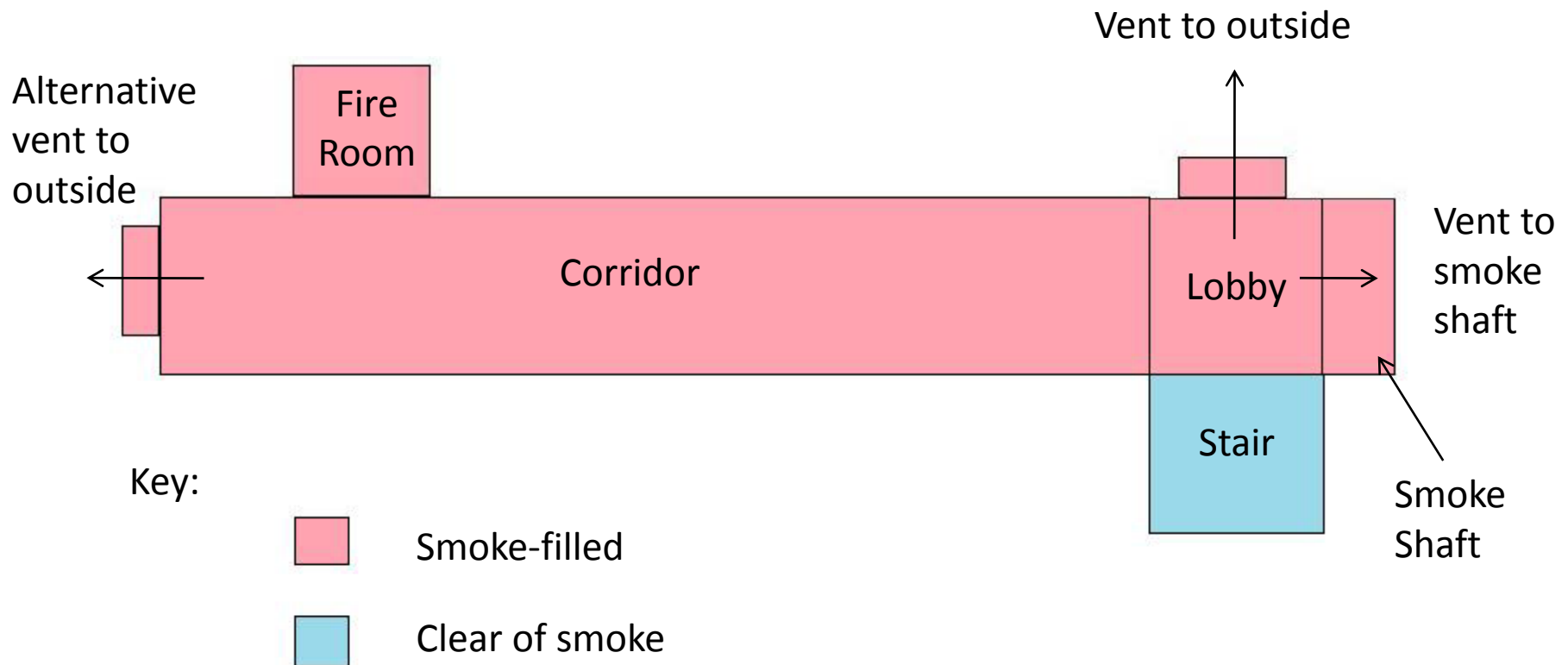
Report No. 213179 – 2005

## Smoke Ventilation of Common Access Areas of Flats and Maisonettes

## BRE Report Conclusions General

- If exposed to smoke from a dwelling for more than a short duration - the adjoining corridor/lobby can be expected to become smoke filled.
- Without appropriate smoke control measures – neighbouring corridors/lobbies and stairwell can be expected to become smoke filled.

# Natural Methods - Schematic



## BRE Report Conclusions Natural Methods

- **‘Ignoring adverse wind or building stack effects’** – natural venting via either window vents or into a vertical smoke shaft can protect the stair very well, albeit at the expense of leaving the corridor/lobby smoke filled.



## Natural Forces

- Buoyancy – Stack Effect
- Wind Effects – Negative/Positive Pressure
- Reliability? – At Best 50%

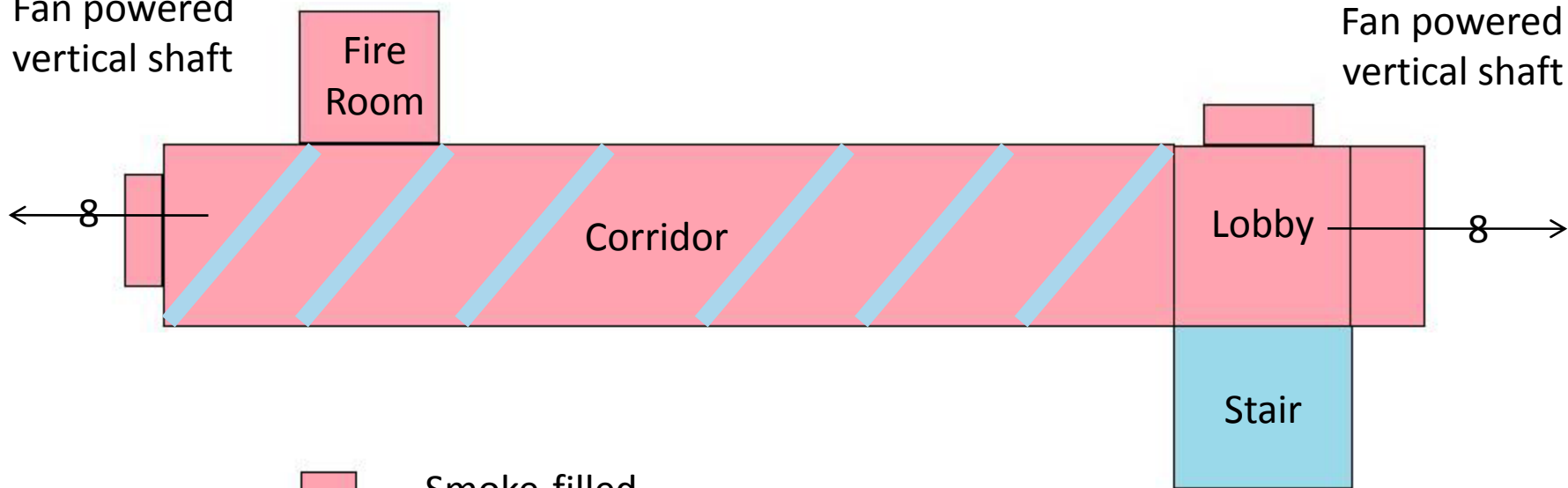
## BRE Report Conclusions Powered Methods

- Suitably designed mechanical systems can provide protection to the stair that is **'resilient to adverse wind and building stack effects'**.
- This can be achieved by either – de-pressurising the corridor/lobby relative to the stair or by directly pressurising the stair relative to the corridor lobby.
- By careful design mechanical methods, can provide a degree of smoke control in the common corridors & lobbies.

# Powered Methods – Depressurisation & Ventilation

De-pressurisation



Fan powered  
vertical shaft



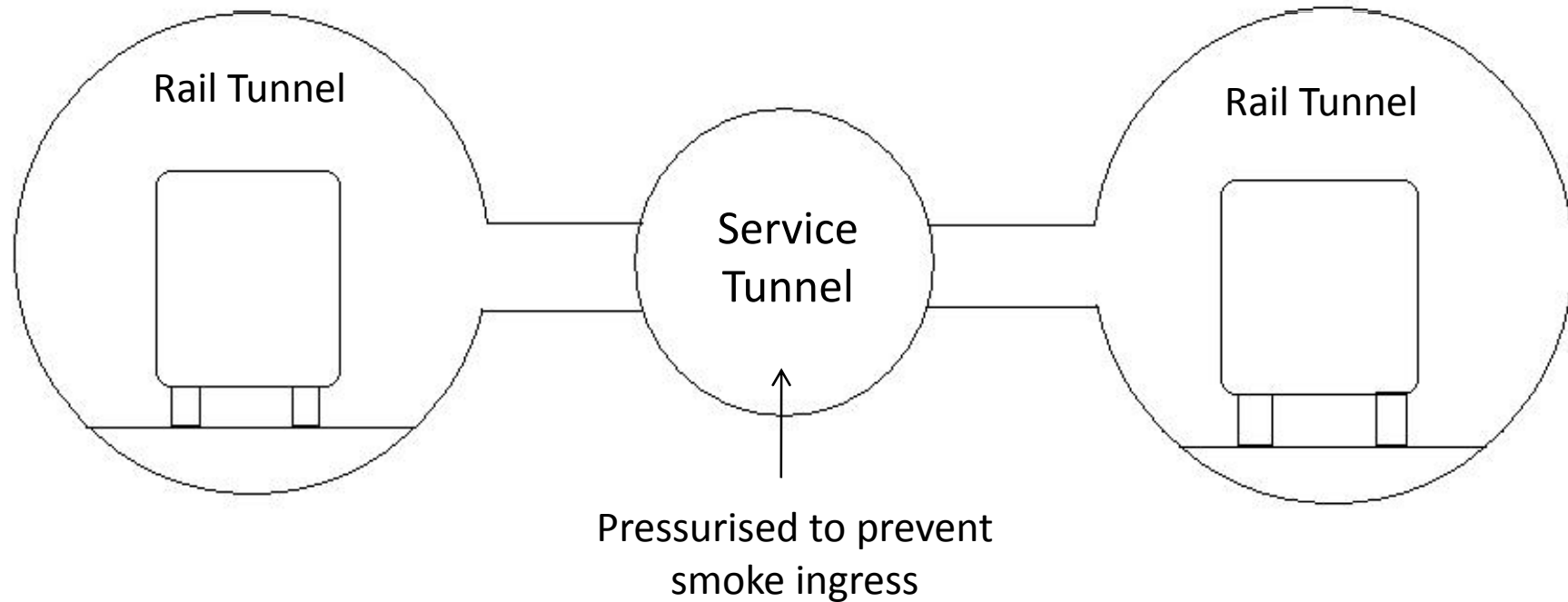
Ventilation

Fan powered  
vertical shaft

Key:

-  Smoke-filled
-  Clear of smoke

# Powered Methods - Pressurisation



## Pressurisation – Fire Research Note 958 Pressurisation of Escape Routes in Buildings

### • Vertical Escape Routes

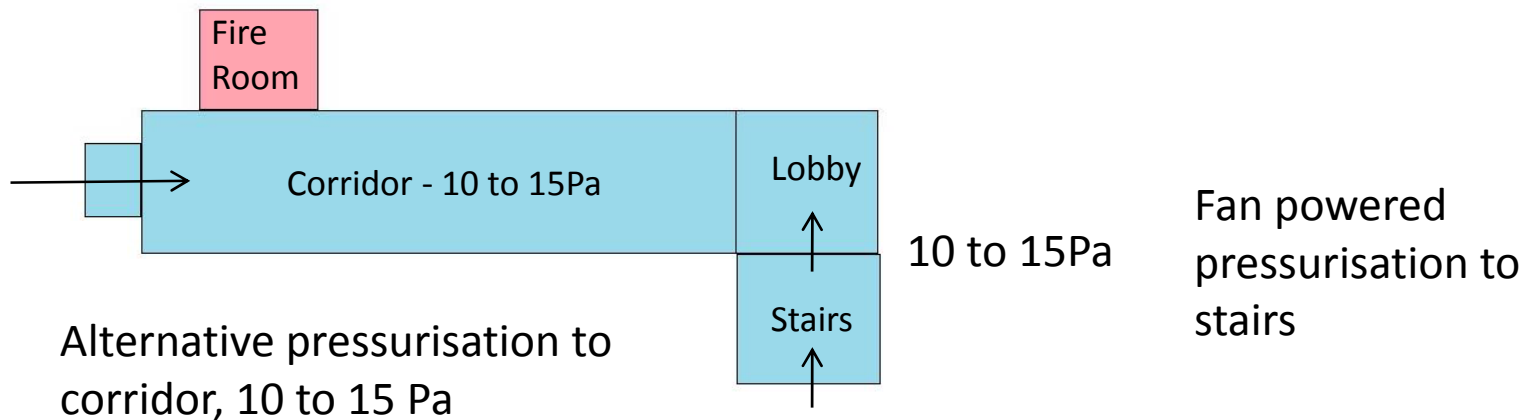
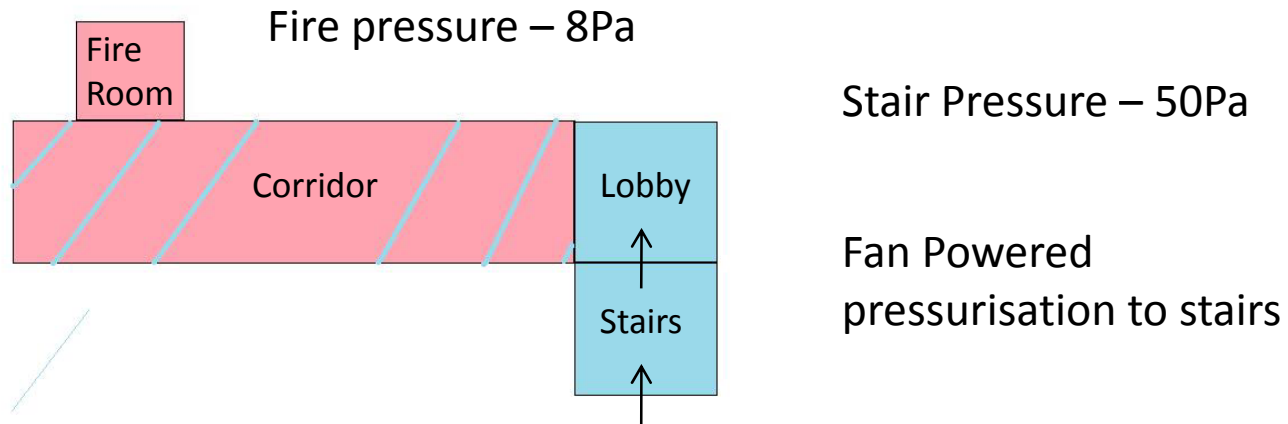
<u>Building Height</u> (metres)	<u>Design Pressure (Pa)</u>	
	<u>Minimum</u>	<u>Maximum</u>
5	5.0	16.5
25	7.0	19.0
<b>50</b>	<b>10.0</b>	<b>21.5</b>
100	15.0	28.0
150	21.0	38.0

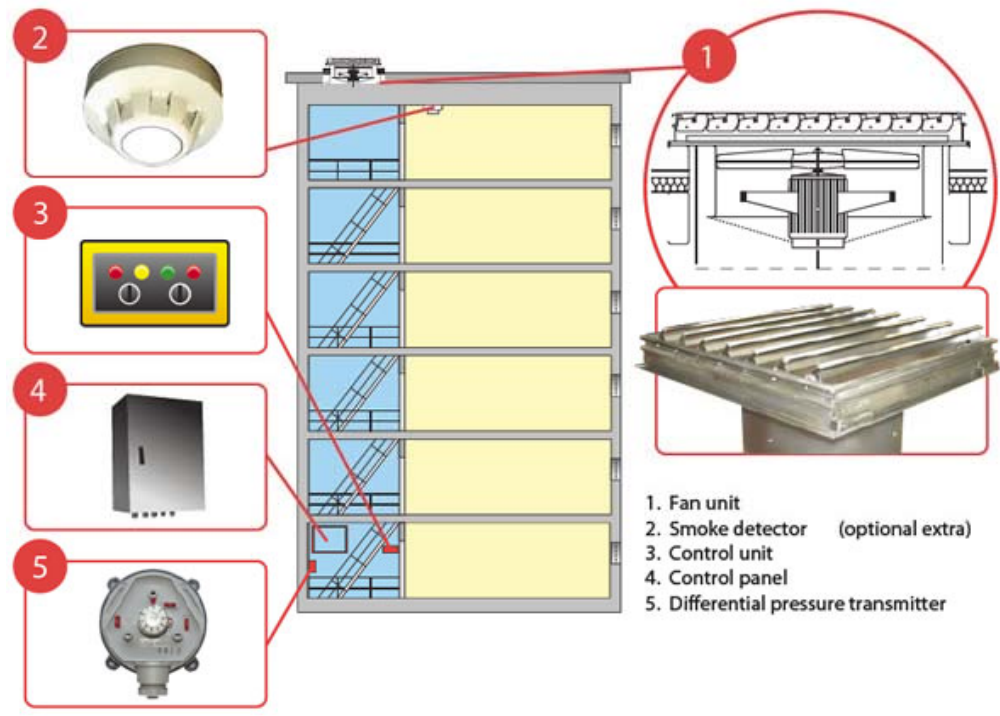
} 25Pa (rows 1-3)  
} 50Pa (rows 4-5)

### • Horizontal Escape Routes

<u>Height</u>	<u>Minimum</u>	<u>Maximum</u>
Single Storey	10.0	15.0

# Powered Methods - Pressurisation





- Roof and window mounting allowing retrofitting in existing buildings.

- Complete system including DESIGN, INSTALLATION and COMMISSIONING to EN12101-6-Category A.

- Reversible high temperature fan and automatic louvre (300C for 2 hrs) allowing for pressurisation and de-pressurisation/ventilation.

- Smoke shafts not always required.



VIDEO

Smoke Angel



*“There’s so much smoke in here....we  
can’t get out”*

Mail on Sunday – 5<sup>th</sup> July 2009