

**CIBSE/ASHRAE Group
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**Sprinklers & Smoke/Heat Vents
Some myths and some facts**

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Introduction

Much talked about issue in fire engineering

Going on since the early 70s

Some polarised views

Some nonsense

Some wrong thinking

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Some facts on SHEVS

Used to

- Maintain safe conditions on escape routes
- Provide good visibility for fire fighters
- Prevent smoke contamination
- Delay/prevent flashover (by removing heat)

Limitations

- Cannot control fire size without other agency
- Guarantees a well ventilated fire

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Some facts on sprinklers

Advantages

- Control (and possibly extinguish) fires
- Affects fires early – before they grow large
- Automatic
- Can be used as fire detection system

Limitations

- Do not prevent smoke logging
- Cannot control fires in shielded fuel supplies
- Can increase CO concentration in smoke

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The effect on each other

Taking note of the previous two slides,

- A combination of sprinklers and smoke ventilation should be a 'dream team'

BUT

- Controversy, especially from the respective proponents/suppliers has raged for over 40 years
- At one time this was so bad that each side rubbished any research undertaken by the other

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The effect on each other

Lots of research and discussion over past 40 years

- Factory Mutual tests in 1970 & 1974
- IIT Research Institute (USA) in 1977
- Ghent Tests (International group) 1990
- FRS/Colt in 1992
- FM in large facility with partial draught curtains
- NFPA in 1997
- IFE attempt at a programme of tests in 1999 – came to nothing due to costs

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The effect on each other

In addition –

- Numerous workshops, seminars, articles, etc over past 40 years
- Major discussion/dissent in CEN 1997-1999 during work on European Standards for SHEVS and for Automatic Sprinkler systems
- None of current main guidance documents discusses this interaction - ? Not seen as a problem.

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The CEN argument

Arose during development of design Standards for SHEVS and Sprinkler Systems

- Both committees wanted a clause to say if both fitted then their system had to operate first
- Special group set up in a separate CEN TC
- Agreement finally reached but entrenched views by some still persist
- Each Standard has a clause recommending care in design and an Informative Annex covering its industry viewpoint.

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What have the tests found

Observations from various tests –

- Vents showed no impairment of sprinkler performance
- Full scale tests not reproducible
- Draught curtains without vents can degrade sprinkler performance when fire starts very near to corner of the curtains
- Some increases, some reductions in number of sprinkler heads operating
- Effect of SHEVS on sprinklers is less significant than most other important parameters

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What has happened on site

Various changes in practices over time from

- No ventilation in sprinklered buildings in case vents hindered sprinkler operation through
- Restriction of operation of vents until first sprinklers had operated – often stipulated by Insurers to
- No restrictions on use of both with each operating independently

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Conclusions ?

- The experiments in the 1990s clearly showed that ventilation did not significantly delay the operation of first sprinklers and could reduce the number of sprinklers operating unnecessarily away from the seat of the fire
- The effects of ventilation on sprinkler operation were secondary to factors like rate of fire growth, the nominal operating temperature of the sprinklers and, with rapidly growing fires, the time constant of the sprinklers

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Conclusions ?

- The effects of ventilation on operation of first sprinklers are least in fires of high heat output which are growing rapidly, particularly vertically

THUS

- As sprinklers and vents perform different functions – both essential for safety of persons and property – there is no real justification for not having both and allowing both to open independently

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Discussion

- Why are consultants and other design professionals and specifiers not installing both ?
- What are their reasons ?
- Maybe one of trying to keep down cost ?
- Maybe something else ?
- What are the fire engineering justifications for 'no vents with sprinklers' ?
- What are your views ?

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Over to you !



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