



Property Protection & Fire Suppression

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Agenda



Building codes neglect property protection and firefighter safety



Review of sprinkler system performance



Brief overview of sprinkler research



Sprinklers as part of the solution



**Building codes neglect
property protection and
firefighter safety**





In Europe sprinklers are not required in:

- Most low & medium-rise buildings
- Most factories and other industrial buildings
- Most warehouses in Ireland, Italy and UK

Firefighter deaths occur disproportionately in factories and warehouses!

These buildings are places of employment!

Why does this matter?

- Firefighters are confronted with uncontrolled fires in large buildings – should they intervene?
 - **Sprinklers control fires, so this dilemma is unnecessary**
- Property is damaged and employment lost
- Governments say this up to owners and insurers, but:
 - Insurance companies cannot afford to refuse many risks
 - Long-term owners, not builders, benefit from sprinklers
 - Builders do not benefit so they do not fit sprinklers
- Only regulation can fix this broken market



Review of sprinkler system performance

Sprinkler system performance

Reliability 87-100%:

- Australia & NZ – 99.5%
- Denmark – 97% & 98%
- France – 97%
- Germany – 98%
- Netherlands – 99%
- Switzerland – 100%
- US NFPA – 87%
- US FM Global – 98%

Deaths and property losses reduced by >80%!



Brief overview of sprinkler research

Sprinkler research

- Emphasis is on new sprinklers or design concepts that can protect risks using fewer sprinklers or less water
- A lot of work on storage:
 - Fewer in-rack sprinklers
 - Greater heights without in-rack sprinklers
 - Protection of exposed, expanded plastics
 - New storage systems
- And on residential sprinklers:
 - Increased area coverage
 - Sloped ceilings
 - More concealed residential sprinklers

Sprinkler research contd.

A lot of work on obstructions:

- Slow-moving, large ceiling fans
- Pipes
- Cupboards, for example in kitchens

Ideas to speed response (smaller fire => less water):

- Each sprinkler separately operated by electronic detection (but expensive, complicated and reliability uncertain)
- Reduce operating temperature and RTI (fire 25-35% smaller but more risk of false activations)

Corrosion research:

- Technologies to detect and prevent it

Sprinkler research contd.

Societal benefits of sprinklers

Making the economic case for sprinklers:

- Cost-benefit analyses on houses in UK and US, other residential buildings and warehouses in UK
- Analysis of tax losses from unsprinklered warehouses in UK
- Tools for regulators and politicians

Making the environmental case:

- Analysis of the carbon loading in industrial buildings and how it can be reduced by fitting sprinklers, recognising that sprinklers themselves embody carbon



Sprinklers as part of the solution

Sprinklers as part of the solution

- Middle East high-rise fires often began as balcony fires
- The buildings are sprinklered (and sprinklers have prevented fire ingress) but the balconies are not

=> Fit sprinklers on the balconies!

- Some considerations:
 - Should the balconies have 141°C sprinklers?
 - Aesthetics of boxing pipe in existing buildings
 - Sprinkler location – must contain balcony fire
- Run some tests to make sure concept works

Who will pay for this research?

Sprinklers as part of the solution

- In double façades if there is a fire load in the voids perhaps sprinklers could be fitted in them
 - Location of sprinklers?
 - How many sprinklers might operate?
 - Do the sprinklers need any special protection?
- Norway is devising a test protocol for façades and may allow fire suppression to be part of the solution

Sprinklers as part of the solution

- Tianjin fire was reported to have begun in nitrocellulose and spread to ammonium nitrate
- NH_4NO_3 is a well-known explosive, for example:
 - West Fertilizer explosion 2013 – 15 dead
 - NFPA 400 has a chapter on ammonium nitrate which includes a requirement for sprinklers
- In Tianjin that might still not have prevented the explosion but it could have been part of the solution!



Thank you!