

Protection of large scale hospitals with High-Pressure Water Mist (HPWM)

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Summary

1.

Introduction

2.

Objectives

3.

Choosing HPWM system

- Traditional advantages
- Additional advantages

4.

Components and Installation



250,000 m² Somatic University Hospital (DNU) protected entirely with a SEM-SAFE[®] HPWM System



DNU Skejby Hospital – Fire Safety Strategy

The Fire Safety Strategy is based on:

❑ Danish Building codes, performance based:

- ❑ Acceptance criteria for human safety
- ❑ Acceptance criteria for fire safety in relation fire & smoke spread

❑ Building requirements from building owner:

- ❑ "Create a :
 - ✓ Modern
 - ✓ Professional
 - ✓ Urban
 - ✓ User friendly environment"

RESULT:

MAXIMUM FIRE SAFETY LEVEL

Fire Protection of the entire hospital with SEM-SAFE®



Fire protection of large scale hospitals with High-Pressure Water Mist ; Lasse Sørensen Laustsen
2. Objectives

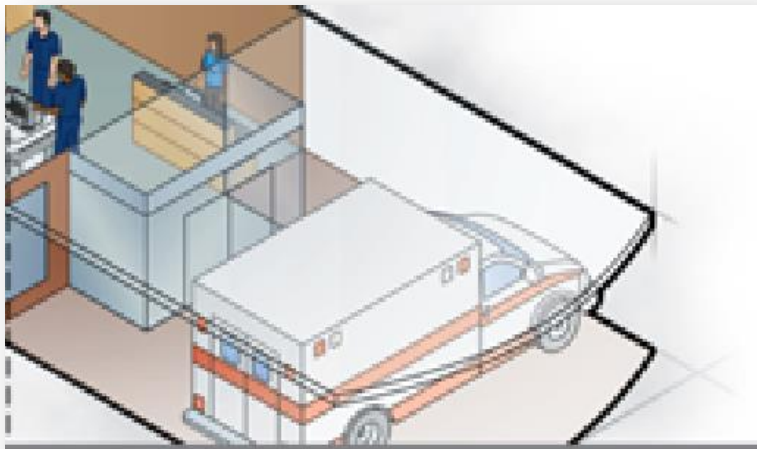
OH1 areas in an hospital protected with SEM-SAFE®

- Patient rooms
- Offices
- Staff facilities
- Corridors
- Operating theatres
- Kitchens and ducts
- Reception areas
- Lobbies and waiting areas
- High-sensitive equipment rooms
- Staff facilities rooms
- Canteen
- Server rooms
- Glass protection and atria
- Emergency generator rooms
- Technical rooms
- Archives



OH2 areas in an hospital protected with SEM-SAFE®

- Car parks
- In house ambulance parking



OH3 areas in a hospital protected with SEM-SAFE®

- **Storage rooms**
- **Shopping areas**
- **Laundry rooms**



*Examples
OH3 shopping area*



Choosing HPWM system

LOW WATER DEMAND

- Immediately cools the fire, preventing fire growth
- Minimal water damage

SYSTEM FLEXIBILITY

- Modular design, easy to extend to cover more sections

MINIMAL INVASIVE TECHNOLOGY

- Harmless to electrical installation(IP23)

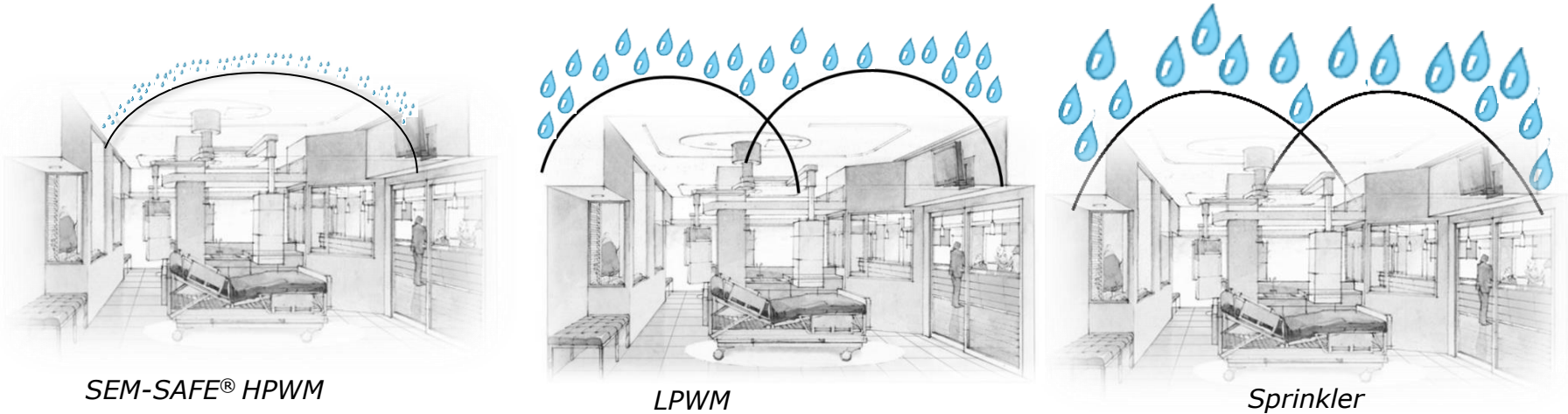
PROVEN TECHNOLOGIES & APPROVALS

- Flexibility in approvals

PERFORMANCE BASED TECHNOLOGY

- Not only a modern sprinkler system

Reduced water amount



SEM-SAFE® HPWM

LPWM

Sprinkler

HPWM



LPWM



Sprinkler



SEM-SAFE® uses up to 50% less water compared to LPWM

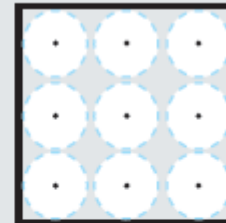
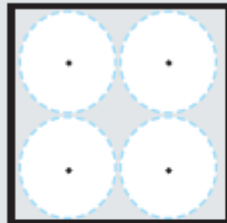
SEM-SAFE® uses up to 80% less water compared to sprinkler

Higher spacing

HPWM

LPWM / Sprinkler

Fewer nozzles & pipes



Smaller stainless steel pipes & fewer fittings

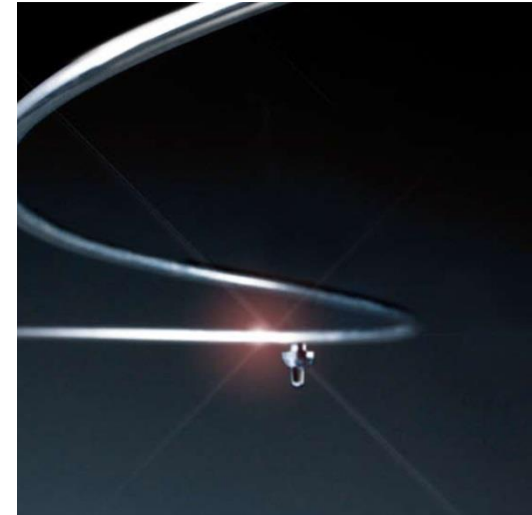


Easy to integrate



Fewer pipes & fittings

- Piping materials:
 - Stainless steel AISI 316
 - Maintenance free(no corrosion)



Typical pipe size

	HPWM	LPWM	Traditional sprinkler
Nozzle Pipes	ø10 - 15 mm	ø25 - 40 mm	ø25 - 50 mm
Ring pipes	ø22 - 33.4 mm	ø50 - 80 mm	ø65 - 100 mm
Main pipes	ø33.4 - 60.3 mm	ø80-100 mm	ø100 - 200 mm

Effective fire protection with SEM-SAFE®

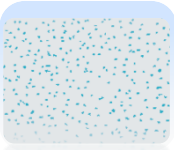


- Higher cooling capability than sprinkler (up to 7 times better than traditional sprinkler)

• Optimal control of the fire



Sprinkler



Water Mist

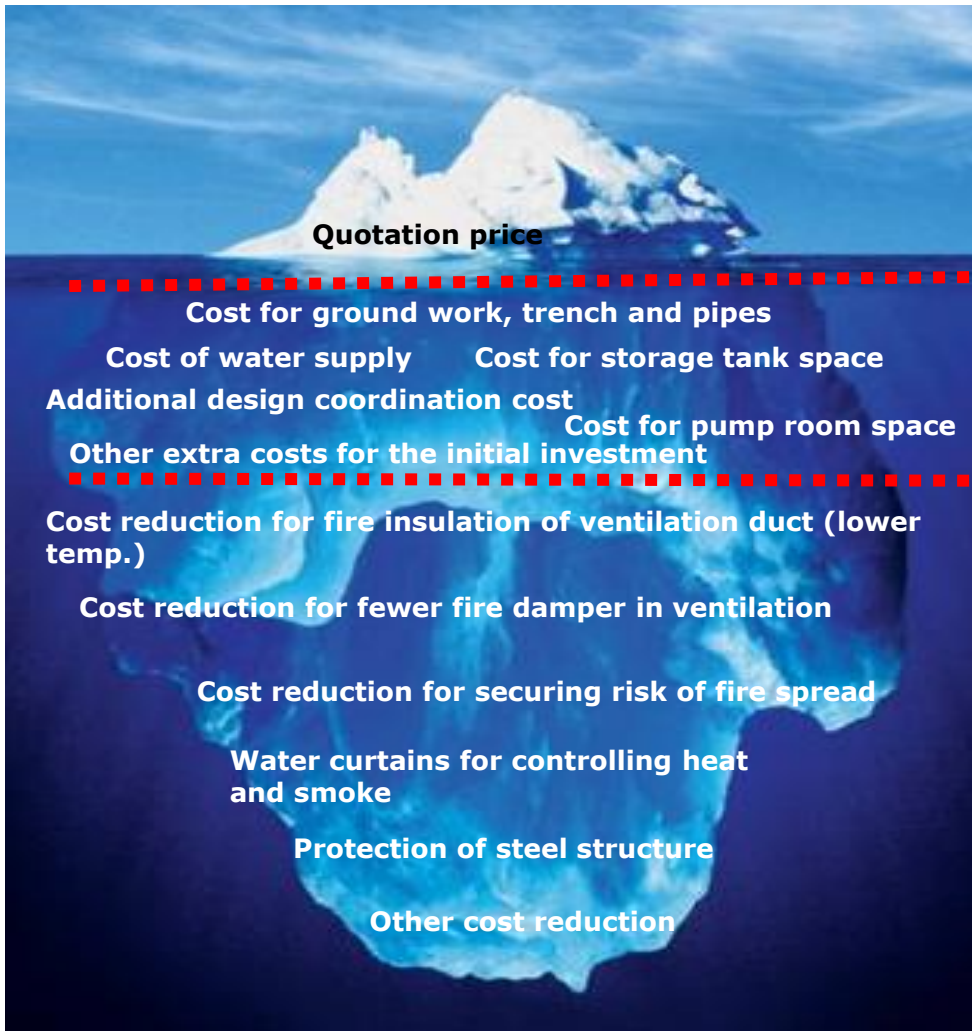
- Minor droplets size compared to traditional sprinkler and low -pressure water mist

• Fast evaporation of the water, while sufficient speed to penetrate the fire. Water damage is kept to a minimum



- Gentle with electrical equipment

• The functionality of the electrical equipment in the hospital is not disrupted and the data is saved



Quotation price

Direct savings

Indirect savings

HPWM Price

Savings

Total investment with sprinklers

Performance-based fire safety – Focus areas

Typical focus areas with performance-based fire safety

- Evacuation & rescue measures
- Fire brigade`s intervening
- Fire safety installations
- Fire & smoke spread
- Constructions



- With a fire safety analysis, we can take advantages of SEM-SAFE® superior characteristics for “indirect savings”

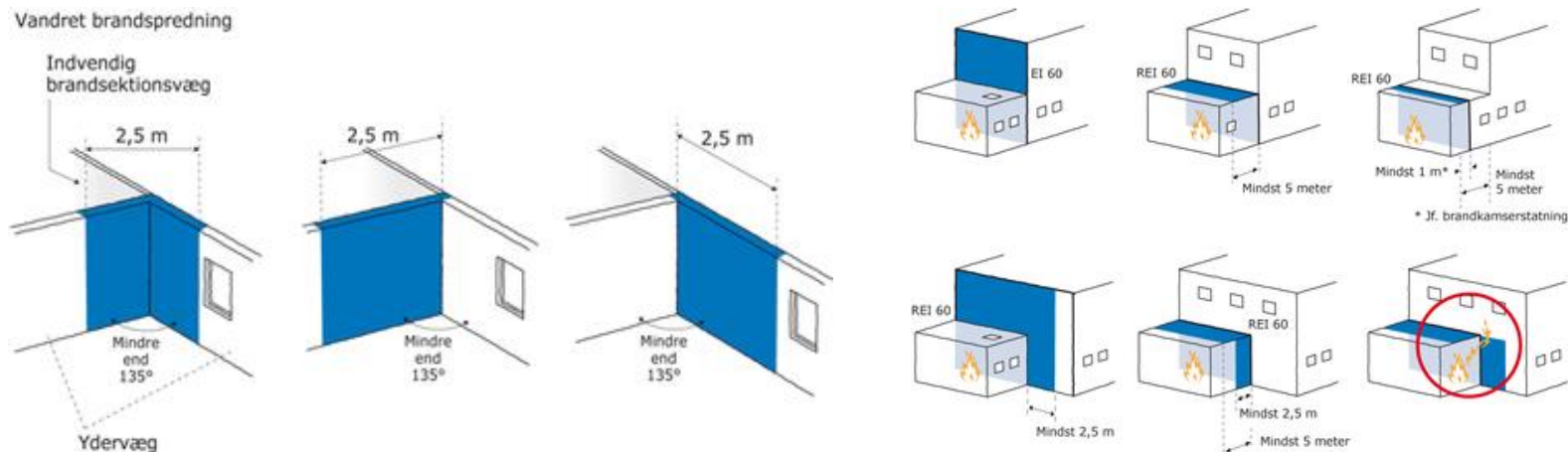
Radiation: SEM-SAFE® is characterized by effective absorption of heat radiation

Temperature: SEM-SAFE® is characterized by effective cooling of combustion gases in enclosure

Smoke: SEM-SAFE® helps controlling smoke and reduction of soot & particles from a fire, by keeping the ventilation system running

Radiation – Horizontal & vertical fire spread between fire sections

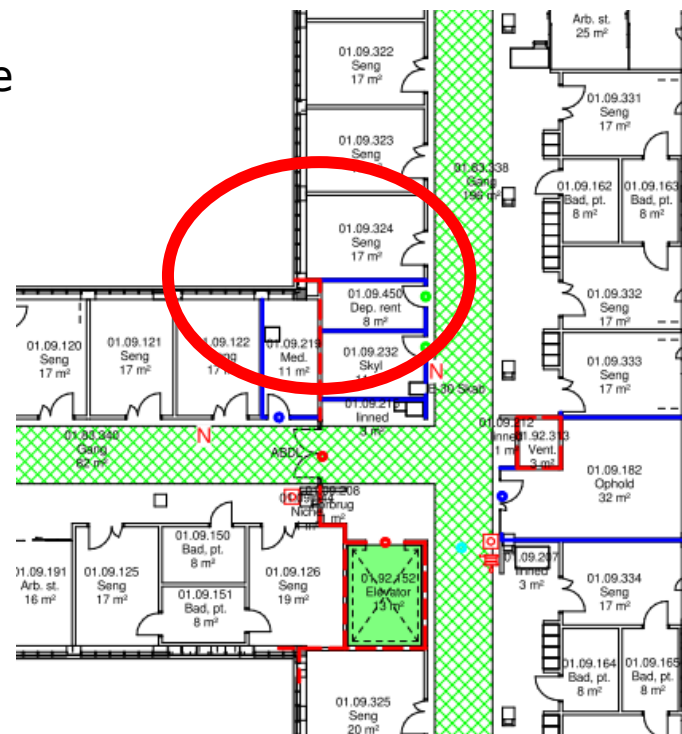
- Protections against fire spread: Limiting temperature and radiation from fire results in less requirement for insulation/separation
- Fire spread at external surfaces of a building can occur due to radiation, for example in a corner of a building through the glass facades



Radiation – Horizontal fire spread between fire sections

- Radiation through a water mist barrier is depending on the droplet size, wavelengths (electromagnetic waves) and the amount of droplets the radiation interacts with “smaller droplets gives better absorption”

- Radiation can be



ons

Temperature - Cooling of combustion gases in enclosure

- HPWM has superior capabilities to absorb heat from the fire, smaller droplet has the best effect on radiation
- With HPWM, lower temperatures secure cost reduction in specification for insulation materials, and/or fire dampers within a ventilation system
- With SEM-SAFE[®], it is possible to continue use of a ventilation system for smoke extraction during a fire
Lower temp doesn't damaged ventilation engines
- Reduced service cost of traditional solution for smoke and/or fire dampers in ventilation system
- Protection of steel structures: Cooling of fire results in less requirement for fire insulation



SEM-SAFE® adds value

- Savings for glass facades
- Savings for insulation of ventilation system
- Savings in numbers of fire & smoke dampers in ventilation system
- Savings for insulation of breach through fire sections, piping etc.
- Savings for insulation of steel structures
- Savings for reduced service cost at water curtain compared to high service cost at alternative solution with automatic fire doors

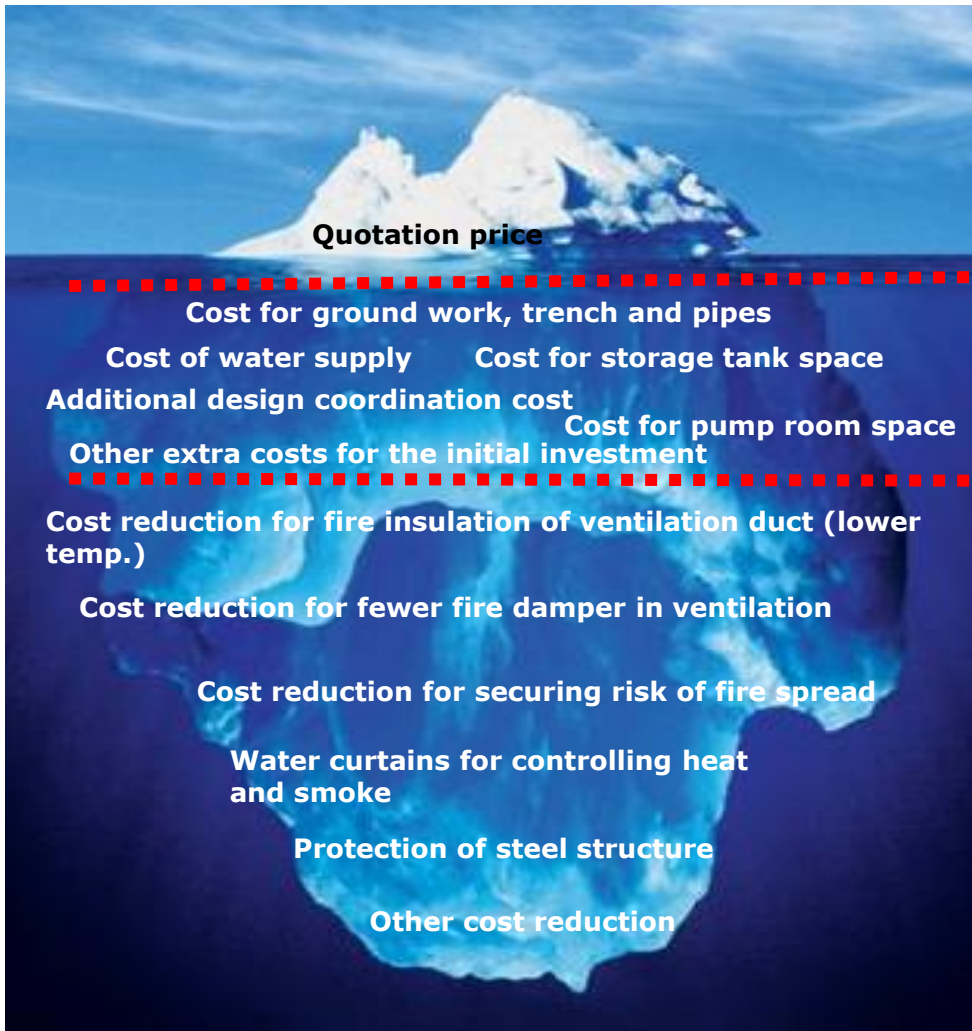
SEM-SAFE® adds value

- Added value by optimal control of a fire
- Added value by securing continued use of ventilation system for smoke extraction
- Added value as lower temperature secure options for reduced dimension of the steel structure
- Added value as smoke in general is reduced



Added value at DNU hospital, savings 11,33 mill Euros

- Water supply, actual savings 0,27 mill. Euros
- Glass in galleries, actual savings 2,8 mill. Euros
- Isolation & insulation of ventilation system, actual savings 4,15 mill. Euros
- Structural design, steel structure etc., actual savings 3,45 mill Euros
- Vertical fire spread, actual savings 0,16 mill Euros
- Water curtains instead of automatic fire doors, actual savings 0,14 mill Euros *Plus reduced service cost at water curtain*



Quotation price

Direct savings

Indirect savings

HPWM Price

Savings

Total investment with sprinklers

All key components for SEM-SAFE® high-pressure water mist are manufactured in-house

Nozzles



- 100% tested
- Less water consumption
- Fully optimized nozzle program for different applications
- High spacing

Pumps



- World's lightest and most compact high-pressure pump
- Multi-axial piston pump in stainless steel
- Uses water as lubricant



Click above to open video

Section valves



- Stainless steel valves
- Compact and modular block valves

DNU Video



Click above to open video

Thank you for your attention

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