Can we use knowledge and experience from other sectors to prove Water mist’s suitability for land applications?

UK Water Mist Seminar
8th March 2016

Mark Davies – Engineering Manager
Background to this presentation.

- Last years IWMC great presentations.
- Technical Meeting on Land Applications.

¿ Why should we always compare to sprinklers? Our own merits.
¿ What more does the IWMA and its members need to do?
¿ The role of the “so called” expert’s in water mist.

+ Water Mist is ...“the gold standard” “The Rolls Royce of fire fighting”
IWMA objective.....growth in the land sector.

“.........We know our product, it appears the decision maker does not.........
..........goes back to sprinklers....”

“Water Mist is <3% of the sprinkler market.”

Q: Are we giving the AHJ’s what is actually needed to make the decision..?

A: We are getting much closer.....

A front door to back door solution.

Perception of Partial protection of the building.

Forget the science, make it easy to compare, – EVIDENCE.
Influences and considerations.

- Fire Tests: Approved and witnessed.
- Meaningful fire tests.
- Comparisons to other standards/approvals.

- The experts facing the customers.
- The difference between a “sales” can do and an “engineered” solution.

- Not all water mist is the same.
- Engineered solutions, not plumbed.
- Not all want to offer a certified designer or installer scheme.
What CAN, and DO we protect?
Is it a big deal?

- Cruise ship (330):
  - ~40m wide, 18 decks, 2,700 passenger cabins

- Eiffel Tower (325m):

- Shard London Bridge (305.8m):

- 775 ROOMS IN BUCKINGHAM PALACE

- 1608 ROOMS IN JW Marriott Marquis Dubai

- ~13,000 nozzles, ~1000l/min, up-to 42mm piping.
What DO we PROTECT?

- Cabin balconies
  - MSC 1/Circ. 1268

- Galley & Stores
  - MSC. 265/84

- Public spaces
  - MSC. 265/84

- Accommodation
  - MSC 265/84

- Service area
  - MSC. 265/84

- RO-RO and special category spaces
  - MSC. 1/Circ. 1272

- Deep fat fryer and Galley ducts
  - ISO 15371:2009 and type approvals

- Machinery space total flooding
  - MSC/Circ. 1165

- Machinery space local application
  - MSC/Circ. 913

- Additional images of ship interiors and machinery spaces.
What we protect at sea – generally accepted on land.
What we protect at sea – generally accepted on land.
If we can PROTECT.

Can we protect?

IMO MSC.265(84) Sec 6
Public Spaces

IMO MSC.265(84) Sec 8
Store rooms & pantries
If we can PROTECT.

Can we protect?

IMO MSC.1268 Sec 3 & 4
Cabin balconies

IMO MSC.265(84) Sec 6
Control Stations.
1990 - Scandinavian Star - 158 people - direct result of fire.

The IMO, SOLAS Reg II-2/12 and water mist.

1994 - IMO - all qualifying ships fitted with sprinklers.

1991 – Marine Safety Committee (MSC) develop guidelines for approved “equivalent sprinkler systems” - “whilst experience had been excellent, the regulation had not been updated since 1974 and lacked the subsequent advances that had been made in sprinkler technology”.

1992 – Reviewed and proposed testing protocols for equivalent sprinkler systems.

1993 – Equivalent sprinkler systems must have the same characteristics (22 requirements) ….. Under the existing regulation.

1993 – Tests for cabins, corridors and public spaces were devised.

1995 – IMO Resolution A.800 (19) introduced.

The background and development of the guidelines in IMO Resolution A.800(19)

Magnus Arvidson
SP Fire Research
SP Technical Research Institute of Sweden
Summary: IMO Approved Solutions

- Accommodation spaces, cabins, stores according to IMO MSC Res 265/84 (IMO Res A800) – SAS F13003
- Total flooding in machinery spaces according to IMO MSC Circ 1165 for volumes up to 3348 m³ – SAS F120152
- Local application in machinery spaces according to IMO MSC/Circ. 913 IMO MSC/Circ. 1387 – SAS F130034
- RoRo/Special category spaces for 5.0m & 2.5m heights according to IMO MSC Circ 1430 – SAS F130156
- Cabin balconies according to IMO MSC Circ 1268 – SAS F130034
- Galley duct protection UL300 – F20989
HOW DO WE PROVE IT?

Q: ....as individual companies or together as IWMA?

• **LISTEN** to the thoughts of AHJ’s.

Give **EVIDENCE** – a need, not a nice to have for AHJ.

• Make it simple, **DATA** of test protocols, cross ref to alternative approvals.

• **INFORM** - educate.
  • Reliable, Accurate and up to date information is a given.
What is the evidence? (IMO)

<table>
<thead>
<tr>
<th>Space Designation(1)</th>
<th>Fire Risk Category(1)</th>
<th>Maximum Area of Space</th>
<th>Nozzle Designation /K-Factor of Nozzle Washers</th>
<th>Spacing</th>
<th>Maximum Distance to Bulkheads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Stations</td>
<td>1</td>
<td>Unlimited</td>
<td>603-260-061-B/3.21 or 603-300-061-B/3.61</td>
<td>5.3(2)</td>
<td>2.65(2)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.3(3)</td>
<td>2.65(3)</td>
</tr>
<tr>
<td>Stairways or Corridors (Width ≤ 1.5m)(5)</td>
<td>2 or 3</td>
<td>Unlimited</td>
<td>603-19-B/1.9 or 603-1-035-B-W/1.35(4)</td>
<td>5.3(2)</td>
<td>0.75</td>
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<tr>
<td></td>
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<td></td>
<td>or</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>4.0(2)</td>
<td>or Sidewalk(4) 1.5 depth(2)</td>
</tr>
<tr>
<td>Stairways or Corridors (Width &gt; 1.5m)(9)</td>
<td>2 or 3</td>
<td>Unlimited</td>
<td>603-260-061-B/3.21 or 603-300-061-B/3.61</td>
<td>5.3(2)</td>
<td>2.65(2)</td>
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<td>5.3(3)</td>
<td>2.65(3)</td>
</tr>
</tbody>
</table>
Non IMO evidence.

- Protection of Non-Storage Occupancies, Hazard Category 1 (HC-1) – FM.
- Office Building - OH1: CEN/TS 14972:2011
- High ceilings up to 12m - OH4: CEN/TS 14972:2011
- INSTA 900-3:2012 Watermist systems equivalent to residential sprinklers
Protection of Non-Storage Occupancies (HC-1) – FM5560 Appendix G
Office Building pertaining to OH1: CEN/TS 14972:2011

Store/shopping centres pertaining to OH3: CEN/TS 14972:2011
High ceilings up to 12m pertaining to OH4: CEN/TS 14972:2011

MUST EXCEED SPRINKLER PERFORMANCE

INSTA 900-3:2012 Watermist systems equivalent to residential sprinklers
Accurate Information

APPLICATION DATA SHEET: Protection of Non Storage Occupancies, Hazard Category 1 (HC-1)

Application: Hazard Categories based on Occupancy

<table>
<thead>
<tr>
<th>Occupancy</th>
<th>Description of occupancy</th>
<th>Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartments</td>
<td>Lightly built for storage and storage management with ordinary combustibles.</td>
<td></td>
</tr>
<tr>
<td>Conceded spaces</td>
<td>Extends for low intensity of heat released by these occupancies.</td>
<td></td>
</tr>
<tr>
<td>Hospital rooms and laboratories</td>
<td></td>
<td></td>
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<tr>
<td>Hotel rooms</td>
<td></td>
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<tr>
<td>Institutional</td>
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<tr>
<td>Meeting rooms in Convention</td>
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<tr>
<td>Dining and Rocks</td>
<td></td>
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<tr>
<td>Office</td>
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<tr>
<td>Retail or commercial offices</td>
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</tbody>
</table>

Technical Data

- FM Approval number: 3043623 in progress
- Fire Test Protocol: FM56882, Appendix G
- Water Quality: Per NFPA

Description of High Pressure System

The ULTRA FG system produces High Pressure Water Mist.

Our nozzles are designed to spray water under high pressure and produce extremely small droplets (Spray-Bang) as efficiently as possible and distribute them throughout the room. These droplets help cool the surrounding area more effectively as well as limit the water damage done to the surrounding area. This ensures that systems can return to being fully operational in a shorter space of time.

1. System Overview

Pressurized water can be created by electric pump, diesel pump or accumulator.

The electric pump system consists of high pressure pumps, the pump station can be master, micro or PSR series; each pump station has a modular and can be configured with different quantities of pumps, depending on the requirement of the areas to be protected. The pump station can have a stand-alone pump if required. The water head is also an option, the required water supply is greater than 250 bar pressure at desired flow rate for the demand areas and for plants requiring water storage systems.

The accumulator is a device that, when released by compressed gas, is stored in cylinders at a pressure of 200 bar. A regulator attached to the accumulator valve regulates the flow rate of the water into the pipeline, for the working pressure at the nozzle.

The number of cylinders supplied with the accumulator system is determined by the water requirement for the water mist and the required mist pressure. The gas cylinder (Master) is filled with a standard actuator valve. All gas cylinders (slave) valves are filled with a standard actuator valve. Upon activation, the gas valves are opened, releasing the gas which in turn pressurizes the water cylinders.

Each section can be equipped with a "section valve".

In the event of the, one or more of the heat sensitive nozzle tube ruptures, causing water at standby pressure to flow through the nozzle.

This flow is measured at the section valve and a signal sends the pump station to start the pump high pressure pump. After that the pumps are starting in sequence, according to the necessary conditions.

The electrical control cabinets are located on the pump station. The station is normally equipped with the following:
- Automatic device between main and emergency power.
- Motor protection for each pump in the unit.
- Sequential start of each high pressure pump.
- Logic PLC controller which controls all functions.
- Control valves and charging diode in 24 VDC. Runtime is at least 1 hour for PLC, operational panels and alarms.
- System start and stop buttons for each pump, including fresh water pump.

2. The Protected Area - Design Parameters

The water supply and capacity are calculated based on several factors:
- Floors: standard and ceiling height
- Location and foundation of fire risk category
- Maximum nozzle setting
- Minimum water pressure
- To size the pump/accumulator - the most hydraulic demanding area shall be calculated based on the following:
  - Minimum Design Area: 140° (1600°)
  - Demand duration is 60 minutes.
How do we **continue** to inform and educate?

- By individual companies or combined as IWMA?
- Self Promotion! – Google! - YouTube!
- Don’t keep it to ourselves!
- Ensure up to date and ACCURATE data is used.
Water Mist Merits.

- >25 years..... >35 years.
- Small pipes / Less weight / Less water – quick return to operation.
- Reduced install and maintenance times.
- No corrosion.
- Aesthetics, doesn’t look 100 years old!
- Can use local water supply / small tank.

- Innovation - Nozzle tool for 100% inspection.
- Can engineer solutions.
- Above and beyond compliance.
Water Mist Merits.

Protection of ceiling voids
Water Mist Merits.

Traditional sprinkler vs ULTRA FOG water mist

- Multi level installations
- In-line monitoring
Water Mist Merits.

Anti-Legionella dosing
Accepted solutions
Example Installations
SUMMARY

• We must work together on the 97% that is NOT watermist.

• Raise our profile - Google doesn’t always have the (best) answers!

• Watermist needs to be given “the opportunity”.
  • Specifications can be restrictive: pressure/flow/piping.
  • What do you specify now? 5, 7.5 or 15 l/min/m²? How can we better it?

• Influence on our strengths, not our weaknesses when compared to sprinklers!

• Continue to PROVE, DOCUMENT and EDUCATE.
Thank you for your attention.