



# Maintenance Requirements for Water Mist Systems

# Effect of Lack of Maintenance



**15 Oct. 2004**

**East Tower of Parque Central Building  
(56 floors) in Caracas, Venezuela**

- Building protected by a sprinkler system
  - Fire began on the 34<sup>th</sup> floor
  - Sprinkler system was not in working conditions since it was not maintained
- ➔ **Fortunately the building was not occupied, but the fire damage was 250 Mio USD**



# Typical Applications for Water Mist Systems



- Heritage Buildings
- Museums
- Theatres



- Hospitals
- Laboratories
- Care Homes



- Libraries
- Archives



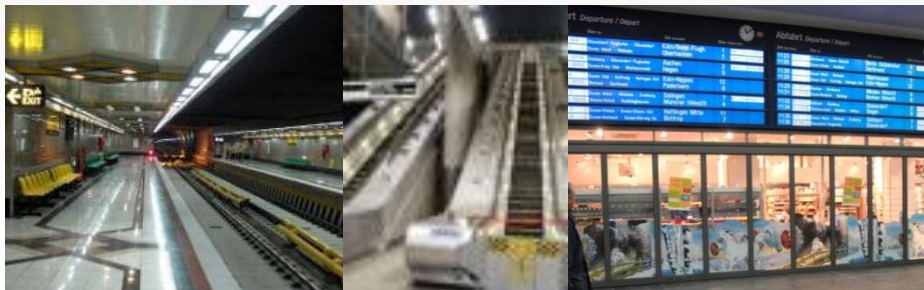
# Typical Applications for Water Mist Systems



- IT Rooms
- Data Centres
- Telecommunication Areas



- Cable Tunnels



- Underground Stations

# Typical Applications for Water Mist Systems



- Flammable Liquid Storage
- Paint Booths
- Hydraulic Areas



- Machinery Spaces
- Turbines
- Generators



- Deep Fat Fryers

# Observed Problems leading to Malfunction



- **Blocked or obstructed nozzles**
- **Uncleaned Pipe work**
- **Loose pipework**
- **Corroded pipework**
- **Clogged filters**
- **Poor water supply and water quality**
- **Incorrect position of shut-off valves**
- **Poor housekeeping in the pump room or at section valves**

# Necessity of Maintenance

- Ensuring the function and operability of the system
- Risks result from
  - Mechanical wear and tear
  - Component defects
  - Modifications in water or power supply
  - Accidents / vandalism
- Inspection for structural changes and changes in fire risk
- Maintaining the approval of the protected area by the fire authority / insurer
- Maintaining warranties from system supplier
- ➔ Minimising financial losses or even danger for human lives



# Maintenance Definition (CEN TS 14972)

## Maintenance

**Combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function**

## Qualified Company

**Company registered by a national body or accepted by the authorities having jurisdiction for design, installation and maintenance of fixed water mist systems and fully trained and authorized by the manufacturer**



# Maintenance Definition (CEN TS 14972)

## Intervals

**The maintenance shall be in accordance with the manufacturer's design and installation manual. Minimum once a year the system shall be maintained in accordance with the manufacturer's instructions by a company authorized by the manufacturer**

## Training

**All persons who may be expected to inspect, test, maintain, or operate water mist firefighting systems shall be trained by the manufacturer's and kept adequately trained in the work they are expected to perform**

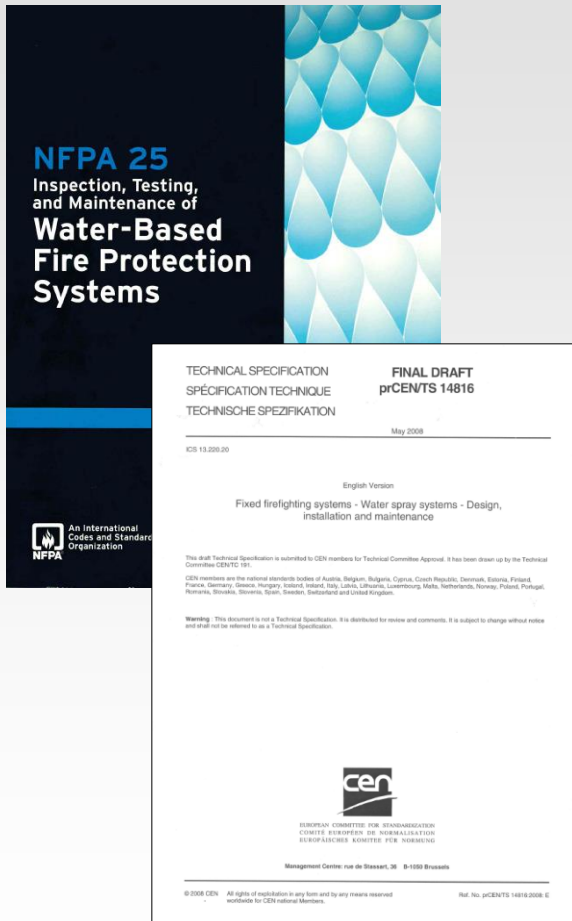
# Importance of Guidelines and Standards

## Applicable Standards

- NFPA 25
- CEN TS 14972
- BS DD 8489

## Definition of

- Uniform maintenance procedures
  - Schedules for periodic maintenance
  - Who is authorized to carry out maintenance
- ➔ Requirement for an Operation and Maintenance Manual by the manufacturer



# Content Operation and Maintenance Manual

- Any limitations in areas where the water mist system can be used safely
- Listing of additives that can be safely used
- Monitoring program for systems and components including instruction on the action to be taken in respect of faults
- General maintenance instructions
- Schedule for maintenance by a competent person
- Instructions to the user to keep records, including a logbook
- Instructions to the user to set the system, in conjunction with any automatic pumps, pressure tanks and gravity tanks, to its proper operational condition

# Maintenance Items Covered in Standards

## Responsibility

- Obligation of the property owner

## Correction or repair

- Damaged parts

## System re-evaluation / Modification

- Occupancy changes / Changes in obstructions or ventilation
- Changes in fire load

## Inspection and testing

- Concerned components
- Maintenance intervals



# Maintenance Items Covered in Standards

## Documentation / Reports

- Comprehensive record of works carried out

## Training

- Maintenance carried out by companies trained and authorised by the system manufacturer

# Main Maintenance Items



## Water supply

- Source pressure and quality  
(Physical / chemical / microbiological)

## Water storage cylinders

- Water content and quality



## Water break tanks

- Water content and quality
- Water supply devices (valves)
- Level alarms

## Compressed gas cylinders

- Cylinder pressure / Filling

# Main Maintenance Items



## Pumps and drivers

- Mechanical transmission
- Pump bearings / Seals
- Filters
- Control valves / Check valves
- Sensors and switches
- Flow rate and pressure
- 10 min. test run



## Control equipment

- Operation tests

# Main Maintenance Items



## Directional (Section) valves

- Operation tests (flow)

## Depending from type of valve

- Sensors and switches
- Seals





# Main Maintenance Items



## Piping

- Pipe support
- Pipe fittings
- Corrosion
- Damages



## Nozzles

- Damages
- Dirt or corrosion
- Filters
- Obstructions

# Maintenance Intervals

## Weekly / Monthly

- Position of control valves
- Inspection of pressure gauges
- Inspection of tank levels
- Automatic pump start test
- Pressurized cylinder pressure

## Quarterly / Half yearly

- Visual nozzle inspection
- Visual inspection of pipework and pipe supports
- Section valve operation test
- Review of protected hazard

# Maintenance Intervals

## Yearly

- Automatic pump flow test
- Cleaning of water tanks
- Cleaning / changing pump system strainers
- Test of infill to water tanks
- Inspection of section valves

## 3 yearly / 10 yearly

- Tank drainage, cleaning and refill
- Inspection of all valves
- Sample nozzle inspection (20 nozzles or 1% of installed nozzles)
- Testing of pressure vessels
- Pipework pressure test

# Conclusion

- **Maintenance is vital for operational availability of water mist systems**
- **Maintenance requirements for water mist systems are comparable to conventional sprinkler and gas extinguishing systems**
- **Uniform maintenance routines shall be applied throughout the water mist industry**
- **Only companies trained and authorized by the manufacturer can offer adequate services**





**Thank you for your attention!**