

# Case study: Cultural Heritage Protection in Milano

Conversion of a cinema into Rinascente's new mall

Zomraude Chantal Chalouhi | September 2025

## An old theatre re-used

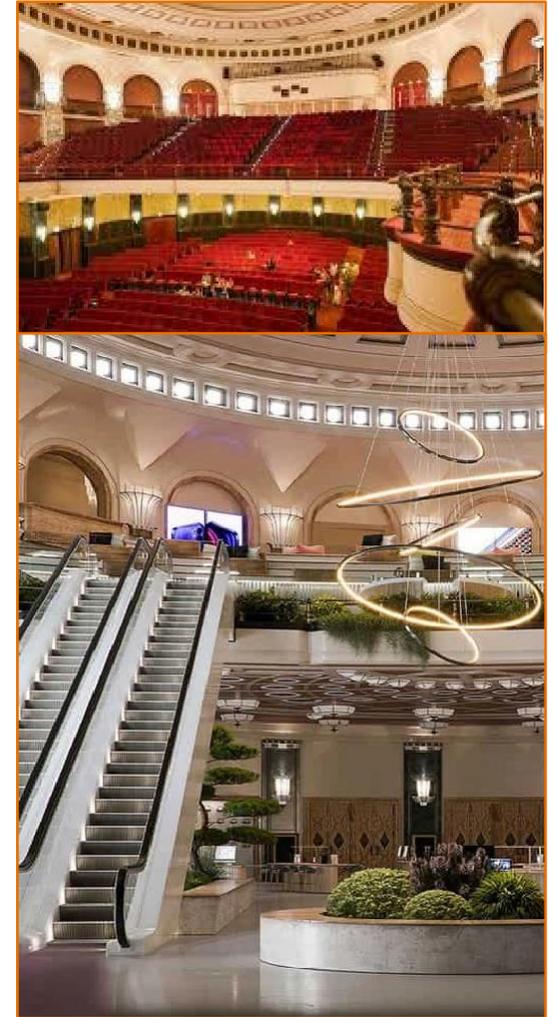
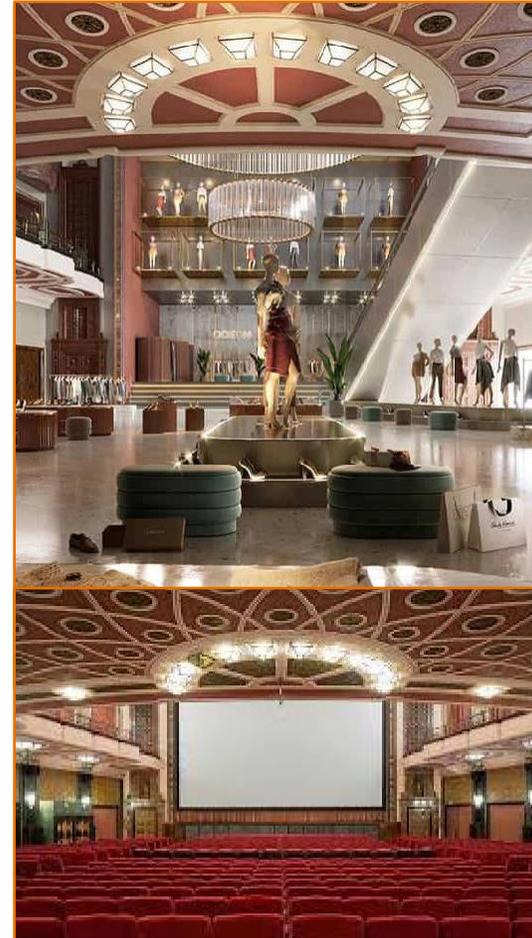
- ❑ Located in **Milan's historic center** at Via Santa Radegonda
- ❑ Steps from **Piazza del Duomo, Piazza della Scala,** and **Galleria Vittorio Emanuele II.**
- ❑ In a **cultural and commercial hub** with theatres, boutiques, and historic sites
- ❑ Area blends **historic heritage** with modern development; the building is being redeveloped from a **cinema into a retail mall.**



# Project description

## Historic Background

- ❑ **Opened:** November 26, 1929, on the site of a former power plant.
- ❑ **Original purpose:** Multifunctional venue with theatre, restaurant, café, and ballroom.
- ❑ **WWII:** Damaged in 1943 bombings but reopened the same year; hosted concerts of the La Scala Orchestra.
- ❑ **Modernization:** Became Milan's first multiplex in 1986 with 10 screens; later joined The Space Cinema chain in 2009.
- ❑ **Recent developments:** Closed for conversion; plans include 5 screens, commercial spaces “Rinascente” and offices.



# Project description

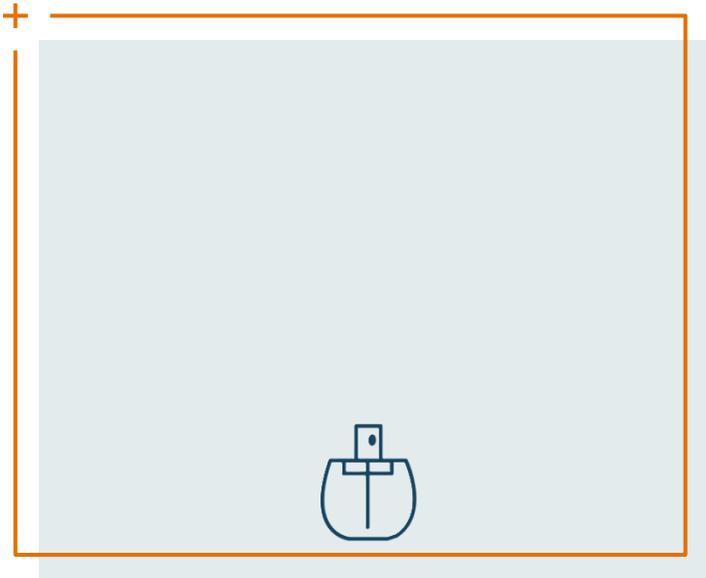
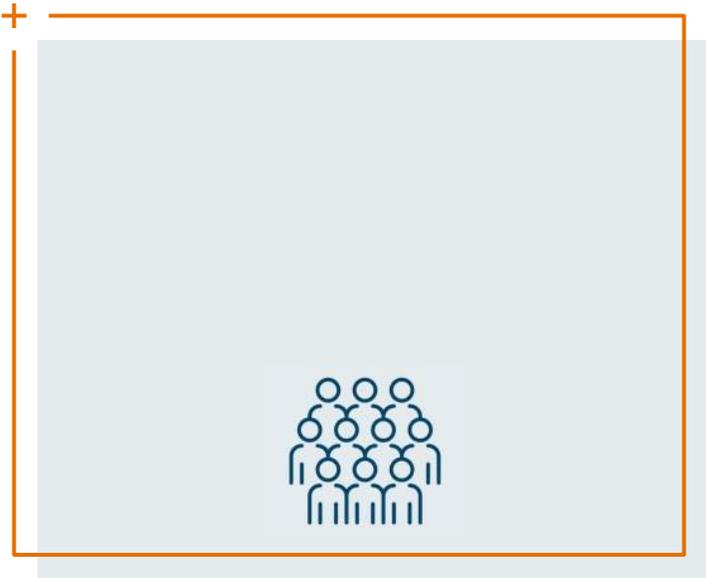
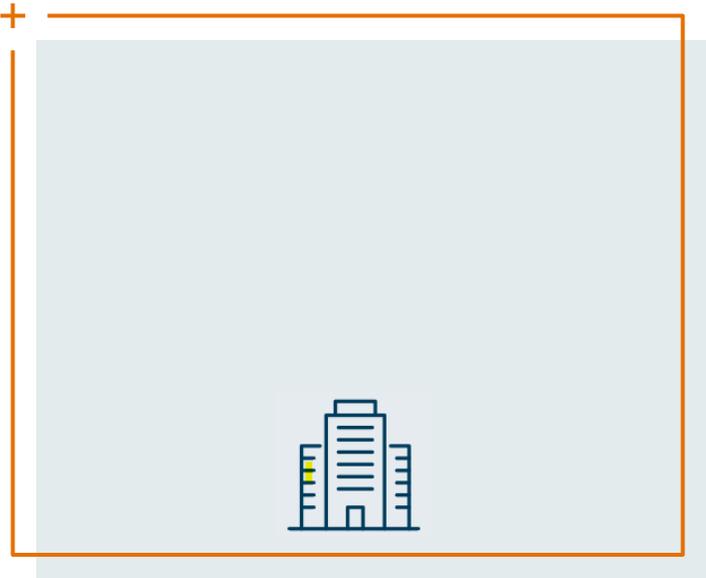
## Retail activity

The retail activity takes place on the ground, first, and second floors of the building. The three floors form a single fire compartment as they overlook the central atrium of the building. The sales area at the ground floor hosts the display of cosmetic materials and perfumes.

## Key Challenges

- + Conversion of a cinema into a retail space;
- + Preservation of historical building;
- + Atrium ceiling height (cosmetics area): 15 -17 m;
- + Flammable products on display: perfumes;
- + Water reserve compatible with available space;
- + Determination of standards and hazard profiles.

# By the numbers



# Fire protection systems

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- Historic building, minimally invasive systems
- High-ceiling atrium
- Limited available space for water storage

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What is the best active fire protection system to protect this building?

- Water mist system

# Determination of standards and hazard profiles

The first step taken was the selection of reference standards and the determination of hazard profiles

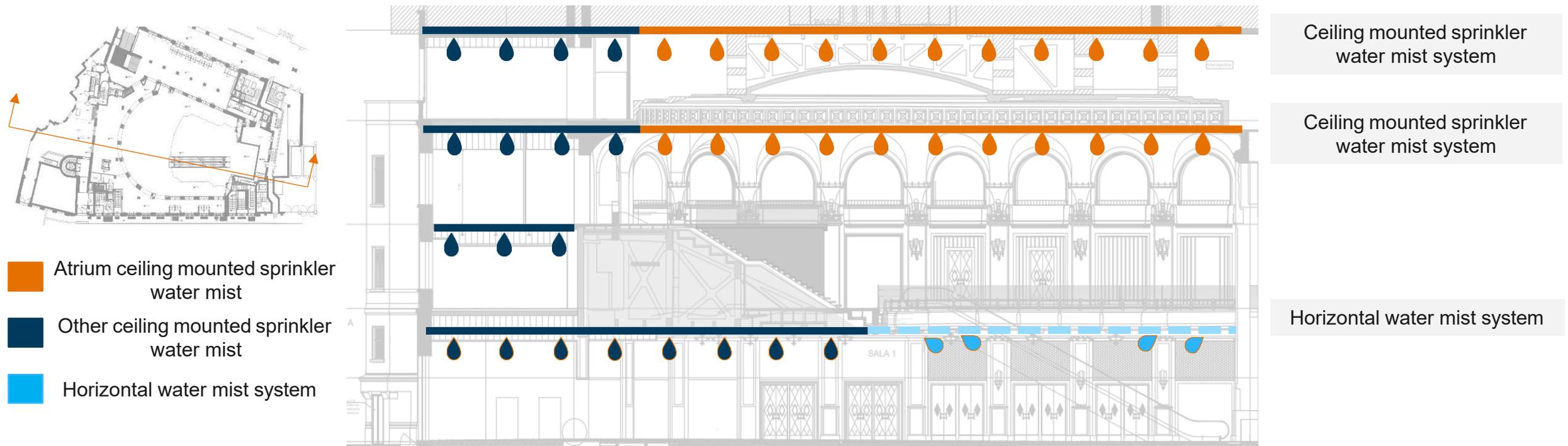


The EN standard does not allow differentiating the hazard profile associated with the perfume sales department (flammable products), so the FM standard was applied, which is able to differentiate the hazard profile between areas selling combustible materials and areas selling flammable products.

# Determination of standards and hazard profiles

The central area (HC3 hazard profile), characterized by a high ceiling, is protected by a horizontal deluge water mist system installed at first-floor level and a ceiling-mounted sprinkler system.

The remaining sales areas (HC2 hazard profile), with 5 - 6 meter-high ceilings, are protected by ceiling-mounted sprinkler-water mist system.



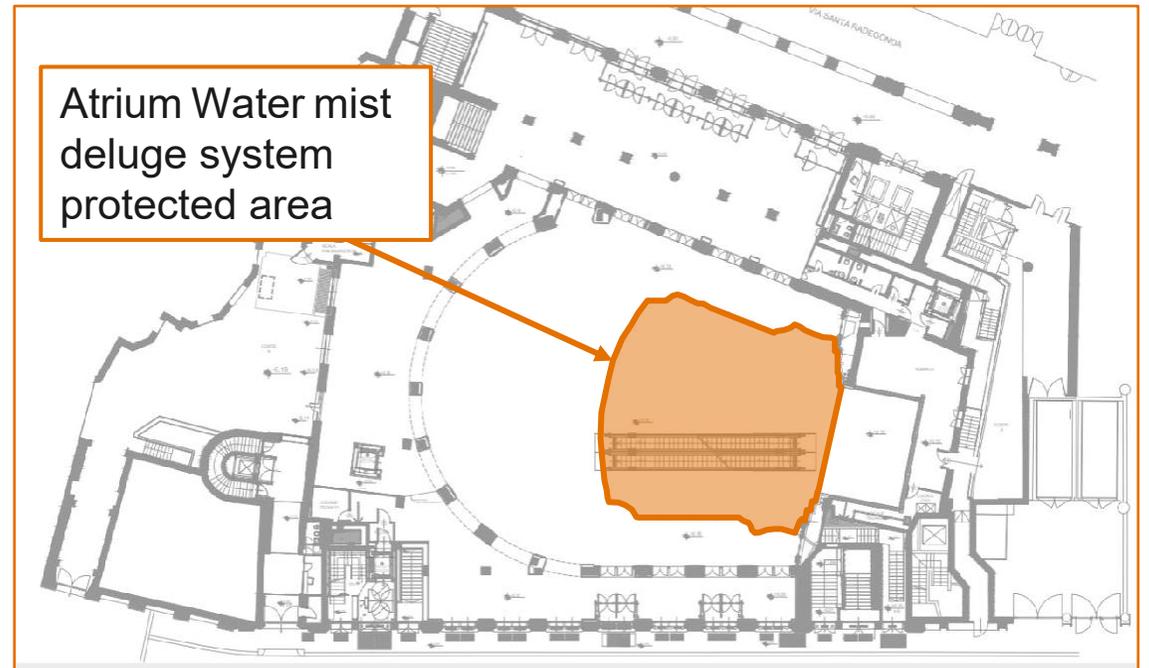
# Fire protection systems: Water mist system

The atrium is protected by a low-pressure water mist system, chosen over a traditional sprinkler system due to the ceiling height and the high flow rates required by the latter (at least 400 l/min for 60 minutes).

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## Characteristics:

- ❑ Horizontal deluge system for atriums
- ❑ Drop size < 300 µm
- ❑ Installed at first-floor balcony level (approx. 5 m)
- ❑ linked to an aspirating detection system
- ❑ Manually operable from a supervised station
- ❑ The system is divided into 7 zones, each controlled by a valve, all capable of operating simultaneously due to the difficulty in accurately identifying the fire
- ❑ The spacing between nozzles is approximately 1 meter.



First floor plan – protected area in orange

# Fire protection systems: Sprinkler-water mist system

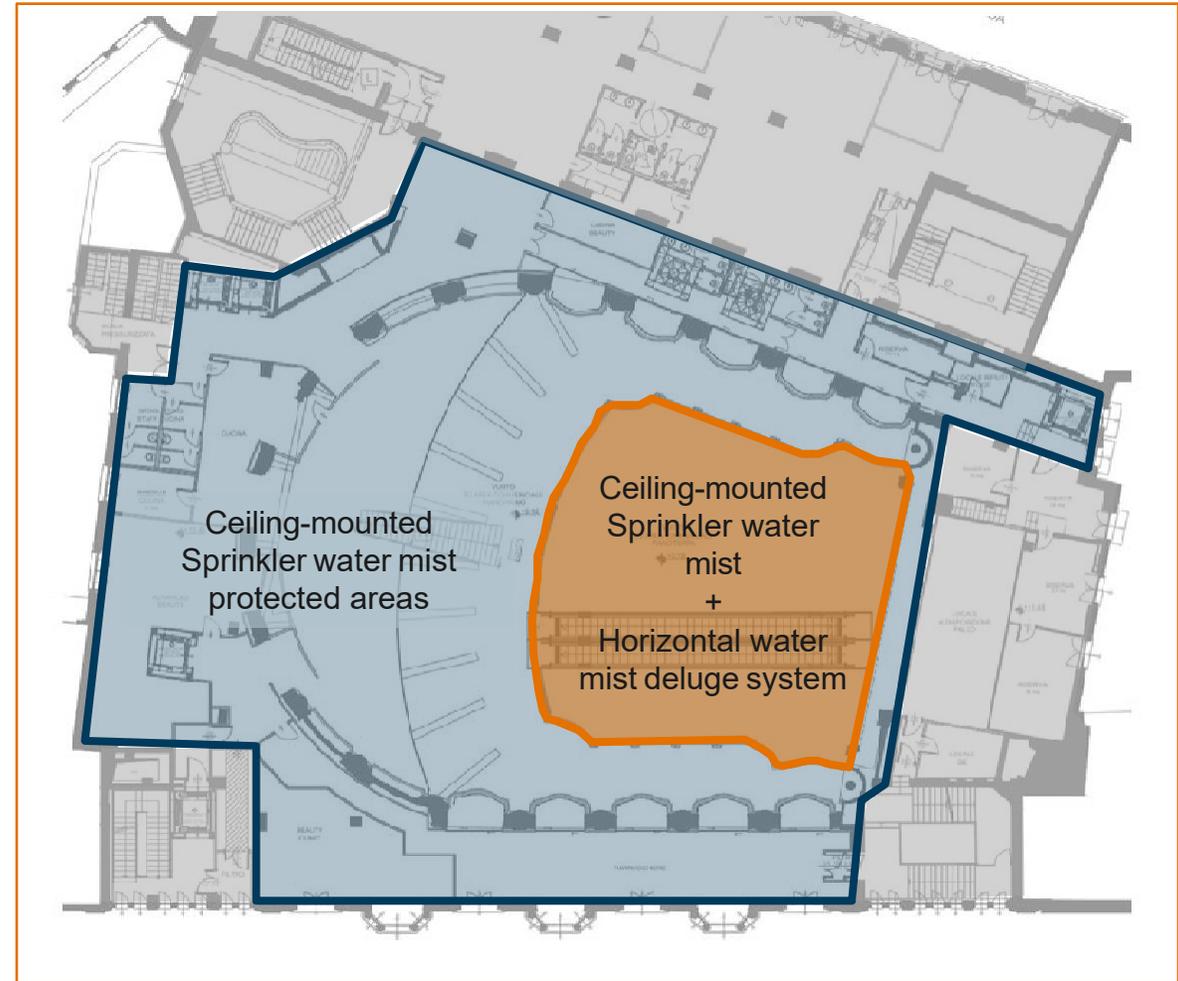
All areas of the facility are protected by a ceiling-mounted sprinkler-water mist system.

The ceiling-mounted sprinkler-water mist system is also required for the protection of the floors or balconies overlooking the central atrium, with walking surfaces located between 6 and 12 meters above ground level.

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## Characteristics:

- ❑ Ceiling mounted sprinkler-water system
- ❑ Activation temperature of the sprinkler system is 93 °C for the atrium area and 68 °C for the other areas. The nozzles are set at 93°C to limit their activation to conditions of actual hazard for the building, the area is also protected by the horizontal water mist system
- ❑ Nozzles are spaced every 12 m<sup>2</sup> in the sales and service areas and every 9 m<sup>2</sup> in the storage areas and in zones with particularly high ceilings
- ❑ Sprinkler activation signalled to supervised station



Third floor plan

# Simultaneous operation of fire protection systems

*All sales areas have been protected with different water mist systems. The last aspect to be verified concerns the possibility of simultaneous system activation.*

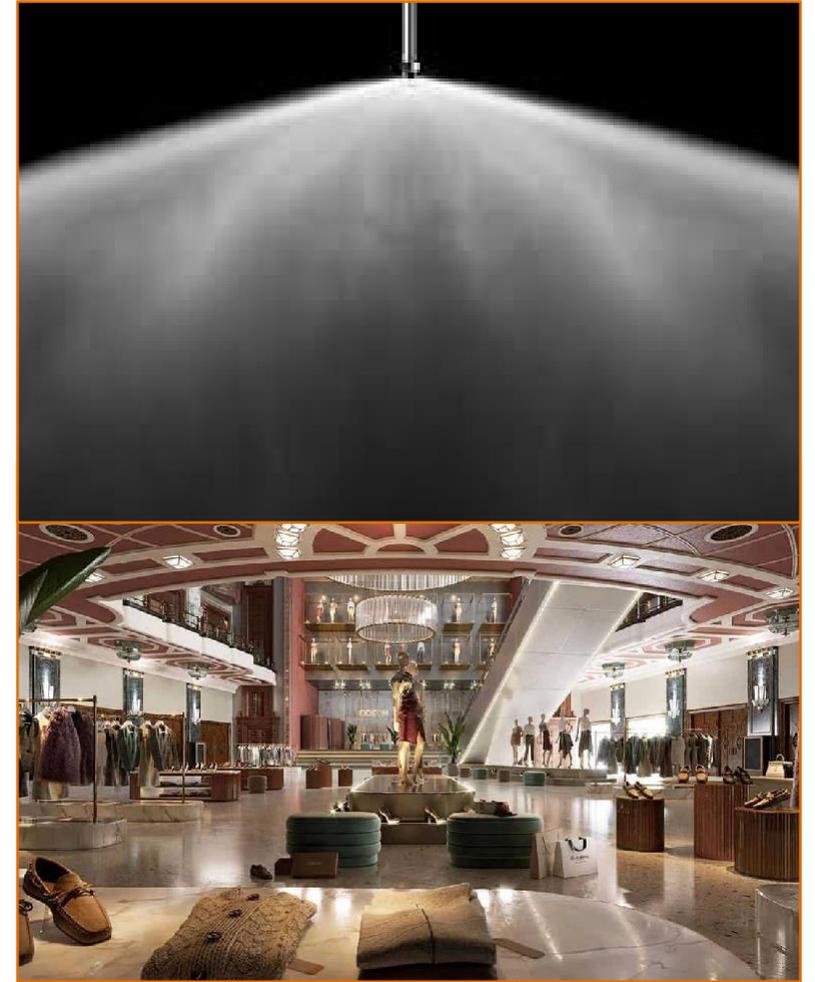
## Analysed scenarios:

- ▣ Activation of atrium deluge system + 4 ceiling nozzles. Total flow rate required: 1000 liters/minute
- ▣ Activation of atrium deluge system + 12 ceiling nozzles. Total flow rate required: 1400 liters/minute

The first scenario is considered the most severe and significant, while the second scenario represents the extreme case. The storage tank is sized according to the requirements of the first scenario; the second scenario can be supported with water supply backed-up from the public main (minimum flow in this area of the city is 500 liters/min).

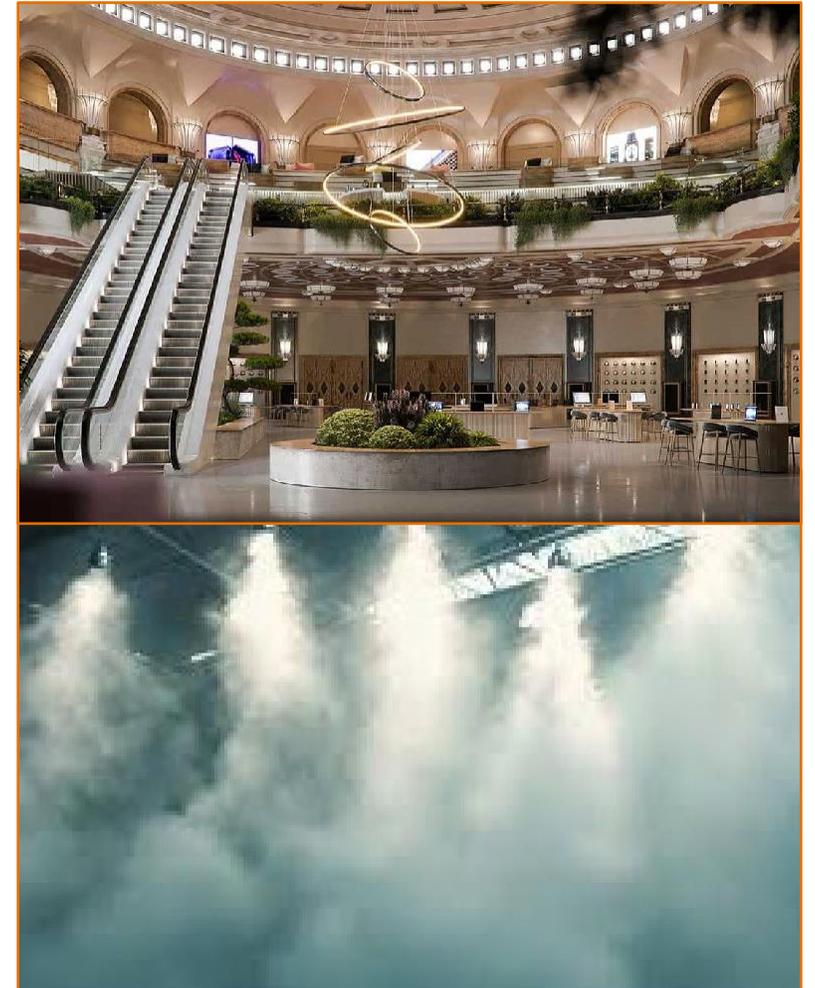
# Deductions 1/2

- The Risk analysis and assessment made it possible to specifically assign different risk profiles according to the characteristics of different areas and of the products displayed.
- Storage areas are very limited and never exceeding 2,5 m height;
- The “atrium” area in the centre of the building creates an extraordinary challenge from a fire hazard point of view
- The historic characteristics of the building shall be respected as per the indication given by the monumental building protection agency
- Water supply is limited by the limited dimension of the water reservoir already existing in the building (100 m<sup>3</sup>)



# Deductions 2/2

- The Water Mist technology appears to be the most suitable protection technology for the building.
- The areas under consideration can be classified as HC2 and HC3 areas as per FM 5560 approval std. The central area with high ceiling can be reconducted to an “ATRIUM Area” as per EN 14972-10 std
- The design and specification was then prepared for the ViD Low Pressure HC2-HC3 system with the Atrium area protected by deluge atrium system
- **The design was finalized in terms of technology, nozzle selection and spacing, operating pressure and water supply leaving to the contractor only the responsibility for piping lay-out definition and final hydraulic verification**



# Conclusions

- The FM standard made it possible to specifically assign different risk profiles according to the characteristics of the products displayed or stored in the various areas of the facility.
- Water mist technology is the only one capable of providing reliable protection for atrium with considerable height.
- The project was developed with detailed specification of the water mist system components, leaving to the contractor only the responsibility for piping definition and final hydraulic verification.
- And

**This type of analysis is possible with the knowledge and experience of an expert fire protection engineer, like ing. Luciano Nigro (Tech. mngr. of Jensen Hughes Italy).**



Ing. Luciano Nigro  
*Technical manager of  
Jensen Hughes Italy*

**Questions?**



# *Thank You*

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