SFPE

Engineering Solutions Symposium

Fire Protection of Cultural and Heritage Sites

November 12-13, 2026

Venice, Italy

<u>Venue:</u> Hilton Molino Stucky Venice - Giudecca 810, Venice 30133, Italy

DAY 1 – Thursday, November 12th	
8:00 – 9:30	**Pre-Symposium Programming** **NFPA Codes and their Application to Cultural Heritage Sites** Sheila Coppinger, *Immediate Past Chair, NFPA Technical Committee on Cultural Resources* Gregory Harrington, *NFPA, Staff Liaison, NFPA Technical Committee on Cultural Resources and Correlating Committee on Safety to Life* Mark Hopkins, *Summit Fire Consulting, Chair, NFPA Technical Committee on Cultural Resources* *This session will provide an overview of the National Fire Protection Association and its codes that apply to cultural heritage sites, including NFPA 101, Life Safety Code, NFPA 5000, Building Construction and Safety Code, NFPA 909, Code for the Protection of Cultural Resource Properties – Museums, Libraries, and Places of Worship, and NFPA 914, Code for Fire Protection of Historic Structures.*
9:30 - 10:30	**Registration and Exhibits**
10:30 – 10:45	**Opening Session - Welcome Remarks** Shamim Rashid-Sumar, PE, FSFPE, *SFPE President* Chris Jelenewicz, PE, FSFPE, *SFPE CEO*
10:45 – 11:00	**Welcome to Venice - Unique Challenges of Protecting Historic Sites** Cristinia D'Angelo, The Venice Fire Department
11:00 – 11:45	**Keynote - Understanding Fire Safe Cultural Heritage** Jose L. Torero, FSFPE, PhD, *University College London* *Cultural heritage brings unique challenges to the fire safety engineer. Historic buildings do not conform with modern approaches to fire safety and limit the potential for intervention. Furthermore, life safety, while a priority, is not the only variable that needs to be addressed. Cultural heritage has an intrinsic value that needs to be protected, and, in many cases, damage needs to be restricted to a minimum. This is not only fire damage, but many times smoke contamination or*

	water damage cannot be tolerated. As a result, the fire safety engineer must work under greater constraints, with limited tools and with more demanding objectives. In contrast, historic buildings many time incorporate architectural features that reduce the fire hazard that the engineer needs to take advantage off. This presentation explores the problem of fire safe cultural heritage and the skills necessary for the engineer to deliver an optimised approach to fire safety that is respectful of the value and capitalizes on the strengths of the architecture.
11:45 – 13:00	Lunch
Historic Buildings Regulatory Oversight Moderated by Joshua Reichert, PE, SFPE Chief Engineer	
13:00 – 13:30	**Fire Safety Engineering in the Renovation of the Royal Swedish Opera House** Johan Hanberger, *National Property Board of Sweden* *The renovation of the Royal Swedish Opera House in Stockholm presents complex fire safety challenges driven by its heritage status, intricate structure, and large-scale modernization. With construction starting in late 2026, the project combines preservation with extensive upgrades to building systems and functionality.* *This presentation outlines fire safety strategies before and during construction, as well as for the completed building. It highlights key challenges and critical design decisions, with a particular focus on balancing the need to protect cultural heritage values against the need to achieve an adequate level of fire safety in a phased renovation of a historic landmark.*
13:30 – 14:00	**From Prescriptive Constraints to Performance-Based Fire Safety: The Italian Approach to Cultural Heritage Buildings** Piergiacomo Cancelliere, PhD, *Ministero dell'Interno Corpo Nazionale dei Vigili del Fuoco* *The Italian regulatory framework currently offers two alternative approaches to fire safety of cultural heritage buildings. The first is the traditional prescriptive system, based on technical rules developed for specific activities during different regulatory periods. Although some of these provisions are now technically dated, they remain legally applicable and may still be used as alternatives to the Fire Prevention Code. These rules prescribe standardised requirements for building features, fire resistance, compartmentation, and protection systems, often limiting adaptation to the characteristics of historic buildings. For museums, galleries, exhibition spaces, libraries, and archives, regulations issued in 1992 and 1995 remain available.* *The second approach is the Italian Fire Prevention Code, introduced in 2015 as a risk-based and performance-oriented framework. The Code establishes fire-safety objectives, risk profiles, and performance levels, allowing designers either*

	to adopt predefined compliant solutions or to demonstrate equivalent performance through alternative solutions supported by recognised methods. *Two vertical technical rules specifically address heritage buildings. Chapter V.10 applies to listed museums, galleries, exhibitions, libraries, and archives, while Chapter V.12 applies to other regulated activities in listed buildings open to the public. Both introduce adaptations for heritage protection and require a damage-limitation plan. Together, they demonstrate how performance-based fire safety can reconcile conservation requirements with effective and proportionate risk management.*
14:00 – 14:30	**Common Challenges, Local Solutions: An International Perspective on Protecting Cultural and Natural Heritage from Fire** Chris Marrion, PE, FSFPE, MScFPE, *Marrion Fire & Risk Consulting* *Cultural and natural heritage include not only the structures, monuments and natural heritage sites we are all familiar with, but also the many places that hold deep significance to global, regional and/or local communities. A number of these often operate in environments with limited local regulations and guidance, and at times with limited infrastructure and funding as well.* *Drawing on observations from heritage sites and structures across a range of locations, this presentation reflects on what can happen when the conditions one typically relies on when developing fire risk management plans may not be fully in place, and on the opportunities to help protect these places from fire that are often already present within the community and the site itself, waiting to be drawn on. It includes looking at engaging local communities and incorporating local knowledge and resources in developing risk-informed prevention, mitigation and emergency response measures grounded in first principles — as well as why this engagement matters not only in developing such measures, but in sustaining them over the long term.*
14:30 – 15:00	**Guide for Fire and Life Safety Assessment of Existing Buildings** Nick Ozog, PE, and Warren Bonisch, PE, *Wiss, Janney, Elstner Associates, Inc.* *This presentation will provide an update on the SFPE Existing Building Task Group and their efforts to create the international Guide for Fire and Life Safety Assessment of Existing Buildings.*
15:00 – 15:30	Coffee Break/Exhibit Hall
15:30 – 16:00	**Speaker Q&A Panel**
Cultural Heritage Sites	
16:00 – 16:30	**The Architect's Perspective on Fire Protection Solutions for Cultural and Heritage Sites** Caterina Frisone, PhD, *Scientific Director - Università Iuav di Venezia*

	From an architect's perspective, fire protection for cultural and heritage sites is not simply a regulatory requirement, but a delicate balance between human safety, conservation of historical material, and preservation of the aesthetics of the space. Safety engineering must therefore adhere to the principle of minimal intervention. The architectural approach is based on three fundamental pillars: minimal intervention (modifying the original structure as little as possible); reversibility (any fire protection system installed must be removable in the future without damage); and fire protection systems must not compromise historical supports (e.g., frescoes, ancient wooden elements). *Most fires in historic buildings originate from within and can be prevented or significantly reduced. As the Mackintosh Building report states, emergency preparedness is certainly essential to prevent fire disasters, but it should not be the only strategy. Protecting historic heritage can no longer be approached simply as a response to emergencies. There is a clear need to promote preventive conservation and risk reduction measures, especially in the presence of construction sites, to encourage the use of new fire prevention technologies, and to foster a culture of fire prevention in cultural institutions.*
16:30 – 17:00	**Fire Safety Design to Protect Notre-Dame Cathedral in Paris – A Close Integration of Architecture and Fire Engineering** Benjamin Truchot, *INERIS* *This presentation describes the fire safety system design during the reconstruction of Notre-Dame de Paris. The project addresses a highly specific context: a timber roof structure, lead covering, and strict heritage constraints. The design was developed in close collaboration with the architect in charge of the cathedral's restoration. Because standard fire-safety solutions could not be directly applied, a dedicated approach was required. The strategy combines numerical modelling with experimental validation to ensure a strong demonstration of the fire system capabilities. Not only were passive measures introduced, but also an active water mist system to minimise the consequences of any fire start. One of the challenges is modelling fire spread, pyrolysis, ventilation effects, and water mist performance in this historical geometry. Coupling with experiments provides valuable data for comparison purposes. The first step focused on passive measures to limit fire propagation and control ventilation. The second step addressed the design of an efficient water-mist system with minimal water consumption. Both simulations and tests showed the strong positive impact of water mist on fire control. Overall, the work demonstrates the value of a dedicated scientific approach for protecting a non-conventional heritage structure.*
17:00 – 17:30	**Fire in Historic Buildings: A Fire and Rescue Service Perspective** Henriette Elmer, MSc Eng, *Greater Copenhagen Fire and Rescue Service*

	Using the 2024 fire at Copenhagen's historic Stock Exchange (Børsen) as a case study, this presentation examines the challenges of firefighting in heritage buildings and the unique risks associated with renovation activities. The case highlights efforts to salvage and protect irreplaceable cultural assets and emphasize the importance of effective incident command structure, specialist expertise, and multi-agency collaboration in determining the outcome of the response. Lessons learned from the incident are translated into broader considerations for resilience, emergency preparedness, and future fire safety strategies for the protection of cultural heritage.
17:30 – 18:00	**The Copenhagen Stock Exchange – Renovation and Rebuilding of a Cultural Heritage Building** Morten Moelgaard Schmidt, *Jensen Hughes DK* *On April 16, 2024, Boersen, one of the most beloved heritage buildings in Copenhagen, Denmark, was severely damaged by a fire. The fire burned down a little over half of the building, and the rest of the building suffered soot and water damage. Immediately after the fire it was decided to rebuild the building using traditional building materials as far as possible while implementing modern fire safety features. This presents several challenges as half of the building must be rebuilt almost from the ground up while the other half needs in-depth renovation. The reconstruction and renovation also bring the opportunity to enhance the building's indoor climate and functionality as an office building with magnificent meeting rooms and historic importance. The presentation will provide an insight into the fire safety strategy for the building and look upon some of the challenges and leanings we have made so far in the project.*
18:00 – 19:00	**Networking Reception** (All invited)

DAY 2 – Friday, November 13th	
9:00 – 10:00	**Registration and Exhibits**
Fire Protection Engineering Solutions	
10:00 – 10:30	**Exploring Suppression System Solutions** William Koffel, PE, FSFPE, *Koffel Associates* & Luciano Nigro, *Jensen Hughes* *Fire Suppression in the cultural heritage has a special approach that needs to consider carefully the compatibility of the fire suppression system with the conservation requirements imposed by the Cultural Heritage Authorities.* *According to these specific requirements, the available fire suppression solutions will be described taking into consideration the advantages that each solution can offer and the realistic possibilities for the heritage sites to manage them appropriately. The systems considered include sprinkler and water mist*

	protection for the water based solutions, gaseous extinguishing systems for the clean agent solutions and the recently introduced oxygen reduction systems as the inerting solution.
10:30 – 11:00	Modern Smoke Control in Historic Buildings: Delivering Safety Within Heritage Constraints Wojciech Węgrzyński, PhD, *Instytut Techniki Budowlanej (ITB)* *Historic buildings must accommodate contemporary expectations of fire safety within spaces that offer limited freedom for intervention. Protected façades, existing openings, shallow ceiling voids and complex internal layouts can restrict conventional smoke control solutions - usually we either lack space for installations or are not allowed to alter the historical structure. Yet, these buildings are expected to provide adequate means of safety, as often expected for the new builds.* *This presentation explores how performance-based fire engineering can address this challenge through three case studies. Together, they demonstrate how understanding smoke movement, external conditions and evacuation needs can reveal solutions within tightly constrained design spaces. This also includes challenges beyond smoke extraction - the fire detection, alarming and overall control mechanisms necessary for holistic fire safety strategy.* *The first case concerns Warsaw's historic Koszyki Market Hall, where conservation requirements limited smoke exhaust to existing façade windows. Coupled wind and fire simulations informed a natural ventilation strategy that selected exhaust openings according to wind direction, with evacuation analysis and hot smoke testing supporting the design. The second examines a historic cellar converted into a music venue, where limited space for ducts and smoke reservoirs constrained mechanical extraction. Numerical investigation of temperature-responsive "smart smoke control" demonstrated the potential to improve tenability by adapting exhaust capacity, without changing the duct layout or building architecture.* *Across these examples, the presentation focuses on identifying the governing physical constraints, selecting proportionate interventions and evaluating their effectiveness against evacuation requirements. It also distinguishes implemented solutions from concepts investigated numerically. The central message is that delivering modern safety in historic venues requires a coordinated understanding of the building, the fire, the occupants and the available interventions.*
11:00 – 11:30	**Modelling Egress Given The Constraints of Heritage Sites** Steve Gwynne, PhD, *University of Greenwich* *Cultural and Heritage sites pose particular challenges for pedestrian and evacuee planning. This is due to their often unique designs, high-profile, and given that their potential age often implies design prior to modern standards and requirements. All of these might affect the individual experience. Such challenges are compounded by the protection afforded these structural designs (given their*

	social and cultural importance) such that the usual structural changes that might be suggested to enhance egress are no longer possible - the number of levers that might be pulled to enhance safety is diminished. This affects what might reasonably be done to improve individual experience and safety. This presentation will discuss some of the evacuation challenges that might be posed by cultural and heritage sites and suggest how our understanding of evacuee performance and our capacity to quantify such performance can support related safety planning and emergency management.
11:30 – 12:00	**Engineered Retrofitting of Heritage Building with PBD solutions** Eric Tonicello, *ISI - Ingénierie et sécurité incendie* *When listed and historic buildings need to be renovated or converted, fire safety often presents challenges for consultants. How can we balance safety, heritage preservation, and cost-effectiveness? We will present several examples where performance-based design has provided our clients with cost-effective, safe, and practical solutions.*
12:00 – 12:30	**Speaker Q&A Panel** William Koffel, Luciano Nigro, Wojciech Węgrzyński, Steve Gwynne, Eric Tonicello
12:30 – 14:00	Lunch
14:00 – 14:30	**Most at Risk: Fire Protection During Construction Activities** Deborah Freeland, FSFPE, CPCU, ARM, FIAE, *Arthur J. Gallagher & Company* *Buildings are often at their greatest risk of fire during construction, renovation, or restoration—and for cultural heritage sites, the consequences can be catastrophic and irreversible. This presentation explores why these activities introduce elevated fire risk, particularly in historic structures where unique materials, concealed spaces, and preservation constraints complicate protection strategies. Common ignition sources are examined alongside contributing factors such as impaired or decommissioned fire protection systems, reduced compartmentation, blocked or limited access for firefighting, and changes in occupancy or fuel load. The presentation also highlights less visible risks, including inadequate policies and supervision, language or cultural barriers among multinational project teams, and gaps in coordination between stakeholders responsible for protection and preservation.* *Drawing on international project experience, this presentation will discuss how these conditions can combine to produce rapid fire growth and significant loss, and will outline practical, risk-based approaches to managing fire exposure during construction. Emphasis will be placed on adapting protection strategies to heritage sites, where maintaining historic integrity must be balanced with safeguarding irreplaceable structures and collections.*

14:30 – 15:00	**Sacred Cultural Heritage at Risk: Balancing Preservation and Fire Safety in Historic Places of Worship** Grunde Jomaas, PhD, *Fire & Risk Alliance* *Every year, fires destroy places of worship that survived centuries of war, neglect, and decay. We call each one a tragedy. We treat each one as a surprise. And then we do very little differently. This presentation asks why — and finds the answer not in the buildings themselves, but in the systems meant to protect them.* *Sacred buildings have burned since the earliest human civilisations. From ancient temples razed by conquering armies to medieval churches consumed by candle and lightning, to mosques and synagogues targeted by hate-motivated arson in the twenty-first century — the threat spans every religion, every continent, and every era. What has changed is not the fire. It is the motivation behind it, and the sophistication of society failing to prevent it.* *The core problem today is a paradox hiding in plain sight: the more officially protected a historic sacred building is, the harder it becomes to protect it from fire. Heritage listing and fire codes pull in opposite directions, and in most countries, nobody has seriously tried to reconcile them.* *Drawing on cases from Notre-Dame to Norwegian stave churches, the presentation traces a pattern that has held across centuries: we understand the risk, we have the tools, and we still lose the buildings. Not because the engineering fails — but because the institutions do. The real story is one of regulatory gaps, funding failures, and two professions — fire safety and heritage conservation — that rarely sit in the same room.* *The good news is that a handful of countries have begun to solve it. Their approach is straightforward enough to replicate anywhere.*
15:00 – 15:30	**The Fire Protection of Cultural Heritage: The Case of the Giorgio Cini Foundation in Venice** Renata Codello, *Fondazione Giorgio Cini* *Fire protection of cultural heritage in Venice requires multidisciplinary expertise and complex design solutions. The installation of fire protection systems also raises challenges related to their placement and technical implementation, while ensuring respect for historic and monumental buildings.* *On the Island of San Giorgio Maggiore, all buildings belonging to the Giorgio Cini Foundation have been equipped with appropriate fire protection systems. This represents an exemplary case study from the perspectives of technological innovation, impact mitigation in environments used as libraries and research institutes, and functional and maintenance effectiveness.*
15:30 – 15:35	**Closing Session** Chris Jelenewicz, PE, FSFPE, *SFPE CEO*

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16:00 – 19:00 Please meet in front of Hilton Molino Stucky by 15:55	ADD ON: Technical Tour – Fondazione CINI – Isola di San Giorgio Maggiore Participants will enjoy a private visit to the Fondazione Giorgio Cini, located on the serene Isola di San Giorgio Maggiore, directly across the water from Piazza San Marco. The tour offers a rare opportunity to explore the historic monastery complex, meticulously restored after centuries of transformations, and to access the Manica Lunga, Fondazione's iconic library. Originally a 16th-century Benedictine dormitory, the Manica Lunga has been converted into a striking contemporary research library, known for its dramatic linear design, vaulted ceilings, and elegant interplay of light and space. It is considered one of the most architecturally significant library restorations in Italy. This tour is organized by SFPE Italy and will provide a technical guide to explain some of the technical aspects of the recent renovation. This tour has a limited capacity, so register early to secure your space.
Saturday, November 14th	
9:00 – 14:00 Please meet in front of Hilton Molino Stucky by 8:55	ADD ON: Guided Venetian Tour including Doge's Palace Participants will begin with a private cruise across the picturesque Venetian Lagoon, offering stunning views of the city's iconic skyline and waterways, ending at the **Cornoldi Pier.** After arriving at the pier, attendees will begin a walking tour, to one of the city's most recognizable landmarks, **St. Mark's Square.** The highlight of the experience is a guided visit to the magnificent **Doge's Palace**, the former seat of power of the Venetian Republic. Following the tour of the palace, participants will be free to browse local boutiques, relax at a historic café, admire the surrounding architecture, or simply soak in the atmosphere of one of Europe's most famous public spaces before returning by private boat to the Hilton. **09:00**: Departure from the Hilton (Please be ready in the lobby by the departure time) **09:20: Arrival at Cornoldi Pier** **09:45 – 11:30:** Doge's Palace Tour **13:35: Departure from Cornoldi Pier** **14:00**: **Return at Hilton**

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Topics and times are subject to change

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