A MISSION SHARED

The interaction between FM Global’s International Codes & Standards (IC&S) group and its operations offices embodies the effectiveness of collaboration and commitment. These comments from Executive Vice President Malcolm Roberts and four of our operations executives are testament to the importance of Global Connections and Local Actions.

“We have many critical groups in FM Global but I put this team up there as one of the most mission-critical. Seeing its success gives me confidence that we will be relevant globally for many years. When I hear how clients are finding it much easier to build to HPR standards in some parts of the world, that’s a great credit to the power of our codes, standards and approvals strategies.”
MALCOLM ROBERTS, EXECUTIVE VICE PRESIDENT

“The work conducted in Australia in the arena of codes and standards provides a significant competitive advantage. Over the last 25 years, we have worked together to successfully integrate FM Global’s latest sprinkler technology and cost-effective fire solutions directly into the Australian Sprinkler Standard, which gives FM Global substantial credibility in the marketplace and makes Australia a safer place to live.”
PAUL MAY, DIVISION ENGINEERING MANAGER, AUSTRALIA OPERATIONS

“IC&S has made significant strides in Asia, particularly in India and China, where we actively participate and cooperate with code-making bodies. The knowledge transfer is making a real difference in these countries, and the relationships IC&S has established are testament to the real value they bring to the table. I’m extremely excited for their future here, particularly now that we have the SimiZone available in the new FM Global Centre in Singapore.”
DAVID JOHNSON, REGIONAL SENIOR VICE PRESIDENT, ASIA OPERATIONS

“IC&S has made significant advances in Latin America, particularly in Mexico and Brazil, where we actively participate and cooperate with sprinkler associations and manufacturers to influence codes and standards within the government. During the last three years, we’ve seen a great advance in the education of designers and installers. The future looks very promising with codes and standards properly adopted in our countries.”
DAVID MORALES, VICE PRESIDENT, OPERATIONS ENGINEERING MANAGER, LATIN AMERICA OPERATIONS

“IC&S has proved to be a real game changer for FM Global across the entire EMEA/APAC [Europe, Middle-East and Africa/Asia Pacific] region. Their work has helped raise awareness of the importance of proactively managing risks and has leveraged scientific data to support the development of more robust local codes and standards. This work has been particularly useful in complementing our market entry strategies by establishing FM Global as a true thought leader in its field of expertise.”
STEFANO TRANQUILLO, DIVISION MANAGER, EMEA DIVISION
The mission of this group is global in every context. We know that the properties of fire do not change by geography; the hazard is the same everywhere—yet codes and standards are not. Our ultimate aim is to see that fire risk is minimized around the world, through the application of best practices and proven solutions. Naturally, this is an undertaking that requires a network of collaborators—within the FM Global organization and throughout the labyrinth of countries and jurisdictions around the world. Thus, the theme of this year’s report: Global Connections. Local Actions.

Our mission calls for more than ordinary teamwork because the approach to the issues we address is different, sometimes dramatically so—in each region of the world, based on government, culture and level of urbanization. One goal in 2018 and again this year, is to find the commonalities between those different approaches and maximize existing synergy where possible.

Within FM Global, we want to strengthen our connections and communication with our operations offices, where everything is local—and particularly with division engineering managers on strategy, and with operations chief engineers on technical issues. The client service teams and field engineers based in those offices are the main pipeline to our policyholders, whose role is to implement our recommendations, thereby helping to improve protections and influence existing standards.

Outside of FM Global, we continue to make and strengthen connections with governmental agencies, in academia and research communities, and among lobbying and advocacy groups to drive changes that reflect better knowledge and understanding of the risks.

In this report, we point to several noteworthy 2018 achievements toward that end. Our ties in the United Kingdom created opportunities to share FM Global research and contribute to governmental hearings that brought about the passage of new national safeguards to regulations and codes for building materials. You will find more specifics in our U.K. report section.

Elsewhere, the tenacity of our team and our partners in Brazil was elemental to the adoption of São Paulo’s comprehensive fire code as a national model code; more specifics appear in our profile pages on Latin America. We also contributed to major strides in fire education in Brazil—something that we hope can be replicated elsewhere.

In China, Rachel Yin, Ph.D, assistant vice president, senior codes and standards consultant, has made such a positive impression that she has been invited to numerous government meetings. FM Global research is the underpinning of all these advances. Be sure to see our feature piece about our research capabilities, and how scientific research drives everything FM Global does as an organization on behalf of its clients.

When we look back, we see how far we have come in the past 12 months—a year in which we introduced the first annual International Codes and Standards Advocacy Award, presented in 2018 to Colonel Cassio Armani, retired fire chief of São Paulo, Brazil. Col. Armani, currently a professor of fire safety, exemplifies the power of communication to effect positive change. Fire safety is his life’s work, and I can think of no better recipient for our inaugural award.

Finally, we made some new additions to our team in 2018, as we welcomed codes and standards consultants Felipe Melo and Srikanth Yajjala to our ranks. I like to think, however, that through our global outreach, we have added many others to our expanded team. As a core group of six people, we see ourselves at the nexus of a broad communications network whose message about the impact of property protection on people’s lives, jobs and businesses, the environment and the economy, hits home wherever it’s delivered.
IN 2018, CHINA ENACTED THE MOST substantial realignment of its fire system since 1949 with the formation of the Ministry of Emergency Management (MEM), which will oversee all of the country’s fire and rescue services (which were previously under military and police authority). Two parallel divisions were created. The Bureau of Fire and Rescue, a new civil servant system, will be responsible for firefighting, inspections, and enforcing codes and standards; the Fire Prevention and Management Department will coordinate with other government ministries and have codes and standards functions. The four fire research institutes previously under the Ministry of Public Security—in Tianjin, Sichuan, Shenyang, and Shanghai—will report to the Bureau of Fire and Rescue.

With the fire service now separated from the military, some industry organizations may play a more important role in fire safety, and FM Global is closely involved with those organizations. In September, we co-sponsored the 2018 China Industry Fire Conference, which attracted more than 800 attendees. Vice president and manager of research Louis Gritzo, Ph.D., gave a keynote speech on “New Solutions for Industrial Fire Protection”; Christopher Wieczorek, Ph.D., vice president and manager of International Codes & Standards (IC&S), and Rachel Yin, Ph.D., assistant vice president, senior codes and standards consultant, participated in a panel discussion titled “One Belt, One Road: New Opportunity and Mission for China Fire Protection Industry,” which helped spread our message to a wider audience in the fire safety field.

Because of the overhaul of the fire system, most of the work on codes and standards revision was on hold in 2018, though FM Global continued consulting with many organizations to strive for progress. We finished our research project with the Tianjin Fire Research Institute (TFRI) on the Evaluation of Fire Hazard in Class D/E Warehouses, which focused on updates to GB50016 (the Code of Design on Building Fire Protection and Prevention), and organized a panel review with 10 highly respected Chinese fire safety experts, including many code committee members. (As a foreign company, FM Global cannot be a member of the committee.)

There were also notable changes in sprinkler standards. New versions of GB50084, the Code for Design of Sprinkler Systems, and GB50261, the Code for Installation and Commissioning of Sprinkler Systems, were enacted on January 1, 2018. During the past six years, IC&S worked closely with the Tianjin and Sichuan Fire Research Institutes on the standards; many of FM Global’s comments were incorporated in the new codes. “Even with the significant change of the fire system in 2018, there are still some uncertainties,” Yin says. “Everyone is waiting to see how it will affect the normal work process. But despite all the changes, our focus is to work closely with the TFRI and the codes and standards committees so our voice can be heard.”

Elsewhere in Asia, IC&S built a relationship with the Indonesia Fire and Rescue Foundation (IFRF) through our participation in the Confederation of Fire Protection Associations-Asia. (Indonesia is one of the few Asian countries that readily adopts U.S. standards.) IFRF manages standards use, training and certifications, and cooperates with the Indonesia Fire Service Association, which includes 582 fire chiefs and approximately 36,000 members throughout the Indonesian Archipelago.

FM Global is working with the IFRF to move forward with the adoption of FM Global Property Loss Prevention Data Sheets in 2019.
“Even with the significant change of the fire system in 2018, there are still some uncertainties. But we will work closely with the codes and standards committees so our voice can be heard.”

RACHEL YIN, PH.D., ASSISTANT VICE PRESIDENT, SENIOR CODES AND STANDARDS CONSULTANT, FM GLOBAL

ABOVE LEFT: Louis Gritzo, Ph.D., vice president, FM Global research manager, gave a keynote speech at the 2018 China Fire Industry Conference.

ABOVE RIGHT: Rachel Yin, Ph.D. (second left) and Christopher Wieczorek, Ph.D. (center) participate in the panel discussion titled “One Belt, One Road: New Opportunity and Mission for China Fire Protection Industry” at 2018 China Fire Industry Conference.

AT LEFT: Ceremony for the establishment of China Fire and Rescue (under Ministry of Emergency Management) on Nov. 9, 2018 at the Great Hall of People in China.
THROUGHOUT EUROPE, International Codes & Standards (IC&S) is stressing cooperation and the belief that shared fire prevention concepts have the potential to benefit all countries.

In Poland, the newly established sprinkler society, Polskie Instalacje Gaśnicze, offers a great opportunity to coordinate the conversation on the effectiveness of sprinkler protection in industrial and commercial buildings. This work will allow IC&S to join with the local fire sector and more fully understand the codes landscape in Poland, which will foster an opportunity to share our knowledge and promote the inclusion of sprinklers into the code.

In Germany, a new study examined the use of sprinklers versus firewalls. Tom Roche, assistant vice president, senior codes and standards consultant, explains that “this work was aimed at bringing one of the myths around sprinklers—cost—into sharp focus. A theme that we have seen in other countries is that people raise the cost of sprinklers as a barrier to their consideration. In this study, we explored the options within German building codes that have provisions for larger compartment sizes when sprinklers are used in warehouse and production buildings.

“Then we compared the build and maintenance costs of these variables,” Roche says. “The findings are remarkable—they highlight that the use of sprinklers can offer savings in construction budgets, increases in available storage space, and comparable maintenance expenses. This study will be important for us to launch into the market with our Frankfurt operations to help drive an enlightening presentation to help people consider sprinklers in a new light. It will move the conversation from insurance benefits into the realm of construction cost and operational efficiencies from additional space. This will enable us to layer on the added benefits of long-term resilience.” Frank Drolsbach, the operations

USE OF SPRINKLERS CAN OFFER

- savings in construction budgets
- increases in usable space
- comparable maintenance expenses

“Sprinkler standards have steadily consolidated through collaboration, and we can strive to ensure that differences between FM Global Property Loss Prevention Data Sheets and regional standards are minimized.”

TOM ROCHE, ASSISTANT VICE PRESIDENT, SENIOR CODES AND STANDARDS CONSULTANT, FM GLOBAL
engineering manager in Frankfurt, says that “the conclusions from the study will be very new for many of our clients and the industry and will positively influence the reputation of automatic sprinkler protection in our marketplace.”

FM Global’s goal of convergence in Europe has spread among sprinkler proponents. Roche notes that he has made “presentations at the Fire Sprinkler 2018 Conference in Stockholm and on cladding to the Italian Chapter of the Society of Fire Protection Engineers. In Stockholm, I explained how our business risk consulting approach contributed to a decision to install sprinklers in a large client facility in Italy to enhance the resilience of their supply chain. This also enabled me to reinforce the positive role our field engineers provide in supporting the project. And I have promoted connections with organizations in the Netherlands to ensure that the intent of FM Global Data Sheets is understood.”

IC&S has also bolstered its operational and approval activities. In Frankfurt, Drolsbach is working closely with the German Insurance Association to drive awareness and provide input into discussions. And he is supporting his local operations chief engineer to contribute to the European Standard, which sets requirements and makes suggestions for the design, installation, and maintenance of fire sprinkler systems. “Sprinkler standards have steadily consolidated through collaboration,” Roche says, “and we can strive to ensure that differences between FM Global Property Loss Prevention Data Sheets and regional standards are minimized.”

Roche concludes that FM Global’s challenges in Europe and worldwide are very similar. “The codes are different, but from the work we have conducted through our extensive partnerships, there is the opportunity to export these insights and tackle the misconceptions and the cost-and-effectiveness arguments in a range of countries. The important thing is to use these resources in the context of the local procedures and codes.”

The newly formed Polskie Instalacje Gaśnicze will work as an advocate for positive change to the country’s fire code.

LEFT: FM Global Property Loss Prevention Data Sheets are driving the use of large orifice storage sprinklers in Europe.

RIGHT: Global trends continue to show the benefit of sprinklers.
IT IS SAID THAT KNOWLEDGE IS POWER. In India, the International Codes and Standards (IC&S) team strives to promote fire protection initiatives by sharing important data and forming strategic alliances.

One of FM Global’s partners, the Fire Loss Prevention Forum of India, is a knowledge-sharing platform which brings together central, state, and local authorities with scientists, researchers, academicians and other experts to discuss ways to reduce fire risk. In November, the Forum issued a white paper on “Loss Prevention in Thermal Power Plants,” which aimed to raise awareness of the potential dangers in the operation of thermal power plants and the risk management needed to ensure the plants are more resilient.

The website is indicative of FM Global’s prominent role in India’s fire prevention community. IC&S is part of the executive committee of the National Association of Fire Officers (NAFO) and chairs the Codes & Standards Committee of the Fire & Security Association of India (FSAI), which advocates for the implementation of the updated and expanded National Building Code (NBC 2016), which was adapted by the Bureau of Indian Standards (BIS) in 2017. Most significantly, IC&S is a member of all of the BIS committees that deal with fire safety codes and standards: the Fire Safety Sectional Committee; the Fire Fighting Sectional Committee; and the Panel for Fire Protection, which is responsible for revising the chapter on Fire & Life Safety of NBC 2016.

To further the utilization of the new code, the BIS has conducted educational workshops throughout India; some states have revised their fire safety regulations and others will soon enact them. FM Global has helped to further the adoption of the code in conjunction with the Fire & Security Association of India. IC&S also works closely with key Authorities Having Jurisdiction (AHJ), including fire chiefs, to promote the understanding of new clauses and their limitations, drawing on data from FM Global Property Loss Prevention Data Sheets.

Elsewhere, as part of a consulting agreement between FM Global and the National Fire Service College (NFSC), we have provided the NFSC with designs, drawings and a list of essential equipment for the construction of a new training facility. The knowledge center will include a sprinkler riser lab, a fire pump lab, and an automatic fire sprinkler lab. NFSC hopes to start building in 2019.

The updating, effective implementation, and knowledge dissemination of codes and standards is a unique challenge in India, with its discrete states and territories. IC&S will continue to engage with clients and officials and seek new partnerships to improve fire loss prevention measures throughout the country.
“The new website will feature news and stories related to fire incidents in India and worldwide and give us an opportunity to share information with the public and the entire fire protection fraternity in India.”

SRIKANTHYAJJALA, CODES AND STANDARDS CONSULTANT, FM GLOBAL
In 2018, International Codes and Standards (IC&S) advanced its mission in Latin America through its vital partnerships and education and advocacy efforts.

In Brazil, FM Global worked with Instituto Sprinkler Brasil (ISB) and the National Secretariat of Public Security (SENASP) to foster the development of a distance-learning program. Marcelo Lima, assistant vice president, senior codes and standards consultant, says, “In 2018, we reached more firefighters than we had trained since the start of our Codes & Standards work in Latin America in 2009. SENASP, which runs the distance-learning courses for all public defense forces (including firefighting personnel) in Brazil, is making efforts to convince the 27 state fire departments to include the ISB sprinkler distance-learning course in the regular curriculum of state fire protection academies.” The CFSC also hopes to establish a master’s program in fire engineering at Inmetro, the National Institute of Metrology Standardization and Industrial Quality, and develop a fire protection program at their facility in Xerém, Rio de Janeiro.

Significant progress was made in December when the São Paulo State Fire Protection Law Decree was signed. Though it is a state fire code, it will likely have a far-reaching effect, since Brazil’s other states usually follow the lead of its most populous state. The key revisions include the requirement of certified fire protection equipment and empowering the fire service to inspect and eventually fine and/or close irregular buildings. The Brazilian Sprinkler Association (ABSpk) encouraged other important associations to sign a legal letter inviting then-Governor Márcio França to approve the law. With the support and influence of retired fire chief Colonel Cássio Armani (the first recipient of the FM Global International Codes and Standards Advocacy award; see sidebar on page 19), the letter was delivered and contributed to the enactment of the law.

Concurrently, a new model fire code, which recommends uniform provisions for most Brazilian states, has been approved by all of its participants, including the National League of Military Firefighters (LIGABOM). But SENASP must sign the code; the 2018 presidential elections and the expected change of staff in all ministries and secretariats have delayed the resolution. The push for the adoption of the code will resume in the first quarter of 2019, when the new appointees are in place.

The 2013 fire at the Kiss nightclub heightened the urgency for new safety measures, and a fire at the National Museum in Rio de Janeiro in September 2018 reinforced the need for sprinklers. “We have monitored the number of times the term ‘sprinkler’ has been mentioned in the general press since the fire, and the numbers surprised us,” Lima says. “Most of the references to sprinklers were very good, and we believe the work to publicize sprinklers is starting to pay off. On the

“In 2018, we reached more firefighters than we had trained since the start of our Codes & Standards work in Latin America in 2009.”

Marcelo Lima, Assistant Vice President, Senior Codes and Standards Consultant, FM Global
negative side, the agency that regulates cultural vintage buildings, the National Institute of Historic and Artistic Heritage, has published new regulations which are not favorable to sprinklers, reflecting a prevailing impression by museologists that sprinklers and art do not mix well. IC&S is continuing its efforts to counteract these positions and, on the positive side, two prominent museums in Brazil that are being rebuilt (Museum of the Portuguese Language) and renovated (Paulista Museum) will install sprinklers. ABSpk is involved in the first project, providing pro bono project review to ensure that the sprinkler systems are properly designed and installed.

There were also some notable developments elsewhere in Latin America. The Mexican Sprinkler Association (AMRACI) produced local installation standards (including a fire pump benchmark) and is now working with the National Council of Fire Safety (CONACF) to introduce sprinkler requirements in NOM 002, the standard that regulates workplace safety in Mexico. “This was a considerable victory,” Lima says, “as AMRACI had never participated in the revision committee. AMRACI continues to have a very successful professional certification program. And Mexico, Brazil, and Colombia, with several other Latin American countries, are discussing the creation of a Latin American Fire Safety Network, which could be established in 2019.”

In Colombia, IC&S signed a membership agreement with the National Fire Sprinkler Association (ANRACI). Felipe Melo, codes and standards consultant, says that the partnership is “a great opportunity to contribute our knowledge and development of codes and standards work.”
IN THE UNITED KINGDOM, discussions about fire risk and protection continue to be driven by the tragic fire at London’s unsprinklered Grenfell Tower. A government study focusing on high-rise residences—“Building a Safer Future: Independent Review of Building Regulations and Fire Safety”—was delivered by Dame Judith Hackitt in May. The executive summary noted that “the current system of building regulations and fire safety is not fit for purpose and that a culture change is required to support the delivery of buildings that are safe, both now and in the future.”

The review proposed a thorough regulatory approach for high-rise residential buildings through a new Joint Competent Authority, which would encompass fire safety, improvements in the design process, a coordinated approach to recording fire safety information and changes through a building’s lifespan, plus the testing, marking, and traceability of construction materials.

At the close of 2018, the government announced its plan to respond to the study and enacted a ban on the use of combustible materials in the external walls of high-rise residential buildings. Most significantly, it launched a wide-ranging technical review of the Regulatory Guidance that supports building regulations in England and, for the first time, considers the potential to include elements of property protection within the code. To many observers, the pace of change is slow and limited to high-rise residential buildings. But Tom Roche, assistant vice president, senior codes and standards consultant, says “there has been a tremendous amount of work prompted by the response to the review within the fire and construction sector, concentrating on competency and training. The Ministry team has grown enormously—they are approaching 200 members. The technical policy team has grown in anticipation and to support a full technical review in 2019. Change is coming and will impact the entire built environment.”

Officials are also debating the prioritization of regulating combustible materials on high-rise residential buildings, while many of them are acting to install sprinklers. Roche says “the debate has been dominated by various elements: construction supplies, such as aluminum composite material (ACM) cladding, sprinklers, defend in place policies, exit stairs, fire doors, etc. It is a matter of something needing to be retrofitted—sprinklers—because it will improve the situation versus something that should not have been there in the first place—ACM cladding [457 high-rise buildings have those materials].” Several projects are retrofitting sprinklers into high-rise buildings, and new development plans have been updated to include sprinklers. Local authorities are pressing for government help with the cost of installing sprinklers, though officials are reluctant to act.

Businesses also need a greater awareness of the issues; the discussions may center on high-rise residential buildings, but new codes will impact the overall built environment. This prompted the Business Sprinkler Alliance (BSA) to launch a campaign to publicize their wide-ranging concerns. To that end, International Codes and Standards (IC&S) continued its work on the Building Code Ranking project, which collects information from codes in use worldwide to minimize the risk of fires and natural disasters. The input from many European partners regarding the use of sprinklers emphasizes commonalities between codes and regulations, which helps FM Global clients understand the requirements for sprinklers in different countries.

In 2019, IC&S “will work with the BSA to alter the perception of the impact of fire on businesses,” Roche says, “which tends to underestimate damage and overestimate the ability to recover, to find a balance for a convergence of life safety efforts and property protection. And we will tirelessly address the myths around sprinklers, vis-à-vis water damage, cost, and suitability, targeting building developers and the architect community through conferences, training events, social media campaigns, and publications.”
High-rise residential is just the tip of a much deeper problem

457 high-rise buildings in the U.K. use hazardous ACM cladding

“IC&S will work to alter the perception of the impact of fire on businesses, to find a balance for a convergence of life safety efforts and property protection.”

TOM ROCHE, ASSISTANT VICE PRESIDENT, SENIOR CODES AND STANDARDS CONSULTANT, FM GLOBAL

In May 2018, FM Global was a prominent participant at the Understanding Risk (UR) Forum held in Mexico City. The UR organizers describe the biennial event as a gathering of a “global community of experts and practitioners [who are] active in the creation, communication, and use of disaster risk information.” Attendees included professionals from the private, public, nonprofit, technology, and financial sectors. In all, 1060 representatives from 101 countries participated.

Christopher J. Wieczorek, Ph.D, vice president and manager of International Codes & Standards, Thomas Roche, assistant vice president, senior codes and standards consultant, and Harold Magistrale, Ph.D, principal research scientist, geological sciences, led a technical session on “Understanding Cascading Events: Earth, Wind and Fire.” In addition, Louis Gritzo, Ph.D, FM Global vice president, research division manager, was part of the steering committee that hosted a session titled “Supporting the Next Generation of Risk Communication Professionals,” which focused on interdisciplinary training to integrate knowledge from multiple disciplines.

A scholarship supported by IC&S made it possible for young people to attend the conference.

ABOVE: Lou Gritzo, Ph.D. answers questions during a “Supporting the Next Generation of Risk Communication Professionals” session at the UR Forum.
TEAMWORK AND TRANSFORMATION

Rigorous research is the backbone of International Codes & Standards’ advocacy.
THE ONGOING EFFORTS TO ELIMINATE major inconsistencies and discrepancies in codes and regulations around the world are driven by the dynamic collaboration between FM Global’s industry-leading researchers and the work of the International Codes & Standards (IC&S) group. Research grounds our underwriting and claims process in a rigorous engineering-based approach, and the advocacy and dedication of the IC&S team has strengthened our clients’ resilience and minimized risk.

Scientists and researchers working in Norwood, Massachusetts, facilitate state-of-the-art methods of analysis of research and testing conducted at the FM Global Research Campus in West Glocester, Rhode Island, providing vital data for IC&S’ outreach.

In the past few years, significant progress has been made on the analysis of the fire hazards of aluminum composite materials (ACM), cladding systems and the impact of smoke and heat vents on sprinklered and unsprinklered fires.

ACM panels are a common construction product that are installed on the façades of buildings; the highly combustible material is chosen for aesthetics, energy efficiency, weather-proofing and cost-effectiveness—not safety. And prevailing methods for testing the combustibility of ACM cladding systems are deeply flawed, enabling potentially life-threatening products to sail through regulatory approvals. In the past decade, many catastrophic high-rise building fires have been linked to ACM panels, including the Grenfell Tower fire in London in 2017. Those incidents prompted the scrutiny of international building codes and the standard fire testing methods used for such construction products. The Fire Hazards and Protection Area of Research initiated a study of the fire hazards of ACM wall assemblies containing combustible elements, using the 16-foot-high parallel panel test (16-ft PPT) method of ANSI/FM 4880, a large-scale fire test used by FM Global and FM Approvals.

Gaurav Agarwal, Ph.D, lead research scientist at FM Global, explains the methodology: “A propane sand burner is placed between two wall panels; the burner simulates the flame heat fluxes of realistic post-flashover and exterior corner fire scenarios. The fire spread performance of a wall assembly is evaluated based on the peak chemical heat release rate (HRR), which correlates to the extent of vertical fire spread. The research study revealed that the fire performance of the complete ACM wall assembly, not individual components, is necessary to evaluate its fire spread hazard, and demonstrated the effectiveness of the 16-ft PPT in determining the fire hazard of ACM assemblies.”

The research has been shared in international groups and to technical groups in the United Kingdom in the aftermath of the Grenfell fire. The FM Global findings were cited by an Expert Witness commissioned by the independent public inquiry.

Agarwal notes that “efforts are underway to include the 16-ft PPT as a fire testing requirement for U.S. building codes (IBC and NFPA-5000) and to develop equivalent test standards for the National Fire Protection Association (NFPA) and the International Organization for Standardization (ISO), so the 16-ft PPT can be referenced and used in building codes worldwide. The ACM research work has also led to the development of a new FM Approval Standard (FM 4411, Approval Standard for Cavity Wall Systems) that will be used to test ACM wall systems using the 16-ft PPT method.”

Since the Grenfell tragedy, Agarwal says that “IC&S has provided key information to researchers regarding proposed revisions to building codes in the U.K. and Europe, and the group has promoted the ACM research data at several industrial and government forums in those regions, educating and impacting the direction of those bodies. And the results from the Norwood team...”
have helped IC&S to detail the hazards and fire behavior of ACM wall systems.” But applying the findings is an ongoing challenge, since evaluations of ACM tests vary widely from country to country.

SMOKE AND HEAT VENT RESEARCH is conducted by Karl Meredith, Ph.D., staff vice president, principal research scientist, and Alex Krisman, Ph.D., senior research scientist. “We use FireFOAM, a high-fidelity numerical modeling tool designed for industrial building fire simulations,” Meredith says. The computational fluid dynamics (CFD) software was developed by FM Global researchers in collaboration with scientists and academic institutions from around the world. “FireFOAM can represent realistic fire growth and suppression—it captures the physics that underpin flame spread across flammable surfaces and water-based fire suppression. We studied fires under ceilings with and without smoke and heat vents, and with and without sprinkler systems.” Smoke and heat vents are designed to remove the products of combustion from building fires. They work by natural convection (hot gasses rise) and/or mechanical pumping (fans) and may be used alongside draft curtains, which accumulate smoke and heat to promote natural convection through the smoke vent.

“But in sprinklered buildings,” Krisman explains, “the presence of the sprinkler system may lead to interactions that prevent one or both systems from performing as intended—because the order of vent and sprinkler activation matters. For example, if the smoke vents operate before the sprinklers, they may cool the ceiling and delay sprinkler activation, which may result in a larger fire than the sprinkler system was designed to deal with.”

ABOVE: Identical fire scenarios for Class 2 commodity. Both images are taken four minutes after the start of the fire. The difference between the two models is that one case has a smoke vent and the other has sprinklers.

“The interaction of the research teams and IC&S enhances FM Global’s worldwide mission.”

CHRISTOPHER WIECZOREK, PH.D., VICE PRESIDENT AND MANAGER OF IC&S
A stalwart proponent of fire protection

Diplomacy is an essential quality when negotiating new laws and regulations. An exemplar of that attribute is Colonel Cássio Roberto Armani, the newly retired commander of the São Paulo State Fire Service in Brazil, and the recipient of the first annual FM Global International Codes and Standards Advocacy Award. The honor is bestowed upon an individual (or organization) who exemplifies the passion to promote, educate, and espouses the increased use of automatic fire sprinklers and the adoption of fire codes in accordance with IC&S efforts.

For 36 years, Col. Armani worked with fire protection organizations and legislators to improve the official and technical standards of ABNT (Brazilian Technical Standardization Association). Brazil is swiftly moving toward a national model code, thanks to the groundwork done by Col. Armani and other advocates, including Marcelo Lima, assistant vice president and senior codes and standards consultant at FM Global.

“Ação has always been a strong proponent of the need for better fire data in Brazil,” Lima says. “I believe Brazil is on the cusp of major changes in its fire protection legislation, and I wouldn’t be able to say that if it weren’t for Col. Armani’s leadership.”

“The goal of this research is to get technically sound results into the hands of IC&S, so the group will be better facilitated to inform and convince policymakers and educate the public on the proper use of smoke vents and the necessity of a higher level of fire protection in all buildings. And IC&S has supported the modeling team with the relevant issues regarding smoke vents, particularly in areas outside the United States, and providing useful feedback on the results.”

The interaction of the research teams and IC&S enhances FM Global’s worldwide mission. Christopher Wieczorek, Ph.D., vice president and manager of IC&S, says, “We are working proactively to establish sound requirements to prohibit the use of materials that have not illustrated adequate performance under ‘end use’ conditions and to mandate the use of automatic fire sprinklers. These efforts will aid in the prevention of such tragic events in the future.”

“Karl Meredith, Ph.D., Staff Vice President, Principal Research Scientist, FM Global

“The goal of our research is to get technically sound results into the hands of IC&S, so the group will be better facilitated to inform and convince policymakers and educate the public on the proper use of smoke vents and the necessity of a higher level of fire protection in all buildings.”

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