THE YEAR IN REVIEW

A look at the events of 2020 through the lens of the NFPA Fire & Life Safety Ecosystem.
But, as relentlessly disruptive as 2020 may have been, the year provided a wealth of events to learn from. Reviewing the fire and life safety incidents that took place, and those that were averted, gives us critical insight into the conditions and practices necessary to taming risk and keeping people safe. In that quest, the NFPA Fire & Life Safety Ecosystem™ is a guiding framework that can help us pinpoint where, in a complex world, there are cracks that will eventually open up into tragedies.

When it comes to improving conditions for safety, we can redouble risk reduction efforts, and promote a safer, more productive 2021 and beyond—a world where ever fewer people will suffer the loss from fire and life safety hazards.
 WHEN THE JUDGE PERMITTED THE CARGO from the sinking ship Rhosus to be off-loaded onto land, it was under the order that the Ministry of Transportation store it in an “appropriate place” under “appropriate safety measures.” Hangar 12, a derelict warehouse storing fireworks and other hazardous chemicals under jury-rigged electricity, was certainly not such a place. Over the course of the next six years, the 2750-metric tons of abandoned ammonium nitrate made its way through an impenetrable bureaucracy, never actually moving. At one point, even the prime minister was due to inspect the hazard but canceled for a more pressing event. Of course, the world knows what happened on August 4th, a little before 6 p.m. local time. The detonation was heard up to 200 kilometers away. At least 200 people confirmed dead. Over 5,000 injured and 300,000 souls displaced from their homes. The Port of Beirut, Lebanon’s vital economic link to the wider world, flattened.

Corruption severs the circuit between authority and responsibility, and much has been written about how Beirut’s graft fueled the apathy that allowed a time bomb in the nation’s capital to be no one’s responsibility. But, if the post-Beirut scramble by officials from Romania to Senegal to find and address their own multi-ton stockpiles of ammonium nitrate is any indication, such complacency is not unique. The people of Dakar can sleep easier knowing much of the material has been removed from the port, but how long it had been there, officials refused to say.

One of the foremost responsibilities to come with authority is the responsibility for risk reduction—the imperative to act against known threats to safety. Ammonium nitrate, used as a fertilizer and in industrial explosives, can be stable, but stored haphazardly—and exposed to fire—the effects can be devastating. The US learned this as recently as 2013, when an ammonium nitrate explosion killed fifteen, injured 200, and damaged or destroyed at least 500 buildings in the small town of West, Texas. After the accident, investigators urged a number of regulatory changes, but even after Beirut, these gaps have yet to be closed. Citizens expect their leaders won’t ignore hazards. And with the availability of codes, standards, and expert knowledge, they have plenty of tools to do this job.

Just as citizens expect government to act to reduce risk, we expect our leaders to be problem solvers, too.

Indelible images from 2020 will certainly include orange morning skies over San Francisco Bay. The year started at the tail end of a brutal bushfire season in Australia that burned over 46 million acres, took 27 lives and 5,000 homes, and caused untold destruction to the country’s unique natural heritage. By summer in the Northern Hemisphere, wildfires in the US were well underway, from the giga (wildfires that burn over 1 million acres, like California’s August Complex) and the mega (those that burn over 100,000 acres, like Oregon’s Beachie Creek and Lionshead and Colorado’s East Troublesome), to those that only burned through tens of thousands of acres of land (like Oklahoma’s 412 and California’s Silverado). At this
point, the damage to communities continues to be assessed, but there have been at least 46 deaths, in California, Oregon, Washington, and Colorado; the loss of homes tallies well into the thousands.

With over 8.2 million acres burned in the United States, 2020 may go down as by far the most active wildfire year in recent memory. However, after the whopping $20 billion-plus in insured damage caused by the 2017 and 2018 fire seasons, the urge to use superlatives should give way to the recognition that intense wildfire activity is likely here to stay. The mounting forces of past land management choices, massive expansion of homes into previously undeveloped lands, and changing climate patterns have resulted in a complex challenge in dire need of committed problem solving instead of political squabbles.

This type of problem solving means comprehensive measures that lower risk to communities in the wildland/urban interface (WUI), which in 2020 did not emerge at any level of government in the US. In California, with an estimated 11 million people living in wildfire hazard areas, the legislature could not agree on how to pay for the state’s massive land and structure mitigation needs, expand state agency’s enforcement capabilities, or address the chaos of its strained insurance markets. In Oregon, the powerful home building industry purportedly coopted any action on stronger building codes to reduce wildfire risk. In Colorado, they passed a report from committee. While the big picture remained out of focus in 2020, some gains were certainly made. In California, the legislature passed a bill to mandate stricter defensible space requirements for homes, putting into practice research and understanding from past fires on how homes ignite and burn down during wildfires.

In late March, calls for emergency medical services rose from an average of 3,000 to 7,000 per day, as 2020’s most complex challenges hit New York City. As a core government function, emergency service providers everywhere had to keep up or fail their citizens. In the Moscow region, call volumes rose 60 percent, stretching average wait times to 24 hours. “There’s a wild shortage of doctors and paramedics,” noted Sergei Fedotov, a paramedic whose station could only staff three of its seven ambulances. Luckily, beleaguered New York City got reinforcements with 250 ambulances and 500 EMTs sent by the federal government. But, as the pandemic stretched into its ninth month in the US, in hard-hit rural areas, like North Dakota, with just four ambulances to serve 10,000 people stretched over 1,500 miles, the demand to meet a 30 percent increase in calls left these providers struggling to stay above water.

Working on the frontlines of the pandemic, not only are responders exhausted, but they are also incredibly vulnerable. In one study, New York City firefighters and EMTs were 15 times more likely to be infected than members of the general public. In huge numbers, responders either got the virus or were sidelined in quarantine by exposures to others. In the US alone, deaths from the disease have numbered well over one hundred. Numbers like these drove the unrelenting demand for personal protective equipment (PPE)—the N95 masks, gowns, and gloves—whose shortage became a hallmark of the pandemic. As case numbers rose in European countries and the US, PPE stockpiles, whose replenishments had been neglected for years, quickly wore down. Without a central agent to locate, negotiate, and distribute these items, countries, states, hospitals, and everyone else in need landed in bidding wars, competing in a treasure hunt for masks and other items. Despite the crisis, in the US the full force of the federal government was not brought to bear.

FOR THE STUDENTS IN LIVERPOOL’S Merseyside flats, the fire that broke out on the 11th floor of their 20-story high-rise will likely only be remembered for a midnight fire drill—if it is remembered at all, contained as it was by sprinklers until fire crews arrived to finish the job.

In sharp contrast, the man firefighters rescued in January from a ledge high above Los Angeles’s Wilshire Boulevard is unlikely to ever forget his experience. A fire in his unsprinklered

Estimates by insurers found that Australia’s 2019-2020 wildfire season was the most expensive on record for that country, with over $4.5 billion in damages.
25-story apartment building left one person dead and a dozen others injured, including a three-month-old baby. Fifteen people had to be rescued from the roof by helicopter. When it was constructed in the 1960s, fire sprinklers were not a code requirement for the Brentwood building. But ensuing tragedies have underscored their indispensability for high-rise structures and compelled the independent stakeholders that update and revise the fire code to require sprinkler retrofits in these older tall buildings. Investigations, like the one issued this year by the Minnesota state fire marshal, point to outdated features like scissor staircases, which spread smoke and confusion in a 2019 five-fatality high-rise fire. Far from an isolated incident, from New York City to Kai, Hawaii, Chicago to San Francisco and Madrid, fires in unsprinklered high-rises took and disrupted lives again and again in 2020.

Retrofitting these buildings won’t happen overnight; but it will happen sooner if authorities implement the most recent fire code.

As the world updates, so do codes and standards. Even the headwinds of 2020 did not disrupt the deployments of battery energy storage systems (BESS) into markets around the world. These massive batteries are integral to electric-grid updates that will bring more renewable power generation online. But, as detailed in a July issued report on the 2019 explosion that gravely injured several Arizona firefighters, these systems bring new safety challenges. The lack of gas detection and venting, fire detection and suppression equipment, as well as protocols for first responders, led to the conflagration that well over 18 months later has prevented those firefighters from returning to duty. While manufacturers work to improve the chemistry and design of their batteries, new standards like NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, and updates to the fire code help installers and inspection authorities understand and reduce safety hazards. Lessons like those learned in Arizona, and other similar incidents, drive safety improvements in codes and standards.

As new industries like commercial space launches and legalized cannabis production heat up, new codes and standards can help identify and mitigate hazards. Even in established industries, new hazards emerge with new technology. Recycling and waste processors are reporting an uptick in fires caused by improper battery disposal. Updates to existing codes may be able to help, but only if they are used and enforced.

According to analysis from the National Fire Protection Association, between 2009 and 2013, there were an average of 14,500 fires in high-rise buildings per year. These fires resulted in an average of 40 civilian deaths and 520 civilian injuries.

WITH 25 DEATHS, 2020 WAS A TERRIBLE YEAR FOR FIRES in Russian nursing homes. With no legal requirement to follow building and fire codes that apply to occupancies housing larger groups of unrelated people, egress and fire safety systems are largely ignored. Crowded housing and occupants with limited mobility make fires especially deadly. An estimated 30,000 Russian citizens live in these unregulated facilities.

ON AVERAGE, THERE ARE NEARLY 4,000 FIRES each year in buildings under construction, renovation, or demolition, and 2020 was no exception. In January, it wasn’t only the $52 million in damages to a revitalization development downtown that stung Bound Brook,
New Jersey. It was also the clean-up’s month-long closure of Main Street in the aftermath that kept shoppers away from local businesses. Ahead of the coronavirus shutdowns, those shops and businesses experienced a 50 percent drop in revenue. Eleven months later, and thousands of miles west, a fire in a seven-story apartment building under construction in Berkeley, California also hurt local business owners, such as the ice cream parlor next door, which lost all of its inventory when electricity was cut by firefighters.

Although a referenced requirement in the fire code, NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition, often goes overlooked and under-enforced. With exposed wood frames, uninstalled fire alarms and sprinklers, and copious debris, a discarded cigarette can cause $48 million in damages, like it did in Fairfax, Virginia, destroying 400 apartment units, 14 townhomes, and 20,000 square feet of retail space slated to open in 2021. To avoid needless and expensive losses, developers and enforcement officials must not overlook fire safety programs and the need to ensure workers on site are trained to carry them out.

Leaving pets, vital documents, and all other possessions behind, all of the residents of the Abbco tower in Sharjah, UAE, managed to escape the flames climbing the exterior of their 49-story residential high-rise. Authorities determined the fire was likely sparked by a cigarette butt tossed over a balcony. The root cause, though, lies within the building’s cladding, a flammable sandwich of insulation and thin metal. Fortunately, the further use of this type of material was prohibited by the UAE government in 2016 with the adoption of building codes that referenced rigorous fire testing standards. However, as the ongoing inquiry into the horrific 2017 Grenfell tragedy reveals, the lack of a reliable and trusted testing regime, and of a common understanding of testing results and performance requirements, will lead to tragic consequences. The inquiry, unfolding over 2020, has thus far found misleading insulation testing results and incurious suppliers, contractors, and architects, creating a “merry-go-round of buck-passing” over the 72 lives lost. Standards referenced in building codes are not merely boxes to be checked. Paying them short shrift will have drastic consequences.

The UK is not alone in facing a cladding crisis. Unfortunately, the application of this material, and resulting fires, has been far reaching, from Turkey to South Korea. Given the lives lost and those disrupted, and the fraught financial and political fallout, recent moves by US policymakers in the District of Columbia, Indiana, Minnesota, and Massachusetts to remove strict fire testing requirements for exterior wall assemblies from their building codes is remarkably short-sighted. Until now, requirements to test cladding material to NFPA 285, Standard Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components, have prevented flammable cladding from becoming a widespread concern in the US. Policymakers must reconsider their actions now to ensure that remains the case.
was 11, not 4,000, but of no comfort to those families and the hundreds hospitalized struggling to breathe. “It seems unskilled labor mishandled the maintenance work and because of that, gas leaked,” said a top official.

If the workers had understood the consequences, perhaps they would have followed more diligent protocols during India’s coronavirus shutdown to ensure the styrene tanks did not warm up. When public safety is at stake, the job is not for everyone. This is just as true when the public is a single family as it is when it is an entire community. For example, according to a series of negligent homicide indictments, a couple in Lyman, New Hampshire would still be alive if the three gas-pipe fitters who had installed a home heating system had followed the manufacturer’s instructions to ensure venting of carbon monoxide.

Gas-pipe fitters, fuel tank technicians, a metro repair crew, refinery workers, solar panel installers, and architects—all jobs where failure to adhere, to understand, and follow the codes, standards, standard operating procedures, and manufacturer guidance can breed catastrophe. Add to that, charter boat captain. In the fall, the National Transportation Safety Board’s (NTSB) investigation of the 34-fatality Concepcion fire revealed that her crew members, let alone the boat’s passengers, hadn’t received any training on what to do in the event of a fire—or were they following Coast Guard watch regulations, which might have alerted vessel occupants before it was too late. Training for the unexpected is just as crucial as training for the routine.

In September, demolition contractors were cutting through steel at New Orleans’s collapsed Hard Rock Hotel when their sparks ignited nearby roofing materials. Unlike the collapse itself a year before, which killed three workers, the dark-flamed fire, fed by roofing tar, “looked worse than it was” according to the fire department. In this case, the workers got lucky. In April, workers at a construction site in Incheon did not. Thirty-eight workers were killed, and 10 were seriously injured, by a fast-moving fire when welders’ sparks ignited urethane in exposed insulation. Whether the workers, some foreign, were familiar with South Korean labor laws meant to ensure hot work safety is unknown. However, faced with pressure to finish the job, in a system often criticized for lax safety enforcement, the workers’ ability to advocate for their own safety may have been limited. Safety training and skills for workers is non-negotiable for reducing the potential for deadly accidents.

In the US, a recent report has found that the difference between the projected need and the number of workers in the electrical workforce will be 251,000 workers by 2030, and 462,000 workers by 2050.

The official conclusion of investigators examining the September explosion at the Baitus Salah Jame Mosque of Narayanganj in Bangladesh was that “nobody or no organization was solely responsible for the incident.” Between leaky gas lines and unsanctioned electrical connections, negligence on the part of several parties led to a blast that killed 31 people. However, the road to the accident started when the mosque was constructed without any permits or permissions, disturbing a natural gas line in the process; just as the road to a Taipei high-rise fire that killed five and injured 50 started when...
fire safety plans were not included in the permitting process for an extensive remodeling job. Such plans reviewed beforehand would have emphasized the importance of not turning off the 14-story building’s fire protection systems during construction. The process of construction must comply with the code.

The plan review and inspection process can catch attempts to cut corners or even simple oversights that can become huge safety failures. To be successful, though, those reviewing plans must be trained on the codes and understand fire safety. However, it can’t stop there. In Boisar, a large explosion in January at a chemical manufacturer revealed that the owner misled inspectors when he claimed new construction by the facility’s gate would be used as office space. Instead, it housed the chemical processing, which exploded, killing eight, and displacing several families who had resided in the building against regulations. Ensuring construction, both new and existing, follows code requirements is a two-way street. This year, a fire in an Ahmedabad hospital, which killed eight, revealed larger dysfunctions—only 91 out of the city’s 2022 hospitals had bothered to renew their fire inspection certificates. While the burden is on the hospital to seek this certificate, the responsibility sits squarely with city officials to ensure that they actually do.

In November, both owners and fire safety officials got lucky when firefighters were able to quickly extinguish a small fire in Massachusetts’s Norwood Commerce Center, a former mill complex converted to artist studios and boutiques. Their success was despite the volume of clutter and unpermitted building alterations that interfered with their efforts. Given the ongoing hazard, though, officials ordered the complex closed until the owners could address the fire safety violations.

While the Norwood firefighters were unscathed, their Los Angeles counterparts were less fortunate. Eleven firefighters were injured, three critically, when an explosion occurred as they were responding to a fire in a downtown smoke shop. Later, investigations revealed the fire department had no record of ever inspecting the shop, which was storing sufficient quantities

In response to coronavirus-imposed social distancing requirements, building inspectors across the US turned to remote video inspections (RVIs) to help keep construction projects moving forward. Prior to 2020, many inspectors were unconvinced that video technology would be as effective as on-site inspections for catching code violations. Anecdotally at least, the rates at which inspectors identified problems over video was about the same as their in-person efforts. And, especially in large counties, without the need to spend hours on the road, inspectors could do more each day. Experts note new scanning technology is on the horizon that will only provide inspectors more detail. Going forward, building departments should continue to evaluate the efficacy of remote inspections and consider getting involved in the development of NFPA 915, Standard on Remote Inspections.
of butane and other chemicals to create an explosion powerful enough to permanently maim one of the firefighters. In the wake of the fire, the city’s fire chief has ordered inspections for all similar businesses operating in their jurisdiction.

Perilous incidents like the LA smoke shop explosion often prompt a step up in inspections. In November, Hong Kong announced it would perform fire safety inspections for residential buildings over 60 years old. This announcement came after a fire in an apartment building killed seven people and injured eleven. These inspections are critical to catching problems. Oakland, California learned this tragically in 2016 when the Ghost Ship, a former warehouse containing unsanctioned art studios, residences, and performance spaces, caught fire, killing 36 people. Post fire, investigations yielded a number of recommendations to ensure properties like the Ghost Ship, rife with code violations, were addressed before they could kill. However, city audits released in 2020 revealed that, four years on, fire inspections remain lackadaisical. Over the prior year, Oakland’s fire inspection bureau had inspected only 26 percent of the properties state law requires. The auditors could find no evidence that most of the code violations identified by inspectors were actually addressed by owners. Properties in low-income neighborhoods remained under-inspected. In light of the findings, Oakland officials have agreed to more reforms, but only continued oversight can measure success.

Cost to the city of Oakland to settle the lawsuit brought by Ghost Ship families and victims: $33 million.

For some in Mollala, Oregon, social media posts held more sway than pleas from local authorities. In September, simultaneous social unrest and catastrophic wildfires created fertile ground for the spread of misinformation. Believing the fires to be the work of arsonists poised to wreak havoc in evacuated towns, some decided to stay put, despite an extremely real natural disaster headed their way. Runaway rumors can endanger those who fall under their sway. But, as Oregon officials experienced, they also steal precious attention from response efforts and create more danger for first responders trying to persuade the misinformed as the wildfire burns ever closer.

Given that the epidemic of misinformation and polarization has spread to all corners of society, it is not surprising to see it manifest in 2020’s wildfire season. However, social science research can provide insight into how people understand risk and decide to act. For example, a study released in 2020 by the National Institute of Standards and Technology identified factors that motivated people to either stay or evacuate during the 2016 Chimney Tops 2 Fire in eastern Tennessee. That fire caused 14 fatalities. According to the study, factors such as having an evacuation plan already developed made people more likely to leave. Conversely, those who had prepared their homes for wildfire were less likely to leave, despite the danger.

Understanding how people perceive risk and tailoring messages to motivate them to act is key to creating an
People must understand the hazards of their environment and steps to take to avoid risk. In Santa Cruz, that education could focus on the dramatic danger to oneself and firefighters posed by re-entering a wildfire evacuation zone to fight fire with a garden hose. In India’s Kochi City, citizens need better awareness of the fire danger from illegal modifications to power connections, overloaded circuits running air conditioners, and mosquito coils catching bed sheets and curtains. Not only does the messaging need to meet people where they encounter the hazard, it must be continuous to ensure it is never forgotten.

Hazards evolve over time. For example, lithium ion batteries have rapidly become commonplace in many households, but from scooters to power drills, people may not realize their potential to cause fires. Along with fire department leaders, government agencies like the Consumer Products Safety Commission are key communicators on the changing hazard landscape. This year, they identified fire safety hazards associated with installation instructions for the Ring Video Doorbell, prompting the company to issue new instructions and contact consumers who had purchased the product. One quarter of the recalls in 2020 singled out products with fire, burn, and electric shock related hazards, representing thousands and thousands of products sold. These agencies’ vigilance of products on the market is a critical contribution to an informed public.

**FOR MANY, A CHURCH ISN’T JUST A BUILDING.**

For the congregants of Manhattan’s Middle Collegiate Church, it wasn’t just the century-old Tiffany stained-glass windows adorning the sanctuary that made it the heart of its Lower East Side neighborhood. And for Bishop Tyreese Bowman, the vacant west Indianapolis structure he and the Greater Zion Fellowship Community congregation devoted countless hours to rehab was more than a setting for Sunday worship. It was a second home for so many in the community. For these congregants, fires exacerbated an already tough year. For the Fitchburg Lutheran Emanuel Church, fire was also unkind, destroying a pipe organ that had served the church for over 150 years. However, because sprinklers kept the fire contained until firefighters arrived, the organ was the extent of the loss. The church’s investment in safety was key to avoiding greater losses.

In October, New York City’s Museum of Chinese in America could rejoice that they would receive $3 million from a private charitable foundation. After a fire ripped through the Chinatown museum’s archives in January, they were faced with the multi-million dollar task of painstakingly restoring thousands of documents, photographs,

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**The National Fire Protection Association’s Fourth Needs Assessment of the US Fire Service found that 85.1% of surveyed fire departments lacked fire prevention education programs.** The smaller the jurisdiction, the less likely the fire department was to offer fire prevention education.

**INVESTMENT IN SAFETY**

Prioritizing safety across the board.
items of clothing, recorded oral histories, and hundreds of other artifacts that tell the story of Chinese people in America and New York's Chinatown itself. Fire protection may be far from the minds of unique cultural museums, but with millions available for restoration, investing ahead of a calamity would be sounder. In 2020 alone, it wasn't only the Museum of Chinese in America. Fires also tore through the museums and cultural centers of the Ho-Chunk Nation and the Confederated Salish and Kootenai Tribes.

Luckily churches can be rebuilt, and artifacts can sometimes be salvaged. The same cannot be said for people, making the fire sprinkler investment of the historic Lovelander Hotel worth every penny. Required by the local fire department due to the age of the building, and assisted with funding from the city council, the Colorado hotel was able to install sprinklers just months before a fire broke out in August. That investment, noted fire marshal Ned Sparks, “likely saved 50 people’s lives, or [ . . . ] prevented injury and death. And not to mention our firefighters. They would have been compelled to risk their lives.” With fire contained and damage limited, residents were able to return within 24 to 48 hours.

Between spikes in home fires this year, relentless coronavirus response, fiery train derailments, massive industrial fires, and more, communities all over have heavily leaned this year on the skills and actions of first responders. But, as the pandemic has strained state and local finances, those communities have looked toward emergency services for cuts of up to 10 to 25 percent of their budgets. The city of Milwaukee announced plans to close a fire station on the city’s south side—a station serving the local airport and several senior living facilities. While the fire chief assured council members response times could still be met, it is on the heels of the city budget two years ago, which closed six fire stations. Even if response times can be maintained, fire prevention programs—including fire inspections—will likely be cut. Efforts to save money through cuts to the fire service may appear elsewhere when preventable fires take lives and property.

At its worst, 2020 was a deadly year for the world’s first responders; at its best, it was simply exhausting. Ten firefighters from Platoon 5 went to the Port of Beirut on August 4 knowing only that a warehouse storing fireworks was on fire; after 2,750-metric tons of ammonium nitrate exploded, none of them returned.

In 2020, first responders were deeply heroic, hanging by ropes from a New York City high-rise, battling fire in Hurricane Isaias, and pulling survivors from a Mumbai apartment collapse. But, just like every year, that devotion to duty carried a risk of injury, often significant. From being swept into the 12-foot swells of Lake Michigan, sustaining a blow to the head from a hose in San Francisco, or suffering severe burns in a cargo ship explosion in Jacksonville, first responders in 2020 dealt with many fraught incidents that in the US alone cost, conservatively, $1.6 billion per year.

Of course, in 2020, it wasn’t only the risk of physical injury that took its toll on first responders. Not only did legions test positive for coronavirus—some with serious illness—responding to record numbers of 9-1-1 calls, but they also had to contend with relentless disasters and social unrest. During protests in the summer, Philadelphia’s firefighters went from responding to seven or eight fires a day to as many as 50 or 60. The frenetic pace of 2020 added even more stress to a job that is now beginning to

Failing to invest in wildfire mitigation is costly. One recent study found that the total economic impacts of California’s 2018 wildfires, including destroyed infrastructure and capital losses, business disruptions, and related health care costs was $148.5 billion, about 1.5% of California’s annual gross domestic product.

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reckon with the impact it has on the mental health of its ranks. A study published in July found increased rates of mental and behavioral health issues, including post-traumatic stress disorder and suicide, among firefighters, emergency medical technicians, and police officers in Canada, Australia, South Korea, Jamaica, and the US. However, the growing willingness to recognize, mitigate, and treat mental health issues is a move in a positive direction. For example, in June, Pittsburgh invested in an alarm system upgrade to reduce sleep disruptions and unnecessary stress among its first responders. The new system does away with constant radio calls and harsh sounds that trigger stress. The city’s firefighters hope changes like these will lower stress and improve well-being.

First responders healthy in body and mind are fundamental to community preparedness and emergency response. To support that, communities must equip their responders not only with equipment and protective gear that meets relevant safety standards, but also proper training, and a commitment to their safety. For example, in November, the US National Transportation Safety Board released survey results that found 31 percent of US fire departments have not done any training on procedures for fighting electric vehicle (EV) fires. With power-packed batteries that can burn for extended periods, responders need different procedures for responding to EV accidents. Responder training must keep up with changing hazards. However, one hazard that remains persistent, and deadly, is the failure of building occupants to share information with first responders. In Peeragarhi, firefighters began the year on a low note when they lost a young colleague to an explosion just as operations at a factory fire were wrapping up. Frustrated, the director of the Delhi fire service stated, “We were not aware of what was inside the building.” Worldwide, fire departments must work with community members to pre-plan for incidents, taking a full account of the hazards firefighters may encounter.

Arming first responders with equipment, training, and information sets them up for success, but not without enough bodies to quickly respond. A report to the Indian Parliament found the number of fire stations in the country fell 65 percent short of the total estimated need; the number of Indian firefighters is short by over half a million. The country needs many safety improvements, but without developing the emergency response workforce, fire in India is likely to remain one of the leading threats to businesses and a killer of around 17,000 citizens a year.

Even where the scale is far short of one billion people, the need for more firefighters remains, particularly in rural areas. For example, in Australia, a country that has long relied on volunteers to put out seasonal bushfires, the cataclysmic 2019/2020 fire season has forced a reckoning. They need, the volunteers say, training, professionalism, and the public to understand the severity of what they’re facing.

Responders are critical to safety, but they are a community’s last line of defense, not their first. In cities like Houston, notorious for their resistance to zoning, homes and industrial facilities are often neighbors. When there are accidents, like an explosion of a 2,000-gallon fuel tank, people’s homes are well within the blast zone. After the blast at Watson Grinding and Manufacturing, the Houston City Council closed a loophole that allowed hazardous enterprises to store larger quantities of chemicals if they stored them outside. The city is considering more changes, including an updated fire code, for 2021. Given the many industrial, and weather-related, hazards that dot Houston, the city must do all it can to prepare for emergencies by preventing them.

**CONCLUSION**

The most defining challenge of 2020—the coronavirus pandemic—will hopefully fade with time. However, for others—wildfires, improperly stored hazardous materials, lax code enforcement—there is no vaccine. The Fire & Life Safety Ecosystem is a key to understanding how decisions made over time either exacerbate or control fire and life safety hazards. Acting on this knowledge will save lives, property, and communities.
Learn more about the NFPA Fire & Life Safety Ecosystem™ by visiting nfpa.org/ecosystem.

Please see the 2020 Fire & Life Safety Year in Review Works Referenced for more information on the incidents, facts, and figures described in this document.

About the NFPA Fire & Life Safety Ecosystem
The NFPA Fire & Life Safety Ecosystem is a framework that identifies the components that must work together to minimize risk and help prevent loss, injuries, and death from fire, electrical, and other hazards. There are eight key components: Government Responsibility; Development and Use of Current Codes; Referenced Standards; Investment in Safety; Skilled Workforce; Code Compliance; Preparedness and Emergency Response; Informed Public. As with any ecosystem, the components of the Fire & Life Safety Ecosystem are interdependent. When they work together, the system protects everyone. If any component is missing or broken, the system can collapse, often resulting in tragedy. Almost always we can trace the cause of injurious life safety incidents and tragedies back to the breakdown of one or more components.

About the NFPA Fire & Life Safety Policy Institute
Created by the National Fire Protection Association® (NFPA®), the Fire & Life Safety Policy Institute supports policy-makers around the globe in protecting people and property from fire and other hazards with best practice recommendations and approaches to develop and sustain a strong fire prevention and protection system. For more information visit nfpa.org/policyinstitute.

About the National Fire Protection Association
Founded in 1896, NFPA is a global self-funded nonprofit organization devoted to eliminating death, injury, and property and economic loss due to fire, electrical, and related hazards. The Association delivers information and knowledge through more than 300 consensus codes and standards, research, training, education, outreach, and advocacy; and by partnering with others who share an interest in furthering the NFPA mission. For more information, visit nfpa.org. All NFPA codes and standards can be viewed online for free at nfpa.org/freeaccess.