



In 2015, a garage roof in Fresno, Calif., collapsed under Capt. Pete Dern, plunging him into an inferno. Five years earlier, his department had helped investigate a similar incident in Modesto, Calif. Dern survived the blaze but is still recovering from severe burns. **Sooji Lee**

Fatal Echoes

In a tragic loop, firefighters die over and over from preventable mistakes

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They stood under fragile walls that would soon collapse.

They entered burning buildings without hoses to protect them.

They rushed into unstable — and unoccupied — structures.

And they died, often because their commanders made poor decisions and strategic errors that put them in excessive danger.

“We allow the same events to occur year after year that lead to firefighter fatalities.”

— Kevin Kalmus, an Austin, Texas, fire captain

Over the last two decades, hundreds of firefighters were killed and tens of thousands injured in incidents that bore a grim connection: They had happened before in almost exactly the same ways.

The Kansas City Star, in a monthslong investigation, found widespread problems within America’s fire service. Topping the list was that, in tragedy after tragedy, firefighters paid the price when fire departments didn’t learn from others’ mistakes.

“We are sadly unoriginal,” said Kevin Kalmus, a fire captain in Austin, Texas. “We allow the same events to occur year after year that lead to firefighter fatalities.”

“You see the same things over and over again,” said Tim Merinar, who heads a federal team in West Virginia that has investigated firefighter deaths since the late 1990s.

“We are our own worst enemies in a lot of ways,” shrugged Brian Kazmierzak, a fire safety officer in Indiana.

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These lapses occurred, fire investigators and safety experts say, despite many science-based safety recommendations that have been widely circulated to the thousands of fire departments across the country.

No single explanation accounts for why best practices are often not followed. A perplexed U.S. Congress authorized a \$1.2 million study in late 2012 to find an answer, but then neglected to provide the money to see it through.

Scores of firefighter fatality reports reviewed by The Star, however, suggest some answers: no national training requirements; complacency within some departments; little regulatory oversight; budget constraints that leave fire departments shorthanded; and poor judgment on the fireground.



Different cities, same sad narrative: A fire rages through a building (from left, in Charleston, S.C.); an investigation begins in the aftermath of a tragedy (Kansas City); a fallen firefighter is honored with a haunting ceremony (Cincinnati); and a memorial is erected (Waycross, Ga.). | **AP Photo/Tyrone Walker, Joe Ledford - jledford@kcstar.com, AP Photo/Joe Munson, Joe Ledford - jledford@kcstar.com**

Kansas City firefighters John Mesh and Larry Leggio were killed in October 2015. A wall fell on the men in an alley that the Kansas City Fire Department said should have been evacuated because it had been declared

unsafe.

What was remarkable about their deaths is how tragically unremarkable they were. Many other firefighters died before them in similar fashion while operating within a “collapse zone,” an area considered too dangerous to enter because of the risk of structural failure.

A federal workplace safety agency that investigated many of those cases had recommended nearly two decades ago that every fire department adopt a written collapse zone policy.

Yet the Kansas City Fire Department did not institute its policy until after the deaths of Mesh and Leggio — not atypical for a dangerous profession that is more reactive than proactive when it concerns safety.

'He wasn't supposed to die'



Grieving survivors and others raise questions about the deaths of firefighters killed at structure fires across the country. A Kansas City Star investigation found that many

fatalities could have been prevented.

“Every time there’s a firefighter fatality or serious injury, we don’t think it can happen to us,” said Burton Clark, who until his retirement taught at the National Fire Academy.

Clark isn’t alone. Numerous officials in leadership ranks of the fire service have expressed deep frustration.

That exasperation found voice this year in a report from a task force investigating the serious injury of a fire captain who fell through a garage roof in Fresno, Calif. The report noted that a similar incident occurred a few years before in Modesto, Calif., and yet the Fresno department, which helped investigate that fire, had not learned from the experience.

The Modesto report that the Fresno department helped write warned against firefighters climbing atop the roofs of burning garages. The roofs’ support systems typically are unprotected by drywall, exposing them to flames. The result is that the roof won’t support a firefighter’s weight. Yet Fresno did not change tactics until after the roof gave way under one of its own, Capt. Pete Dern, plunging him into an inferno.

The accident fit a broader pattern within fire departments nationwide, one of the Fresno report’s authors told The Star. Factors contributing to that incident were also noted in 70 of 77 firefighter fatality reports they reviewed from the previous decade.

“It’s not a Fresno problem. It’s not a Modesto problem,” said Alan Ernst, the Modesto Fire Department’s division chief for operations. “It’s an American fire service problem.”



Men and women stood at attention in a sea of blue before a community memorial service for Kansas City firefighters Larry Leggio and John Mesh. More than 5,000 people attended the service inside the Sprint Center on Oct. 17, 2015, for the two firefighters who died when a wall collapsed on them. | **Joe Ledford** - jledford@kcstar.com

Falling walls

Eugene McDonough was “a firemen’s fireman,” fellow Vermont firefighters said. A 20-year veteran of the St. Johnsbury Fire Department, with another 15 years on top of that at other departments, McDonough loved the battle. And on a Saturday night, a big battle was shaping up at a warehouse in nearby Lyndonville.

“It was a substantial fire,” a Lyndonville firefighter recalled. “A gigantic building.”

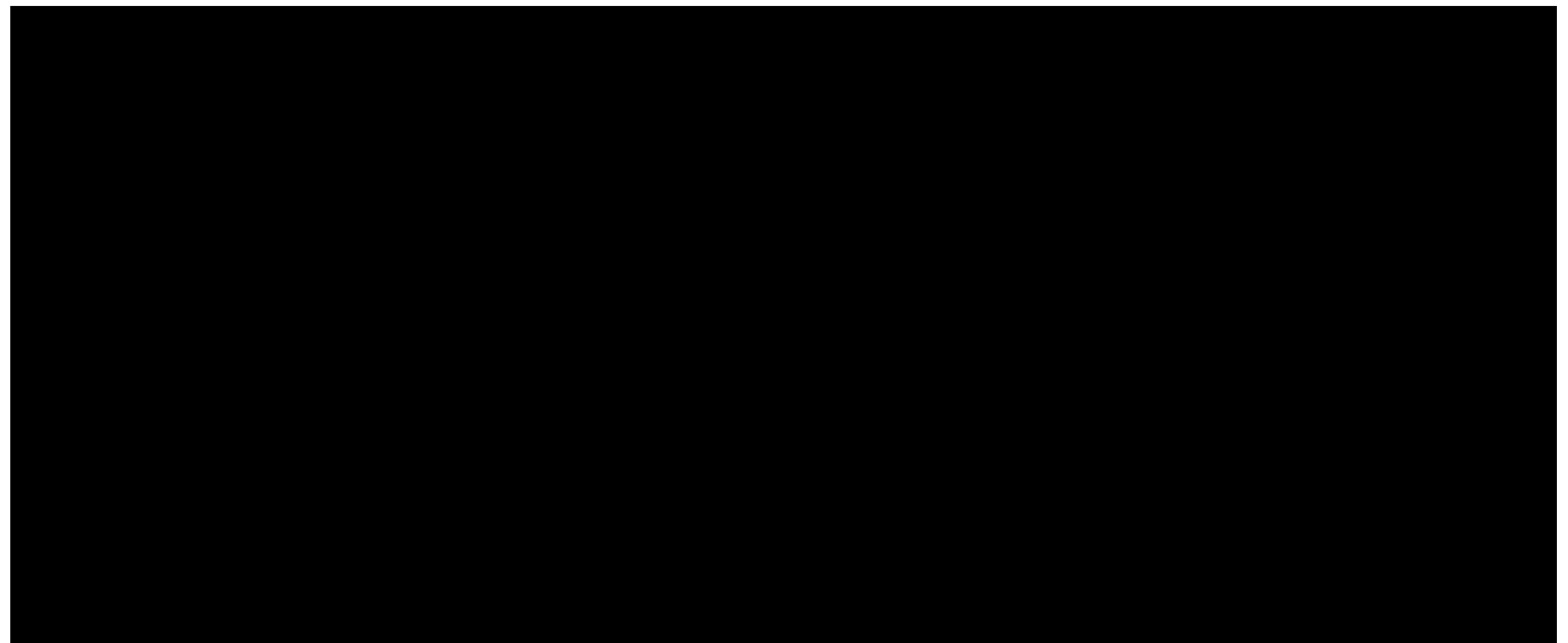
Gigantic, unoccupied and ablaze by the time fire crews arrived. Far too dangerous to enter, the commander on the scene decided.

So a defensive, exterior fire attack was ordered. “Surround and drown” is how one after-action report summed it up.

To drown the flames, someone needed to open the barn-like center doors so firefighters could spray in water from a distance. Opening the doors was McDonough’s job. But soon after, the doors slammed shut. When he returned to prop them open, the parapet wall above him gave way.

Parapet wall collapse

In this example from the City of New York Fire Department, there was a partial roof collapse, followed by a collapse of the front parapet and exterior wall.



A few steps either way and the 54-year-old veteran firefighter might have escaped death. No one would ever be able to say for sure.

But when federal authorities arrived days later to study the circumstances, their aim wasn’t to second guess so much as to understand what happened and pass on those lessons.

McDonough's death in 1998 was one of the first fatalities examined by a special team of federal investigators formed to determine how and why firefighters were dying. The team's goal, initially, was to investigate each line-of-duty death.

“The need for such federal investigations has never been greater,” the general president of the International Association of Firefighters, Alfred Whitehead, had said in arguing for creation of the program. “At a time when many communities are cutting firefighter staffing, reallocating resources away from fire departments, and cutting corners to save money, our nation's firefighters are exposed to greater risks of death and injury than any time in our past.”

Despite a decadeslong decline in the number of structure fires in the United States — thanks partly to smoke alarms and stricter building codes — the death toll per hundred thousand fires was just as high in the late 1990s as it had been 20 years before. Now the National Institute for Occupational Safety and Health was going to find out why and suggest ways to save lives.

The safety agency's investigators spent a year probing McDonough's death and writing their report, which presented the incident as a cautionary tale for the 1 million U.S. volunteer and career firefighters. Firefighters should never work under parapet walls — those facades, often brick, that extend above the roof line and make a building look taller.

U.S. fire service by the numbers

1.1 million firefighters

29,980 fire departments

346,150 career firefighters (31 percent)

788,250 volunteers

93 percent men

7 percent women

Source: National Fire Protection Association

“A parapet wall has less stability because it has fewer connections to the rest of the structure and is subject to collapse if it suffers any movement, shock, or vibration during fire fighting operations,” the agency reported.

That same year, the safety agency reinforced the point when it published a 12-page alert on the overall dangers of interior and exterior structural collapse, and again highlighted parapet walls.

Many fire departments took the advice to heart. But not everyone got the message.

On Sept. 30, 2002, in Terre Haute, Ind., Capt. Ralph Stott Jr., 50, was killed and two others were injured when a parapet wall collapsed at a burning auto body shop.

The safety agency sent its investigators, who once again issued a report advising firefighters nationwide to put some distance between themselves and parapet walls: “As a free-standing masonry wall, a parapet has little if any lateral stability and presents an extreme collapse hazard.”

Five years after that report, 42-year-old Robert L. Knight, chief of the volunteer fire department in Teague, Texas, died when a commercial building’s parapet wall collapsed.

It was another surround-and-drown situation. The building was empty. Knight had just begun to spray water through the doorway when he was buried in hot bricks.

The Texas state fire marshal concluded that Knight should not have been so close to the building. A collapse zone extending out one and a half times the height of the building should have been designated and everyone ordered out of it.

“No firefighters’ lives should be put in jeopardy where no possibility of saving property and lives exists,” the state report said.

The national safety agency agreed and urged fire departments to designate collapse zones when structural failure is suspected and then keep firefighters outside the zones.

But to the frustration of Tim Merinar, who wrote the report on Knight’s death and who now heads the national institute’s firefighter fatality program in West Virginia, firefighters continue to be crushed within collapse zones, just as they continue to die from other recurring errors.

“We continue to see the same contributing factors that we were seeing when the program started,” Merinar said.

The Star could find no record of the safety institute investigating deaths involving parapet wall collapses since 2008. Whether more have occurred since then is impossible to know; the agency, despite its initial goal, does not examine the circumstances of every on-the-job fatality.

Budget cuts have made that impossible. The institute’s Fire Fighter Fatality Investigation and Prevention Program employed just six full-time investigators this year — down from 14 a decade ago — and two of them focus exclusively on heart attacks and other medical issues. That allows the institute to investigate only one-third of on-duty firefighter fatalities.

It is forced to pick which problems to focus on, with building collapse a recurring problem that the institute thinks warrants attention.

In 2012, two Philadelphia firefighters died in a warehouse fire inside a collapse zone that had been declared long before they walked into it, but had not been marked or maintained.



Firefighters battle a fire in a warehouse on York Street near Kensington Avenue in Philadelphia early Monday, April 9, 2012. Two firefighters died after a wall collapsed on them while they fought the massive early-morning blaze. | **AP Photo/Joseph Kaczmarek**

Three years later, the two Kansas City firefighters were similarly killed six minutes after a collapse zone was declared. It too was not marked or evacuated.

In the past 20 years, more than 150 firefighters have suffered fatal injuries when part of an unoccupied building collapsed.

Because it's not easy to predict when a structure will fail during a fire, commanders should always consider the possibility of exterior and interior collapse, safety experts say.

“We need to be putting far more emphasis on understanding building construction, fire behavior, fire extension and how it relates” to structural integrity, says Christopher Naum, a consultant who provides analysis for the national institute's fatality reports.

“Our department was determined to make sure this didn't happen again.”

— Matt Gillet, safety officer

The volunteer fire department in Teague, Texas, has been more cognizant since Chief Knight's death.

Even before the state and federal reports were issued, that department recognized its shortcoming and adopted new written operating guidelines, including one for collapse zones.

“Our department was determined to make sure this didn't happen again,” safety officer Matt Gillet told The Star.

It's unfortunate, he said, that it often takes a tragedy before a fire department tightens its safety policies and methods.

“Now,” Gillet said, “we absolutely make our people stay back.”

Empty hoses

You wouldn't think firefighters would enter a burning building without water to put the fire out. But it happens, sometimes with fatal results.

At least two dozen U.S. firefighters have died in the past two decades because they didn't have a hose with them while fighting a fire, *The Star* found.

A charged hose — one filled with water and ready to use — is necessary not only to fight flames inside a building, but also to buy time while firefighters search for possible occupants. A hose is also a lifeline that marks the way out of a smoke-filled building.

Related: A catastrophic fire in Charleston, and 'glaring similarities' later

Related: Here's what happens when the Fresno fire department forgets about Modesto's mistakes

Fatal Echoes: See the full project

But all too often firefighters run in without a hose, or carry one that's too short or doesn't have a water supply, reports show.

The national safety institute began focusing keenly on this problem with the Jan. 21, 1998, death of 24-year-old West Virginia firefighter Gregory Carter.

Carter was a member of the Fairlea Volunteer Fire Department, units of which arrived at the scene of a supermarket fire about 10:40 that morning. The building was emitting black smoke from the ventilation system in the rear of the building, but visibility was good in the grocery aisles.

A former store employee, Carter knew the layout and volunteered to go inside and help find the origin of the fire. Donning turnout gear and his air mask, Carter and the crew captain entered through the front door without a hose line.

Crouching beneath the growing smoke cloud, they felt their way to the back of the store, where Carter opened the door to a meat room and then turned to run.

“It’s too hot!” he hollered as he bumped into the captain. “We have to get out of here!”

Visibility was near zero. Without a hose line to help them find their way out, they radioed for help, but none came. Bumping into shopping carts, the captain finally saw a ray of light and made it to an exit unscathed. But Carter had run out of air and died of smoke and soot inhalation.

Less than three months later, the national agency issued a report with four recommendations. The biggest priority: “Ensure that fire fighters who enter hazardous areas...be equipped with life lines or a hose line.”

Yet firefighters kept dying for want of a hose line.

A New Jersey firefighter without a water supply was killed two years after Carter’s death.

In 2002, the lack of a charged hose line was a contributing factor when two St. Louis firefighters died.

In 2003, 25-year-old Oscar Armstrong III burned to death after he and two other Cincinnati firefighters entered a house without water in their hose. Within minutes, the fire flashed over, filling rooms with flames from floor to ceiling as the temperature approached 1,100 degrees.

Many other deaths followed in the ensuing decade, as did continuing warnings from the national safety agency to always have a working hose line when entering a burning building.

In 2011, lack of a hose line was cited as contributing to the death of a Baltimore County, Md., volunteer firefighter. Mark Falkenhan, 43, died after becoming trapped on the third floor of an apartment building when the oxygen-starved fire two floors below him suddenly raged out of control.

“We’re seeing line officers, company officers and chief officers who have limited hands-on firefighting experience”

— Tim Merinar, heads a federal investigation team

As in most firefighter fatalities at structure fires, no single factor was to blame. But the safety agency concluded that Falkenhan might have survived if a search crew on the second floor had had a hose to douse the flames before the fire raced up the stairwell and took his life.

Merinar was a member of the team that investigated that case, too.

Asked why he thinks firefighters continue to die in frustratingly similar ways year after year, he attributes part of it to training gaps.

Only half of the nation’s 30,000 fire departments have all personnel trained to fight structure fires, according to a recent survey.

At some small volunteer departments, firefighters may get no formal training at all. Even in departments with good training programs, firefighters don’t get as much practice as they once did.

“A lot of the smaller departments across the country don’t fight a lot of fires,” Merinar said. “Even though a firefighter may have X number of years of experience as a firefighter, he may have very limited actual structural firefighting. And then say that firefighter gets promoted up the ranks, throughout his career. We’re seeing line officers, company officers and chief officers who have limited hands-on firefighting experience.”

But sometimes, department policies are also at fault.

At the time Armstrong died, the Cincinnati department’s standard operating procedures did not require its firefighters to have a charged line with them when entering a house fire.

Poor decisions

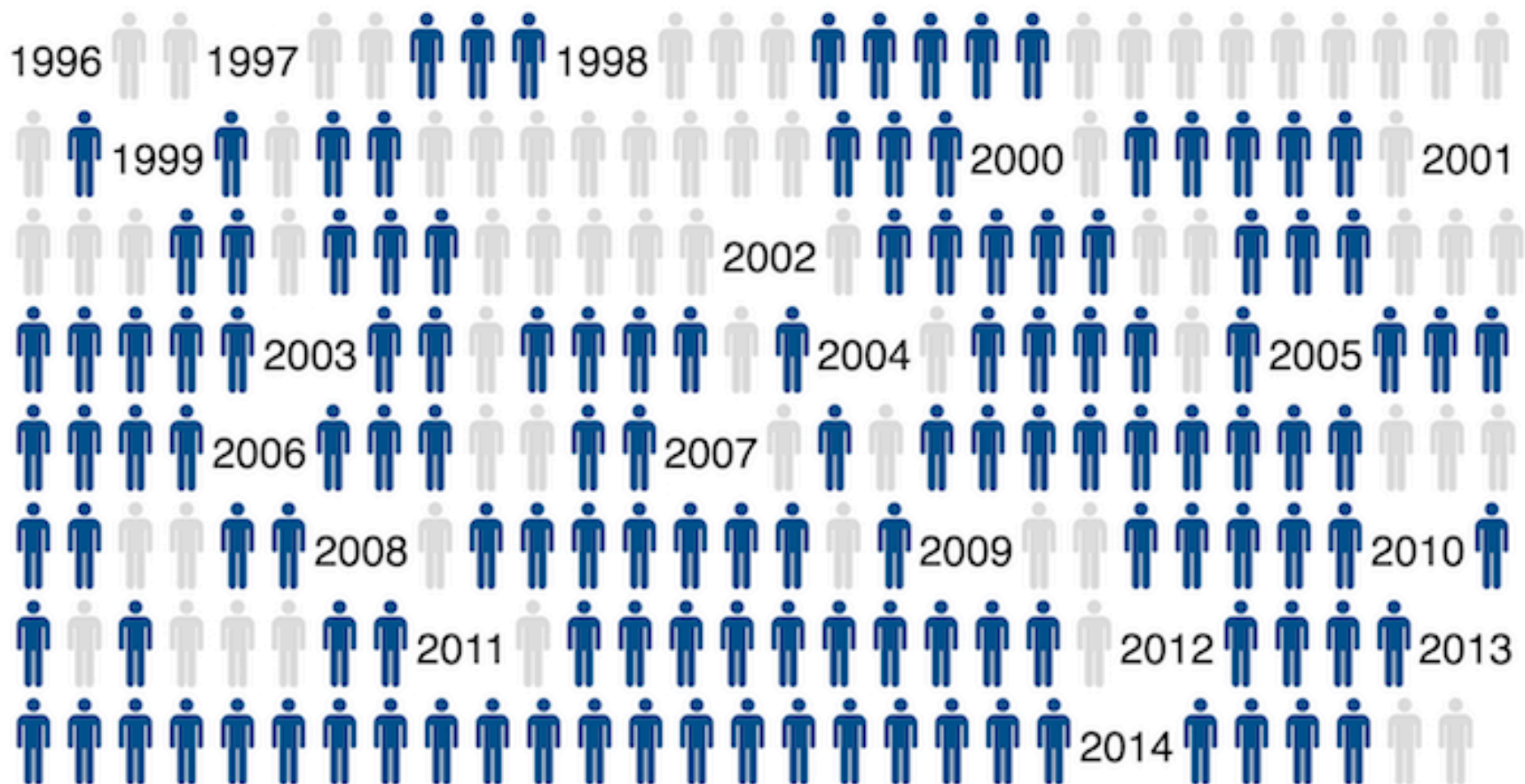
Whether it’s confusion, lack of experience or poor communication between commanders and fire crews inside blazing buildings, tactical errors show up repeatedly as contributing factors in the national safety institute’s line-of-duty death reports.

The Star reviewed all 128 reports the agency has published about structure fires where firefighters died from traumatic injuries — 201 fatalities in all — over the past 20 years.

In almost every case, investigators determined that the firefighters might have lived had wiser decisions been made at the fire scene.

Data: Many tragedies, same mistakes

The Kansas City Star reviewed every investigative report from the National Institute for Occupational Safety and Health for firefighter deaths from traumatic injuries at structure fires. The reports go back 20 years. See the data [here](#).



The Star’s analysis found that in 57 percent of the traumatic deaths at structure fires that the safety agency investigated, the reports cited commanders’ failure to properly size up a fire scene and consider the risks before committing to a plan of attack. Firefighters too often died because risks weren’t weighed against possible gains.

The Star’s analysis also showed that firefighters rarely lost their lives rescuing civilians trapped inside burning structures. They died after everyone had been evacuated and the building was past saving. Or they died searching for civilians who they mistakenly thought might be inside, the institute said.

Critics say the institute has “hindsight bias.” It’s easy to criticize actions on the fireground when one is not in the midst of all the danger and chaos, they say.

Partly for that reason, institute reports do not assess blame, and any criticism of a fire department’s actions is handed out with non-judgmental diplomacy. Even the names of the fire departments are withheld, although

the states they are in and the dates cited make it easy to identify them.

The reports are supposed to be teaching tools only. They lay out what happened and list contributing factors that led to deaths. The institute has no regulatory power to enforce its recommendations.

The Star's analysis of those reports showed that the most common contributing factors, cited in 70 percent of deaths, were tactical. In multiple reports, firefighters died inside structures, during offensive operations, when the safety agency said it would have been wiser to fight the fire defensively, from outside.

For instance, the investigation of a June 2006 house fire concluded that an Indiana fire department initially had too few firefighters on the scene — two instead of a recommended 14 — to risk sending anyone inside. A deputy chief fell through a floor and died of carbon monoxide poisoning before he could be rescued.

Less than a year later, inadequate staffing was cited in the death of a Pennsylvania firefighter, whose partner was seriously injured.

Nearly three dozen firefighters have died when crews failed to properly coordinate an interior fire attack with air flow. If timed correctly, ventilating a building by opening doors, breaking windows and cutting holes in the roof can improve visibility. Firefighters then find it easier to evacuate civilians and pinpoint the source of a fire because the smoke has a path of escape.

But too much air at the wrong time can be disastrous. For many years, firefighters thought that air flow had a cooling effect in a building fire, and the more air flowing, the better.

In fact, it has the opposite effect. Oxygen fuels the fire and can kill firefighters who are caught in the flow when a fire flashes over, reaching temperatures more than twice what their protective gear can withstand.

“The air flow just went up the stairs and toasted them,” Kevin Quinn, chairman of the National Volunteer Fire Council, said in recalling the deaths of two Washington, D.C., firefighters in 1999.

Firefighters were still dying under similar circumstances 15 years later, despite a growing body of research that has caused many in the fire service to rethink tactics. The safety institute cited uncontrolled ventilation as a contributing factor in the deaths of at least eight firefighters in the last few years.

Among them: Toledo, Ohio, firefighters Jamie Dickman, 31, and Stephen Machcinski, 42, killed in a flashover on Jan. 26, 2014.

Smoke was billowing from the roof of a two-story apartment building when fire crews arrived. Thinking the fire originated on the second floor, the commander ordered a ladder truck crew to cut a hole in the roof to let out the smoke, while Dickman and Machcinski climbed a ladder and got in through a second-story window.

But as it turned out, the fire was on the first floor, which meant Dickman and Machcinski were halfway between an oxygen-starved fire and multiple openings letting in the fresh air. Suddenly, the second floor filled with flames and intense heat, trapping the two men in a furnace as they turned to run for safety.

“Jamie was just six feet away from the window of getting out, but he just couldn’t go anymore,” his mother, Linda Dickman, told The Star.



Toledo, Ohio, firefighters rushed a fellow firefighter down the stairs of a six-unit apartment building on Jan. 26, 2014. The fire claimed the lives of firefighters Jamie Dickman, 31, and Stephen Machcinski, 42. Uncontrolled ventilation was a contributing factor in their deaths, a federal safety institute concluded, as it was in at least six other firefighter fatalities in the last few years. | **AP Photo/Jetta Fraser**

“I always called him momma’s little fireman.”

Investigators said the deaths might have been avoided had the commander on the scene taken more time to determine the source of the fire before ordering men inside.

The two firefighters died in a building that was unoccupied at the time.

To the institute’s critics, who contend that firefighters have an obligation to search for possible occupants even when there is little chance anyone inside might still be alive, the institute has a boilerplate answer:

“Many fire fighters stand by the notion that all incidents are ‘people’ events until proven otherwise,” it said in more than one report. “Historically, the fire service has a poor history of changing risk-taking based upon the people/property issue.”

Indeed, out of the 201 fatalities reviewed, fewer than a dozen firefighters died while attempting to rescue civilians trapped inside a structure. In each of those cases, the civilians were either already dead or perished with the firefighters during the rescue attempt.

“It’s a risk/reward relationship,” said Alan Brunacini, a retired chief of the Phoenix Fire Department, who is one of the leading experts in firefighter safety. “The building is probably doomed, and it was 30 minutes ago. Anybody who was in the building died before the door went up in the fire station. Now what we’re going to do is we’re going to commit suicide operating at it? That doesn’t make any sense.”

Other researchers discovered patterns similar to what The Star identified in the safety agency’s reports.

A University of Georgia study published in 2011 looked at overall line-of-duty deaths from 2004 to 2009 and identified four basic factors leading to tragic consequences: too few firefighters for the task at hand, lack of preparation, training gaps and command failures.

Need for change

For more than a decade, the National Fallen Firefighters Foundation has been urging fire departments to focus on reducing deaths and injuries.

In 2004, it launched 16 lifesaving initiatives and set what seemed like an achievable goal: Cut the number of line-of-duty deaths in half within a decade.

But the foundation's goal hasn't been met and the Federal Emergency Management Agency said in a 2015 report that "the rate of on-duty firefighter death and injury has remained relatively unchanged in the past four decades."

"There's the mindset still to this day," said blogger and retired battalion chief Robert Avsec, "that it's a dangerous job and you're going to get hurt and there's just nothing you can do about it."

"I'm sorry, but I don't subscribe to that."

Bill Metcalf doesn't, either.

During his year as president of the International Association of Fire Chiefs, Metcalf was determined to keep firefighter safety front and center.

"One of the things you get to do is you get the bully pulpit," he said one morning as he and his wife visited the National Fallen Firefighters Memorial in Emmitsburg, Md.

From his pulpit, Metcalf urged fire departments to take a hard look at how they do business and pay more attention to safety.

The consequences were too great to do otherwise, he said, and there was ample proof of that in the headlines to back him up when he took office midway through 2013.

It was one of the fire service's deadliest years in the past decade. Among the 99 firefighters who died on the job in 2013 were 10 who perished when a fertilizer plant exploded in West, Texas, and 19 wilderness firefighters killed near Yarnell, Ariz.

"We know what kills firefighters in fires," Metcalf said. "And we know how to prevent it. But yet we keep having firefighters die."

Metcalf says line-of-duty death rates are higher in the United States than in most other developed countries, in part because of the risk-taking culture in some departments.

Changing that culture won't be easy, which is why he's open to the government stepping in with a firmer hand.

“I think that at some point that's probably what it's going to take to get people to pay attention,” he said. “Because I think we as a fire service, in many ways we've shown that we are not able or not willing to fix it ourselves.”

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ABOUT THIS SERIES

The Star set out to examine how and why U.S. firefighters die on the job after Kansas City firefighters John Mesh and Larry Leggio were killed in October 2015.

Reporters Mike Hendricks and Matt Campbell interviewed scores of experts on fire behavior and firefighter safety. Hendricks and photographer/videographer Joe Ledford visited Texas, Georgia, New York, Maryland and Washington, D.C., to speak with firefighters and survivors, visit the National Fire Fighters Memorial and observe a federal rule-writing committee in action.

The reporters analyzed hundreds of federal and state fatality investigative reports, five years' worth of federal workplace safety inspection records and reams of meeting transcripts of an advisory board that recently proposed the first new federal safety regulations governing the fire service in decades.

HOW MUCH TRAINING AT AREA DEPARTMENTS?

There are no mandatory nationwide training requirements to be a firefighter.

Neither Missouri nor Kansas has state-required minimum training levels for firefighters, career or volunteer. They also do not require annual refresher training.

Missouri does offer a voluntary certification program, but local jurisdictions are allowed to set their own standards.

Most area departments require basic Firefighter I and Firefighter II training, based on National Fire Protection Association standards, and have ongoing training programs.

The Overland Park Fire Department requires two hours of ongoing training a day, which can include classroom time or equipment checks at the fire station.

The department also reviews fire responses to incidents and conducts more extensive critiques, with video, for more serious events. The department requires firefighters to have an annual physical. And reports of firefighter deaths nationally are distributed throughout the department.

Deputy Chief Mike Casey said the department embraces new advances in firefighting theory.

In Olathe, firefighters averaged 160 hours of ongoing training in 2015. “Near miss” reports about firefighter risks from the International Association of Fire Chiefs are reviewed monthly.

The Independence Fire Department has a weekly training program and firefighters average 100 to 120 hours a year. A safety committee of labor and management reviews emerging issues in the fire service.

Neither the Kansas City nor the Kansas City, Kan., fire departments responded to a Star request for training information.

Matt Campbell, The Star