NIOSH FIRE FIGHTER FATALITY INVESTIGATION AND PREVENTION PROGRAM

SERIOUS INJURY REPORT

Volunteer firefighter seriously injured after fall from aerial platform during vertical ventilation operations – Wyoming

F2026-09 WY · November 2026

KEY POINTS

- On May 25, 2026, one volunteer firefighter was seriously injured after falling from an aerial platform while performing vertical ventilation operations.
- Fire departments should equip firefighters with means to work at heights while maintaining their safety.
- Professional development plans can be established to enable firefighters to overcome experience and knowledge gaps.
- Activating the fire department as early as possible after fire detection may reduce damage and loss.



Image 1. View of Side Alpha of the structure once the fire had breached the roof from the Side Alpha/Delta corner. (Source: Fire department)

SUMMARY

When the Truck 16 (TK16) crew arrived on scene, they were tasked with vertical ventilation of the Side Delta portion of the structure. They positioned the aerial platform and successfully completed the first ventilation hole near the peak of the roof. The platform was repositioned between two dormers on Side Delta near Side Alpha. A firefighter working within the platform unhooked his safety tether from the platform and moved to the roof to complete the next vertical ventilation cut. When he stepped onto the steep roof, he lost his footing. He slipped from one dormer to the other, then to the ground approximately 20 ft below. A Mayday was declared from both the aerial turntable and the platform. The firefighter sustained fractures to the lower leg and heel and was transported for treatment. *See Table 1 for contributing factors and prevention actions.*

Table 1. Contributing factors and prevention actions

Contributing factor	Prevention action summary
1. Fall from aerial platform during vertical ventilation operations	Ensure firefighters use and properly maintain fall prevention devices when working from an elevated aerial platform.
2. Initial scene size-up and risk assessment	Ensure the first arriving resource completes an initial scene size-up and risk assessment to inform a risk-benefit analysis before committing firefighters to vertical ventilation.
3. Training and evaluation for rank and skill	Develop and implement a professional development program that includes routine evaluation based on rank and skill for all combination fire department personnel.
4. Department culture and risk management	Promote a department culture that balances the life safety mission with proactive risk management.
5. Standard operating procedures/guidelines (SOPs/SOGs)	Train firefighters on and routinely review SOPs/SOGs.
6. Delayed activation of fire department response	Consider requiring property owners to use and maintain monitored detection systems in all commercial occupancies, regardless of when they were constructed.

BACKGROUND

Table 2. Fire department information

Category	Information
Department type	Combination
Divisions	Fire prevention, operations, and training
Jurisdiction	4,200 square miles
Population	22,473 residents with 25,000 average daily visitors
Average response	2,300 calls for service annually
EMS	Advanced life support
Personnel	30 career and 75 volunteer firefighters
Shifts	Three (A, B, and C)
Shift type	56-hour work week (24-day cycle)

Category	Information
Shift staffing	7 minimum, budgeted for 9
Leadership	One fire chief, two deputy chiefs, and three battalion chiefs

Apparatus, staffing, and communications

At 03:02, units were dispatched for a possible gas leak. The incident was subsequently upgraded to a commercial structure fire. Table 3 lists responding units and their recorded arrival times:

Table 3. Responding units and arrival times

Apparatus	Staffing	On-scene arrival
Engine 61 (E61)	2	03:12 (to originally dispatched location)
Medic 60 (M60)	1	03:12 (to originally dispatched location)
Engine 21 (E21)	3	03:21
Battalion Chief 6 (BC6)	1	03:21
Engine 11 (E11)	4	03:34
Medic 10 (M10)	1	03:34
Mutual Aid Engine 59 (E59)	2	03:39
Tender 67 (T67)	2	03:40
Truck 16 (TK16)	6	03:43
Mutual Aid Truck 56 (TK56)	2	03:45
Engine 71 (E71)	4	03:54
Engine 31 (E31)	1	03:58
Medic 20 (M20)	1	04:00
Rescue 34 (R34)	2	04:18
Tender 37 (T37)	1	04:28
Battalion Chief 3 (BC3)	1	04:40
Engine 41 (E41)	2	04:41

The countywide combination department staffs multiple ambulances and engines that are usually dispatched first to incidents in their first- and second-due response areas. The county operates a public safety answering point (PSAP) that dispatches all emergency and non-emergency fire, emergency medical services (EMS), and law enforcement response calls.

Training, education, and professional development

The fire department provides initial recruit training for volunteer firefighters through an in-house firefighter academy. This training meets the minimum requirements set forth by the Wyoming State Fire Marshal. The curriculum is taught to the NFPA 1001 [2019] job performance requirements.

BC6 (incident commander) had 17 years of total fire service experience at the fire department. He was certified as Pro Board® Hazardous Materials Operations, Firefighter 2, Fire Officer 2, and Wyoming State Fire Instructor 1. TK16FF4 (seriously injured) had 3 years of structural firefighting experience, with an additional 2 years of wildland firefighting experience. He was certified as Pro Board® Hazardous Materials Operations and Firefighter 1.

Cause of serious injury

TK16FF4 sustained fractures of both bones in his left lower leg and a heel fracture. He was treated at the local hospital, and the fractures were repaired surgically.



Image 2. View of Side Bravo of the incident building showing the identical design of Side Delta. (Source: Fire department)

Building construction

This incident involved a Type V wood-frame commercial structure built in 1991. It had two stories above a partially subterranean parking garage of Type I construction. The Type V upper levels were composed of dimensional lumber joists and framing. The building was 9,600 square feet and the parking garage was 4,300 square feet. The structure was separated internally to house a total of five business tenants. The roof of the building was constructed as a ventilated or cold roof which incorporated open void spaces within the roof assembly of the building. The roof was constructed with various pitch angles between the main roof and the dormers and the roof surface was covered with cedar shake shingles. The building was built before the authority having jurisdiction required a fire suppression system or a monitored detection system. *More about ventilated and cold roof construction can be found under More Information.*

Occupancy status

The building in this incident was subdivided internally into multiple businesses. The building was unoccupied at the time of dispatch.

Fire cause and origin

The Wyoming State Fire Marshal investigated the incident and determined the area of origin was between the first and second floors in the Side Alpha/Delta corner.

Personal protective equipment

At the time of the incident, TK16FF4 was wearing full structural firefighting turnout gear, integrated truck belt harness, and a NIOSH Approved® self-contained breathing apparatus (SCBA). The tether had been disconnected from the aerial platform before TK16FF4 stepped onto the roof. No evidence of a defect or malfunction in the structural firefighting turnout gear, harness, or SCBA was identified.

Weather conditions

At 02:56 on May 25, 2026, the outdoor temperature was 42°F, dew point 36°F, the wind was from the north at 6 mph, there was no precipitation, and conditions were fair [Weather Underground 2026].

TIMELINE

This is a timeline of events. Sources include dispatch records, audio recordings, and witness statements, among others. This is not an official record of events.

Day 1: May 25, 2026

03:01 – 03:11

- The PSAP received the first 911 call for a gas leak. The caller described it as “a big cloud of gas that smells like propane.”
- E61, M60, BC6, and E21 were dispatched.
- E61, M60, and BC6 were enroute.

03:12

- E61 and M60 arrived on scene. BC6 requested a sheriff unit to respond to the location.
- E61 provided the following size-up: “We have a haze and smoke smell in the area. We have not pinpointed the location; we will be investigating.”

03:14 – 03:18

- E21 was enroute.

03:19

- E61 discovered the incident building (at a different address from the one dispatched) and updated, “seeing waterflow, appears to be the origin of smoke.”
- First alarm companies repositioned to the correct building and prepared for fire attack.

03:20

- A sheriff’s unit updated, “smoke coming out of the roofline, multi.”
- E61 updated, “waterflow and flames.”

03:21

- BC6 and E21 arrived at the incident building.
- BC6 requested the incident be upgraded to a structure fire.

- E11, TK16, T17, T27, T37, T67, and T77 were dispatched.
- E61 made entry for fire attack on Division 1 through Side Alpha with a 1 ¾-inch hoseline.

03:22

- BC6 established command and provided a size-up of the building, “3-story commercial occupancy, structure fire, command on Fire 1, BC6 with command.”
- E21 was assigned to stretch a 1 ¾-inch hoseline to Division 2 on Side Delta.

03:23

- E11 and M10 were enroute.
- Command requested that mutual aid be dispatched.

03:25

- Command requested, “dispatch every engine in the county.”
- Command requested an update on E11’s location.
- E12 and E71 were dispatched.

03:26 – 03:28

- E61 interior requested the pressure be increased on attack line 1.
- E31 was dispatched.
- E61 operator copied the request from E61 interior.

03:29

- E61 interior requested a second increase in pressure on attack line 1.

03:32

- TK16 was enroute.

03:33

- PSAP updated Command that they were 20 minutes into the incident.
- Mutual aid company updated Command they were responding with a truck and “possibly an engine.”
- Command requested a conditions, actions, needs (CAN) report from E61 interior.

03:34

- Command ordered E11 to tie in with E61 in Division 1, updated that Command was near the sheriff's office vehicles.

- M10 and E11 arrived.

03:35 – 03:45

- TK56 was enroute.
- TK16 updated Command they were five minutes out. Command gave them orders to position on Side Delta and advised them that a hydrant was available.
- Mutual Aid E59 arrived on scene.
- T67 and E31 were enroute.
- T67 arrived on scene and requested orders.
- Command ordered T67 to stage near M10 and report to Command for a face-to-face.
- E71 was enroute.
- PSAP contacted the utility company to shut off service. Utility company was to call back with a time estimate.
- E21 updated Command they were making entry to Side Charlie Division 2.
- E11 updated, “smoke pushing pretty bad on the back side.”
- TK16 arrived on scene.
- Command copied E21 making entry on back side.
- Command requested PSAP discontinue the incident timer.
- Mutual aid TK56 arrived on scene.

03:46

- E21 updated from Division 2 Side Charlie, “Floor is very spongy on entry, approximately 10 ft in. We pulled out and have active fire on the outside.”

03:47

- E11 provided a CAN report, “Division 1 finding active fire where E61 was operating, every piece of ceiling we pull we are finding fire inside.”

03:52 – 03:54

- E11 in the Side Alpha/Delta corner requested what building orientation Command was using.
- M20 was enroute.
- E71 arrived and was ordered to report to the main parking lot for a face-to-face with Command. E71 was then assigned as the rapid intervention team (RIT) and staged on Side Delta.

03:56

- TK16 called Command and advised they were breaking the Division 2 window on Side Delta.
- TK16 was operating with two personnel in the platform (TK16FF4 and TK16 Lieutenant) and an additional firefighter was in and out of the platform retrieving equipment as needed from the ground. At this point in the incident, there were three personnel in the platform.
- Command asked if TK16 had water if needed and repeated the update.

03:57

- Command updated E11 that crews planned to ventilate above them.
- E11 updated they were still pulling ceiling on Division 1 and not making progress.
- R34 was enroute.

03:58

- E31 arrived on scene.

03:59

- Command ordered E31 to “stage and report to Command for a face-to-face.”
- TK16 attempted to move to perform vertical ventilation from Side Delta at the peak of the roof.
- Command reported to E11 that “TK16 is flowing heavy water in Division 2, caution.”
- E11 copied and said they were backing out through the Side Alpha door.
- Command requested someone from E11 outside to conduct a face-to-face.
- TK16 officer asked for water to be shut down to the tip so they could access the roof.

04:00

- Utility company updated they would arrive in approximately 25 minutes.
- TK16 had taken a saw to the roof with them initially, but it would not start.
- E41 was enroute.
- M20 arrived on scene.

04:01 – 04:10

- TK16 requested Command to get someone to bring a chainsaw to the roof. The second saw brought to the roof also did not start.
- M70 staged to cover the town while all other units worked the fire.
- TK16 requested a chainsaw to the roof for a second time.

- T37 enroute.

04:11

- TK16 requested a running chainsaw to the roof. This was the third saw taken to the platform. This chainsaw started and ran.
- TK56 asked if Command wanted a vent hole in the Side Charlie/Delta section of the roof.
- TK16 asked TK56 what their plan was.

04:15

- E11 updated Command “Division 1 all clear, primary search, no fire, it’s all above us.”

04:17

- E11 updated Command, “Out of the building.” They then advised Command there was a floor collapse down to Division 1.
- TK16 to Command, “Your hole is cut.” This hole was the first ventilation hole near the peak of the roof on Side Delta.



Image 4. TK16 personnel operating on the ladder after venting the peak of the Side Delta portion of the building. (Source: Fire department)

04:18

- Command asked PSAP to resume the incident clock. PSAP advised they were 50 minutes into the incident

now.

- R34 arrived on scene.

04:19

- Command updated, “Division 2 floor collapse, no more units inside of the building. E21 from Command, can I get a personnel accountability report (PAR)?”
- TK16 relocated the platform to make an additional ventilation hole between the two dormers located on Side Delta near Side Alpha. TK16 crew members in the platform prepared to ventilate the roof between the dormers to expose fire in the roof system.

04:20 – 04:21

- TK16 called Command to update that they were going to make another ventilation hole. TK16FF4 then unclipped his truck belt tether from the platform attachment point and stepped out onto the roof. TK16FF4 lost his footing on the middle dormer, slid toward the dormer closest to Side Alpha, then fell between the dormers. He slid down the main part of the roof and landed feet first on a concrete sidewalk below. The total fall distance was approximately 20 ft.

04:22

- Mayday declared by TK16 and copied by Command. Command ordered all units on scene to move communications to Fire 2.



Image 5. TK16FF4 fell from between the two dormers shown in the photo onto a concrete sidewalk. He landed near the staged RIT, whose members immediately provided care. (Source: Fire department)

04:23

- BC6 transferred Command to Lieutenant 1 (LT1). BC6 handled the Mayday.

04:24

- TK16 declared a Mayday again.

04:25

- BC6 requested PSAP message all off-duty chiefs and request they respond.
- BC3 was enroute.

04:26

- BC6 cleared the Mayday and reassumed Command. All operations were back to Fire 1.

04:27

- Utility company was on scene and completed termination of utilities.

04:28

- T37 on scene.
- PSAP advised Command they were 60 minutes into the incident.

04:29

- PSAP advised a voicemail was left for BC1 and BC2.

04:31

- TK16 called TK56, “We’re going to start blowing water here in a minute.”

04:32

- M20 transported TK16FF4 with a leg injury.

04:35

- Command updated that operations were defensive with heavy fire showing through the roof.
- Command requested TK16 to direct water on the fire through the roof.

04:39 – 04:46

- PSAP advised Command they were 70 minutes into the incident.
- Command updated all units they would be conducting a PAR in two minutes.

04:48 – 06:30

- M20 arrived at the hospital with TK16FF4.
- Defensive operations continued throughout this period with the roof of the structure subsequently collapsing.
- Command began demobilizing the incident scene and returning units to quarters.

06:31 – 19:28

- Command was transferred to BC3 during this period.
- Relief crews were requested for TK16.
- Command was terminated for the incident.

CONTRIBUTING FACTORS AND PREVENTION ACTIONS



Contributing factor · Fall from aerial platform during vertical ventilation operations
Prevention action · Fire departments should ensure firefighters use and properly maintain fall prevention devices when working from an elevated aerial platform.

In this incident, TK16FF4 had an integrated truck belt attached to the pants of his turnout gear. While working to perform ventilation, the crew of TK16 maneuvered the platform between the dormer windows of the roof on Side Delta, closest to Side Alpha. TK16FF4 was under the impression that he was to step out of the platform onto the roof to use a chainsaw to ventilate the roof. He unclipped his truck belt harness from the tie-off point inside the platform of TK16 to step onto the roof. When he stepped out of the platform, he was unable to maintain his footing. TK16FF4 then slipped from one dormer onto the other. He slid through the gaps between the dormers, off the roof, and to the ground where he landed feet-first on concrete.

NFPA 1550 [2024] sets forth requirements for personnel operating from the platform of aerial apparatus. These requirements include:

- Each person ascending or descending the ladder on an aerial apparatus shall do the following:
    - Use a ladder belt and tether that meets the requirements of NFPA 2500 [2022].
    - Use the three points of contact climbing method – one hand and two feet or two hands and one foot in contact at all times.
    - At high ladder angles, ascend or descend by grasping the rungs and not the handrails.
- Each aerial apparatus shall carry correctly sized ladder belts and tethers to accommodate all members authorized to climb the ladder or ride in the platform of the apparatus.
- People working on a ladder shall be anchored to a structural feature of the ladder or platform when one of the following occurs:
    - The device is in motion.
    - They are not actively entering or exiting the platform.
    - They are not actively climbing or descending the ladder.

Noting that TK16FF4 was actively working to exit the platform of the aerial, he was not required to be tied in. However, this was determined to be a lack of clarity in the communication of operational objectives between personnel in the platform on the tactics to be employed to complete the vertical ventilation tasks. Clear communication of the tactical plan should take place between all personnel assigned to the task prior to action

taking place. Once the tactical plan is communicated, all personnel should work together to accomplish the task.

If the safety equipment is not sufficient to keep personnel safe while performing a task, additional equipment such as longer fall protection tethers may be employed [Brown 2023], or changes to the tactical plan should be considered. In this incident, performing vertical ventilation cuts from the platform while the harness was secured to appropriate tie-off points may have alleviated the need to step from the bucket to the roof. While maneuvering the platform around to accomplish the task may have required more time, personnel had already identified that there were no civilian life safety concerns within the structure.



Contributing factor · Initial scene size-up and risk assessment
Prevention action · Fire departments should ensure the first arriving resource completes an initial scene size-up and risk assessment to inform a risk-benefit analysis before committing firefighters to vertical ventilation.

In this incident, the PSAP dispatched the fire department to an odor of gas call at a large commercial building used as a golf course clubhouse. The initial assignment arrived at the dispatched location with nothing apparent on arrival. The initial companies began an investigation of the property and discovered the source was an adjacent commercial building. All first alarm companies repositioned around the identified incident building and began suppression operations. TK16 arrived and was assigned vertical ventilation on Side Delta, nearest Side Alpha. Many buildings in this county have access issues due to building size and topography, making apparatus access and size-up completion difficult in some instances. The 360 size-up and risk assessment are essential to determine the possible survivability of occupants, fire dynamics, and firefighter safety information [NFPA 1700 2026].

Some of the information gathered during the size-up can include fire department resources, life hazard, fire behavior, time of day, building construction, occupancy, and building condition [NIOSH 2025a; NIOSH 2026a; NFPA 1700 2026]. Personnel should also consider fire size and location, length of time the fire has been burning, fuel load (including hazardous materials), exposures, and weather conditions. The incident building itself can alter whether an offensive or defensive fire attack is warranted. This includes building size, construction type, age, condition (evidence of deterioration, weathering, etc.), evidence of renovations, roof loads (HVAC equipment, ventilation ductwork, utility entrances, etc.), and available pre-plan information [NIOSH 2008; NIOSH 2026a; NFPA 1700 2026]. Risk-benefit analyses use hazard identification and information gathered during the size-up to weigh potential risks compared to potential benefits. Incident commanders should collect current, accurate, and relevant information for a risk-benefit analysis to inform effective initial and ongoing actions [NIOSH 2026a; NFPA 1700 2026]. NFPA 1550 [2024] states the incident commander should determine the life safety profiles of the incident and level of risk consistent with the established principles. Risk management should follow these principles [NFPA 1550 2024]:

- Limit activities that present a significant risk to the safety of members in situations where there is potential to save endangered lives.
- Recognize activities that are routinely employed to protect property as risks to the safety of members. Limit, reduce, or avoid these risks when possible.
- No risk that threatens the safety of members is acceptable when there is no possibility to save lives or property.
- In situations where risk to fire department members is excessive, limit all activities to defensive operations.

Consistent and continuous communication supports effective risk management. It allows the incident commander and all personnel operating at an incident to be aware of changing conditions and adjust the incident action plan accordingly. The 360 assessment is an important piece of the size-up process and assists

by completing the risk assessment picture for the incident commander. The International Association of Fire Chiefs' *Rules of Engagement for Structural Firefighting* recommends that the first rule for incident commanders is to rapidly conduct or obtain a 360 size-up of the incident [NIOSH 2026a]. Many incidents may contain obstacles that prevent viewing all sides of a structure. Obstacles occur most often at incidents with large geographical areas. In large structures with access all the way around the building, the 360 size-up may be accomplished on arrival by driving around the structure. Additionally, the incident commander should use tactical-level management to inform their scene size-up and risk-benefit analysis. This strategy can be supported by establishing divisions or groups to direct operations in specific geographic areas or manage incident functions [NIOSH 2026a; NIOSH 2025a; IFSTA 2015].



Contributing factor · Training and evaluation for rank and skill
Prevention action · Fire departments should develop and implement a professional development program that includes routine evaluation based on rank and skill for all combination fire department personnel.

The department in this incident uses a task book that has been developed to guide personnel new to the department to become fully qualified members. The components of the task book center primarily around the requirements for Firefighter 1 certification with additional information specific to the department. However, each station within the department also houses at least one specialty apparatus, such as an aerial, tanker or tender, wildland apparatus, or rescue truck. These specialty pieces require no additional training or certification beyond the original membership task book. The department has previously hosted a monthly "truck day" where the ladder company skills are supposed to be reviewed and practiced, though it does not occur at regularly scheduled intervals. This inconsistency has led to training disparity between members of the career and volunteer staff as well as between members with more tenure versus newer personnel. During interviews with the NIOSH investigator, some personnel expressed a realization that cutting ventilation holes from the platform of the aerial was not something they had the opportunity to train on. All the training scenarios they utilized up to this incident revolved around working on the actual roof decking or a ladder placed on the roof decking and not from the platform itself.

Training protocols should be developed for rank and skill level in combination fire departments, regardless of career or volunteer status. The routine, ongoing dissemination of an education, training, and professional development program can aid in the prevention of injuries and fatalities in the fire service. It will ensure the introduction of the necessary knowledge, skills, and abilities to members who are new in their position as well as ongoing development of existing skills. Department-provided training should incorporate both technical skills and hands-on completion, while also addressing academic knowledge and the understanding of why things are happening. Combination fire departments can train career and volunteer firefighters together to facilitate communication and a greater understanding of the skills of each firefighter [NIOSH 2025b].

Designing a professional development program requires department leadership to be forward thinking and identify both the everyday tasks performed within the department, as well as the more infrequent but often higher risk tasks that may be encountered. This forward and future planning can be challenging for an all hazards department such as in this incident. This challenge is amplified when inclusion of both full-time career personnel as well as volunteers are critical to successfully supporting the combination department model. Department leadership should periodically evaluate their professional development plan and consistently increase the minimum competency levels for all personnel. Examples include developing additional sub-ranks within the major ranks of the department, and adding required minimum training, certification, and competency levels relative to qualifications for the various ranks. A professional development program could also include consistent interval testing of the core competencies of each level to ensure the identified minimums are maintained.



Contributing factor · Department culture and risk management
Prevention action · Fire departments should promote a department culture that balances the life safety mission with proactive risk management.

In this incident, the county is known to have unique and challenging housing circumstances. This includes the potential occupancy of a commercial building as a living quarters even when not permitted for such use. The incident commander quickly addressed the potential of a civilian life safety concern and a primary search of Division 1 was undertaken as were attempts to locate the fire. Engine companies operated in Division 1 and began locating fire in every stud and joist bay they opened on the Side Delta half of the building. The engine company that entered Division 2 reported a spongy soft floor approximately 10 ft inside the Side Charlie door and immediately backed out. Division 2, in the area the engine company had just retreated from, then partially collapsed into Division 1. This situation provided indication that the fire had been burning unnoticed for a while prior to the initial PSAP call. Taking the information gathered during continuous size-ups and applying it to the incident action plan and risk assessment allows incident commanders to maximize the safety potential of operating personnel.

An organization's culture is a composite of the shared values, beliefs, norms, and behaviors that shape communications and decisions [Zohar 1980]. Both formal practices and informal traditions contribute to a department's culture over time, influencing individual and group behavior at various levels of the organization [NIOSH 2020; Detert et al. 2000]. Broadly, fire departments tend to operate based on the bounds set by their respective SOPs or SOGs (i.e., formal practices). However, each individual firehouse and its separate shifts can have its own culture that deviates from the overall department policy. These differing values, perceptions, and norms may influence decision-making and how certain tasks are performed such as forcing doors, conducting a search, or pushing a hallway [NIOSH 2026b].

A department can support a tactically aggressive approach in which actions are efficient, intelligent, purposeful, and reflective, with risks justified by current incident conditions [Norris 2024]. Whether the response is offensive or defensive in nature relies on the conditions met on arrival [NIOSH 2026b]. *More about department culture and risk management can be found under More Information.*



Contributing factor · SOPs/SOGs
Prevention action · Fire departments should train firefighters on and routinely review SOPs/SOGs.

The department provided their risk assessment and decision-making SOP to NIOSH during the investigation. Within this SOP, the incident commander is tasked with conducting a risk-benefit analysis based on standard incident priorities in this order: life, incident stabilization, then property and environment conservation. The fire was determined to be in the floor assembly between Divisions 1 and 2 when TK16 arrived and was assigned vertical ventilation. Conditions in the structure inside Division 1 were clear with fire in the void spaces between the floor joists and stud bays. The roof structure of this building incorporates voids into the design for temperature and ice dam control. This allowed the fire to grow within the structure without visibility deteriorating as quickly as if the fire were inside a room or common area. The decision-making flow chart within the departmental SOP provides clear pathways on how the fire should be attacked and warns of potential collapse based on the incident conditions.

In the fire service, SOPs/SOGs exist to give personnel a basis to make split second decisions effectively and safely. If these are constructed well and in a manner that reflects how operations are typically completed, personnel may not deviate from the written guidelines or policies. SOPs/SOGs allow fire departments to approach operational risk management in a standard manner that will include a full range of safety considerations [USFA 2018]. Incorporating SOPs/SOGs in all facets of operations and training allows personnel to execute safety considerations as part of the IAP [NIOSH 2025c].

NFPA 1550, *Standard for Emergency Responder Health and* Safety, Chapter 6 [2024] outlines that fire departments should prepare and maintain written policies and SOPs that document the organization structure, membership, roles and responsibilities, expected functions, emergency operations, and training requirements. This includes:

- The types of standard evolutions that are expected to be performed.
- The evolutions that must be performed simultaneously or in sequence for different types of situations.
- The minimum number of members required to perform each function or evolution.
- The number and types of apparatus and personnel that will be dispatched to different types of incidents in accordance with NFPA 1750 [2026].

The standard also states these SOPs/SOGs should specify the procedures that will be employed to initiate and manage operations at the scene of an emergency incident and post-incident control and mitigation of emergency scene contaminants [NFPA 1550 2024; NIOSH 2025c; NIOSH 2025d]. NFPA 1550 also states that fire departments should evaluate current trends and research annually or following a near miss or catastrophic event to determine if policies and procedures are appropriate [NFPA 1550 2024; NIOSH 2025d]. In this incident, department SOGs had many segments that had not been reviewed for several years prior to this incident.



Contributing factor · Delayed activation of fire department response
Prevention action · Governing municipalities (federal, state, regional/county, and local) should consider requiring property owners to use and maintain monitored detection systems in all commercial occupancies, regardless of when they were constructed.

The authority having jurisdiction in this incident adopted an ordinance validating the use of a variety of the 2024 International Code Council codes with specific appendices and amendments. The codes adopted by county council in 2025 include the 2024 International Building Code, the 2024 International Residential Code, the 2024 International Plumbing Code, the 2024 International Mechanical Code, the 2024 International Fuel Gas Code, the 2024 International Energy Conservation Code, the 2024 International Existing Building Code, and the 2024 International Property Maintenance Code. Additionally, in 2024 the county council adopted the 2024 International Fire Code (IFC) with specific amendments and appendices.

Industry's best practices frequently state that faster activation of fire department resources may lead to better outcomes and less damage due to fire. The Wyoming adoption of the IFC [2024] states that an approved fire alarm system shall be installed in existing buildings and structures in accordance with Sections 1103.7.1 through 1103.7.6 and provide occupant notification in accordance with Section 907.5 unless other requirements are provided by other sections of this code. The structure in this incident was a commercial building with multiple tenants above a partially underground parking area which also housed the utilities. This classifies the building as a Group B Occupancy. While the IFC does not require monitored detection systems in Group B Occupancies, municipalities can draft and adopt ordinances to require NFPA 72 [2025] compliant alarm systems. NFPA 72 requires that alarm signals reach a supervising station within 90 seconds and be immediately retransmitted to the communications center. This adoption may further be expanded by creating an amendment to the IFC to require alarm systems in any building undergoing construction or remodeling with a requirement for acceptance testing by the authority having jurisdiction appointed fire marshal.

When alarm systems activate emergency responders, even for false alarms, authorities having jurisdiction should ensure an immediate response to handle the signaled alarm. This is critical in instances of fire with people trapped to allow personnel to affect a rescue and give occupants the best chances of survival from a fire. Based on USFA nonresidential fire estimate summaries spanning 2014-2023, there were an estimated 110,000 fires resulting in 130 deaths and 1,200 injuries [USFA 2025]. This resulted in losses of $3,164,400,000. Over these years, there were trend increases in fires, deaths, and dollar loss. Authorities

having jurisdiction have a duty to protect their residents and requiring automatic detection systems may provide residents and visitors with the best chance for survival in a fire situation.

FIRE DEPARTMENT ACTIONS TO ECHO

Actions to echo are measures the fire department took before and during the incident that may have prevented further serious injuries or fatalities or may help prevent similar incidents. NIOSH investigators identified the following actions to echo:

Plan the apparatus placement.

The incident commander ensured appropriate areas were left for both truck companies dispatched to the scene to have a maximally effective scrub area. This required clear communication from the incident commander to incoming units to ensure the truck companies could position with adequate space to operate for both vertical ventilation and elevated master stream operations.

Request additional resources early.

The incident commander requested mutual aid company response early into the incident once it was determined to be a working fire. Requesting additional resources allows them to begin responding sooner, reducing the arrival time. In cases where the incident is mitigated quickly or is less severe than originally thought, unneeded companies can be canceled or returned to service.

Dedicate a staged RIT company.

The incident commander ensured the RIT company was staged and ready to deploy if necessary. This is a task that is not always accomplished by departments. It ensures there is a company prepared to deploy in the case of a Mayday which is critical to provide fresh resources to aid a firefighter in distress.

CONSIDER THIS

Although there is no evidence that the following actions would have prevented this injury, they are reminders of critical firefighter safety components to use before, during, and after incident operations.

Specialty task books

Specialty equipment requires differing levels of technical expertise to be operationally effective. If a department focuses on just one aspect of fire and emergency services for training but requires personnel to fulfill roles of a specialty crew (e.g., heavy rescue, hazardous materials company, truck company), personnel should complete training and demonstrate the competencies required for that company's assigned tasks. As the assignment responsibilities change for personnel, so should the minimum training and educational requirements to maintain proficiency in their role.

Transmitting critical information

The building in this incident where the fire was located is near the original dispatch location. While en route, personnel thought they were going to be operating at the initial dispatched address. When the initial companies begin operations and establish command, the incident commander should update dispatch with the correct address and information to ensure any available pre-incident plans can be located and reviewed by companies not already on scene.

POST-INCIDENT FIRE DEPARTMENT PREVENTION ACTIONS

After this incident, the fire department implemented changes to its incident response and fireground operations. These changes were based on the department's critique of the incident.

Post-incident analysis

Per NFPA 1550 [2024], the fire department began a formal post-incident analysis to document observations, concerns, and recommendations related to this incident. The analysis focused specifically on command procedures, department SOPs, operational practices, and training. This analysis was done concurrently with the current NIOSH investigation.

Safety Stand Down

The department immediately initiated a safety stand down of vertical ventilation by its personnel. The purpose of the stand down was to conduct retraining on various vertical ventilation practices and verify that personnel could perform the task safely.

Truck Task Book

The department in this incident has begun developing a truck company task book to ensure that personnel assigned to the truck company have been trained to perform the tasks that may be required of the truck company at an incident. This includes vertical ventilation tasks on residential and commercial structures.

SOP Review

The department has also begun a thorough review and revision of SOPs to ensure alignment with recognized best practices across the fire service.

MORE INFORMATION

Ventilated or cold roof information

Review information previously shared on this subject above.

The structure where this incident occurred had a double roof system, which is different from what is known as a rain roof in other areas of the country. Image 3 shows the construction of a ventilated or cold roof like the one in this structure. This roof design is intended to reduce ice damming by ventilation. The intent is to provide ventilation along the underside of the roof sheathing to allow any heat or moisture escaping from the structure to be carried away before reaching the sheathing [Maines 2025].

The initial roof, closest to the occupied space or building interior, is constructed as a typical roof with insulation, rafters, and sheathing. On top of this sheathing, a vapor-open membrane is installed followed by two-inch dimensional lumber purlins. On top of the purlins, two-inch dimensional "over-rafters" are installed followed by another layer of sheathing. The final roof covering is installed over the upper sheathing, whether a metal roof, composite asphalt shingle, or otherwise [Maines 2025].

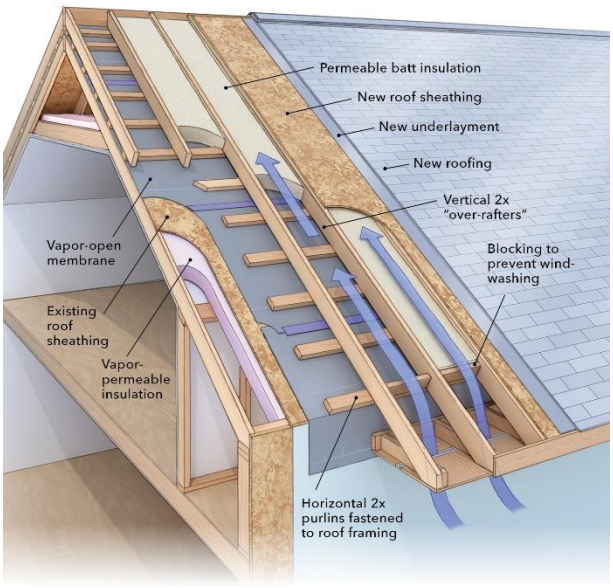


Image 3. Illustration of cold roof design. (Source: Maines 2025)

Department culture and risk management

Review information previously shared on this subject above.

Department leadership can foster a supportive culture that is also tactically aggressive. One tangible way to do this is to develop or update SOPs/SOGs that align policy with operational practice while maintaining established safety standards, identifying condition triggers, and incorporating risk assessment into operational procedures. Normalization of deviance can occur when informal practices displace established SOPs/SOGs and recognized safety standards, allowing departures from those expectations to become routine [Vaughan 1996]. Consequently, when SOPs/SOGs are developed to reflect the department's core values and support its personnel, staff may feel a greater sense of autonomy, empowerment, and support [NIOSH 2026b].

Second, when leaders hold themselves and their crews accountable to SOPs/SOGs, it demonstrates the department's commitment to the safety and well-being of its personnel [Broadribb 2024]. Departments cannot overlook the influence of leadership in each firehouse, including among company officers, who can drive cultural change shift by shift, firehouse by firehouse, and district by district [Caward 2024]. Research has shown that leadership accountability and role modeling can encourage other employees to follow suit. For example, if the company officer or group leader always wears their PPE as described in the SOP/SOG, it sets the expectation among other personnel to do the same and nonverbally communicates the importance of that behavior [Haas and Orstad 2025]. Alternatively, if the company officer does not wear or properly use their PPE but reprimands others for not wearing it, trust in leadership may be compromised [NIOSH 2026b].

Leadership communication with personnel also plays a role in fostering a positive culture [NIOSH 2020; Haas 2020]. Communicating with and getting to know personnel can assist in discovering what motivates individual firefighters to perform at higher levels. Eventually, department leaders can leverage these relationships often formed at the crew level, whether between company officer and line personnel or between "rookies" and more senior firefighters, to foster teamwork and support positive culture change [Palumbo 2025; NIOSH 2026b].

The fire service is deeply rooted in its traditions and history. Attempts at change can be met with staunch resistance. Anecdotally, some circles within the fire service view a culture of safety as not wanting to do the (risky) job of a firefighter. However, as windows for decision-making get shorter during a response, a strong culture is key to preventing a status quo mindset. Consequently, those who are willing to challenge this mentality can help ensure that unnecessary, high-risk actions are not taken prior to conducting a risk assessment [Willing 2020]. By actively assessing risks and employing tactics to mitigate and manage risks, the fire service can more safely perform at the highest level [Langlois 2019]. Because culture change or sustainment starts at the top, leadership should create a clear, relatable mission and a vision that reflects the organization's values. If members don't support the mission or vision, the organization's culture will not thrive. Leaders who empower their people and support their growth are paramount to developing a culture that can make difficult decisions at light speed [NIOSH 2026b].

Investigator information

The incident investigator and report author was Stephen J. Ringer, Investigator, with the Fire Fighter Fatality Investigation and Prevention Program, Surveillance and Field Investigations Branch, Division of Safety Research, NIOSH. A subject matter expert review was provided by Logan Huesing, Fire Engineer, San Antonio Fire Department, Texas, and Brian Bennett, PhD, Lewes Fire Department, Delaware. Dan Madrzykowski from the Fire Safety Research Institute, part of the UL Research Institutes, provided an expert review. The NFPA Emergency Response & Responder Safety Division provided a technical review. The Wyoming Department of Fire Prevention and Electrical Safety provided a state partner review of the investigation report.

RESOURCES

NFPA 1700, Guide for Structural Fire Fighting (2026 edition)

NFPA 1700, *Guide for Structural Fire Fighting*, 2026 edition, connects fire dynamics research with strategy, tactics, and best practices for firefighters in controlling fires within a structure.

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During report preparation, the author used the CDC PARTs, an AI tool developed by CDC based on ChatGPT (OpenAI, San Francisco, CA; *6; Thinking Level*), to check the report's adherence to the *Domains of Excellence Framework for High-Quality Public Health Science*. The author reviewed all output and is responsible for the accuracy, integrity, interpretation, and final content of the report.