Fire Engineering

Close

The Most Dangerous Fireground Activity, Part 2

THIS IS A CONTUATION OF THE May 2007 Roundtable discussion on the most dangerous fireground activity.

Question: What necessary fireground activity do you believe is the most dangerous for firefighters, and how can that activity be made safer?

Carl D. Avery, program coordinator,
York County (PA) Fire School

Response: Interior fire attack/search and rescue followed closely by roof ventilation. Why do I cite these as the most dangerous? Because of the changes we are seeing in building construction, particularly residential building construction, the bread-and-butter call of most fire departments. I am speaking about engineered, lightweight, truss style, and manufactured wood beams. If you are in an area where construction of residential units is booming, as it is in this area, I urge you to go see what is going into today's homes. More and more conventional building methods and materials are being replaced by these modern methods and materials.

I used to live in upstate New York, not too far from where the two Manlius firefighters were killed in a residential fire when the floor collapsed underneath them as they pressed an interior attack. I have also recently heard of another line-of-duty death with circumstances that sounded similar to the incident I just mentioned. No conclusion has been made as to the contributing factors of that recent death; it is still too early. And in the deaths of the Manlius firefighters, there were other contributing causes noted. Each of those factors must be addressed. But we cannot and should not underplay the importance of this new construction and the impact it has on the fire service.

I remember after the fire in upstate New York, there was a lot of talk about a type of MSDS for houses-some method of letting firefighters know what lies awaiting them. With the new construction comes new challenges, and especially in residential settings-single- and two-family homes-we all too often don't know that those challenges exist until we are in trouble. Firefighters deserve to know what they are getting into.

If this trend continues, I can foresee the day when interior fire attack may be done only on a very limited basis and only if we know a life is in danger. I know that that will not set well with a lot of people.

Believe me, I am coming from a generation and a department that strongly believed in getting in there and getting it. But, unless we can develop a way to easily identify these new types of construction, this burden should not rest solely on the fire service. The construction industry, homeowners, and such should be there to shoulder the task with us and develop new tactics and strategies for these new homes. Let's not forget that remodelers are using these new materials as well. We will have to keep our troops out of harm's way and reinvent the exterior attack.

Mike Gurr, lieutenant,
Pompano Beach (FL) Fire Rescue

Response: Searching on the fire floor or right above the fire without a hoseline. This is where you want your experienced people. This is accomplished by vent-enter-search (VES) or interior searches.

Searches must be quick and methodical. Firefighters must pay close attention to fire and smoke conditions. High heat buildup is a good indicator that the hose team has not made any advancement on the fire. You must remember where your last area of safe refuge is. Listen to radio progress reports, and always leave yourself a way out.

The best way to make this assignment safer is training. Try to work always with a partner. Have a portable radio with a good battery. Carry a personal escape rope. Do not freelance on the fireground. Make good educated decisions; don't try to be a hero. ICs must get the second hoseline into play as soon as possible. Place ground ladders and aerials for emergency egress. Implement vertical ventilation early. Establish the RIT/FAST function. An experienced IC with strong tactics and accountability practices would help tremendously.

Jeffrey Post, firefighter,
Submarine Base Fire Department, Groton, CT

Response: Primary search. The primary search will often be based on information given on arrival that may not be accurate (reports of occupants trapped when they are not). The primary search in many departments is carried out rapidly and does not have the benefit of a hoseline to immediately accompany the members involved. The primary search also in many cases brings the search team above the fire. History has proved this to be the most dangerous area of the fireground.

Heavy smoke, high heat conditions, and a growing fire will often confront members conducting the primary search. I feel it is important to conduct the primary search early on arrival and simultaneously with the first handline. In many cases, the building is proven negative only after we search it. Care must be given at this point to other fireground operations and how they are conveyed. Failure to communicate water problems or rapidly extending fire conditions will place search teams in danger unnecessarily.

The first factor in increasing safety in the primary search is an accurate and continuous size-up. By continuing to update your personal size-up, you continue to process information and how it affects your position on the fireground. Failure to do this may lead to your becoming lost or the fire's gaining the upper hand on your placement. The second factor for increasing safety is the rapid and proper placement of a handline in the building. An engine company placing a handline to key positions, such as the stairways or the pathways protecting the egress of the building, will make it safer for the search teams to execute its tasks. The engine company must make this stretch quickly and without kinks and difficulty. Department policy dictates the order of your tactics, but protecting the egress of the civilians and firefighters is a must.

Proper search discipline allows for better orientation and accountability of the progress made. Counting

turns and noting objects you pass provide landmarks you can use to maintain your direction within the fire building. Knowing in which directions the sides of the building are and the identity of the exposures also provides for better safety if there is rapid fire growth or collapse. The final factor is training. Everything mentioned here is basic firefighting. Training is the fiber that ties it all together.

Joseph D. Pronesti, captain,
Elyria (OH) Fire Department

Response: Being above a fire without a hoseline. Firefighters today are protected incredibly well with personal protective gear. They can advance farther in a structure than ever before. Many of today's firefighters also have personal harnesses, rope, bailout equipment, and a RIT standing by outside. Although this is good, it may give a false sense of security while operating above the fire floor. We may save a life, but we may fail to read the smoke, or worse, gauge the heat and fire conditions until it is too late.

Experience is also a huge factor. Many of today's firefighters and company officers just don't "have a feel" when the fire conditions make the floor above untenable.

We can make it safer by training, going back to firefighting basics. We need to emphasize fire behavior, building construction, and search techniques.

Although I am a big believer in using thermal imaging cameras, especially above a fire, I believe the next generation of firefighters and company officers will not know how to (will fail to be trained) operate without one above the fire floor.

Jean Solecki, instructor/firefighter,
West Bradford (PA) Fire Company

Response: Exterior operations. So many times this activity is considered the safest, and its obvious dangers sometimes can be overlooked. Officers and firefighters concentrate on the inherent dangers of interior firefighting, RIT, and other activities that deal directly with the emergency; however, fumes, overexertion, poor personnel pool placement, tripping, and collapse/falling objects plague exterior activities. Firefighters engaged in exterior operations are rarely rehabilitated and can suffer severe injuries because of a false sense of safety.

Exterior operations can improve through awareness/preplanning and practicing safety. Impress on fire personnel the importance of PPE. Have SOGs in place, and stress discipline in following them. Create plans for staging, personnel pools, safe zones, and rehab. Many times preplans stop at water supply and vehicle placement. That is not enough. Practice safety in exterior support operations (i.e., ground ladders and tool carrying, for example). These are the operations that contribute to the success of the interior operations and make the fireground safer for all when properly employed.

Jerry Clark, assistant fire marshal,
Fairfield (CA) Fire Department

Response: From my experience, the overhaul phase is the most hazardous in terms of causing chronic illnesses and debilitating injuries. The primary cause is the mistaken belief of firefighters that the danger has passed once the fire is knocked down. Couple that with weak or nonexistent guidelines and policies for continued wear of PPE during overhaul operations, and it's a recipe for disaster.

There are dozens of toxic by-products off-gassing hours after the fire is extinguished. And yet we continue to see firefighters tearing through walls, pulling down ceilings, and removing debris and other burnt materials with minimal PPE and no respiratory protection. Whether it's through lack of training and awareness, carelessness, or plain old machismo, this is the mindset the modern fire service needs to change.

Besides putting our firefighters in harm's way, another result of this mindset is the draining of precious funds for workers' compensation claims that could have been avoided with enforcement of safety standards. Of all the jobs in the world, the fire service should be the shining example of making safety a priority.

Stan Mettinger Jr., captain,
Brooksville (FL) Fire Department

Response: You have to examine a very broad picture. There is always the risk of backdraft or flashover during initial entry and attack or the risk of roof collapse on the folks inside or from under those attempting to ventilate. These events pose a threat of the most serious injuries. However, we leave it to the IC and the crews on the hoselines or roof to maintain vigilance. In most cases, this is easy because the job is not yet done. Although all those areas pose a significant danger to our folks operating during suppression, the most significant dangers are present during overhaul.

We often fail to monitor the levels of CO and other gases during this phase. We drop our SCBA and, in some cases, reduce the levels of PPE. The building had been compromised by fire, and we continue to work inside without a great deal of attention to what goes on around us. The risk of falling through floors or having pieces of the building falling on you is significant; the severity is based on the amount of fire the building experienced. We continue to shake our heads and ask why this happens. The simple answer is that the task is boring and mundane and the crews' only interest at this time is to get out of there.

A well-respected mentor of mine once told me that he felt it may be appropriate to send those first crews home and call in a fresh crew for overhaul. The replacements will not be tired, and they get to come and "play." This makes sense, but it is not always an avenue you can use, especially in smaller career departments, volunteer departments, or rural areas where assistance is limited. Therefore, we must stress the importance of being vigilant and keeping our people safe. We have to make sure they are fresh and understand the dangers. Air-quality levels must be monitored, and safety officers must do their job and ensure that the operation is done safely, efficiently (no rekindles), and in a timely manner. We get people hurt when we become complacent, and it is easy to become complacent in overhaul situations.

Brian K. Singles, firefighter,
Hampton (VA) Fire Department

Response: All fireground activities are dangerous in their own right, from advancing a hoseline into a burning structure to conducting a primary search-most of the time blindly-to raising aerial and ground ladders near and around overhead wires, all the way to trying to pay extra attention to other incoming apparatus with "tunnel vision operators" behind the wheel. All are dangerous but are necessary fireground activities that must be accomplished in a somewhat orchestrated fashion.

Ventilation is one of the most dangerous and the most important job of all. Those of us who have been assigned to do this have performed this many times at all types of structure fires. Many firefighters before us have gotten to the roof just seconds before it collapsed, sending them to the fiery hell below, never to return.

We were all taught in drill school and in training sessions throughout our careers that when performing vertical ventilation, never leave the safety of your roof ladder. We also know that this is not always possible. There are some things that we as responsible firefighters can do to make vertical ventilation safer for all of us: (1) Take the extra time to throw an additional roof ladder. (2) Instead of one team of two firefighters going to the roof, have two teams of two firefighters go, just like the two-in/two-out rule for interior firefighting. (3) Have the IC assign an additional safety officer to the roof team during vertical ventilation. (4) Once ventilation has been accomplished, get off the roof. (5) If a fixed aerial device is on-scene, use it, working off the tip or the bucket.

Safety should be on the minds of all the firefighters on-scene, not just the IC and his safety officers. Always remember that the most valuable tool you take to battle is your brain. Use it.

Paul J. Urbano, captain,
Anchorage (AK) Fire Department

Response: It's difficult to select just one fireground activity as the most dangerous, so here are a few thoughts on a few fireground activities.

Response: Wear seat belts; drive according to road conditions-believe it or not, slow may be better than fast. It could mean the difference in getting there or not.

Fire attack: Be a student of building construction so you'll have a better understanding of collapse potential and fire spread. Ventilation is critical for many reasons, especially to minimize flashover potential. Be sure to coordinate with fire attack.

Search: Know where the fire is and where you are (orientation). Coordinate with ventilation and fire attack. Use a TIC if available. Think VES when appropriate.

Overhaul: Structural integrity-how much structural damage did the fire do, and how much weight have we added (water and firefighters)? Wear your SCBA. Carbon monoxide is one of many highly toxic products of combustion found during overhaul; hydrogen cyanide is 35 times more toxic than carbon monoxide.

It's our responsibility to be safe individually and collectively. Regardless of our rank, we must make a risk/benefit analysis of everything we do from the training ground to the fireground.

Jim Grady III, chief,
Frankfort (IL) Fire District

Response: The decision-making process exhibited by the first-in officers and IC become the cornerstone for the events that will unfold. If the first-in officer fails to make decisions on what he observes, a slow or haphazard attack will take place. Important observations missed will lead to injury or other catastrophic events, as will underestimating the problem with which you are confronted or underestimating or taking for granted an ordinary job. Rebounding at times is what we do best. When command is handed over, playing catch-up or getting ahead of the events on the fireground takes place, hopefully. As we continue to look at the expectations of our first-in officers, we see that throughout the country we have some of the best in the business, but we still throw a lot at them. It is imperative that our leaders are well versed in size-up, reading smoke, and understanding building construction and ready to make decisions based on rapid deployment, quick attack, or back up/get out: This building is not worth the lives or bodies of our brothers and sisters.

Scott Tichenor, training officer,
White River Township (IN) Fire Department

Response: Overhaul. I say this because there is not a lot of proper air monitoring taking place nationwide. There are monitors that will help ICs make the safest call for "all clear SCBA." The fire service should put out the request to monitor the conditions during the overhaul process or leave firefighters in their SCBA. There are just too many unknown toxins once the fire is under control or out. With the numerous safety initiatives from fire service organizations, the "all clear SCBA "command should not be given until thorough air monitoring has been accomplished. We are all guilty of this procedure. We go to a working fire, and we are blowing black soot out of our noses for the next two or three days. This should not happen on every fire anymore. Buy the monitoring equipment to protect your personnel.

Todd Walton, captain,
Kearney (NE) Volunteer Fire Department

Response: Responding to or returning from the call. Vehicle collisions primarily do not occur on the fireground but are an all too common occurrence in emergency response. Review the U. S. Fire Administration's data on line-of-duty deaths from 2000 to 2005, and you will find that on average 24 firefighters are killed annually as a result of vehicle collisions. That accounts for almost one out of every four deaths.

How can that transporting be made safer? First, buckle up. Several deaths were caused by people being ejected or falling from the vehicle (privately owned and apparatus). Every vehicle and apparatus should have seat belts installed from the factory, so dig them out and start using them. Apparatus design can hamper these efforts-for example, commercial chassis fitted with SCBA seats. If the factory seat belts are too short to reach, have them replaced with longer ones. This is the cheapest, easiest, and most immediate way to save your firefighters' lives and yours.

The second way to improve safety is through training. As you review the summary of fatalities, some apparatus drivers had less than a year in the department. Does your department have a set training program and SOPs regarding apparatus driver training? If not, establish one. If you do, review that program, current apparatus, SOPs, and the qualification process to determine if it is still applicable. How many drivers do you have who were qualified on the truck when it was delivered a number of years ago but don't routinely operate it? Do your drivers understand the laws of physics as they relate to fire apparatus and that those same laws apply all the time, especially in regard to tankers (tenders)? Is an emergency vehicle operations course part of your training program? If changes need to be made, determine the best way to do it, and make them. You may not make friends or create harmony within the department when you make the needed changes. Do you have the backbone to do what is best for the department? If you are more worried about doing what is popular instead of what is right, you should not be in a leadership position.

Maintenance is also a key component regarding vehicle collisions. Are your apparatus maintained to ensure they are safe to operate? How about your private vehicle? Look at your preventive maintenance program and determine if it works. If you don't have one, create one.

Finally, are you as the officer or senior firefighter taking the responsibility for the crew when riding in an apparatus? If the driver is going too fast for the conditions or operating in an unsafe manner, it is your responsibility to speak up. If the driver doesn't have control of his adrenaline, he probably doesn't have control of the apparatus. You, your crew, and your apparatus are no good if they don't get to the scene to perform.

Charles Rogers, fire director,
Baltimore County (MD) Fire Department

Response: A fire reported with people trapped. Naturally, our response is stepped up. We will always go beyond the call to save a life. How can we as risk managers minimize the risk to our folks? The first-arriving company should give a good, brief initial report; command should be established early; and firefighters should know the type of construction in the structure they are about to enter.

Everyone should look at the cues on arrival: time of day, cars in the driveway, toys, swing sets. Is smoke or fire showing? I would rather have fire showing vs. smoke. Fire showing allows immediate mitigation or hold. Was anything reported over the radio system while en route or verbally on arrival?

Use thermal imaging cameras and radios for interior operations for all crews. This is where we get in trouble. Our officers do not do the proper size-up relative to sending our folks into harm's way based on what they see. If you see more than 25 percent involvement and you are the only one there, then you must invoke the following:

- If I see or hear a victim, we go all out to save that life.
- But, if it is only reported and we have no further information, we do not trade a firefighter's life for the unknown. Period.
- When additional resources arrive, a proper decision can be made based on the risk benefit and our peoples' welfare with RIT in place. We are getting better, but the two-in/two-out rule is a great tool on which to train all of our folks.

Ed Herrmann, captain,
Boynton Beach (FL) Fire Rescue

Response: When we talk about danger on the fireground, many point to search and rescue. For the most part, these crews are inside the involved structure with its hazardous atmosphere and structural issues with only the physical protection on their backs (literally). These crews are often sent into searches without the protection of a hoseline because it would slow and exhaust the team's efforts. You can make this activity safer by ensuring that the crew has appropriate equipment for the task; the crew is trained in its use and in the task; experienced personnel are a part of the crew; and laws, standards, and sound decisions are followed in the scene's operation.

I believe that the role of IC is also a perilous position on the fireground. Although this person is not usually in great physical danger, today's increasingly litigious society creates an entirely different threat for this officer. We are seeing an increasing number of cases where fireground decisions that must be made in moments are being scrutinized for weeks in courtrooms. The potential for monetary impact on the officer's family, the stress of the incident's being dissected to lay blame, and the potential impact on the officer's career can all result in psychological and physical repercussions.

The solution to this problem begins with training, progresses through experience, and involves a bit of luck. I have heard the statement, "When you're through learning, you're through" made several times in my career. Nowhere is it truer than when everyone on a scene is looking to you for answers and the lawyers are waiting to debate the outcome.

Robert Murphy, lieutenant,
Central Vol. Fire Co. of Elizabeth Township,
Allegheny County, PA

Response: The most dangerous fireground activity is that of the interior engine and truck crews. The most dangerous function has nothing to do with training, fire education, or the ability to be a good interior firefighter. As an obese firefighter, I believe that the removal of danger begins with each of us at home. The overall health of our firefighters is the most dangerous fireground factor. We all are in some way an added problem to this whether we know someone who does not take care of his health or we do not take care of our own health. Let's start by getting into good physical shape. Events such as collapse, flashover, entanglement, and air supply are all avoidable on the fire scene. Heart attacks and strokes are not. They are the leading causes of death in firefighters.

Paul W. Eichler, lieutenant,
Anne Arundel County (MD) Fire Department

Response: How can you define or assign a higher priority to fireground responsibilities when you work to break down the safety hazards from the time of ignition through the times of discovery, reporting, responding, mitigation, overhaul, cleanup/takeup, and returning to service? Each part can be just as deadly as the next. We are finally learning from others' mistakes with near-miss reporting and the inadequacies of investigations that are supposed to provide more insight but fail the fire service. We should not be prioritizing activities to then invite complacency with other activities and responsibilities. Consider that if we are lucky enough to survive the response to, mitigation of, and return from the event, have we been subjected to conditions that threaten us years down the road? Which is worse, being injured or killed immediately on the fireground or suffering the debilitating effects of exposure to whatever toxins and then developing chronic disease? I don't know the answer and will try to continue to avoid both outcomes.

P.D. Hoyle, lieutenant,
Portsmouth (VA) Fire Department

Response: We tend to assume that fire attack is the most dangerous fireground operation we routinely perform. Certainly, no one questions the intrinsic risk involved in performing this task, and the numbers indicate that more injuries to firefighters result from fire attack than any other activity.

However, I think that if you review the NIOSH Fatality Reports and Close Calls, it becomes apparent that search operations lead to more firefighter fatalities. We really have to connect the type of casualty to the fireground activity to get a good handle on the risks involved. Solutions to the two very different types of casualties must be addressed separately to ensure the safety of our personnel.

For attack crews, injury is largely caused by tremendous physical activity under extreme environmental conditions. There is no easy solution to this; however, there are a few things that will help. Effective training in basic skills and practice play a part. An active physical fitness program for all firefighters will also help. The best way to reduce the necessary physical output of an attack crew is simply to increase the size of the crew. That's a tough nut to crack for most of us. Additionally, we need to be more adept at crew rotations to keep crews as well rested as possible. Fresh crews have fewer injuries-that's a simple and verifiable fact.

To reduce firefighter fatalities linked to search operations, we need to focus a lot more time and effort on several areas. The first is a good model for risk/benefit analysis. Are we sending search teams into a structure when there is no practical likelihood of finding viable victims? If so, why? Second, we must spend more time training personnel on search techniques for varying conditions. Searching a large commercial structure with the same tactics we use in a residential incident is a direct path to a firefighter fatality. The same can be said for multiple occupancies such as apartments and hotels. We need to adapt new technologies more rapidly.

Each team should have radios, TICs, and search ropes and should know how to use them from exhaustive practice under the most realistic conditions we can develop without harming the trainees. Individual locators are just around the corner. They will be expensive, but so is losing a brother or sister.

Finally, and this one applies to both problems, we must become better ICs with the knowledge and skills necessary to size up incidents, maintain communications and accountability, and perform accurate and rapid risk/benefit analysis.
