

What's in Your Toolbox?

BY NICK J. SALAMEH

ALL RECRUIT FIREFIGHTERS receive a toolbox when they come on the job, whether they are paid or volunteer. It is our bag of tricks or, in this case, our learning foundation and experiential resources that keep us effective.

Intuition

We collect tools for our toolbox from what we learn in recruit school and on the job at the firehouse during daily drills and incident scenes. As our experience grows, we eventually add another tool to our toolbox, intuition. This comes with time, experience, and maturity, but only if you are in sync with your intuition and actually listen when it speaks to you. This is the little voice inside that all of us have. Trust your intuition! It's always right.

Influencing Factors

Over time, a number of factors influence our toolbox including people (co-workers, friends, officers, supervisors, the public, and so forth), what you've seen that works and doesn't work (trial and error; most lessons learned come from the latter), seminar and webinar presentations, trade books and magazines, the National Institute of Standards and Technology (NIST) and Underwriters Laboratories (UL) modern fire studies, the National Institute for Occupational Safety and Health (NIOSH) line-of-duty-death (LODD) investigations, higher level education, and other things you learn along the way. With so many influences, at times we can become confused and overwhelmed in trying to distinguish which influences are truly the ones we should pay attention to.

Our toolbox is our go-to bag. When something works, we tend to stick with it; if it worked once, likely it will work again. However, don't get stuck in a rut applying the same strategy and tactics to every fire incident or automatically following a department's culture of

operational procedures and training, which may no longer meet today's fireground requirements. Each fire requires us to do what is right for the call we are on.

Sure, we have standard operating procedures (SOPs) that provide a foundation from which to work—our starting point. Hopefully, you have researched, trained on, and reviewed and updated these SOPs periodically to ensure they provide consistent positive results in most cases for today's fire challenges. Although SOPs may create a department's standard practice, every fire is different, and we may need to call an audible from time to time to make and coordinate adjustments as our fire scene dictates. Make sure this information is communicated to all involved. When SOPs no longer meet current day standards on the fireground or anywhere else in our fire departments, we must revise or discontinue them or create new ones to keep them effective and efficient.

Some of the tools in our toolbox come from recognition primed decision making (RPDM), created by Dr. Gary Klein, *Sources of Power: How People Make Decisions*. As Gordon Graham, risk manager, describes it, "Consider your mind as a 'hard drive.' Your daily experiences help load this drive."

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Everything you do and experience is loaded into your hard drive. When you get involved in any task or incident, your magnificent brain quickly scans your hard drive and looks for a close match."

Experience

For instance, you learned that when you apply water to a vehicle's burning engine compartment and it violently throws back blue sparks, you are dealing with a magnesium fire. This requires cautious cooling with water, then final extinguishment with a dry chemical extinguisher or special purpose extinguisher for metal fires. You don't forget this if you've experienced it yourself.

Good Information, Good Calls

If you feed good information into your hard drive, you will generally help to ensure you make the right calls on incident scenes. However, when you face an incident you've never experienced before, you will have to fall back on your SOPs, knowledge, experience, and intuition to determine how you will mitigate it. Proceed with caution since you are in unknown territory and are more vulnerable to unknown safety hazards.

Although RPDM assists us in quickly recognizing like situations so we can make reasonably good defensible decisions, there is a chance our tactics could be accidentally successful. For instance, you have a fire, you put water on it, and it goes out. No one died, no one got hurt. This can often translate to others as a good operation, whether it was or not, that is thought to be worthy of repeating for similar effective results. It's possible you were just "accidentally successful" and never realized it.

Were We Just Lucky?

Although things may work out on your fire scene, there is always something to be learned through

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a postincident analysis. You may find the “red flags” you ignored or did not see at all. They are your added dangers, which can multiply within the first few minutes of an incident. Ordinarily, a scene in which the red flags approach seven or more is headed for a catastrophic event if you take no action to reduce and eliminate them. This is illustrated time and time again in NIOSH LODD investigations through the bullet list of main contributing factors.

Suppose that the same mitigation efforts on our successful fire above were used 50 times with the same positive results but on the 51st incident we suffered a catastrophic event. Were our mitigation efforts successful for the first 50 fires or were we simply accidentally successful? The postincident analysis will help identify this, but if we become complacent, ignorant, and arrogant regarding our mitigation efforts, it will eventually catch up to us.

As Bill Carey reported in his online article, “One Out of 93,” one LODD out of 93 occurred on the fireground that year and “2017 went as the years before it ended, with most the names of the fallen having succumbed to heart attacks, stress, and overexertion.” This suggests we may be operating more safely on the fireground, but perhaps we are neglecting our physical conditioning and other health and medical wellness programs. Regardless, 93 deaths out of the total number of active firefighters may not seem high, but it is 93 too many. I'm sure the family members of those lost would agree. We should not let our guard down on the fire scene because the numbers indicate a reduction in fatalities from direct fireground-related operations like fire attack, searching, and rooftop ventilation. What if, only by the grace of God, we just lucked out in many cases?

Over the past several years, the UL and NIST studies have flipped some of what we thought to be true in the fire service as it relates to our strategy and tactics and modern fire dynamics for good reason. At its core, the studies' results provide clear and illustrative proof, in real time, that understanding modern fire dynamics and modern fire attack principles leads to more effective, efficient, and safe operations. These empirical data are based in science and cannot be denied. Studies were conducted in real-world residential settings where firefighters' bread-and-butter fires occur and also where firefighter and civilian deaths are more likely to occur.

GEARGRID
FIRE
REDUCE YOUR RISK

FIREFIGHTERS HAVE a 2X GREATER RISK of CANCER

Tips to Help Reduce Your Risk:

- Wipe off & shower immediately after fire
- Have second set of clean gear
- Properly air dry, hang, store & care for turnout gear
- Prevent “dirty” gear from contacting clean gear/clothing
- Limit exposure to toxins & carcinogens in fire station
- Get regularly scheduled physical
- Inspect gear for damage after every fire

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Update Your Policies

For many years, fire departments across the nation have written operational policies and have trained on procedures that appeared to be created on a solid foundation. As a result of these studies, some of us have realized that this foundation was built from a now dated playbook from which we understood fire behavior, strategy, and tactics differently. However, the NIST/UL studies have provided a new playbook in which the foundation of firefighter learning is from modern fire dynamics and modern fire attack principles. This is the playbook fire departments should be following to create today's foundation for fireground SOPs and training procedures. This should be a nationally recognized effort to get every fire department on the same page.

Now that we better understand today's fires and what we need to control our fire scenes, we can work smarter, not harder, and improve operations. More importantly, we should have a very clear understanding of the fire dynamics and air flow paths present at our incidents and of how to strategically address them more effectively, efficiently, and safely.

The tools NIST/UL has provided to the fire service are perhaps the most important tools we've ever received. Some folks are still skeptical and believe what they've always done still works. That may be the case, but I would argue those folks have been accidentally successful. I encourage them to conduct an objective post-incident analysis to identify the red flag factors that may have been present and to consider evolving their operations to meet today's required standards for firefighting.

Modern Fire Dynamics

Others of us are onboard with the new information: We get it or are still learning. When viewed objectively and fundamentally, the key study findings include the following:

- Today's fires burn hotter and have a higher heat release rate as a result of the presence of synthetics in furnishings and contents.

- Lightweight wood construction is much more vulnerable to fire than legacy construction, and structural integrity is quickly reduced.
- Legacy collapse potential is approximately 20 minutes vs. lightweight wood collapse potential at approximately four to eight minutes.
- Sufficient and sustained water applied on the seat of the fire puts out the fire.
- Straight and solid stream applications do not push fire.
- Placing water on the fire as quickly as possible, which is often from the exterior, improves conditions immediately by significantly reducing temperatures (hundreds of degrees in seconds), stops the forward progress of fire, aids in reducing and preventing trigger events, creates a safer and more tenable interior environment for firefighters and savable trapped occupants, and speeds operational effectiveness. Spraying sufficient water on visible reachable fire improves fire conditions.
- Smoke is fire, and it's okay and appropriate to cool smoke in compartments and overhead.
- Door and window control must take place to control the air flow paths.
- Any opening in a structure creates ventilation, which must be controlled and coordinated simultaneously (as staffing allows) or after the fire has been controlled.
- Wind-driven fires create blowtorch effects on the fireground and quickly take control when flow paths and the fire are not controlled.
- Additional findings as indicated in each NIST/UL study.
- The fire is the source of all fireground problems. Quickly put it out with water and everything gets better.

Flow Paths

Every opening we make or the fire makes in the structure is ventilation and can influence flow path. In the past, we routinely opened and propped doors, broke out windows, and vented the roof. Today, we know these actions feed air to the fire and draw it to create air flow path intakes and exhausts. Firefighters and trapped

occupants positioned in the middle of these flow paths without effective fire control are extremely vulnerable. The NIST/UL science-based information is clear and helps us understand why current training and methods being used from the past need to change. NIST/UL is helping the fire service identify a better and safer way of fighting fire while increasing effectiveness and efficiency.

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If you have not already placed the NIST/UL tools in your toolbox, please go back and review the findings of their studies, which are easily found online through their Web sites and at the UL- Firefighter Safety Research Institute Web site, <https://ulfirefightersafety.org/>. Test this information against your past fires. You can apply it to any fireground footage or real incident to easily see there is a better, faster way to control the fire and coordinate on scene actions.

Learn modern fire dynamics and modern fire attack principles and add them to your toolbox. Your life and the lives of others depend on it. ■

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