

The Intent of LCES



A tool for ensuring you're prepared for the worst the fire can do

By Brad Mayhew

Since Paul Gleason championed “Look-outs, Communications, Escape Routes and Safety Zones” (LCES) in the early 1990s, it has become one of the most trusted and applied tools in the wildland firefighter’s arsenal. It’s simple and reliable and covers the minimum critical safety measures for avoiding burnover and entrapment.

Many of us trust that as long as we have LCES covered on our fire, we’ll avoid burnover, even if everything else falls apart. But when we look closely at our mishaps, we find firefighters who *thought* their LCES was covered, but they still got trapped. Competent firefighters say things such as, “I had an escape route, but it was cut off,” or “We had a safety zone, but we took a lot of heat there.”

In this article, I’ll share an approach to LCES that can improve your safety on wildland and wildland/urban interface (WUI) fires.

NOT MISSING, BUT INADEQUATE

It’s common to approach wildland fire tragedies or near-misses with the assumption that “Their LCES was not in place,” as though the firefighters

skipped their safety measures. Yet when we listen to the survivors themselves, we find that “skipping LCES” usually was not their mistake. Instead, we find firefighters who had LCES in place *in their minds*, but it turned out that their LCES was not adequate for the actual fire. They misread the fire and used safety measures that didn’t fit the fire potential—even though those same safety measures might have been appropriate under other conditions (even on the same fire earlier the same day).

So talking about LCES as “in place” or “implemented” or “covered” doesn’t paint an accurate picture of what it takes to avoid getting burned or what’s actually going through our brains when we’re on the fireline. It would be more useful to focus on whether LCES is *adequate*.

When we use language such as *adequate*, it prompts us to think about fire behavior, whether our safety measures actually match the fire potential and whether our risk is at an acceptable level. On the other hand, using a phrase like “in place” shortcuts these concepts. This

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shortcut makes sense, if you're an experienced firefighter and already proficient at wildland risk management. But for the less experienced, when we use language like "in place," we set ourselves up for using LCES as a mechanical checklist, without thinking about fire behavior or the *intent* of the tool.

The intent of LCES is *to not get burned*. No matter what this fire does, LCES gives you a backup plan, a way to avoid burnover. It's not about jumping through hoops or covering our administrative bases. We don't check off the letters because it's the right thing to do; we don't do it for the safety officers, the bosses, the chiefs, policymakers, OSHA or Congress. We don't even do it for the lawyers. *We use LCES to keep ourselves and our buddies from getting burned on this fire.* To achieve that intent, LCES must be adequate for the *worst* the fire is capable of.

DYNAMIC FIRE, DYNAMIC LCES

In addition to underestimating fire behavior and using inadequate LCES, there's another way firefighters get entrapped: You start off the shift with good LCES, but then conditions change and your LCES isn't adequate anymore.

It really doesn't do much good to have LCES based on what the fire's doing *right now*. If the fire keeps doing exactly what it's doing right now, you probably won't need LCES. LCES is for what the fire *might do later*.

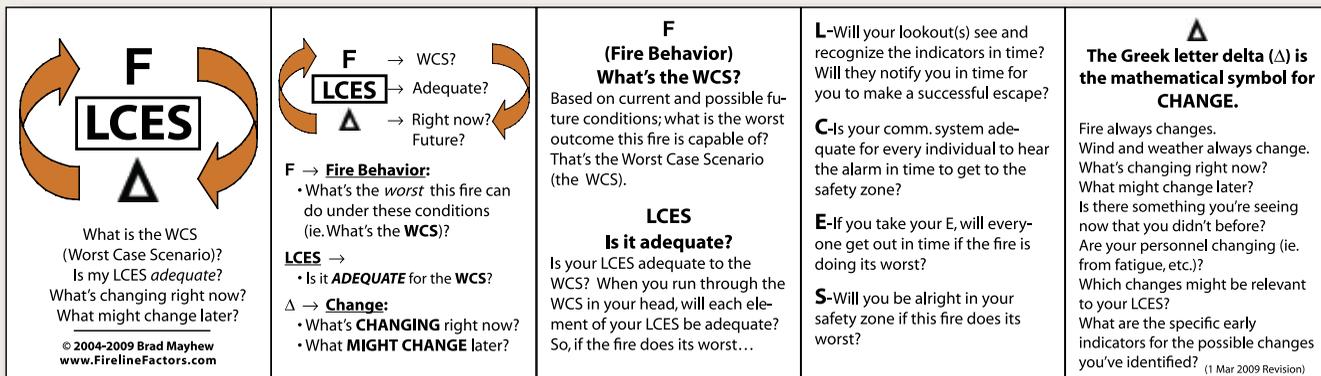
burnover victims. They're not slouches or mediocre officers. If it can happen to them, it can happen to us, and it happens based on the natural wiring of the human brain.

THE F-LCES-DELTA TOOL

The tool "F-LCES-Delta" (see diagram on this page) is a method to help firefighters fulfill the intent of LCES. The "F" stands for fire behavior and prompts you to ask, "What's the worst this fire can do?" Then look at your LCES and ask whether it's adequate to the fire potential. The Greek letter Delta (Δ) prompts you to look for change, and the circular arrows indicate that it's an ongoing process. *Note:* This isn't an attempt to change LCES. This is an approach to communicating, training and thinking about LCES to ensure that we use LCES based on its intent.

This tool encourages firefighters to make time to consciously look for change, and intentionally ask whether these changes affect your LCES. Prairie dogs provide a good example. They put their heads down and work, then they pop their heads up and look around and check things out, and they chirp at each other. They don't hesitate to bolt to their safety zone underground when a potential hazard gets too close. Ever snuck up on a prairie dog? Me neither!

F-LCES-Delta is also a tool for ongoing dialog among firefighters. Every person on the crew has a different



Note: To download a full-size version of the F-LCES-Delta tool, visit www.fire-rescue.com.

Many of our fatalities happen when changes sneak up on us. This is a critical point. Wind, temperature, relative humidity, exposed slopes, your distance from the safety zone—these all change throughout the day. Fire is dynamic, so we want to make sure our LCES is dynamic. Yet modern brain research shows that humans aren't very reliable at noticing change, especially if they're not expecting change and consciously searching for it—especially if they're busy doing something else, like fighting a fire.

In addition, in many near misses and tragedies, firefighters *did* notice significant changes in the fire behavior, but in the heat of the moment, they didn't make the connection between their LCES and the changing conditions they saw. Or they made the connection, but it was too late, and they were overrun.

In the comfort of a training room, it's easy to write all this off as a dumb mistake you'd never make. But look at our

perspective and is noticing different elements of the fire environment. So if everyone takes it upon themselves to make sure their LCES is adequate—and if the crew keeps an open dialog about what the fire's capable of and how it's changing and how this affects our LCES—this will increase everyone's chances of success.

Often in our burnovers, we find that some firefighters *did* recognize warning signs, but the information didn't get communicated. Or if they did try to communicate it, it wasn't heard. Open communication among crewmembers is a critical element of operational risk management, and a tool like F-LCES-Delta provides a platform for this dialog.

GO/NO-GO

This tool also serves as a "go/no-go" criterion. If you're not confident that your LCES is adequate, then ►

what level of engagement is appropriate?

Consider what we're risking (our lives, the trauma to our family/crew/agency), and consider what we have to gain (usually it's saving an empty house or a few more acres). Most of us will conclude that we only want to engage when we're confident that our LCES is adequate for the worst-case scenario.

But there are some tricky cases. Sometimes it might seem right to engage even though you're *not* confident your LCES is adequate. In those cases, the key question is, "Is the potential gain worth the risk?" Sometimes it might be worth the risk because a human life is at stake.

Subjective Human Judgment Is Good

The F-LCES-Delta tool prompts you to use your judgment. It doesn't pretend that managing risk is something you can do mechanically. Sometimes we wish we could come up with tools and rules to replace human judgment—lists we could follow mechanically without using our minds. But fighting fire *requires* subjective judgment—it's part art and it's based on experience. We couldn't remove human judgment from the equation if we wanted to. And we don't want to! Lists don't put out fires or keep firefighters safe; human judgment does. There's no substitute for human judgment, so the purpose of the F-LCES-Delta tool is to prompt you to make the judgments that keep you from getting burned.

Usually it isn't. This is a judgment call.

Tip: Talk through such risk-vs.-gain decisions with your crew ahead of time. What's worth risking a lot for? Make the call for yourself when you're back at the station or thinking about your family, because in the heat of the moment, everything feels like it's worth the risk.

It might seem like we're only talking about the second part of "go/no-go." But this isn't a tool for never engaging. The pivotal fire order says: "Fight fire aggressively, having provided for safety first." F-LCES-Delta is a way to continually provide for safety first, which sets the stage to fight fire aggressively.

As I mentioned before, we don't do LCES for anybody else; we do LCES for ourselves and the firefighters next to us, for our families back home and for a long career of helping other people. And we do LCES so that we can engage this fire aggressively, because we're confident we've mitigated the risk to an acceptable level.

EXPERIENCE LEVEL

We've seen how the F-LCES-Delta tool can help you engage the fire when you're confident that your LCES is adequate for the worst-case scenario.

But how do you come up with the worst-case scenario? It will be based on the information you gather about fire behavior, topography, fuels, weather, etc. But ultimately it still comes back to your experience and your judgment. ▶

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So the critical question is whether, in *your judgment*, you're confident your LCES is adequate.

What that means is that younger or less-experienced firefighters will end up turning down assignments that they probably could have completed. That's part of the

learning process, and the houses will grow back. But the key is to not get burned along the way. As one of my chiefs said, "You can't learn lessons from inside a pine box."

The intent of this approach is to stick to the bare minimum, to give you three or four questions to ask yourself, and to keep the process simple enough to use when you're actually on the line and a million other things are happening.

In tactical decision making, there's a limit to what your brain can work with. So when it comes to operational risk management, we want to limit the scope. We can't do everything with this tool, so let's only focus on one part of fighting fire: not getting burned. And let's keep it simple so we can actually use it on the line.

Caveat: It's got to be the bare minimum, but it can't be less than the bare minimum. You can't do LCES well if you're not (at some level) conscious of fire potential and aware of change. These processes are often intuitive and subconscious for experienced firefighters. But if you're like me, you need a built-in reminder to prompt yourself to be mindful of fire potential and changing conditions.

When Bad Things Happen

Fighting fire and managing risk involve subjective judgment. It's possible to misjudge. We aren't calculators (and calculators can't put out wildfires anyway). So when we do have tragedies and near misses, it's critical to face what really happened.

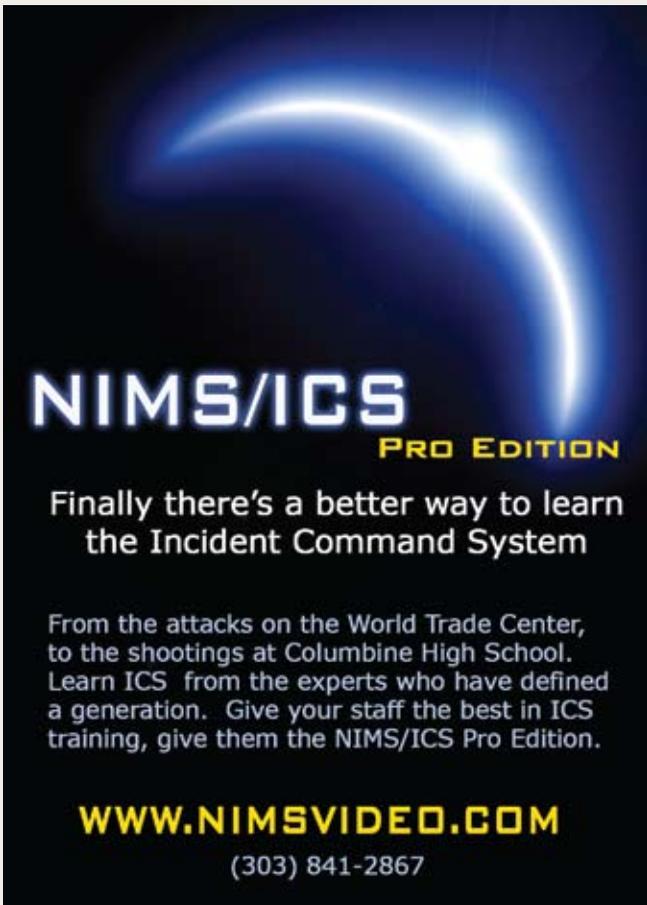
When you're looking back on wildland tragedies and near misses, here are some key questions to help avoid the pitfall of oversimplifying the actions of fellow firefighters in the heat of the moment:

- Did the firefighters get burned because they disregarded their safety measures and skipped LCES?
- Or, did they misread the fire? Did they use the safety measures that seemed right at the time, but which didn't fit the severity of the situation?
- Did they miss changing conditions and keep using the same safety measures even though the situation was transforming?

Such questions can provide meaningful lessons. It's a copout to write off our own as "rule breakers" who didn't follow standards and didn't have their safety measures covered. Sometimes people *do* break rules and violate policy, but there's a big difference between disregarding safety measures vs. using safety measures that *seemed* adequate, but weren't.

DEFINING LCES

F-LCES-Delta also gives us a useful way to define the components of LCES. *Example:* What are the characteristics of a good lookout? Does your lookout have to see the whole fire; do they have to be on a high point? ▶



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Do they have to be able to see the crew? Should they be the most experienced firefighter on the crew?

Each of these is *usually* true of a good lookout, but there are exceptions, and if you only define a lookout with the characteristics I just listed, then there will be confusion. Here's what should *always* be true of an adequate lookout: You're confident that your lookout will notice and recognize the early warning signs and get the word to you with enough time for you to get to safety. Whatever it takes to meet this fundamental requirement on this fire is what makes for a good lookout.

The same is true for safety zones. Ultimately, what matters most is whether you're confident, based on the worst this fire is capable of doing (in your judgment), that this safety zone will be big enough to keep you safe from the fire. Size, location, etc.—these other details fall into place if you focus on the fundamental intent of your safety zone. The same goes for each element of LCES, and it's all broken down on the pocket card.

BEYOND THE NEXT SHIFT

So far, we've been focusing on this tool as a way to avoid entrapment on the next fire.

But there's another, long-term upshot: By making a habit of these questions, you sensitize your brain to critical fire behavior dynamics. You're training your situational awareness, developing your wildland judgment

and building communication patterns. You're building the mental muscles that will be useful even when you're not consciously thinking about the tool.

And the tool isn't limited to wildland fires. LCES can apply to hazards in other areas of the modern all-risk fire service (hazmat, USAR, etc.). For different hazards, we have different levels of acceptable risk.

By making a practice of looking for change and evaluating the incident deliberately, you'll increase the likelihood of noticing and recognizing change in the future, even when you aren't trying. ☺

Brad Mayhew served as a wildland firefighter with the USFS Los Padres Hotshots. He helped author the Human Factors pages for the NWCG Incident Response Pocket Guide (2006) and received the NWCG Leadership Committee's Paul Gleason Lead by Example Award for Innovation in 2007. Through Fireline Factors Consulting, he offers workshops on LCES and other human factors topics. For more information, visit www.firelinefactors.com, or contact Mayhew at 805/965-0955 or brad@firelinefactors.com.

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