



Continuing Education Course

Interior Size-Up from the Door

BY SAMUEL HITTLE

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Interior Size-Up from the Door

Educational Objectives

On completion of this course, students will:

- Identify the reasons why it is so important to size up a situation prior making entry
- Describe how “listening” can lead to victims and identify the movement of other firefighters in the structure
- Describe how “looking” can help identify risks and conditions
- Describe how “feeling” can help firefighters recognize fire and building conditions

BY SAMUEL HITTLE

OUR OCCUPATION REQUIRES SWIFT ACTION WHEN we are called to serve. We respond without hesitation, armed with limited information and the mindset that every second counts. Adrenaline-driven with a desire to help, our nature is to plunge headfirst into the alarm. There are moments, however, when we must make ourselves slow down to achieve a greater situational awareness and use our time more efficiently. These wisely used seconds can save minutes, and those minutes can save lives.

This ideology holds true in many facets of our response. A driver who visualizes the best route before pulling out of the firehouse can avoid feeling pressured to drive beyond limits to gain time that otherwise would be lost. A rig that approaches the fireground slowly is more likely to get the most advantageous positioning for company deployment and other responding pieces. Seconds taken to speak with occupants or view at least three sides of the structure (when possible) will result in better strategic decisions. And, a moment taken at the door to the fire area can greatly affect the outcome of interior operations.

Whether assigned to an engine or a truck, it is important to pause, look at, listen to, and feel the surroundings when you arrive at the entry point to the fire area. This is especially important when your apparatus is the first due. It is not something you want to spend a lot of time doing, but taking a few seconds often will provide additional information while simultaneously confirming your on-scene size-up.

LOOK

For the purpose of this course, it is assumed that the door has already been popped and controlled. This does not presume all aspects regarding the door are immaterial. You still want to know if the door was unlocked or open on arrival. If it was secured, how many locks were engaged? By looking up the latch side of the door slab, you can make this deter-



(1) Looking up the latch side of the door slab can help you determine if the door was unlocked or open on arrival and, if the lock was secured, how many locks were engaged. (Photo by author.)

mination (photo 1). The number of engaged locks in conjunction with the time of day will influence your risk/benefit assessment when weighed against interior conditions. When multiple locks are activated, it assumes an increased probability of an interior life hazard. This is based on the premise that most occupants rarely secure more than the slam latch and a secondary deadbolt when leaving the occupancy.

Because the thermal balance is usually undisturbed prior to making entry, you have an opportunity to get low and look into the structure from the doorway. Look for victims, layout, fire conditions, smoke behavior, indicators of occupant type, and special hazards. If you have access to a thermal imaging camera (TIC), this is a great place to use it. Perform a three-point shoulder-to-shoulder scan of the area. Look for the following:

- **High scan**—temperature; rollover; heat extension; compromised structural integrity with regard to the roof or ceiling; ceiling construction materials and method (open, truss, or drop); height and depth of area; direction of trusses in type II occupancies (for navigational aid); and the location of prominent columns and beams in big-box

(2) Looking under the smoke before committing to interior operations can reveal critical information to crews. (Photo by Brian Bastinelli.)

stores (for course plotting or emergency refuge if a collapse occurred).

- **Middle scan**—victims; blind spots that require closer inspection; thermal layering; fire load; where the fire has been, is, and is going; windows for ventilation or emergency exit; doors; and occupancy configuration.
- **Low scan**—temperature, victims, holes, stairwells, and elevator shafts.

The TIC is a powerful tool for attaining information regarding interior conditions if you are trained to understand its abilities and limitations. Operator inexperience can lead to misinterpretations, moving too slowly, or moving too fast. Additionally, this equipment has the potential to fail, so don't abandon your fundamental training. The TIC allows you to do more when executing functions, not less.

Despite the type of structure in which you are going to function, you must have a basic understanding of the floor plan. This starts on arrival by identifying the construction type and the era in which the structure was built. In residential occupancies, you should already have a general idea of the layout based on the style of the home—Victorian, bilevel, for example. Be that as it may, you still need to take a few seconds at the door to look under the smoke to qualify your original presumptions (photo 2). On commercial alarms, the business or occupancy type can point toward how the building is laid out; but, again, it will require confirmation. You want to establish if the structure is compartmented, if the layout is an open area, or if the layout is restricted in any way. These factors can be critical in establishing a successful plan for a stretch or search pattern.

When scanning the fire area, locate secondary egresses (before one is needed), staircases, hallways, corridors, or other access points to adjoining portions of the building. Early identification of these key areas will prove valuable if conditions change rapidly once committed to interior operations. This includes recognizing the need to remove doors entirely to enhance uninterrupted mobility throughout the fire area. For example, it is not uncommon for doorways of add-ons or remodels, closets, halls, or access to garages to be hidden behind a primary door when they are opened. Having to close one door to open another is not conducive to the deployment of an attack line or an emergency exit by fire crews. Be



proactive; remove these doors early in the job.

While looking at the layout, you can also acquire other useful information associated with the potential occupants or special hazards. Infant and toddler toys or a child gate on the staircase may indicate the presence of young children. A walker, a wheelchair, or an oxygen cart may indicate the presence of elderly or nonambulatory victims. Both populations are at the highest risk of becoming fire-related fatalities. If you see building materials such as fallen ceiling components or exposed structural members, you must reevaluate the risk/benefit assessment. When responding to a vacant property, look for holes and any dilapidation that could contribute to early collapse or rapid fire spread. These unoccupied structures are also likely to have drug paraphernalia scattered throughout.

When surveying the area for fire, it is natural to look for obvious flames,

but you must see beyond this as a fire professional. You should identify where the fire has been, where it could be hiding, and how much is possibly being masked. You must ask yourself if your fire flow is going to be sufficient to suppress the amount of involvement. Should you hold the egress until a second line can be put into service, or do you commit to extinguishment efforts? What is burning, and what has the potential to burn (i.e., what kind of live-fire load exists)? Are you confronted with a contents fire or a structure fire? The answers will influence your risk/benefit assessment. When assigned search, evaluate your expected path of egress, especially if you will be operating above or in front of the fire. You must determine if your way out has been damaged by current conditions or has the potential to be jeopardized before you return. Your access may be the only source of fresh air to feed the fire and draw it back to this area.

A Fire Department Instructors Conference (FDIC) instructor once explained that visible fire makes for easy work, whereas seeing smoke only is more of a concern. Although these types of fires are inherently more difficult to fight and dangerous to operate in, when properly read, smoke provides information about what is happening or can possibly happen. By looking at the smoke's behavior and characteristics, you can get an idea about what is burning, where it is burning, the active burning stage, and how much fuel is involved.

Although reading smoke is best accomplished from outside the structure, conduct an evaluation at the entry before committing to the inside. The smoke conditions may present differently when a vent location is opened up (i.e., your entrance). Be especially cognizant of fast-moving, thick, dark,

● INTERIOR SIZE-UP



(3) This hole claimed a firefighter's life. Notice the location of the front door. (Photo from Firefighter Fatality Investigation Report F2006-24 CDC/NIOSH.) (4) Use a tool to extend reach when sweeping the entry of a doorway. (Photo by author.)



and heat-pushed boiling smoke. This is the ideal mixture for flashover conditions even if you are remote from the fire. The nasty turbulent smoke now floating overhead most often is the product of incomplete combustion from household furnishings. These particulates have the potential to burn again when introduced to the new oxygen source. When you are not sure that the smoke is volatile, let it blow before you go. Allowing it to vent for a brief moment will increase the environment's overall tenability, improve visibility, expose fire, and possibly prevent your crew from being caught in a hostile fireground event.

If you have not had a chance to hear Battalion Chief (Ret.) Dave Dodson's lecture or watch his DVD *The Art of Reading Smoke*, you should do so. He has taken great efforts to disseminate this information to the fire service. He lectures on the topic at FDIC.¹ It is one of the best classes I have attended.

LISTEN

When smoke conditions limit your ability to see, defaulting to other senses helps you gain an overall picture of what is happening. Take a deep breath and hold it, eliminating the SCBA regulator noise, and listen. Pay attention for fire crackling, the sound of falling objects in a room as they lose structural integrity from a superheated atmosphere, and victims. Yell out for victims; they just might yell back.

Once you have established a sense of direction to the seat of

the fire, use the sound of the stream to assist in finding openings and identifying any holes or open stairwells. To locate doorways, open the bail completely and sweep the wall from one end to the other approximately two feet above the floor. As the stream passes through an opening, you should notice an audible change from that of water deflecting off a wall.

Moving the line higher across the wall (approximately five feet off the floor) will reveal the locations of windows. You will hear a distinct rattling noise when water hits a window-pane. It is important that you recognize this sound. If ventilation is desired, work the line vigorously in the general area until the glass fails. This is a very effective technique if the glass has been subjected to high temperatures. The water's rapid cooling effect in combination with the stream's force will usually cause it to fail. Conversely, you may not want to ventilate when operating in high winds or on elevated floors (i.e., high-rise operations). The premature failure of a window can cause fire to overrun crews, forcing them to forfeit the ground gained. In these circumstances, immediately redirect the line away if you hear that rattling sound.

To search for holes or open stairwells, sweep with the stream along the floor in front of your intended pathway, listening for audible differences. This will simultaneously clear debris (i.e., biological hazards like drug paraphernalia) and cool the floor for advancing crews, preventing knee burns.

FEEL

In zero-visibility situations, it is essential that you effectively recognize the physical environment and atmospheric conditions by feel. Foremost, sound the floor with a tool as far out in front of you as possible, to establish its structural integrity. If it is soft or spongy, you will need a different access point. While sounding for stability, place one hand on the floor to feel for elevated heat. Be mindful, however, that structural firefighting gloves will mask true heat levels because of their slow absorption properties. To accurately access subsurface temperatures to correlate with the building construction requires the use of a TIC. *Note:* Engineered wooden I-beams (TGIs) are affected at only 400°F vs. a traditionally framed floor of solid sawn wood joists. Numerous National Institute for Occupational Safety and Health (NIOSH) firefighter line-of-duty fatality reports have reported that firefighters have fallen into an inferno just a few feet inside the door (photo 3); they did not realize they were crawling over fire.

If you deem the floor stable, sweep the immediate area in front of and behind the door for potential victims. Make sure to sweep with your hand when searching for civilians. Searching with a tool makes it difficult to distinguish among the objects being touched. Use your tool to enhance reach by hooking it on the door jamb in hostile conditions (photo 4).

After establishing that the floor is stable, if the environment allows, stand up and check the overhead. Off to the side of the doorway, punch a small hole to expose fire or smoke conditions above, identify construction type and materials, and get an overall impression of the ceiling's height. Feel how the tool reacts on contact. Are you dealing with a drop ceiling, open joist construc-

tion, or gypsum board?

If it is gypsum, ask yourself how hard it was to poke through. If your tool goes through with relative ease, consider that a substantial heat source has been working on it. Think of overhaul in the fire room vs. an adjacent one. The wall board in the fire room is always softer. That is because high heat levels have drawn the water content out of the product, reducing it to a very weak chalklike substance.

If it is a drop ceiling, you have to anticipate the potential for unseen fire spread through the void space as well as the prospect of an entanglement hazard to crews if the ensemble of acoustic tiles and gridded framework gives way. This has happened without warning on numerous occasions during interior operations.

A concern associated with open-joint construction is that the structural components are left vulnerable to fire degradation by direct flame impingement. In both cases, you must monitor overhead conditions closely and adjust your fireground clock accordingly.

Knowing the ceiling height of the room in which you are operating is important to accurately evaluate heat levels and estimate a suitable fire flow. Unusually high ceilings may necessitate your doubling your fire flow calculations. If the ceiling is too high for you to make contact with it with your tool, the nozzle position should burp a short blast of water straight upward. Feel and listen for water to return. Did it return? How long did it take? Did it feel hot when it came back down? These are all clues indicating the factors that may be affecting the structural components.

Before entering, get a sense of how much heat is present. This will tell you if the area is tenable for victims and also give you a baseline to refer to when evaluating if interior conditions are improving or getting worse. Having a heightened awareness of the environmental temperature is crucial for early recognition of rapidly developing changes. If operating without a TIC, this may be the only precursor to flashover you will get in a zero-visibility situation.

SOME ADDITIONAL CONSIDERATIONS

Following are some final considerations my captain passed down to me:

- Look at your senior members. If things aren't right, it will probably come across in their demeanor.
- Listen to your crew members. If they give the impression they are concerned or articulate with more excitement than normal, ask yourself why.
- Don't ignore what you feel. Most firefighters who have experienced a near-miss will tell you they felt things weren't right prior to the event. This is likely your subconscious experience speaking to you. Ignoring it can prove fatal.

•••

I have performed an insufficient size-up of the fire area on more alarms than I would like to admit, because I responded controlled by adrenaline and excitement. This mentality was dangerous and could have unnecessarily endangered me and the crews with which I was operating. As fire professionals, we have an obligation to ourselves, the firefighters we fight alongside, and the people we protect to be more calculating in all our actions. Taking a few seconds to ask three simple questions poises us to make a better risk/benefit assessment, increasing the probability of a positive outcome to an otherwise chaotic situation: What do I see? What do I hear? What do I feel? ●

ENDNOTE

1. Dave Dodson's DVD *The Art of Reading Smoke* was released by Fire Engineering Books in 2007. His article of the same name was published in *Fire Engineering*, September 2005. His other works (Web casts, Web articles) may be found on fireengineering.com/.

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Notes

Interior Size-Up from the Door

COURSE EXAMINATION INFORMATION

To receive credit and your certificate of completion for participation in this educational activity, you must complete the program post examination and receive a score of 70% or better. You have the following options for completion.

Option One: Online Completion

Use this page to review the questions and mark your answers. Return to www.FireEngineeringUniversity.com and sign in. If you have not previously purchased the program, select it from the "Online Courses" listing and complete the online purchase process. Once purchased, the program will be added to your **User History** page where a **Take Exam** link will be provided. Click on the "Take Exam" link, complete all the program questions, and Submit your answers. An immediate grade report will be provided and on receiving a passing grade your "Certificate of Completion" will be provided immediately for viewing and/or printing. Certificates may be viewed and/or printed anytime in the future by returning to the site and signing in.

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COURSE EXAMINATION

- The author suggests before entering the fire area to pause, look, listen, and:
 - smell
 - feel
 - touch
 - think
- According to the author, multiple engaged locks is an indication of:
 - a high crime area
 - lack of police protection
 - an interior life hazard
 - a reason to call for the truck company
- In order to make better strategic decisions, *the author* suggests talking to occupants or:
 - view three sides of the building
 - conduct a PAR
 - debrief and assume command
 - do an interior size-up
- Once the door has been forced, you should first:
 - quickly move inside
 - call out to victims
 - move the hoseline in
 - get low and look into the structure
- If a thermal imaging camera is available, you should conduct a:
 - long, medium, and short view
 - low, medium, and high scan
 - "1,2,3" scan
 - "a, b, c" scan
- In order to understand the floor plan of a structure, firefighters must identify the construction type and:
 - the age of the occupants
 - the neighborhood
 - the proximity of exposures
 - the era when it was built
- When scanning the fire area, look for:
 - secondary means of egress
 - corridors
 - hallways
 - all of the above
- What might indicate the presence of the elderly?
 - key-operated deadbolts
 - wheelchairs
 - an Oldsmobile in the driveway
 - a child gate
- According to *the author*, drug paraphernalia might indicate:
 - a meth lab
 - teenagers
 - a vacant building
 - a fraternity house
- One question to ask yourself when scanning the fire area is to determine: is this a "contents fire" or a:
 - structure fire
 - hidden fire
 - masked fire
 - confined fire
- Fast-moving, thick, dark, and heat-pushed boiling smoke at a door opening may indicate:
 - an imminent flashover
 - a hoseline "pushing" smoke
 - floor collapse
 - roof collapse
- It is said, "let it blow..."
 - "...at the door"
 - "...before you go"
 - "...so you know"
 - "... as you know"

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PROGRAM COMPLETION INFORMATION

If you wish to purchase and complete this activity traditionally (mail or fax) rather than Online, you must provide the information requested below. Please be sure to select your answers carefully and complete the evaluation information. To receive credit, you must answer at least six of the eight questions correctly.

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First Name

Profession/Credentials License Number

Street Address

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TRADITIONAL COMPLETION INFORMATION:

Mail or fax completed answer sheet to
Fire Engineering University, Attn: Carroll Hull,
1421 S. Sheridan Road, Tulsa OK 74112
Fax: (918) 831-9804

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Should you have additional questions, please contact Pete Prochilo (973) 251-5053 (Mon-Fri 9:00 am-5:00 pm EST).

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Signature

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Please check the correct box for each question below.

- | | |
|---|---|
| 1. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 11. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 2. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 12. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 3. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 13. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 4. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 14. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
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| 10. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 20. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |

COURSE EVALUATION

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 1.

- | | | | | | |
|--|-------|---|---|-----|----|
| 1. To what extent were the course objectives accomplished overall? | 5 | 4 | 3 | 2 | 1 |
| 2. Please rate your personal mastery of the course objectives. | 5 | 4 | 3 | 2 | 1 |
| 3. How would you rate the objectives and educational methods? | 5 | 4 | 3 | 2 | 1 |
| 4. How do you rate the author's grasp of the topic? | 5 | 4 | 3 | 2 | 1 |
| 5. Please rate the instructor's effectiveness. | 5 | 4 | 3 | 2 | 1 |
| 6. Was the overall administration of the course effective? | 5 | 4 | 3 | 2 | 1 |
| 7. Do you feel that the references were adequate? | | | | Yes | No |
| 8. Would you participate in a similar program on a different topic? | | | | Yes | No |
| 9. If any of the continuing education questions were unclear or ambiguous, please list them. | _____ | | | | |

10. Was there any subject matter you found confusing? Please describe.

11. What additional continuing education topics would you like to see?

PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.

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