CHAPTER

17

The ISO at Training Drills and Events

Flames: © Ken LaBelle NRIFirePhotos.com

Knowledge Objectives

Upon completion of this chapter, you should be able to:

- List four safety-minded values that should be present for training drills. (p 248)
- List four nonincident events that can benefit from the assignment of a separate, dedicated safety officer. (p 248)
- Describe the preevent planning issues that a safety officer should cover with an instructor-in-charge. (p 249)
- Define *shadowing* and describe how it is part of a three-step approach to new ISO training. (pp 249–250)
- List the three training/exercise steps that should take place prior to a full-scale drill for non-fire-agency participants. (p 250)
- List at least seven items that should be included in a safety officer–prepared, predrill written safety briefing. (p 250)
- Describe the pros and cons of a no-notice drill, and list several guidelines that can be established to make a no-notice drill safer. (pp 253–254)
- Identify the steps that can be taken to reduce liabilities associated with live-fire firefighter training events. (pp 254–255)
- Define the instructor ratios and assignments that are mandated for live-fire training events. (pp 255, 259)
- Describe the makeup of a live-fire training safety team. (pp 259–260)

Skills Objectives

There are no ISO skills objectives for this chapter.

You Are the Incident Safety Officer

A large-scale house burn is being planned by the training division. Many mutual-aid departments have been invited, and planning is almost complete for the session. The training officer asks you to visit the site with him to review the water flow calculations and apparatus positioning planned for the training. The house is in an isolated area without any exposures or other hazardous conditions in the area. You walk up the narrow driveway and see that the house is in disrepair and appears to be in a fairly weakened state. The training officer is planning two interior evolutions on each floor of the building.

1. What NFPA standards exist to guide decision making and recommended practices for live-fire training? What is the most current edition of each of these standards?
2. How should the training officer proceed in the planning of this evolution? Would your department proceed with the training burn under these conditions? Can a reduced-scale evolution still have training benefit?

Introduction: Practice Makes Perfect?

The popular expression "practice makes perfect" is perhaps overused and may even set the stage for failure. The legendary professional football coach Vince Lombardi understood this when he said:

> Practice doesn't make perfect. Only perfect practice makes perfect.[1]

And while we are mentioning famous quotations, there is another one applicable to this chapter:

> We are what we repeatedly do.

This from the Greek philosopher, understudy of Plato, and advisor to Alexander the Great: Aristotle.[2] Fire department training drills (and other nonemergency planned events) are opportunities to set a positive, safety-minded approach that we use for actual incident response. The planning nature of each type of event creates an arena for a perfect "practice incident." The opportunity can extend to participating firefighters, officers, and safety officers. In fact, training drills and planned events can provide newly assigned or potential ISOs an opportunity to gain experience under the tutelage of an experienced one.

Some may argue that training drills should not bear the pressure of achieving perfection; they are for discovering and improving weaknesses in a safe environment. That point is well taken and brings up two more points.

First, the type of training practice we're talking about here has to do with *in-context* drills or evolutions as opposed to classroom lessons and skills introduction. Lombardi would introduce a new play on a chalkboard, let the players walk through it a few times, then have the players practice it in real time. The practice would continue until the play was repeated perfectly (practice 'til you can't get it wrong). Every drill opportunity is a practice incident, and we should do it until we can't get it wrong.

Second, the "safe environment" for discovery and improving weaknesses continues to be misapplied, as evidenced by the history of firefighter line-of-duty deaths (LODDs) associated with training activities. Research reveals an average of 10 training-related LODDs per year in the past 10 years.[3] The environment may not be as safe as we believe it to be.

This chapter is new to this text and is presented in response to the many comments and suggestions shared with the author since the book was first published. In it we will discuss the responsibilities of the incident safety officer (ISO) at fire department training activities, such as drills and live-fire events. Some of the information in this chapter is applicable to smaller nonemergency events like a planned local festival or small crowd event. Events that have the potential for large crowds, limited emergency access, or civil disturbances are beyond the scope of this chapter and typically involve a significant planning effort by fire department chief policy makers and emergency managers.

The Need for a Safety Officer at a Training Drill

There seems to be a resurgence of priority given to ongoing training as a primary responsibility of firefighters. Those of us who value training (and education) are jubilant! After all, "We are what we repeatedly do." Unfortunately, the increase in training drills also brings the potential for more injuries (and deaths) as well-meaning training officers and fire officers attempt to make that training more realistic. The potential has become reality in some cases. NFPA reports a steady increase in training-related firefighter injuries in the past 10 years: In 2004, 8.9% of all firefighter injuries were related to training activities; by 2013, the number had risen to 11.79%.[4] The use of an ISO at reality-based training drills seems prudent given the increase in injuries.

While training should be an organized, preplanned event designed to teach and reinforce *safe* accomplishment of skills, realism in training does make it more practical. Thus, some believe that the training and reinforcement of skills must be accomplished in an environment similar to that which firefighters will likely encounter (heat, smoke, changing conditions, high stress). Therein lies the foundation for injuries and fatalities. Given this inherent danger in training, it falls to the assigned training officer (TO), instructor-in-charge (IIC), and/or ISO at training events to reinforce the concept of *risk-taking*. In real operations, there are times when firefighters must take great risks, such as when making rescues. In the context of a planned training drill, there are no lives to save; therefore, risk-taking should be minimized. The TO, IIC, and ISO (or any officer,

for that matter) need to approach training with a safety-minded value system that includes some key overhead commitments:

- The safety of participants trumps performance expectations.
- Train in accordance with established standard operating procedures/guidelines (SOPs/SOGs), national standards, and best practices.
- Train only in environments that can be quickly controlled through preplanned and communicated protective measures.
- All participants are empowered to stop unsafe acts and alter any activity (for themselves or others) that presents an imminent threat of injury.

The responsibility for planning and safely conducting training activities lies with the IIC. Likewise, the company officer is the default IIC when a crew or company decides to conduct a spontaneous skills practice. In either case, the IIC is the *safety officer* for the training activity unless he or she delegates the safety function to a separate individual **FIGURE 17-1**. Certain training activities can benefit from the assignment of a separate individual, independent of the IIC, to serve as a safety officer. (For training drills, we will now call the ISO an SO.) The activities that can benefit from a separate SO should include:

- Live-fire training
- Full-scale drills involving multiple companies
- Multiagency drills
- Non-fire training evolutions involving some degree of inherent risk (rope rescue, dive/water rescue, collapse tunneling/shoring)
- Events that include multiple hands-on skill stations such as a hosted hands-on training seminar
- Nonemergency planned event like a small community festival.

In the case of live-fire training (e.g., dedicated burn building, exterior prop, acquired structure), the assignment of a separate, dedicated SO is mandatory according to NFPA 1403, *Standard on Live Fire Training Evolutions*. Similarly, some state and local laws require that a dedicated SO (separate from the IIC) be assigned for firefighter live-fire training drills **FIGURE 17-2**.

FIGURE 17-1 The assigned instructor at a training drill is the default SO for the activity unless the role has been delegated.

FIGURE 17-2 NFPA 1403 requires a dedicated SO, separate from the IIC, for firefighter live-fire training drills.

Courtesy of Clallam County Fire District 2

Let's look at the general responsibilities of the SO assigned to any type of training activity, and then we'll cover drills and live-fire training more specifically.

General Safety Officer Functions at Training Events

The functions of the SO at a training event can be similar to those at an actual incident, with a few notable adjustments. Using the *hazard MEDIC* mnemonic to remind the SO of his or her functions is, for the most part, applicable:

M = Monitor
E = Evaluate
D = Develop preventive measures
I = Intervene
C = Communicate

However, applying the MEDIC functions at a training event differs from actual incidents in several ways. Because training events typically are planned, the evaluation (*E*) of environmental conditions and the development of preventive measures (*D*) can be addressed prior to the actual training. For this reason, the SO should meet with the assigned IIC and do some pretraining planning. Likewise, the assigned SO has an opportunity to develop a safety briefing that should be shared with those participating. Ideally, the IIC and the SO should co-deliver the safety briefing to show unity and emphasize safety. They should agree on content, divide it up, and deliver it to the participants in a unified manner.

Safety Officer Pretraining Planning

The SO assigned to a training activity should invest in some preplanning to help ensure a safe, accident-free event. Acquired structure live-fire, full-scale, and multiagency drills will typically require planning meetings and several site visits

in preparation for the event (covered later). For most other training activities, the SO can meet with the IIC a few hours prior to the training. At a minimum, the SO and IIC should discuss and agree on the following:

- Training description
- Objectives
- Minimum personal protective equipment (PPE) required by the participants *and* instructors/assistants
- Rehabilitation needs, including EMS standby
- Rapid intervention crew (RIC) requirements
- Conditions that would terminate the training (e.g., weather, interruption by an actual incident)
- Communication methods and the signal used by anyone to stop the training

The SO should also tour the drill site and evaluate the hazards that are present. The site evaluation should be relatively simple for known department training facilities, although the evaluation should still be accomplished to check for serviceability, maintenance issues, varmint infestation, or other hazards. Drills conducted in places other than a known fire department facility will require more time to survey, evaluate, and prepare. Items to evaluate and address include:

- Permission/notification of person(s) responsible for the site
- Hazardous energy
- Lighting issues and trip/fall/sharp-edge hazards
- Traffic and parking issues
- Potential to draw onlookers
- Potential to do unintended damage (liabilities)
- Off-limits areas
- Water resources
- Asbestos/lead presence
- Number and location of fires
- Fire load
- Hazards such as holes in the floor, walls, or roof

Many issues can be addressed by simply flagging or zoning the hazard using marking tape. Red-and-white diagonally striped tape can be used to mark areas that are off limits to firefighters participating in the drill or to flag for hazardous energy. Solid yellow tape should be used to warn potential onlookers of hazards and to prevent their entry into dangerous areas. "Training in progress" or "exercise ahead" signs are a wise investment. They can advise potential onlookers of the activity and help reduce the number of inquiry calls to the dispatch center or department administration FIGURE 17-3.

Information and actions derived from the instructor meeting and site visit are then used to develop a safety briefing, which is delivered to the drill participants by the IIC and SO. As mentioned previously, the risk-taking level at a training incident should be minimized. The SO is wise to use the initial safety briefing to inform the participants that risk-taking should be reduced and that interventions will take place as warranted. Likewise, the SO should inform participants that there will be more emphasis placed on rehabilitation efforts, as strains/sprains and overexertion are the leading types of injuries at training events. The balance of the SO MEDIC functions can proceed as if the training activity were an incident.

FIGURE 17-3 "Training in progress" signs can help calm the public and reduce the number of inquiry calls to dispatch.

Training New Safety Officers

Departmental drills and evolutions provide a perfect environment to help prepare "rookie" ISOs for their functions. The methods of shadowing and coaching are particularly useful. Training and preparing new ISOs involve a three-step approach:

1. *Step 1: Introductory training.* New or prospective ISOs should be trained in a classroom environment that includes information front-loading and learning assessments (group projects and scenarios).
2. *Step 2: Shadowing.* Shadowing is a training approach in which a trainee closely observes experienced mentors as they perform their assigned duties. By allowing the ISO trainee to observe and interact with a mentor, the process allows the trainee to vicariously (and thus safely) experience live, evolving situations. It is important that the mentor focus more on the event taking place than on training the new ISO. Mentors are wise to not only set a good example (discipline, responsibility) but also verbalize some of their thoughts as they address the issues that they encounter. Shadowing is an often-missed step when training new people for a role.

3. *Step 3: Coaching.* Coaching and shadowing are different. Coaching places the trainee in the hot seat to perform ISO functions. The mentor becomes a watchful supervisor who encourages the trainee and advises him or her when a hazard issue goes unnoticed.

Ideally, the new ISO should experience shadowing and coaching at training drills and planned events first, then move to shadowing and coaching at actual incidents. At some point, the mentor should "sign off" that the ISO trainee can be assigned as a solo ISO at incidents and training events.

Specific Safety Officer Functions at Drills

The general functions covered so far apply to all training activities at which an SO is assigned. Certain training activities, such as multiagency drills and the so-called "no-notice" drills, present the potential for more safety issues and require the SO to do more preparation.

Multiagency Drills

The historical lessons of natural and human-caused disasters have compelled fire departments to work with multiple agencies in addressing the challenges of such events. The development of disaster plans (all-hazard emergency management plans), initial training, and the practice of exercises (drills) are ongoing, and now commonplace, processes in most communities. In many cases, the fire department (typically the department's emergency manager) serves as the lead coordinator for the many stakeholders involved in a disaster response/recovery. Some of the stakeholder agencies may not be accustomed to working within the framework of an incident management system (IMS) and may not fully understand the role of the SO within a supporting incident command system (ICS). Scheduling a full-scale disaster drill that involves these agencies is sure to be a disaster without careful planning, initial training, and skill-building exercises.

Predrill Preparation

The SO should be aware of the general training and stakeholder preparation steps needed to prepare for a full-scale, multiagency drill. Briefly, they include:

- *Initial indoctrination and classroom training.*
- *Table-top drill.* A representative from each agency attends and talks through a scenario.
- *Functional drill.* This no-pressure walk-through of a scenario includes the establishment of a command post, use of radio/communication links, and the response of involved agencies that stage, deploy, and simulate the accomplishment of their tasks. Most functional drills are done in street clothes or a duty uniform with no risk-taking or need for PPE.
- *Full-scale drill.* This takes the functional drill scenario to the next level and can include victim actors and actual performance of skill sets by responders using apparatus, PPE, props, and other resources to help achieve a level of realism.

As mentioned, the fire department's emergency manager will likely take the lead in facilitating the events listed above, often with the help of the department's training officer. The wise emergency manager should select an ISO-trained individual to serve as the SO for the upcoming drills. The selected SO is encouraged to be involved in every step of the preparation process. Doing so can help the SO anticipate and prepare preventive measures for hazards and safety issues that may eventually present themselves at the full-scale drill.

Once the logistical planning process begins for a full-scale drill, the SO should be in attendance at each meeting. During these meetings, the SO should be processing the information and decisions being made and mentally ask, "What could possibly go wrong if they do that?" Answering that question for various aspects of the drill becomes the substance of a drill safety plan FIGURE 17-4.

As the date of the full-scale drill approaches, the designated SO may have to evaluate props, deliver written predrill safety briefings, sign off on developed scenario and response plans, and recruit assistant safety officers (ASOs) to help ensure a safe and successful event. Of particular importance is the predrill safety briefing. In essence, the prebriefing, delivered before the drill date, is a tool to help the involved agencies and responders understand certain safety expectations. It has the added benefit of helping to create a positive safety attitude or culture. At a minimum, the safety prebriefing should include:

- A safety overview (expectations, risk-reduction philosophy)
- Chain of command and contact numbers
- A traffic plan (parking, staging, and apparatus movement areas)
- The level of PPE required for various functions
- Procedures for a true emergency or injury
- Expected hazards and the marking scheme used for zoning or flagging
- Responsibilities for each participant (e.g., be rested, hydrated, nourished)
- The rehabilitation resources that will be available
- The identification method used for SOs and drill monitors (vest or armband color) so that rapid recognition is possible in case assistance is needed

Full-scale, multiagency drills will likely exceed the abilities of a single SO to address the hazard MEDIC functions. Assembling and preparing a "safety team" is prudent. The safety team can include ASOs (trained and competent ISOs) as well as drill monitors (non-fire-trained assistants). The role of the drill monitors is to provide an easy-to-spot assistant who can answer questions or provide immediate communication to the drill coordinators and SO or ASOs. The monitors can also serve to help document observations. Clearly, the primary SO needs to brief monitors on reporting procedures and provide them with identification and communication tools.

Drill-Day Issues

Good planning, training, and predrill safety briefings should combine to make a safe and successful drill. Still, issues can

Training Safety Plan

Drill Date:	Time:	Shift:

Drill Location:

Type of Training: *(Check all that apply)*

☐	Fire Suppression	☐	EMS	☐	Technical Rescue
☐	Live Fire Training	☐	Vehicle/Machinery Extrication	☐	Hazardous Materials/WMD
☐	Driver Training	☐	Other Acquired Structure Training	☐	Water/Dive Rescue
☐	Apparatus Operation	☐	Preplan Survey or Simulation	☐	Physical Fitness Activity
☐	Other:				

Drill Risk Assessment: ☐ High ☐ Medium ☐ Low

Maximum Student/Instructor Ratio:		to		Safety Officer Needed: (Required on High Risk Drills)

Instructor PPE Requirements:

☐ SCBA	☐ Full PPE	☐ Helmet	☐ Eye Protection	☐ Filter Mask	☐ Hearing
☐ Gloves	☐ Radio	☐ Lights	☐ High Visibility Vest		

Drill Objective(s): *(Brief explanation of objectives)*

Description of Training: *(e.g., extricate victim from vehicle, victim search in limited visibility)*

PPE/Equipment Required for Each Participant: *(Check all that apply)*

☐	Helmet	☐	Personal Floatation Device
☐	Eye Protection	☐	Buoyancy Compensator
☐	Hearing Protection	☐	Mask/Snorkel/Fins
☐	Gloves (*Type*):	☐	SCBA
☐	Bunker Coat	☐	SCUBA
☐	Hood	☐	Other Respiratory Protection (Type):
☐	Bunker Pants	☐	Hazardous Materials CPC (Type):
☐	Safety Boots	☐	Radio
☐	Other (*Specify*):		

Department Related SOPs or Technical References: *(List number and name)*

☐	
☐	
☐	
☐	
☐	
☐	
☐	

FIGURE 17-4 A sample drill safety plan.

Courtesy of Forest Reeder

(continues)

Hazards and Control Measures: *(Check all hazards AND write in control measure)*			
	Atmospheric (e.g., smoke, dust, low oxygen):		Sewage/Septic:
	Combustible/Flammable Environment:		Sharp Edges/Objects:
	Confined Space:		Structural:
	Electrical:		Terrain:
	Elevation:		Traffic:
	Hazardous Substances (e.g., asbestos, chemicals):		Water:
	Nighttime Conditions:		Weather:
	Other:		

Accountability: *(Check all that apply)*	
	Buddy System
	Visual
	Passport
	Dive Master Control Sheet
	Other:

In Case of Emergency: *(Check all that apply)*	
	Code or Signal Used:
	RIT Assigned:
	ALS Standby:

Communications:	
	Radio—Primary Frequency:
	Radio—Secondary Frequency:
	Hand Signals
	Rope Line
	Lights
	Other:

Resources Assigned: *(Check all that apply AND fill in designated unit)*	
	Battalion Chief(s):
	Rehab Officer/Area:
	Rescue Unit(s):
	Safety Officer:
	Specialty Unit(s):
	Suppression Unit(s):
	Other Resources/Equipment:

Rehabilitation Plan: *(Describe rehabilitation plan and guidelines)*

Job Safety Analysis

1. Identify level of required PPE for each participant.

2. List basic steps required to safely complete evolution.

3. Identify potential accidents or hazards that may occur.

4. Determine recommended safe procedures.

Safety Planning Notes: *(e.g., site plan, drawings)*

Lead Instructor:	
Signature:	Date:
Reviewed by *(print)*:	
Signature:	Date:

FIGURE 17-4 A sample drill safety plan.

Courtesy of Forest Reeder

crop up and the ever-present Murphy's law can lead to unforeseen problems.

The SO will likely have to attend a drill-day meeting to get final instructions and to deliver a final safety message for the overhead team. He or she will need to plan time to have a separate final meeting with the safety team so that responsibilities, communications, and last-minute inspections of the drill site can be assigned and confirmed.

The SO may choose to keep a presence at the command post during the drill, depending on the number of ASOs assigned to fill the monitoring, evaluation, and intervention functions. History tells us that no drill is perfect and issues will arise. The SO and ASOs should not hesitate to make interventions! Remember, it is a training event, and injury prevention takes precedence over task completion or performance. Don't be afraid to terminate the drill (or a portion of the drill) if an unacceptable hazard or responder injury is presented. Common drill issues that require SO/ASO focus and interventions include:

- Weather-related problems
- Traffic congestion and apparatus movement
- Failure to rehabilitate (overexertion and strain/sprain prevention)
- Overzealous actors and/or responders
- Control zone discipline problems

As with incidents, the SO should address postincident responsibilities (covered in the *Postincident Responsibilities and Mishap Investigations* chapter) as the drill terminates. That includes circulating among crews and inquiring about their well-being. Likewise, the SO should have a postdrill huddle with ASOs and any monitors to collect their thoughts, being sure to take notes. Lastly, the SO must document actions and observations to help prepare for the formal, postdrill debriefing and/or critique.

Bonus time: If you replace the word "drill" with "planned event" in the preceding discussion, you have a perfect planning and delivery tool for SOs assigned to common community activities such as festivals, parades, concerts in the park, and small- to medium-sized gatherings (less than 500 people), all of which have the potential to challenge normal fire department incident responses.

No-Notice Drills

The "no-notice" drill has been, and may continue to be, a controversial doctrine among fire service officers. Although some professionals (chiefs and some TOs) support the basic evaluation-tool concept of no-notice drills, others (SOs and some TOs) question the spontaneity of the event.

There are two schools of thought at play here. The first school of thought can be seen in those TOs who practice no-notice drills with all the top-secret security of a *DEFCON 1* nuclear missile launch. They argue that the only way to truly evaluate whether firefighters know their stuff is to observe them acting spontaneously, with absolutely no notice or hint of the upcoming drills; after all, that's what they have to do at an actual incident. One corollary to this school is the chief administrator or officer who conducts a no-notice drill without even informing the TO or SO.

Members of the other school contend that no-notice drills undermine the learning process and, more often than not, emphasize "sneaky testing" versus improving. They go on to argue that a no-notice drill can be dangerous and that responders may take unnecessary risks or experience unnecessary stress. These safety-doctrine adherents would rather give full notice of upcoming drills and even schedule the exact time and place of the drill. Further, they may outline the expected evolution and the desired outcome and coach the participants to use a slow pace for drill accomplishment.

For our purposes, the two schools have been displayed at their extremes. The idea is to show that no-notice drills are controversial. Not surprisingly, they are criticized by those required to participate (line responders). However, perhaps a middle ground (or third school of thought) can help people accept the use of no-notice drills. In the words of Alan Brunacini, "Standard outcomes are a result of firefighters doing standard things in a standard, predictable way."[5] The quote is applicable to incident actions as well as the no-notice drill; the drill is merely a way of observing firefighters doing what they do. Couple this attitude with some simple preestablished guidelines, and the no-notice drill can become a *successful*, *safe*, and *minimal-stress* training tool. Preestablished guidelines for no-notice drills include the following:

1. *Make sure the drill has been previously presented as a training evolution that has been practiced by all potential responders.* Without a doubt, this is a key to eliminating the fear and apprehension of no-notice drills. Firefighters and fire officers who have had the opportunity to practice a given evolution tend to gain confidence in the proper learning environment. TOs should take advantage of successful training drill sessions to announce that the crew may be asked to perform the evolution in a no-notice drill in the future. Let the crew know how the drill will be announced and what to expect in the way of evaluation and critique.
2. *Don't wait for information "half-life."* Within a given department, firefighters will retain, gain, and lose skill, knowledge, and abilities over time. If a given evolution is practiced in March, it may not be appropriate to conduct a no-notice drill the following November if no opportunity to practice or perform the evolution has happened in between. This information half-life varies based on the complexity, necessity, and repetition of the evolution.
3. *Have a safety plan.* Writing out a department-recognized guideline or SOP regarding no-notice drills can establish safe practices and expected behavior before the drill is ever announced. Main components of that SOP/SOG include the following:
   - Preface initial radio dispatching using the phrase, "This is a drill." Follow-up radio transmissions should be prefaced with "drill message." If a radio message needs to be made that is outside the drill evolution, consider prefacing it with "real-world message."

- Apparatus response to the drill will be non-emergent, following all traffic laws (no lights or siren).
- Play as you've been trained: Do predictable things in a predictable way.
- Have a signal or phrase that *anyone* can use to terminate the drill because of a safety issue.

4. *Prenotify key personnel.* Department administrators, dispatchers, and allied agencies have real-world responsibilities and may not appreciate the interruption of a no-notice drill that might impact them.
5. *Use an SO.* A predesignated SO is essential for multicompany, complex, or multiagency no-notice drills. The SO should be part of the drill facilitation team and work the scene as he or she would an actual incident.
6. *If the drill involves live fire, scrap the no-notice approach.* Stick to safe guidelines (like NFPA 1403), careful safety planning, and participant prebriefings when dealing with live-fire events (or other drills that are inherently a higher risk).
7. *Be practical.* A relevant axiom would read "Leave your imagination at home." Most veteran fire officers have experienced the following scenario: They're told to respond to a no-notice drill involving the collision of a school bus and truck. The responders begin size-up and triage only to have a note handed to the incident commander (IC) explaining that the truck has released some unpronounceable chemical. After adjusting and dealing with that, the IC receives another note saying that a military jet just crashed into the accident scene. To compound things, mutual-aid companies are not available due to a multiple-alarm commercial fire. Spare us! Make the drill realistic with a chance for success. Keep the "surprises" minimal and practical. Save the doomsday imagination for table-top exercises.
8. ***Congratulate** before you **evaluate**.* This should be obvious. Nothing reinforces performance better than praise. If you believe that the drill performance was so bad that you want to give up TO/SO responsibilities and return to the backseat, maybe the crew wasn't ready (see number 1 above).

If practiced right, no-notice drills can be an effective reinforcement and evaluation tool for trainers and a practice tool for SOs. Perhaps these guidelines can help you reconsider the use of no-notice drills or help you be more successful with your current use of this evaluation and learning tool.

Safety Officer Functions for Live-Fire Training

Most firefighters will never forget their first working structure fire. Likewise, most fire academy graduates will never forget their first live-fire event in a burn house or acquired structure. The training can be that powerful. In many ways, live-fire training is the pinnacle of all fire training events. It can also be the most hazardous.

NFPA 1403, *Standard on Live Fire Evolutions*, has been developed to address the inherent dangers and risks associated with live-fire training. The standard should be mandatory reading for any SO or instructor involved with any form of firefighter live-fire training. Major topics covered within the standard include:

- General requirements
- Acquired structures
- Gas-fired live-fire training structures
- Non-gas-fired live-fire training structures
- Exterior live-fire training props

Of note within the general section are requirements for student prerequisites, a mandate for a designated SO (and responsibilities), IIC responsibilities, and planning/preparation procedures.

In some jurisdictions, instructors and SOs must be *certified* to perform those functions and must follow, by law, the requirements set forth in the standard when conducting live-fire training events. SOs *must* research and adhere to local and state laws, permit processes, and other requirements that might be applicable prior to any live-fire training activity. Where no requirements exist, the SO should, at a minimum, follow the 1403 standard. The reasons for this strict directive are founded in a history of deaths associated with live-fire training and the liabilities that may be incurred.

Safety Officer Liabilities at Live-Fire Training Events

If court case history is any indication, the liability for injury or loss resulting from a live-fire training incident will fall directly on the IIC *and* the designated SO.[6] An argument can be made that a designated SO is ultimately responsible for the safety of everyone participating at live-fire training. That argument is found by comparing the NFPA 1403 safety responsibilities for the IIC to those for the SO:

Instructor-in-Charge:

4.6.3 *It shall be the responsibility of the instructor-in-charge to coordinate overall fireground activities to ensure correct levels of safety.*

Safety Officer:

4.4.1 *A safety officer shall be appointed for all live fire training evolutions.*

4.4.3 *The safety officer shall have the authority, regardless of rank, to intervene and control any aspect of operations when, in his or her judgment, a potential or actual danger, potential for accident, or unsafe condition exists.*

4.4.4 *The responsibilities of the safety officer shall include, but not be limited to, the following:*

(1) Prevention of unsafe acts

(2) Elimination of unsafe acts

4.4.5 *The safety officer shall provide for the safety of all persons on the scene, including students, instructors, visitors, and spectators.*

This language differs significantly from ISO requirements and responsibilities for actual incidents (NFPA 1561). For incidents, the IC is ultimately responsible for the safety of all responders.

A finding of SO liability is more probable for live-fire training (versus IC liability for an incident) simply because training events are *planned* and actual incidents are not. NFPA 1403 can be viewed as a "nationally recognized standard of care" for live-fire training and includes many planning and preparation requirements to help minimize the chance of injuries or deaths. Failure to follow a recognized standard for a planned event is likely to be viewed as a form of negligence in the eyes of a judge or jury.

Fire Marks

ISFSI Live Fire Instructor Credential Program

The International Society of Fire Service Instructors (ISFSI) has developed a Live Fire Instructor Credential Program to address the responsibilities of instructors who facilitate and deliver live-fire training events. The program is designed to satisfy the live-fire training requirements found in NFPA standards 1231, 1402, 1403, and 1500. Its content is based on NFPA 1403, *Standard on Live Fire Training Evolutions*, and it references the textbook *Live Fire Training: Principles and Practice* by Jones and Bartlett Learning. After successful completion of the program, students are eligible for an area-specific ISFSI Live Fire Instructor Credential. The area-specific credentials are as follows:

1. Live Fire Instructor—Fixed Facility (online course plus an ISFSI-instructed hands-on academy program)
   - Gas Fire Facilities
   - Class A Facilities
2. Live Fire Instructor—Acquired Structure (online program only)
3. Live Fire Instructor—Instructor-in-Charge (online program only)

To enroll in the credentialing programs, candidates must already be certified as an Instructor I or higher and be a certified Firefighter II or higher. Credentialing lasts for three years but requires a minimum of 4 hours of live-fire or NFPA 1403 continuing education credits from ISFSI and a minimum of one (1) documented burn in each year (to maintain credentialed status).

The program can benefit anyone who is interested in making a difference in the creation and execution of a safe and controlled live-fire experience, including:

- Training officers
- Instructors
- Company officers
- Safety officers

More information can be found at the ISFSI website (http://isfsi.org/).

The point here is not to discourage the use of live-fire training or to scare an individual away from filling the role of the SO at those events. The path to minimizing SO injury and death liability for live-fire training can be found by following some simple guidelines:

- Know the content of NFPA 1403 and ensure that the IIC is adhering to its planning, preparation, and delivery requirements. (It contains many useful checklists!)
- Participate in the planning and preparatory activities.
- Perform the SO live-fire training functions with due diligence and good intent.
- Don't hesitate to intervene if you judge something to be unsafe or a potential for injury exists.
- Consider becoming *credentialed* as a live-fire training instructor (see the *Fire Marks* box).

Safety Officer Focus Areas for Live-Fire Training Events

Historical experience lessons and some suggestions can be added to the content and training information in NFPA 1403 to help the SO prevent injuries at the live-fire training event. These additions include building preparation, instructor issues, and the establishment of a safety team.

Building Preparation

Buildings that are designed and built for the purpose of live-fire training typically have minimal safety hazards that require SO evaluation and intervention. That is not to say the SO shouldn't inspect the structure prior to drills. NFPA 1403 includes a burn facility inspection sheet that can assist the SO.

Acquired structures require much more SO evaluation. There are two template forms in 1403 that are used for acquired structures: a site inspection worksheet that has "fill-in" space to document items such as building materials and wastes, and a live-fire evolution checklist FIGURE 17-5 that includes a section for training structure preparation. The IIC may have filled in the required information and "checked all the boxes," but many of the items are subjective. For example, one checklist item states, "Unnecessary inside and outside debris removed." Another directs that "All extraordinary exterior and interior hazards are remedied." These items are open to interpretation. The SO should consider the spirit of the checklist and ensure that items are satisfied that lead to prevention of mishaps and injuries.

Instructor Issues

The IIC is responsible for assigning additional instructors as necessary to ensure a ratio of one instructor to a maximum five students (1:5 ratio); a ratio of 1:3 is better FIGURE 17-6. All instructors must be familiar with NFPA 1403 and be approved by the department (or other regulatory jurisdiction) to serve as a live-fire instructor. Additionally, the instructors need to be

LIVE FIRE EVOLUTION SAMPLE CHECKLIST

PERMITS, DOCUMENTS, NOTIFICATIONS, INSURANCE.

____ 1. Written documentation received from owner:
- ❑ Permission to burn structure
- ❑ Proof of clear title
- ❑ Certificate of insurance cancellation
- ❑ Acknowledgment of post-burn property condition

____ 2. Local burn permit received
____ 3. Permission obtained to utilize fire hydrants
____ 4. Notification made to appropriate dispatch office of date, time, and location of burn
____ 5. Notification made to all affected police agencies:
- ❑ Received authority to block off roads
- ❑ Received assistance in traffic control

____ 6. Notification made to owners and users of adjacent property of date, time, and location of burn
____ 7. Liability insurance obtained covering damage to other property
____ 8. Written evidence of prerequisite training obtained from participating students from outside agencies

PREBURN PLANNING.

____ 1. Preburn plans made, showing the following:
- ❑ Site plan drawing, including all exposures
- ❑ Floor plan detailing all rooms, hallways, and exterior openings
- ❑ Location of command post
- ❑ Position of all apparatus
- ❑ Position of all hoses, including backup lines
- ❑ Location of emergency escape routes
- ❑ Location of emergency evacuation assembly area
- ❑ Location of ingress and egress routes for emergency vehicles

____ 2. Available water supply determined
____ 3. Required fire flow determined for the acquired structure/live fire training structure/burn prop and exposure buildings
____ 4. Required reserve flow determined (50 percent of fire flow)
____ 5. Apparatus pumps obtained that meet or exceed the required fire flow for the building and exposures
____ 6. Separate water sources established for attack and backup hose lines
____ 7. Periodic weather reports obtained
____ 8. Parking areas designated and marked:
- ❑ Apparatus staging
- ❑ Ambulances
- ❑ Police vehicles
- ❑ Press vehicles
- ❑ Private vehicles

____ 9. Operations area established and perimeter marked
____ 10. Communications frequencies established, equipment obtained

TRAINING STRUCTURE PREPARATION.

____ 1. Training structure inspected to determine structural integrity
____ 2. All utilities disconnected (acquired structures only)
____ 3. Highly combustible interior wall and ceiling coverings removed
____ 4. All holes in walls and ceilings patched
____ 5. Materials of exceptional weight removed from above training area (or area sealed from activity)
____ 6. Ventilation openings of adequate size precut for each separate roof area
____ 7. Windows checked and operated, openings closed
____ 8. Doors checked and operated, opened or closed, as needed
____ 9. Training structure components checked and operated:
- ❑ Roof scuttles
- ❑ Automatic ventilators
- ❑ Mechanical equipment
- ❑ Lighting equipment
- ❑ Manual or automatic sprinklers
- ❑ Standpipes

____ 10. Stairways made safe with railings in place
____ 11. Chimney checked for stability
____ 12. Fuel tanks and closed vessels removed or adequately vented
____ 13. Unnecessary inside and outside debris removed
____ 14. Porches and outside steps made safe
____ 15. Cisterns, wells, cesspools, and other ground openings fenced or filled

FIGURE 17-5 Live Fire Evolution Sample Checklist from NFPA 1403 (2012). (continues)

LIVE FIRE EVOLUTION SAMPLE CHECKLIST *(continued)*

____ 16. Hazards from toxic weeds, hives, and vermin eliminated
____ 17. Hazardous trees, brush, and surrounding vegetation removed
____ 18. Exposures such as buildings, trees, and utilities removed or protected
____ 19. All extraordinary exterior and interior hazards remedied
____ 20. Fire "sets" prepared:
- ❑ Class A materials only
- ❑ No flammable or combustible liquids
- ❑ No contaminated materials

PREBURN PROCEDURES.

____ 1. All participants briefed:
- ❑ Training structure layout
- ❑ Crew and instructor assignments
- ❑ Safety rules
- ❑ Training structure evacuation procedure
- ❑ Evacuation signal (demonstrate)

____ 2. All hose lines checked:
- ❑ Sufficient size for the area of fire involvement
- ❑ Charged and test flowed
- ❑ Supervised by qualified instructors
- ❑ Adequate number of personnel

____ 3. Necessary tools and equipment positioned

____ 4. Participants checked:
- ❑ Approved full protective clothing
- ❑ Self-contained breathing apparatus (SCBA)
- ❑ Adequate SCBA air volume
- ❑ All equipment properly donned

POSTBURN PROCEDURES.

____ 1. All personnel accounted for
____ 2. Remaining fires overhauled, as needed
____ 3. Training structure inspected for stability and hazards where more training is to follow (see Training Structure Preparation)
____ 4. Training critique conducted
____ 5. Records and reports prepared, as required:
- ❑ Account of activities conducted
- ❑ List of instructors and assignments
- ❑ List of other participants
- ❑ Documentation of unusual conditions or events
- ❑ Documentation of injuries incurred and treatment rendered
- ❑ Documentation of changes or deterioration of live fire training structure
- ❑ Acquired structure release
- ❑ Student training records
- ❑ Certificates of completion

____ 6. Building and property released to owner release document signed

RELEASE FORM

Having agreed with the Building Official, City of _____, that a structure owned by me and located at _____ is unfit for human habitation and is beyond rehabilitation, I further agree that the structure should be demolished. In order that demolition may be accomplished, I give my consent to the City of _____ to demolish, by burning or other means, the said structure.

I further release the City of _____ from any claim for loss resulting from such demolition.

Fire Department _____
Address _____
City, State _____
Date _____
Owner/Agent _____
Owner/Agent _____
Witness _____

(continues)

FIGURE 17-5 Live Fire Evolution Sample Checklist from NFPA 1403 (2012).

RESPONSIBILITIES OF PERSONNEL

INSTRUCTOR-IN-CHARGE

____ 1. Plan and coordinate all training activities
____ 2. Monitor activities to ensure safe practices
____ 3. Inspect training structure integrity prior to each fire
____ 4. Assign instructors:
- ❑ Attack hose lines
- ❑ Backup hose lines
- ❑ Functional assignments
- ❑ Teaching assignments

____ 5. Brief instructors on responsibilities:
- ❑ Accounting for assigned students
- ❑ Assessing student performance
- ❑ Clothing and equipment inspection
- ❑ Monitoring safety
- ❑ Achieving tactical and training objectives

____ 6. Assign coordinating personnel, as needed:
- ❑ Emergency Medical Services
- ❑ Communications
- ❑ Water supply
- ❑ Apparatus staging
- ❑ Equipment staging
- ❑ Breathing apparatus
- ❑ Personnel welfare
- ❑ Public relations

____ 7. Ensure adherence to this standard by all persons within the training area

INSTRUCTOR

____ 1. Monitor and supervise assigned students (no more than five per instructor)
____ 2. Inspect students' protective clothing and equipment
____ 3. Account for assigned students, both before and after evolutions

SAFETY OFFICER

____ 1. Prevent unsafe acts
____ 2. Eliminate unsafe conditions
____ 3. Intervene and terminate unsafe acts
____ 4. Supervise additional safety personnel, as needed
____ 5. Coordinate lighting of fires with instructor-in-charge
____ 6. Ensure compliance of participants' personal equipment with applicable standards:
- ❑ Protective clothing
- ❑ Self-contained breathing apparatus (SCBA)
- ❑ Personal alarm devices, where used

____ 7. Ensure that all participants are accounted for, both before and after each evolution

STUDENT

____ 1. Acquire prerequisite training
____ 2. Become familiar with building layout
____ 3. Wear approved full protective clothing
____ 4. Wear approved SCBA
____ 5. Obey all instructions and safety rules
____ 6. Provide documentation of prerequisite training, where from an outside agency

FIGURE 17-5 Live Fire Evolution Sample Checklist from NFPA 1403 (2012).

FIGURE 17-6 Live-fire training should not exceed a 1:5 instructor-to-student ratio. A ratio of 1:3 is better!

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assigned such that no less than one instructor is in a position to directly supervise the following:

- Each functional crew (e.g., attack, ventilation, search)
- Each backup line
- Outside students (uninvolved or staged students awaiting rotation)

Additionally, a fire control team must be established that includes a minimum of two qualified firefighters (not a student or the SO). One of the members of the fire control team is designated as the *ignition officer* and is responsible for starting the fire. The other member serves as a ready observer (in full PPE) to rescue the ignition officer if something goes wrong. In most cases, the fire control team supervises the fuel delivery and setup process for repeated or rotational fire sets. The SO must serve as a "quality control" officer to make sure these instructor/fire control team requirements are maintained as part of the monitoring/evaluation function. The SO is also responsible for giving the ignition officer and IIC a final go/no-go signal for each fire set.

An area that bears SO attention—and is not specifically addressed in the 1403 standard—deals with instructor rehabilitation. Making rehabilitation provisions available for all participants (students and instructors) is the responsibility of the IIC, and assistant instructors are usually good at making sure their students rotate to rehabilitation. Too often, though, the instructors themselves don't rotate to rehabilitation. There are many historical, anecdotal, and research cases where live-fire instructors were found to have dangerously high core temperatures, overexertion symptoms, and dehydration (see the *Safety Tip* box). The SO needs to intervene as necessary to make sure instructors are also rotating to rehabilitation.

Safety Team Establishment

While not required by NFPA 1403, some live-fire training specialists[7] establish a safety team to help manage the training evolution. The safety team typically comprises:

Safety Tip

ALERT! Instructor Rehab

Providing rehabilitation resources for students participating at live-fire events is essential, and rehab is likely enforced and reinforced by event instructors. An irony exists when the live-fire instructors themselves don't adequately partake in rehab. In one example, a veteran live-fire instructor of thousands of live-fire drills (over a 10-year span) developed a heart condition that was directly attributed to repeated exposure to elevated core temperatures and dehydration. This instructor is known to be in outstanding physical condition with a calm, self-deprecating nature and possessing instructor skills that are above reproach. Still, the heart condition and subsequent surgery almost ended the instructor's fire service career as a suppression company officer and regional fire school instructor.

The need for live-fire instructor rehab, including active cooling, hydration, electrolyte replacement, and nourishment, cannot be overemphasized. In fact, an argument can be made that instructors who cycle multiple students through repeated fires in a burn facility are in need of more rehab than the students themselves.

When assigned as the SO at live-fire drills, you should monitor rehab efforts for all participants—including the instructors. A friendly (and discrete) reminder may be all that is needed. Oh, and don't forget to be the *example* and rehab yourself!

- The designated SO
- An experienced interior standby team that includes an officer, nozzle person, and door control person (no students)
- An outside building monitor who is dedicated to evaluating structural issues, smoke flow paths, and fire behavior
- A fuel shutoff officer (for facilities with gas-fired devices) or a fuel-set supervisor (for repeated class A fuel fires)
- An ignition officer (the ignition officer and fuel shut-off officer serve as the NFPA 1403-required fire control team)

The benefits of a safety team are numerous—the most obvious being the interior standby team (independent of instructors or students) that is ready to make an immediate fire suppression or rescue intervention should something go wrong. The SO is wise to establish a safety team (especially for acquired structures) to help maximize safety efforts. An ICS-inspired organization chart that shows the reporting relationship of the IIC, SO, safety team, and other training participants is shown in FIGURE 17-7.

The SO functions, liabilities, and focus areas for live-fire training evolutions presented in this chapter are not meant to replace the requirements and responsibilities contained in NFPA 1403. Rather, the intent is to highlight certain areas and make recommendations to enhance the standard and help improve an SO's ability to prevent training-related mishaps, injuries, and deaths.

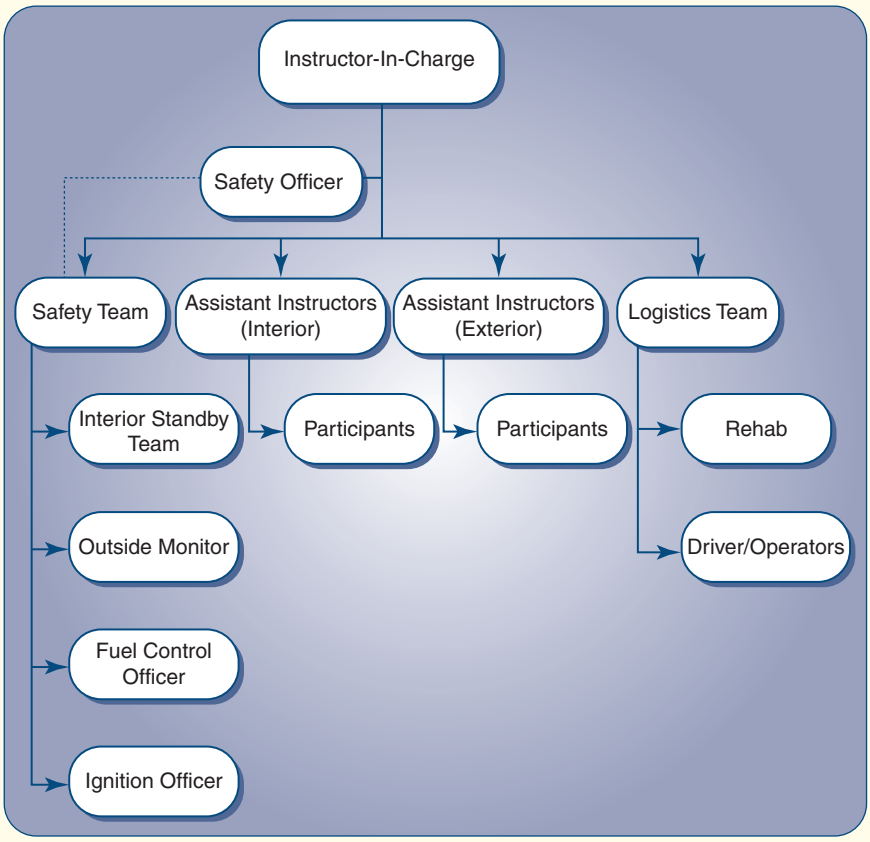

FIGURE 17-7 Sample ICS organization chart for a live-fire training drill.

Wrap-Up

Chief Concepts

- The preplanned nature of training activities provides an opportunity for "practice incidents" to help develop firefighters, officers, and SOs.
- On average, 10 training-related LODDs occur every year. Further, the rate of injuries at training events has been growing over the past 10 years: 8.9% of all injuries in 2004 compared to 11.8% in 2013.
- All fire officers should be committed to four safety-minded values during training events: (1) Safety trumps performance expectations, (2) train in accordance with established SOPs/SOGs and national standards, (3) train only in environments that can be quickly controlled through preplanned measures, and (4) empower everyone with the responsibility to stop unsafe acts.
- Nonincident activities that can benefit from the assignment of a separate, dedicated SO include live-fire training (SO required), full-scale multiagency drills, inherently risky training activities (such as rope rescue drills), and events that include multiple skill stations that participants rotate through.
- The SO and instructor-in-charge (IIC) of a training event should preplan training events together and agree on the training description and objectives, minimum PPE required by instructors/participants, rehabilitation needs, RIC requirements, termination triggers (weather, etc.), and communication methods used by anyone to stop the training.
- Shadowing is a training approach in which a trainee closely observes experienced mentors performing their assigned duties. The concept of shadowing is part of a three-step approach when training and preparing new ISOs: introductory classroom training, shadowing, and coaching (where the ISO trainee is supervised while filling the role).

- Multiagency drills can include participants who are not familiar with ICS or the role of the SO. Therefore it is best to prepare them for a full-scale drill by first exposing them to a three-step training/exercise process that includes initial classroom indoctrination followed by a table-top drill (talk-through in a classroom) and then a functional drill (walk-through using a command post, use of radio/communication links, and the response of involved agencies who stage, deploy, and simulate the accomplishment of their task).
- Multiagency drills benefit from a predrill, written safety briefing (developed by the SO) that includes items such as a traffic plan, level of PPE required for various roles, expected hazards and defined control zones, rehabilitation measures, and participant responsibilities.
- The SO assigned to a multiagency drill should not hesitate to intervene when any situation is deemed an unacceptable hazard. Common drill-related intervention issues include weather-related problems, traffic, failure to rehabilitate, and overzealous actors or participants.
- The SO processes used to plan and perform duties for a multiagency drill can be equally applied to planned, nonemergency events like festivals, parades, park concerts, and small-crowd gatherings that have the potential to challenge normal fire department incident responses.
- No-notice drills typically induce participant stress and may be viewed as unsafe. When performed, simple guidelines that are contained in written SOPs/SOGs can help lead to a successful, safe, and minimally stressful event.
- NFPA 1403, *Standard on Live Fire Evolutions*, addresses the inherent dangers and risks associated with live-fire training. Any SO or instructor involved with any form of firefighter live-fire training must adhere to this standard.
- The SO must provide for the safety of all persons on the scene of a live-fire training event, including students, instructors, visitors, and spectators (NFPA 1403). This requirement leads to the potential of SO liability if a mishap, injury, or death occurs. The following steps will reduce SO liability:
  1. Know the content of NFPA 1403 and ensure that the IIC is adhering to its planning, preparation, and delivery requirements.
  2. Participate in planning and preparations activities that are managed by the IIC.
  3. Perform the SO live-fire training functions with due diligence and good intent.
  4. Don't hesitate to intervene if you judge something to be unsafe or a potential for injury exists.
  5. Consider becoming credentialed as a live-fire training instructor through the ISFSI live-fire training credential program.
- Focus areas for the designated SO at live-fire training events include building preparation (especially for acquired structures), instructor requirements, and the creation of a safety team.
- The IIC is responsible for maintaining an instructor-to-student ratio of 1:5 (maximum); 1:3 is better. A separate instructor is required for each functional crew (e.g., attack, ventilation, search), for each backup line, and for outside crews awaiting rotation. The IIC must also designate a two-person *fire control team.* The SO serves as a quality control officer to make sure these requirements are met.
- Live-fire instructors exposed to multiple fire evolutions (rotating student groups through repeated drills) are candidates for dangerously high core temperatures and dehydration. The SO should pay particular attention to instructor rehab and provide discreet rehab reminders to help prevent acute and chronic health issues.
- The wise SO will establish a live-fire *safety team*, comprising an interior standby team (experienced officer and two firefighters), an outside monitor for building and smoke conditions, a fuels-control officer, and an ignition officer.

Key Terms

fire control team A minimum of two qualified firefighters (not a student or the safety officer) used as an ignition officer and a ready observer (in full PPE) to rescue the ignition officer should something go wrong at live-fire trainings.

safety team When applied to live-fire training, a team comprising the designated safety officer; an experienced interior standby team made up of an officer, nozzle person, and door control person; an outside building monitor; a fuel shutoff officer or a fuel-set supervisor; and an ignition officer.

shadowing A training approach in which a trainee closely observes experienced mentors performing their assigned duties.

Review Questions

1. List four planned, nonincident events that can benefit from the assignment of a separate, dedicated SO.
2. What are the planning issues that the SO should cover with an instructor-in-charge?
3. What is meant by *shadowing*, and how does it fit into a process to train new ISOs?
4. List the three training/exercise steps that should take place prior to a full-scale drill for non-fire-agency participants.

5. What steps can be taken to minimize stress and improve the safety of no-notice drills?
6. Identify the steps that can be taken to reduce liabilities associated with live-fire firefighter training events.
7. Define the instructor ratios and assignments that are mandated for live-fire training events.
8. What is a live-fire training safety team and who should it include?

References and Additional Resources

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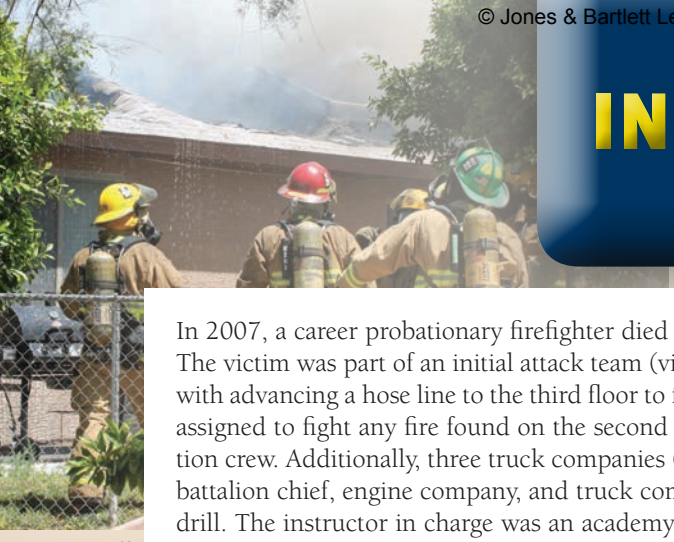
5 Brunacini, Alan. Quote from an International Fire Department Instructors Conference 2013 workshop. Verified via personal contact January 2015.

6 *People v. Baird*, 2 A.D.3d 1433, 768 N.Y.S.2d 88, 2003 N.Y. Slip Op. 20227. The IIC of a live-fire training event was found guilty of criminally negligent homicide following the death of firefighter participant.

7 The title *live-fire training specialist* refers to veteran fire instructors who are well versed in NFPA 1403 and provide live-fire training services to fire departments or regional training academies on a contract or reciprocal basis. Many are certified and/or credentialed.



Smoke: © Greg Henry/ShutterStock, Inc.

INCIDENT SAFETY OFFICER *in action*

In 2007, a career probationary firefighter died while participating in a live-fire drill in a condemned, three-story townhome. The victim was part of an initial attack team (victim plus three recruit students), led by an adjunct instructor, and was tasked with advancing a hose line to the third floor to find and extinguish any fire found on the third floor. A second attack team was assigned to fight any fire found on the second floor. An academy instructor and three students served as the rapid intervention crew. Additionally, three truck companies (each with an instructor and three or four students) participated in the drill. A battalion chief, engine company, and truck company (fully staffed, no students) were on scene but did not participate in the drill. The instructor in charge was an academy instructor lieutenant. A medic unit with two paramedics served in a standby role on scene.

A total of nine fires were set (one on the first floor, six on the second floor, and two on the third floor) using wood pallets and excelsior bales. The victim's team was instructed to bypass any fire they found on the second floor. As the drill proceeded, the initial attack team encountered heavy fire conditions on the second floor and the stairwell to the third floor. The adjunct instructor knocked down some of the second floor fire so they could proceed to the third floor. As they reached the third floor, they found moderate heat and gray smoke, but no visible fire. The other initial attack team members were assisting with hose advancement in the stairway as the victim and instructor searched for the fire.

The second attack team became delayed as they needed to add hose sections to reach the second floor. The second attack team also encountered fire conditions on the first floor, which furthered delayed their advancement to the second floor. Subsequently, a team assigned to truck functions placed an extension ladder to a second floor window for ventilation. Once opened, fire immediately blew from the window.

Conditions in the stairwell between the second and third floors deteriorated rapidly causing the initial attack team back-up members to seek shelter on the third floor (one member receiving burns). As the third floor became untenable, the instructor and one backup team member escaped out a third floor window and onto the roof of the second floor. The victim became stuck in the same window, which was 41 inches above the landing floor. The instructor tried several times to free the victim who was now screaming as flames vented out the same window. The second attack team controlled the fire in the stairwell, and their adjunct instructor raced up the stairs to the third and assisted in freeing the victim who had become unresponsive. He then went downstairs and summoned the second attack crew to come fight the growing fire on the third floor. The victim was immediately transported to a trauma center and then pronounced dead. The initial attack team adjunct instructor and one back-up team member received first, second, and third degree burns to various body parts.

The investigation into this incident revealed numerous NFPA 1403 noncompliance issues including:

- Inadequate preparation of the acquired structure
- Too many fire sets in multiple locations
- Absence of pre-burn briefings and walk-through
- Extensive fuel loads
- Adjunct instructors who did not meet minimum instructor training requirements for live-fire evolutions

1. What additional NFPA 1403 noncompliance issues seem to have contributed to this case study?
2. How could the resources present at this drill be better assigned to help prevent injuries and deaths?
3. What does NFPA 1403 mandate as the minimum instructor-to-student ratio for live-fire evolutions?
   - **A.** 1:3
   - **B.** 1:5
   - **C.** 1:7
   - **D.** 1:10
4. A live-fire safety officer should establish a safety team that includes which of the following?
   - **A.** Instructor rehab crew
   - **B.** Exterior rapid intervention crew (minimum of an instructor and three students)
   - **C.** Interior standby team (no students)
   - **D.** Instructor in charge

Note: This case study was developed from NIOSH Firefighter Fatality report #2007-09 available at www.cdc.gov/niosh/fire.