

## **Alaska Standard for Live Fire Training Evolutions**

**Alaska Fire Standards Council**

**Reference Document:** This Standard is based in part on the “Standard on Live Fire Training Evolutions”, NFPA 1403, National Fire Protection Association, 2002 edition. Cross-references to specific NFPA 1403 paragraphs are provided in parenthesis.

**Scope:** This Standard identifies the minimum requirements for training personnel engaged in firefighting operations under live fire conditions.

**Purpose:** The purpose of this standard is to provide a process for conducting live fire training evolutions to ensure that they are conducted in safe facilities and that the exposure to health and safety hazards for the trainees is minimized. Procedures for live fire training evolutions that involve marine structures and ground cover or wildland fires are not addressed in this standard. (1.1, 1.2)

### **Definitions:**

**Acquired Prop:** A piece of equipment such as an automobile that was not designed for burning but is used for live fire training evolutions. (3.3.1)

**Acquired Building:** A structure acquired by the authority having jurisdiction from a property owner for the purpose of conducting live fire training evolutions. (3.3.2.1)

**Applicable:** As defined/determined by the Authority Having Jurisdiction. (no ref.)

**Authority Having Jurisdiction (AHJ):** The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure. Depending on the context of the term as well as the local or statutory authority with respect to the issue, this may include the local Fire Chief, Training and Education Bureau, Alaska State Fire Marshal, Alaska Fire Standards Council, etc. (3.2.1)

**Demonstration:** The act of showing a skill. (3.3.3)

**Evolution:** A set of prescribed actions that result in an effective fireground activity. (3.3.4)

**Instructor:** An individual qualified by the authority having jurisdiction to deliver fire training, and who has the training and experience to supervise students during live fire training evolutions. (3.3.5)

**Instructor-in-Charge:** An individual qualified as an instructor and designated by the authority having jurisdiction to be in charge of the live fire training evolution. (3.3.6)

**Live Fire:** Any open flame or device that can propagate fire to the building or other combustible materials. (3.3.7)

**Participant:** Any student, instructor, safety officer, visitor, or other person who is involved in the live fire training evolution within the operations area. (3.3.8)

**Safety Officer:** An individual appointed by the authority having jurisdiction as qualified to maintain a safe working environment at all live fire training evolutions. (3.3.9)

**Shall:** Indicates a mandatory requirement. (3.2.2)

**Should:** Indicates a recommendation or that which is advised but not required. (3.2.3)

**Student:** Any person who is present at the live fire training evolution for the purpose of receiving training. (3.3.10)

**Training Center Burn Building:** A structure specifically designed for conducting live fire training evolutions on a repetitive basis. (3.3.2.2, A3.3.2.2)

**Student Prerequisites:** Prior to being permitted to participate in live fire training evolutions, the student shall have received training to meet the applicable job performance requirements for Firefighter I in NFPA 1001, Standard for Fire Fighter Professional Qualifications, related to the following subjects:

- (1) Safety
- (2) Fire Behavior
- (3) Personal Protective Equipment

(4.1.1, 5.1.1, 6.1.1, 7.1.1, 8.1.1)

Additionally, the student shall have received training meeting the job performance requirements for Firefighter I in NFPA 1001, Standard for Firefighter Professional Qualifications, applicable to the training being delivered. For example, if the live training involves the use of portable fire extinguishers, then training addressing the job performance requirements for portable fire extinguishers would be appropriate. Similarly, if the training involves the use of handlines, then training in the applicable job performance requirements for hose, appliances, and fire streams, would be appropriate.

Prior to the live fire training evolution, the authority having jurisdiction shall identify the additional student training prerequisites necessary to insure a safe and productive training opportunity for the student. Only students meeting these prerequisites shall be allowed to participate in the live fire training evolution.

Students participating in a live fire training evolution who received the minimum training requirements specified above (and by the sponsoring agency) from other than the agency sponsoring/delivering the training shall present written evidence of having successfully completed the prescribed training prior to being permitted to participate in any live fire training evolution. (4.1.2, 5.1.2, 6.1.2, 7.1.2, 8.1.2)

**Safety:**

A designated Safety Officer shall be appointed for all live fire training evolutions. (4.4.1, 5.4.1, 6.4.1, 7.4.1, 8.4.1)

The safety officer shall have the authority, regardless of rank, to intervene and control any aspect of the operations when, in his or her judgement, a potential or actual danger, accident, or unsafe condition exists. The responsibilities of the safety officer shall include, but not be limited to, the prevention of unsafe acts and the elimination of unsafe conditions. (4.4.2, 4.4.3, 5.4.2, 5.4.3, 6.4.2, 6.4.3, 7.4.2, 7.4.3, 8.4.2, 8.4.3)

The safety officer shall provide for the safety of all persons on the scene including students, instructors, visitors, and spectators. The safety officer shall not be assigned other duties that interfere with safety responsibilities.

(4.4.4, 4.4.5, 5.4.4, 5.4.5, 6.4.4, 6.4.5, 7.4.4, 7.4.5, 8.4.4, 8.4.5)

The safety officer shall be knowledgeable in the operation and location of safety features available within the burn building or inherent to the training prop, such as emergency shut-off switches, fuel shut-off valves, evacuation alarms, emergency exits, etc.

(5.4.6, 6.4.6, 8.4.6)

The Safety Officer shall be responsible for ensuring an accountability system is in place appropriate for the evolutions to be performed, that a Rapid Intervention Team (RIT) is established and utilized as appropriate, and that an ICS system is established for the management of the training activities.

The instructor-in-charge of the live fire training evolutions shall determine, prior to each evolution, the number of training attack lines and back-up lines that are necessary. The appropriate quantity and flow rates that are needed for fire control and extinguishment should be determined in advance, and certain factors such as equipment, manpower, fire area, and topography should be taken into consideration.

(4.4.6, 5.4.7, 6.4.7, 7.4.7, 8.4.7, A4.4.6)

Back-up lines shall be provided to ensure protection for personnel on training attack lines. Note: The backup line requirement for live fire training evolutions involving exterior fire attack from a “safe” distance such as that conducted for the Rural Basic Firefighter or live incipient level training, may be waived at the discretion of the authority having jurisdiction.

(4.4.6.2, 5.4.7.2, 6.4.7.1, 7.4.6, 8.4.7.2)

The instructor-in-charge shall assign the following personnel:

- One instructor to each functional crew, not to exceed 5 students.
- One instructor to each backup line.
- Additional personnel as necessary to backup lines to provide mobility.
- One additional instructor for each additional functional assignment
- One safety person to each manually activated safety station where provided.

(4.4.7, 5.4.7.3, 6.4.7.3, 7.4.7.2, 8.4.8)

Additional safety personnel, as deemed necessary by the safety officer, shall be located strategically within the area to react to any unplanned or threatening situation or condition. Additional safety personnel can be necessary to watch for signs of fire in voids, concealed spaces, and exit paths at acquired structures. Where fire is discovered in any of these areas, the operation should cease as a training exercise and should be treated as a working structure fire.

(4.4.8, 5.4.8, 6.4.8, 7.4.8, A4.4.8)

A method of fireground communications shall be established to enable coordination among the incident commander, the interior and exterior sectors, the safety officer, and external requests for assistance.

(4.4.9, 5.4.9, 6.4.9, 7.4.9, 8.4.9)

For live fire training involving structures, a building evacuation plan shall be established, including an evacuation signal to be demonstrated to all participants involved in an interior live fire training evolution. Participants involved in the live fire training evolution should be instructed to report to a predetermined location for a roll call if evacuation of the building is signaled. Instructors should immediately report any personnel not accounted for to the instructor-in-charge.  
(4.4.10, 5.4.10, 6.4.10, A4.4.10)

Emergency medical services acceptable to the authority having jurisdiction shall be available on site to handle injuries. Written reports shall be completed and submitted in accordance with the requirements of the authority having jurisdiction for all injuries and for all aid rendered.  
(4.4.11, 4.4.12, 5.4.11, 5.4.12, 6.4.11, 6.4.12, 7.4.10, 7.4.11, 8.4.10, 8.4.11)

A search of the structure shall be conducted to ensure that no unauthorized person, animals, or objects are in the structure prior to ignition.  
(4.4.13, 5.4.13, 6.4.13)

**No person(s) shall play the role of a victim inside a structure during live fire training evolutions.**  
(4.4.14, 5.4.14, 6.4.14, 7.4.13, 8.4.13)

Only one fire at a time shall be permitted within an acquired structure when conducting interior fire attack training.  
(4.4.15)

Fires shall not be located in any designated exit paths.  
(5.4.15, 6.4.15, 7.4.14, 8.4.14)

The training session shall be curtailed, postponed, or canceled as necessary to reduce the risk of injury or illness caused by extreme weather conditions.  
(4.4.16, 5.4.16, 6.4.16, 7.4.15, 8.4.15)

Each participant shall be equipped with full protective clothing and self-contained breathing apparatus including PASS alarms. EXCEPTION: For live fire training conducted where participants are not exposed to smoke, heat, or other products of combustion, such as incipient level training or exterior fire training conducted for the Rural Basic Firefighter Program, the personal protective equipment, SCBA, and PASS alarm requirements may be waived at the discretion of the authority having jurisdiction. Personal protective equipment, self-contained breathing apparatus, and PASS alarms utilized shall be in accordance with applicable standards.  
(4.4.17, 4.4.17.2, 4.4.17.3, 4.4.17.4, 4.4.17.5, 5.4.17, 5.4.17.2, 5.4.17.3, 5.4.17.4, 5.4.17.5, 6.4.17, 6.4.17.2, 6.4.17.3, 6.4.17.4, 6.4.17.5, 7.4.16, 7.4.16.2, 7.4.16.3, 7.4.16.4, 7.4.16.5, 8.4.16, 8.4.16.2, 8.4.16.3, 8.4.16.4, 8.4.16.5)

Except as noted above, all students, instructors, safety personnel, and other personnel shall wear all protective clothing and equipment specified according to manufacturer's instructions whenever they are involved in any evolution or fire suppression operation during the live fire training evolution.  
(4.4.17.6, 5.4.17.6, 6.4.17.6, 7.4.16.6, 8.4.16.6)

All students, instructors, safety personnel, and other personnel participating in any evolution or operation of suppression during the live fire training evolution shall breathe from an SCBA air supply whenever operating under one or more of the following conditions:

- (1) In an atmosphere that is oxygen deficient or contaminated by products of combustion or both.
- (2) In an atmosphere that is suspected of being oxygen deficient or contaminated by products of combustion or both.
- (3) In any atmosphere than can become oxygen deficient or contaminated or both.
- (4) Below ground level.

(4.4.17.7, 5.4.17.7, 6.4.17.7, 7.4.16.7, 8.4.16.7)

All participants shall be inspected by an instructor prior to entry into a live fire training evolution to insure that the protective clothing ensemble is appropriate for the evolution, is properly donned, and is in serviceable condition.

(4.4.17.1, 5.4.17.1, 6.4.17.1, 7.4.16.1, 8.4.16.1)

One person who is not a student shall be designated as the “ignition officer” to control the materials being burned. The ignition officer shall wear full protective clothing including SCBA as required when performing this function.

(4.4.18, 4.4.18.1, 6.4.18, 6.4.18.1, 7.4.12, 7.4.12.1, 8.4.12, 8.4.12.1)

Where necessary to ensure the safety of the ignition officer, a charged hoseline shall accompany the ignition officer during light off. In cases where a charged hoseline is not used, concurrence of the Safety Officer shall be obtained.

(4.4.18.2, 6.4.18.2)

The decision to ignite the training fire shall be made by the instructor-in-charge in coordination with the safety officer. The fire shall be ignited by the ignition officer in the presence of and under the direct supervision of the safety officer. Fires shall not be ignited without an instructor visually confirming that the flame area is clear of personnel.

(4.4.18.3, 4.4.18.4, 5.4.18, 5.4.19, 6.4.18.3, 6.4.18.4, 7.4.12.2, 8.4.12.2)

Flammable gas fires inside structures or other confined areas shall not be ignited manually.

(5.4.20)

### **Instructors:**

All instructors shall be qualified to deliver fire fighter training according to the authority having jurisdiction.

(4.5.1, 5.5.1, 6.5.1, 7.5.1, 8.5.1)

The participating student-to-instructor ratio shall not exceed 5 to 1. Additional instructors shall be designated when factors such as extreme temperatures or large groups are present, and classes of long duration are planned, or where the Safety Officer determines additional instructors are warranted based on the nature of the exercise.

(4.5.2, 4.5.3, 5.5.2, 5.5.3, 6.5.2, 6.5.3, 7.5.2, 7.5.3, 8.5.2, 8.5.3)

The instructor-in-charge shall be responsible for full compliance with this standard.

(4.5.4, 5.5.4, 6.5.4, 7.5.4, 8.5.4)

Prior to the ignition of any fire, instructors shall insure that all protective clothing and equipment utilized is done so in accordance with applicable standards and manufacturers instructions.

(4.5.5, 5.5.5, 6.5.5, 7.5.5, 8.5.5)

Instructors shall take a head count when entering and exiting the building during an actual attack evolution. Instructors shall monitor and supervise all assigned students closely during the live fire training evolution. Additionally, an accountability system consistent with local SOP's shall be implemented.

(4.5.6, 4.5.7, 5.5.6, 5.5.7, 6.5.6, 6.5.7, 7.5.6, 7.5.7)

The instructor-in-charge shall provide for rest and rehabilitation of personnel, including any necessary medical evaluation and treatment, food and fluid replenishment, and relief from climatic conditions.

(4.5.8, 5.5.8, 6.5.8, 7.5.8, 8.5.6)

Where concurrent, multiple, live fire training evolutions are being conducted, the identity of the instructor-in-charge shall be clear to all participants. It shall be the instructor-in-charge's responsibility to coordinate overall fireground activities to ensure proper levels of safety.

(5.5.11, 5.5.12, 6.5.9, 6.5.10)

Instructors responsible for conducting live fire training evolutions with a gas or liquid fueled training system shall be trained in the complete operation of the system. This training of instructors shall be performed by an individual knowledgeable in the safe operation of the system and authorized by the authority having jurisdiction to conduct such training.

(5.5.9, 5.5.10, 7.5.9, 7.5.10, 8.5.7, 8.5.8)

**General Requirements for Live Fire Training in Acquired Structures, Training Centers, and Exterior Props:**

Strict safety practices shall be applied to all live fire training evolutions.

(5.2.1, 6.2.1, 7.2.1, 8.2.1)

Property adjacent to the training site that could be affected by the smoke from the live training evolution, such as railroads, airports, nursing homes, hospitals shall be identified. The persons in charge of these facilities shall be informed in advance of the date and time of the evolution.

(4.2.18, 4.2.19, 6.2.8, 6.2.9, 7.2.16, 7.2.17, 8.2.17, 8.2.18)

Adjacent buildings, property, or utilities that might become ignited shall be properly protected or removed.

(4.2.14, 4.2.15, 7.2.12, 8.2.13)

Trees, brush, and surrounding vegetation that create a hazard to participants shall be removed. Combustible materials other than those intended for the live training evolution shall be removed or stored in a protected area to preclude accidental ignition.

(4.2.16, 4.2.17, 7.2.14, 7.2.15, 8.2.15, 8.2.16)

Streets or highways in the vicinity of the training site shall be surveyed for potential effects from live fire training evolutions, and safeguards shall be taken to eliminate any possible hazards to motorists.

(4.2.20, 6.2.10, 7.2.18, 8.2.19)

Pedestrian traffic in the vicinity of the training site shall be kept clear of the operations area of the live burn.

(4.2.21, 5.2.8, 6.2.11, 7.2.19, 8.2.20)

All required permits to conduct live fire training evolutions shall be obtained. Required permits may include air quality, water run-off, water usage, burning, traffic, etc. The required permits shall be provided to outside, contract, or other separate training agencies by the AHJ upon request of those agencies. **NOTE:** The Alaska Department of Environmental Conservation has specific regulations addressing the burning of structures for fire training that must be reviewed and complied with.

(4.2.2, 4.2.8, 7.2.10, 7.2.11, 8.2.11, 8.2.12, A4.2.2)

Awareness of weather conditions, wind direction, and wind velocity shall be maintained, including a final check for possible changes in weather conditions immediately prior to ignition.

(4.2.22, 5.2.9, 6.2.12, 7.2.20, 8.2.21)

The water supply for any individual live fire training evolution shall be assessed based on the extent of the evolutions to be performed. Consideration shall be given to the control and extinguishment of the fire and the provision of back-up lines to protect personnel.

(4.2.23, 5.2.10, 5.2.10.1, 6.2.13, 6.2.13.1, 7.2.21, 7.2.21.1, 8.2.21, 8.2.22)

The minimum water supply and delivery for the live fire training should be determined using the criteria in NFPA 1142, Standard on Water Supplies for Suburban and Rural Firefighting. A minimum reserve of additional water in the amount of 50% of the fire flow recommended above should be available to handle exposure protection or unforeseen circumstances.

(4.2.23.1, 4.2.23.2, 5.2.10.2, 5.2.10.3, 6.2.13.2, 6.2.13.3, 7.2.21.2, 7.2.21.3, 8.2.22.2, 8.2.22.3)

Separate sources shall be utilized for the supply of attack lines and back-up lines in order to preclude the loss of both water supply sources at the same time. The intent here is to prevent the simultaneous loss of both attack lines and back-up lines in the event of a pump or water supply failure. Where a public water supply system is used, two pumpers on two different hydrants should be used. Two pumpers drafting from the same pond or river also are appropriate, provided the source contains sufficient usable water. Where tankers or folding tanks or both are used, two separate pumpers should be used to supply the attack and back-up lines. **EXCEPTION:** A single source is sufficient for training center facilities where the water system has been engineered to provide adequate volume for the evolutions conducted and a back-up power source or back-up pumps or both are in place to ensure an uninterrupted supply.

(4.2.23.3, 5.2.10.4, 6.2.13.4, 7.2.21.4, 8.2.22.4, A4.2.23.3)

Areas for the staging, operating, and parking of fire apparatus used in the evolution shall be designated. Areas for parking apparatus and vehicles that are not part of the evolution should be designated as well. Consideration for locating this area shall include facilitating the prompt response of apparatus in the event of an emergency.

(4.2.24, 4.2.24.1, 4.2.24.2, 5.2.11, 5.2.11.1, 5.2.11.2, 6.2.14, 6.2.14.1, 6.2.14.2, 7.2.22, 7.2.22.1, 7.2.22.2, 8.2.23, 8.2.23.1, 8.2.23.2)

Where required, parking areas for police vehicles or for the press should be designated.

(4.2.24.3, 5.2.11.3, 6.2.14.3, 7.2.22.3, 8.2.23.3)

A parking area for an ambulance or emergency medical services vehicle shall be designated and located to provide for a prompt response in the event of injury to participants in the evolution. Consideration shall be given to the designation and layout of ingress/egress routes in order to ensure their availability in the event of an emergency.

(4.2.24.4, 4.2.24.5, 5.2.11.4, 5.2.11.5, 5.2.11.6, 6.2.14.4, 6.2.14.5, 6.2.14.6, 7.2.22.4, 7.2.22.5, 7.2.22.6, 8.2.23.4, 8.2.23.5)

Prior to conducting actual live fire training evolution, a pre-burn briefing session shall be conducted for all participants, in which all facets of each evolution to be conducted are discussed and assignments made for all crews participating in the training are given. The location of simulated victims need not be disclosed provided that the possibility of victims is discussed during the briefing.

(4.2.25, 4.2.25.1, 5.2.12, 5.2.12.1, 5.2.12.2, 6.2.15, 6.2.15.1, 6.2.15.2, 7.2.23, 7.2.23.1, 7.2.23.2, 8.2.24, 8.2.24.1, 8.2.24.2)

A pre-burn plan shall be prepared and utilized during the pre-burn briefing session. All features of the training areas and structure should be indicated on the plan.

(4.2.25.2, 4.2.25.3, 5.2.12.3, 5.2.12.4, 6.2.15.3, 6.2.15.4, 7.2.23.3, 7.2.23.4, 8.2.24.3, 8.2.24.4)

Prior to conducting any live fire training, all participants shall be required to conduct a walkthrough of the structure or prop(s) in order to have a knowledge of and familiarity with the layout of the building or prop(s) and be able to facilitate any necessary evacuation.

(4.2.25.4, 5.2.13, 6.2.16, 7.2.24, 8.2.25)

All spectators shall be restricted to an area outside the operations area perimeter established by the safety officer. Control measures such as ropes, signs, and fire line markings should be used to indicate the perimeter.

(4.2.26, 4.2.26.1, 5.2.14, 5.2.14.1, 6.2.17, 6.2.17.1, 7.2.25, 7.2.25.1, 8.2.26, 8.2.26.1)

Visitors who are allowed within the operations area perimeter to observe should be escorted at all times. Visitors in the operations area perimeter must be equipped with a properly wearing the appropriate level of PPE.

(4.2.26.2, 4.2.26.3, 5.2.14.2, 5.2.14.3, 6.2.17.2, 6.2.17.3, 7.2.25.2, 7.2.25.3, 8.2.26.2, 8.2.26.3)

All possible sources of ignition other than those under the direct supervision of the person responsible for the start of the training fire shall be secured from the operations area.

(4.2.27, 5.2.15, 6.2.18, 7.2.26, 8.2.27)

There shall be ample room provided around all structures and props such that there is adequate space for all attack lines and back-up lines to operate freely.  
(5.2.16, 7.2.27, 8.2.28)

In preparation for live fire training, an inspection shall be made to determine that the floors, walls, stairs, and other structural components are capable of withstanding the weight of contents, participants, and accumulated water. Particular attention should be directed to identifying the presence of exposed gang nailers and various uses of laminated wood that may lead to early or unanticipated structural failure.  
(6.2.7)

The fuels that are utilized in live fire training evolutions shall have known burning characteristics that are as controllable as possible. Unidentified materials, such as debris found in that structure that could burn in unanticipated ways, react violently, or create environmental or health hazards, shall not be used.  
(4.3.1, 4.3.2, 5.3.1, 5.3.2, 6.3.1, 6.3.2, 7.3.1, 7.3.2, 8.3.1, 8.3.2)

Pressure-treated wood, rubber, plastic, and straw or hay treated with pesticides or harmful chemicals shall not be used.  
(4.3.3, 6.3.4, 7.3.4)

Fuel materials shall be used only in the amounts necessary to create the desired fire size. The fuel load shall be limited to avoid conditions that could create an uncontrolled flashover or backdraft.  
(4.3.4, 4.3.5, 6.3.3, 6.3.5, 7.3.3, 8.3.3)

The instructor-in-charge shall assess the selected fire environment for factors that can affect growth, development, and spread of fire. The instructor-in-charge shall document the fuel loading.  
(4.3.7, 4.3.8, 5.3.5, 6.3.7, 6.3.8, 7.3.5, 8.3.4, 8.3.5, A4.3.7)

The training exercise shall be stopped immediately when the instructor-in-charge determines through on-going assessment that the combustible nature of the environment represents a potential hazard. The exercise shall continue only when actions have been taken to reduce the hazard.  
(4.3.9, 4.3.10, 5.3.6, 5.3.7, 6.3.9, 6.3.10, 7.3.6, 7.3.7, 8.3.6, 8.3.7)

**Specific Requirements for Live Fire Training in Acquired Structures:**

Ownership of the acquired building shall be determined prior to its acceptance by the AHJ. Ownership information should be reviewed by the legal counsel of the AHJ. Evidence of clear title should be required for all structures acquired for live fire training.  
(4.2.3, 4.2.4, A4.2.3)

Written permission shall be secured from the owner of the structure and should be reviewed by the legal counsel of the AHJ. A clear description of the anticipated condition of the acquired building at the completion of the evolution(s) and the method of returning the property to the owner shall be put in writing and acknowledged by the owner.  
(4.2.5, 4.2.6, A4.2.5)

Proof of insurance cancellation or a signed statement of nonexistence of insurance shall be provided by the owner of the structure prior to acceptance by the AHJ, and this information should be reviewed by the AHJ's legal counsel.  
(4.2.7, A4.2.7)

All hazardous storage conditions shall be removed from the structure or neutralized in such a manner as to not present a safety problem during the training. Appropriate references should be consulted or assistance should be obtained on the specific substance encountered. Areas within a tank or vessel should be filled with dry sand as a preferred means of rendering the internal atmosphere inert. Under no circumstances should water or other liquids be utilized as a means of inerting a tank or other closed vessel.  
(4.2.9, A4.2.9)

Closed containers and highly combustible materials shall be removed from the structure. Oil tanks and similar closed vessels that cannot be removed shall be vented sufficiently to prevent an explosion or overpressure rupture. Any hazardous or combustible atmosphere within the tank or vessel shall be rendered inert.  
(4.2.9.1, 4.2.9.2, 4.2.9.3,)

All hazardous structural conditions shall be removed or repaired so as not to present a safety problem during use of the structure. Floor openings shall be covered. Missing stair treads and rails shall be repaired or replaced. Dangerous portions of any chimney shall be removed. Holes in walls and ceilings shall be patched.  
(4.2.10, 4.2.10.1, 4.2.10.2, 4.2.10.3, 4.2.10.4)

Low density combustible fiberboard and other unconventional combustible interior finishes such as burlap, carpeting, artificial turf, shall be removed. Any debris creating or contributing to unsafe conditions shall be removed.  
(4.2.10.5, 4.2.11.1, A4.2.10.5)

Extraordinary weight above the training area shall be removed. The collapse of overhead structural members can result from the combined effect of the weight of both live and dead overhead loads (including snow loads), as well as the loss of structural integrity caused by the fire.  
(4.2.10.6, A4.2.10.6)

Roof ventilation openings that are normally closed but can be opened in the event of an emergency shall be permitted. These openings may consist of pre-cut panels or hinged covers.  
(4.2.11.2, A4.2.11.2)

Utilities shall be disconnected.  
(4.2.11.3)

Any toxic weeds, insect hives, or vermin that could present a potential hazard to personnel shall be removed.  
(4.2.11.4)

The acquired structure shall be inspected and certified asbestos free or otherwise abated to make it asbestos free in accordance with State and Federal Guidelines.  
(4.2.11.5)

Exits from the building shall be identified and evaluated prior to each training burn. Participants of the live fire training shall be made aware of exits from the building prior to each training burn.  
(4.2.12, 4.2.12.1)

Buildings that cannot be made safe in accordance with the provisions above shall not be utilized for interior live fire training evolutions.  
(4.2.13)

Flammable or combustible liquids shall not be used in live fire training evolutions in acquired structures.  
(4.3.6)

**Specific Requirements for Live Fire Training in Gas-Fired and Non-Gas-Fired Training Center Buildings:**

Training center burn buildings shall be inspected visually for damage prior to live fire training evolutions. Any damage found shall be documented.  
(5.2.2, 5.2.2.1, 6.2.2, 6.2.2.1)

The structural integrity of the building should be evaluated and documented annually by a licensed professional engineer with burn building experience and expertise. Part of the burn building evaluation should include, once every 5 years, the removal and reinstallation of a representative area of thermal linings (if any) to inspect the hidden conditions behind the linings. The engineer should core solid structural concrete slabs and walls that have been exposed to temperatures in excess of 300 degrees F. to check for hidden delaminations and to test compressive strength once every 10 years for conventional (Portland) concrete and every three years for refractory (calcium aluminate) concrete.  
(5.2.2.2, 5.2.2.3, 5.2.2.4, 6.2.2.2, 6.2.2.3, 6.2.2.4)

Where burn building damage is severe enough to affect the safety of the students, training shall not be permitted.  
(5.2.2.5, 6.2.2.5)

All doors, windows and window shutters, roof scuttles and automatic ventilators, mechanical equipment, lighting, manual or automatic sprinklers, and standpipes necessary for the evolution shall be checked and operated prior to the training.  
(5.2.3, 6.2.3)

All safety devices such as thermometers, oxygen and toxic/combustible gas monitors, evacuation alarms, and emergency shutdown switches shall be checked prior to any live fire training.  
(5.2.4, 6.2.4)

For burn buildings that contain gas-fueled training systems, the instructors shall run the system prior to exposing students to live flames in order to ensure the correct operation of devices such as gas valves, flame safeguard units, agent sensors, combustion fans, and ventilation fans.  
(5.2.5, 6.2.5)

Training center burn buildings shall be left in a safe condition upon completion of live fire training evolutions. Debris hindering the access or egress of firefighters shall be removed prior to the beginning of the next training exercises.  
(5.2.6, 5.2.7, 6.2.6)

The use of flammable gas such as propane and natural gas shall be permitted only in burn buildings specifically designed for their use. Liquefied versions of these gases shall not be permitted inside the burn building.  
(5.3.3, 5.3.4)

The use of flammable or combustible liquids shall not be permitted to be used in live fire training evolutions in structures. Exception: limited quantities of combustible liquid with a flash point above 100 degrees F shall be permitted to be used in a training center burn building that has been specifically designed to accommodate this fuel.  
(6.3.6)

**Specific Requirements for Live Fire Training with Exterior Props:**

For outside training, care shall be taken to select areas that limit the hazards to both personal safety and the environment.  
(7.2.2, 8.2.2)

The training site shall be flat and open without obstructions that can interfere with firefighting operations.  
(7.2.3, 8.2.3)

The ground cover shall be such that it does not contribute to the fire. The ground cover should be impervious and must be of such topography that the runoff from live fire training does not enter municipal, private, or public waters or other sensitive areas.  
(7.2.4, 7.2.5, 8.2.4, 8.2.5)

Exterior props and the burn area shall be inspected visually for damage prior to live fire training. Damage noted shall be documented.  
(7.2.6, 7.2.6.1, 8.2.6, 8.2.7)

The structural integrity of the props shall be evaluated and documented annually.  
(7.2.6)

All safety devices such as thermometers, oxygen/combustible gas monitors, evacuation alarms, and emergency shutdown switches, shall be checked prior to any live fire training.  
(7.2.7, 8.2.8)

Props shall be left in a safe condition upon completion of live fire training evolutions.  
(7.2.8, 8.2.9)

Props used for outside live fire training shall be designed specifically for the evolution to be performed.  
(7.3.8, 8.3.8)

All props that use pressure to move fuel to the fire shall be equipped with remote fuel shutoffs outside of the safety perimeter but within sight of the prop and the entire field of attack for the prop. During the entire time the prop is in use, the remote shutoff shall be continuously attended by personnel trained in its operation.

(7.3.9, 7.3.10, 8.3.9, 8.3.10)

Liquefied petroleum gas props shall be equipped with all appropriate safety features as described by applicable standards and/or NFPA 58, Liquefied Petroleum Gas Code, and NFPA 59, Utility LP-Gas Plant Code.

(7.3.11, 8.3.11)

Where the evolution involves the simulated failure of a safety feature, the simulated failed part shall be located downstream from the properly functioning safety feature.

(7.3.12, 8.3.12)

Measures shall be taken where using flammable or combustible liquids to prevent runoff from contaminating the surrounding area. Runoff water shall be managed in accordance with permit conditions, local, State, and Federal regulations.

(7.3.13, 7.3.14, 8.3.13, 8.3.14)

Vehicles used as props for live fire training shall have all fluid reservoirs, tanks, shock absorbers, batteries, drive shafts, and other gas filled closed containers removed, vented, or drained prior to any ignition. The list of items to be removed prior to a vehicle burn evolution should include (but not be limited to) bumper compression cylinders, shock absorbers, fuel tanks, drive shafts, and brake shoes (asbestos). The oil pan, transmission, and differential drain plugs should be removed, and the fluids should be drained and disposed of properly.

(7.3.15, A7.3.15)

For flammable metal fires, there shall be a sufficient quantity of proper extinguishing agent available so that all attack crews have an adequate supply as well as a 150% reserve for the use of back-up crews.

(7.3.16)