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Technical Bulletins: Use of Acquired Structures for Training

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USE OF ACQUIRED STRUCTURES FOR TRAINING

Dennis Wolf, Fire Management Consultant

BACKGROUND

To be effective, firefighters need to train under conditions that approximate their work environment, which means they need live fire training. Police departments do not hand new recruits a vest and a firearm and say, "Point this end at the bad guy," and then send the police officer out on patrol. Police recruits undergo many hours of classroom, range time and scenario-based training to become proficient in the knowledge and use of deadly force. However, the fire service sometimes takes the approach of "here are your turnouts; point this end of the nozzle at the fire" and then puts the firefighter on the fire engine to fight fire.

In the period between 1977 and 2009, the number of structure fires decreased by 53 percent. During this same period, the number of firefighter deaths due to traumatic injuries on the fire ground increased from 1.8 deaths per 100,000 fires to 3.0 deaths per 100,000 fires. According to the National Fire Fighter Near-Miss Reporting system, for the period between January 2005 and December 2010, there were 89 live fire training near-miss incidents (where some type of unsafe practice occurred) and 28 of those incidents (31 percent) were in acquired structures compared with 17 incidents (16 percent) that occurred in dedicated burn buildings.

The number of fires is decreasing, but firefighter fatalities are increasing, so how do firefighters gain

the knowledge and experience needed to be good, safe firefighters? The answer is controlled situation live fire training. Firefighters need to train in combat conditions, facing real fires, either of Class A materials or with environmentally friendly propane simulators. Firefighters need to feel the heat and experience the loss of sight and disorientation in hot, dark, smoke-filled environments. Live fire training provides real-time, real-world experiences that the classroom environment cannot replicate. Live fire training carries as much risk as any structure fire, but careful planning can mitigate some of the risk.

Some departments have the luxury of having a purpose-built structure (burn building) capable of providing live fire training, but many departments do not. The Tennessee Fire and Codes Enforcement Academy has an excellent live fire training facility, but many departments, especially volunteer departments, do not have the time required to travel to the academy or the money for meals and lodging, even though the cost of training at the academy is reasonable. Many volunteers cannot take the time off from work required to participate in academy classes. One option for these departments is the use of acquired structures for training.

WHAT IS AN ACQUIRED STRUCTURE?

The 2012 edition of National Fire Protection Association (NFPA) Standard 1403, *Standard on Live*

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Fire Training Evolutions, defines an acquired structure as “A building or structure acquired by the authority having jurisdiction from a property owner for the purpose of conducting live fire training evolutions (§ 3.3.24.1).” This differentiates an acquired structure from a live fire training structure, which NFPA defines as “a structure specifically designed for conducting live fire training evolutions on a repetitive basis (3.3.24.2).” NFPA recognizes that firefighters use other types of training props, and the 2012 edition defines “acquired property” as “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).”

Before 1986, when NFPA published the first edition of NFPA 1403, there was no consensus standard on live fire training. Before knowledge of environmental issues and a greater emphasis on firefighter safety increased, fire departments burned acquired structures with minimal concern for the smoke and toxic gasses released, while using flammable or combustible liquids such as gasoline or diesel fuel to ignite the fire, and started multiple fires at the same time rather than just one fire. Today, such practices are contrary to environmental sustainability and common sense, which is why fire departments must follow industry standard guidelines to use an acquired structure for training in as safe a manner as possible. If a new recruit is going to panic during his or her first fire, it is better to have that happen in a controlled environment rather than on a working structure fire.

THE USE OF ACQUIRED STRUCTURES – COST VERSUS BENEFIT

Using an acquired structure for live fire training requires careful planning and preparation. It requires a significant investment in time and labor, and possibly money, on the part of the fire department. The expense may be worth it as the benefit depends on how much time, effort, and money need to go into preparing the structure for burning compared to how much actual training is possible given careful planning by the fire department training officer. The fire department should agree to burn an acquired structure for the department’s benefit (training) — not for the benefit of the property owner (demolition).

GETTING STARTED

Preparation should start by making sure that the person who states that they own the structure and have the authority to give the fire department permission to use the structure actually is the owner and has the authority. The fire department and owner must discuss and agree on which party will be responsible for what, such as site preparation, removal of utilities, asbestos testing, permits, debris removal, etc. and sign an agreement with these details. The fire insurance policy should be canceled so the owner does not claim the training fire as a loss.

Once legal ownership and authority to grant permission to the fire department to use the structure is established, the fire department should conduct a visual inspection of the property. Some structures are simply too unsafe to burn. If the structure is not safe, the fire department should say, “Thank you, but we cannot use this structure safely,” and move

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on. If the structure is safe for live fire training, the department should create a written training plan for the structure. The training officer must share the plan with all participants before any training takes place. Firefighters need to experience live fire training in as controlled an environment as possible — not surprised by something unexpected.

An acquired structure intended for live fire training can provide many training opportunities before igniting the first fire. Firefighters can review building construction, perform forcible entry, perform search and rescue drills, conduct ladder evolutions, advance hose lines, run mayday scenarios, practice Rapid Intervention Team (RIT) response, conduct bailout drills, practice technical rescue evolutions and conduct other training opportunities to gain knowledge and skills. The training officer should create a plan that maximizes the benefit of the structure for training opportunities in addition to live fire training. Even if it is not possible to use the structure for live fire training, the structure can provide these and many other one-of-a-kind training opportunities. Before starting any non-fire training, the department must test the structure for asbestos and remove any asbestos products. In structures constructed with asbestos materials, likely exposure to asbestos will occur while breaching walls, conducting ventilation, etc.

Before starting live fire training, repair holes in walls, floors, etc. that existed before the fire department acquired the structure or are a result of the previously mentioned non-fire training evolutions. Abnormal fire spread, falls, etc. can result from any openings in the construction. For safety, repair any holes (existing or made by the fire department) before

conducting RIT, ventilation or other training in the structure.

Once the department has decided to use the structure for live fire training, contact the local air quality or pollution control authority for the area and ask if there are any requirements for preparing acquired structures for burning and if a permit is required. Some air pollution control/air quality authorities require removal of asphalt shingles, petroleum based floor coverings, plastic plumbing pipe, synthetic furnishings, etc. before granting permission to burn. Removal of electrical wiring, electrical outlets, wall switches and cover plates may be required because those items are plastic.

The structure may have exterior siding, insulation, floor tiles or mastic that contains asbestos. Test the structure for asbestos and remove any asbestos found before burning the structure. Asbestos abatement should be required before demolition and haul-off, so the expense of testing and abatement may be a wash for the property owner. Any HVAC systems still in place need to have the Freon or other gas removed. Disconnect all utilities. Provide a reliable source of water that is sufficient to control the fire and protect any exposures if the entire structure is on fire at once. The fire department needs to know where the runoff water is going as it will contain chemicals and contaminants and may need to be collected or diverted from ponds and streams.

If the structure is safe to burn and the fire department desires to conduct live fire training, then the city must be ready to assume liability. MTAS legal staff has opined that the liability rests with the city. MTAS does not have a sample liability

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release, but NFPA does have a sample release as part of its recommendations for live fire training in acquired structures. The NFPA sample release speaks about demolition of the structure as the reason the fire department is burning the structure. Air quality is a real concern, and most jurisdictions allow firefighters to burn a building for training but not for demolition. Therefore, if you use the sample language in the NFPA checklist, substitute “training” in place of “demolition” and have your agency’s attorney approve the release.

The department needs to locate, provide, and ensure that an adequate and reliable water supply is available for training evolutions, safety lines, and to protect exposures. If the structure is in an area protected by fire hydrants, the department may need to lay supply lines across roadways or across property owned by others. The department must coordinate any road closures, provide traffic flow, and obtain permission to access other property before starting training.

The department needs to provide logistics for the training evolutions. Staging areas, control of scene access, parking, media access (the department should invite the media to a live fire training day), personal hygiene facilities, refreshments for staff and trainees, and rehab for the trainees should be available when they exit the live fire evolution. Provide sufficient air bottles, a cascade system on the scene, or an air resupply shuttle to ensure no one runs out of breathing air. Inspect all self-contained breathing apparatus (SCBA) and personal protective equipment before the live burn. Do not use any personal protective equipment with physical damage or missing components. Notify adjacent property

owners well before the live burn. Assure that all personnel operating in the Immediately Dangerous to Life and Health (IDLH) atmosphere have conducted SCBA face-piece fit testing in accordance with OSHA 1910.134.

The fire department must take responsibility for preparing the structure so the training is safe. Follow NFPA Standard 1403 guidelines as a nationally recognized best practice. Safety must, at all times, be the primary concern when making preparations and decisions. Establish and use the incident command system and a personnel accountability system. Have emergency medical personnel and an ambulance available on the training ground. Use Class A fuels only and keep fuel loads to the minimum amount to provide sufficient smoke, heat and fire conditions to accomplish the training evolution’s goals and objectives while avoiding flashover. Ignite only one fire at a time in the structure.

CONCLUSION

Live fire training in an acquired structure is very valuable as it provides firefighters with some of the real life experience they need to be effective firefighters. Many communities do not have access to a training facility with a dedicated live fire building or smoke house, so using an acquired structure can provide a local opportunity to train under realistic conditions. If the building is not suitable for live fire training, other drills, such as search and rescue operations, ladder drills, ventilation drills, etc., are possible. If the building is suitable for live fire training, non-fire drills are still possible before the first live fire drill occurs. Depending upon the size of the structure, number of rooms, and fire control techniques, many air

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mask drills in smoke conditions, individual fires, search and rescue scenarios, and fire attack scenarios can occur before the building becomes too unsafe to use for further interior attack practice. At that point, the department lets the entire building catch fire, and exterior hand line operation and master stream training takes place. Follow NFPA 1403 guidelines for live fire training evolutions. These are the nationally recognized consensus standards defining the *minimum* acceptable practice for live fire training. With proper preparation and planning, an acquired structure can provide firefighters with many different opportunities to train, practice and improve essential fire ground skills.

RESOURCES

Because of its importance to the fire service, NFPA allows free online access to the complete contents of NFPA 1403, Standard on Live Fire Training Evolutions. Registration is required to access the standard. For access, go to <http://www.nfpa.org/aboutthecodes/aboutthecodes.asp?docnum=1403>.

NFPA has licensed for individual use the checklist found in NFPA 1403. The checklist is included here for a quick review of the items necessary to conduct safe live fire training in an acquired structure. For more information on the checklist, contact NFPA directly. Obtain a copy of and become familiar with NFPA 1403 before conducting any live fire training evolutions.

The Tennessee Fire and Codes Enforcement Academy offers live fire training programs. For information on live fire and other training programs, contact the academy.

Tennessee Fire Service and Codes
Enforcement Academy
2161 Unionville-Deason Road
Bell Buckle, Tennessee 37020
1-800-747-8868
(931) 294-4111

REFERENCES

- Fahy, Rita F. (2010). U.S. Fire Service Fatalities in Structure Fires, 1977-2009. Quincy, MA: NFPA
- IAFC, ISFSI, NFPA. (2012). Live Fire Training Principles and Practices. Sudbury, MA: Jones and Bartlett Learning, LLC.
- National Fire Fighter Near-Miss Reporting System. www.firefighternearmiss.com.
- NFPA. (2012). NFPA 1403, *Standard on Live Fire Training Evolutions*. Quincy, MA: NFPA

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 pre-requisite training obtained from participating students from outside agencies

PREBURN PLANNING.

1. Pre-burn plans made, showing the following:
 - a. Site plan drawing, including all exposures
 - b. Floor plan detailing all rooms, hallways, and exterior openings
 - c. Location of command post
 - d. Position of all apparatus
 - e. Position of all hoses, including backup lines
 - f. Location of emergency escape routes
 - g. Location of emergency evacuation assembly area
 - h. 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

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:
 - i. Class A materials only
 - ii. No flammable or combustible liquids
 - iii. 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 _____

City _____ State ____ ZIP _____

Date _____

Owner/Agent _____

Owner/Agent _____

Witness _____

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