

Incident Investigation of Two Firefighters Deaths During a Training Fire

Poinciana, Florida
July 30, 2002



Prepared by the
Bureau of Fire Standards and Training
Florida Division of State Fire Marshal

BFST Safety Investigative Report 02-01

Incident Investigation – Training Fire at Poinciana
Osceola County Fire Rescue Division and City of Orlando Fire Department
July 30, 2002; Kissimmee, Florida
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Summary of Incident

On July 30, 2002, two Osceola County firefighters died during a multi-agency, live-fire training exercise on the southwest corner of the intersection of Poinciana Boulevard and U.S. Route 17-92, near Kissimmee in Osceola County. The live-fire exercise was being conducted in a vacant one story, single-family dwelling constructed of cement block. The training fire was in a cement block room apparently originally built to be a garage.

The two firefighters that died entered as a crew without a hoseline to simulate a search and rescue operation. They were to look for a mannequin dressed as a firefighter. To reach the fire room, they had to pass through two doorways and two narrow spaces. A crew with a hoseline was located in the next room by the doorway that led into the fire room. A flashover occurred, and that hoseline crew retreated due to severe heat conditions (at least one crew member received thermal burns). The two search and rescue team firefighters were found after the fire was knocked down by another crew and were evacuated to the exterior, and were medically treated and transported to a hospital, where they were declared dead. The deaths were the “result of smoke inhalation and thermal injuries suffered during the training exercise.”¹

Summary of Findings to Reduce Risk of Similar Incident

1. Agencies conducting live fire training must comply with NFPA 1403.
2. Agencies conducting “search and rescue” training should limit their use of live fire. Realistic conditions can be simulated without the danger of live fire.
3. When live fire is used:
 - It is preferable to have any crew being trained be equipped with a charged hoseline.
 - The safety team must be in place to monitor the progress of the crew being trained and the fire. The safety team must have a hoseline of sufficient flow (minimum of 95 GPM) to extinguish a fire involving the entire fire room.
 - Training mannequins should be readily identifiable as such, so as not to be confused with a firefighter.

¹ Fire Investigation Report, Florida State Fire Marshal, Bureau of Fire & Arson Investigations (BFAI), SFM Case Number 26-02-3753, November 19, 2002. (Available at www.fsfc.ufl.edu)

- No fire room shall be used where two separate means of egress/escape are not available.
 - Live fire used in training should never be in a position to block the main or planned secondary exit of firefighters.
 - Emergency ventilation must be planned to limit fire spread and to improve tenability in the event such action is necessary. Normal room venting shall not be through the primary or secondary egress point.
4. Training fires are no different than hostile fires, and must be ventilated sufficiently to reduce the chance of unexpected flashover and to maintain visibility at the floor level. Adequate emergency ventilation must be provided for the fire room and any combustible attic space above.
 5. Live-fire training in acquired structures must include planning for secondary means of egress or escape in case of unexpected fire condition changes. The use of rooms with limited access should not be considered.
 6. Firefighters should be trained to constantly identify hazards and alternative escape routes during interior fire suppression operations inclusive of training exercises. Prior to live fire training drills, firefighters need to identify two ways out of each area.
 7. Firefighters need training specific to recognizing the signs of a flashover, backdraft, proper ventilation techniques, and/or water application to reduce the chance of flashover (see Addendum 1).
 8. All participants' protective clothing, PASS and SCBA must to be inspected for proper use and serviceability.
 9. Formal communications plans must be in place inclusive of alternate channels, Incident Command communications versus crew-to-crew, emergency operations, medical operations and scene to dispatch.
 10. Formal training for instructors conducting live fire training is necessary.

Purpose/Background of Investigation

Under Florida State Statute 633.808, The Division of State Fire Marshal (DSFM) is charged with the responsibility to "Investigate and prescribe by rule what safety devices, safeguards, or other means of protection must be adopted for the prevention of accidents in every firefighter employee place of employment or at any fire scene; determine what suitable devices, safeguards, or other means of protection for the prevention of occupational diseases must be adopted or followed in any or all such firefighter places of employment or at any fire scene; and adopt reasonable rules for the prevention of accidents, the safety, protection, and security of firefighter employees engaged in interior

firefighting, and the prevention of occupational diseases.” The Bureau of Fire Standards and Training (BFST) of the Division has the responsibility for the implementation of this law.

Other agencies and entities have investigated this incident for different purposes. The Bureau of Fire and Arson Investigation (BFAI) of the Division of State Fire Marshal investigated this fire at the time of the incident for the purpose of determining any criminal offense. The National Institute of Occupational Health (NISOH) investigated this incident for the purposes of preventing similar incidents.

The BFST charge for this report is to disseminate information to reduce the chance of a similar incident occurring. However per Florida Statute 633.808 it is also charged with the responsibility to provide training, if necessary prepare legislation to reduce the chance of a similar incident from occurring, and to investigate the incident for violation of Florida law or administrative rule within its authority.

It was determined by the BFST staff assigned to this investigation that the interviews and information collected by the BFAI was sufficient to meet the legislative intent, and did not require additional interviews with the involved firefighters. A thorough review of the following materials was completed for this report:

- Fire Investigation Report, Florida State Fire Marshal, Bureau of Fire & Arson Investigations (BFAI), SFM Case Number 26-02-3753, November 19, 2002.
- Post fire video 02-3753 by DSFM and fire video by Osceola County Fire Rescue
- NFPA 1403, Standard on Live Fire Training Evolutions
- A comprehensive on-site examination of the training scene at 1701 S. Poinciana Blvd, Poinciana by BFST.

The following conclusions from the BFAI fire investigative report number 26-02-3753 where found to be significant:

- “A flashover occurred in the room of fire origin during the training exercise.”
- The deaths were the “result of smoke inhalation and thermal injuries suffered during the training exercise.”
- “All of the participants stated that from the beginning of the exercise they did not have any concerns regarding the conditions of the fire inside the structure and it appeared to them as normal fire behavior.”
- “There was no evidence that any of the participants could foresee that a flashover would occur during the training exercise. In fact some of the participants that were inside the structure were surprised when they saw the portion of the video recording of the training exercise where the flashover occurs. The addition of the foam mattress to the fire load is one of many variables that could contribute to a flashover but is not exclusive.”

The Involved Structure

The topic structure was one of several cement block structures homes that at one time had been model homes for the development of Poinciana, and now the vacated campus of the Florida Bible College.

The property is located at the southwest corner of Poinciana Blvd. and U.S. Highway #17-92 near Kissimmee. Those homes, along with a motel had been contracted by the Osceola County Fire Rescue Division (OCFRD) to conduct live fire training. Training burns previously had been conducted in several of the other homes and the motel.

The topic dwelling was approximately 1600 square feet and contained 3 bedrooms, 2 bathrooms, laundry room, living room, and kitchenette. There was a 4'6" X 24' patio and porch on the east side at the main entrance, which lead into the living room at the center of the dwelling. The bedroom at the north side of the dwelling appeared to have been converted from either a carport or garage. The gable roof was of wood truss construction covered with asphalt shingles. There were air vents at the peaks of the gables at the north and south sides. A third vent was located at the peak of a gable that faces north, just south of the north bedroom². See figure 1 for the floor plan.

The Training Session³

The written statements and information obtained from witnesses in the initial interviews indicate that live-burn training exercises were being conducted on property where other buildings had previously been utilized for similar training. On July 30, 2002, firefighters from the OCFRD and the City of Orlando Fire Department (OFD) participated in a joint training exercise utilizing one of the buildings that had not been previously burned.

The training exercise was conducted by the OCFRD Training Officer. He was assisted by four firefighters in the preparation of the exercises. The firefighters assisting the training officer also served as interior safety officers during the training evolutions. The Training Officer gave a safety briefing prior to the beginning of the exercise for all of the participants. [Note: in an interview, the Training Officer advised that the safety crews were not briefed at the beginning of this exercise due to their past involvement⁴] The training officer walked all the participants through the structure and explained the safety aspects and goals of the training evolution. This was to be a Search and Rescue/Fire Suppression exercise involving a mannequin dressed in firefighter bunker gear was placed inside the structure. A team of two firefighters would conduct a search of the structure, find the mannequin and remove it from the building prior to extinguishment of the fire by the designated attack teams.

² From Lt. LaCorte's (BFAI) Supplement Report 2

³ Ibid, annotated

⁴ From interview of Training Officer by BFAI

The following identifies assignments of the joint training exercise:

ASSIGNMENT:	PERSONNEL:
INCIDENT COMMANDER (I.C.)	OCFRD Training Officer
PUMP OPERATOR (P.O.)	One Firefighter
INTERIOR SAFETY (Fire Room Area)	2 Firefighters
INTERIOR SAFETY (Outside the Fire Room Area)	2 Engineers (Driver/Operator)
RAPID INTERVENTION TEAM (R.I.T.)	1 Firefighter, 1 Engineer
SEARCH AND RESCUE (S.A.R.)	1 Lieutenant, 1 Firefighter
ATTACK TEAM - ONE (A.T.- 1)	1 Lieutenant, 1 Firefighter, 1 Engineer
ATTACK TEAM – TWO (A.T.-2)	1 Lieutenant, 1 Firefighter
EXTERIOR VENTILATION	1 Engineer
PUBLIC INFORMATION (Photographer)	1
OBSERVER	1 Inspector

On the first evolution the mannequin had been placed in the kitchen on the west side of the structure. A bedroom on the northeast corner of the structure was utilized as the room of the live fire. The fire was located in the northwest corner of the northeast bedroom (see figure 1). Two fuel piles were used, both stacked almost upright and almost adjacent to each other, one in the closet, one in front of the closet opening. Fuel stacked in the open closet included two pallets, several scraps of wood and some hay. Outside the closet were two pallets, a hollow core interior door and 3/4 of a bale of hay. After the fire was started, a foam mattress was added to the pile outside of the closet.

The fuel was ignited with a road flare. After ignition, a foam mattress was placed on the fire. Transcripts indicate this was with the permission of the Incident Commander.

After the fuel had been ignited the exercise began. Firefighters entering the structure wore protective clothing (Bunker Gear) including Self Contained Breathing Apparatus (SCBA) and Personal Alarm Safety Signal (PASS) devices. There were four instructors positioned inside the house to serve as interior safety officers. They were to monitor for safety and to be mobile during operations. Transcripts indicate one team stayed with Attack Team 1, in the small room located between the dining room and the bedroom where the training fire was located. The two deceased firefighters were assigned as the Search and Rescue (SAR) Team. The SAR Team entered the structure at the front (east) door and began a right hand search of the building. Three firefighters on Attack Team One (AT-1) with a 1 3/4" pre-connected hose line with a smooth bore nozzle followed the SAR Team into the structure. Two firefighters on Attack Team Two (AT-2) pulled a 1 3/4" pre-connected hose line with variable fog nozzle and waited at the front doorway.

Another firefighter was stationed on the exterior and waited for orders to ventilate (break windows or cut holes in the structure to allow heat and smoke to escape). Two firefighters were assigned as the Rapid Intervention Team (RIT) who would monitor the exterior for

safety and enter the building in the event of a problem. A third, charged 1³/₄" hoseline was located at the front of the building for the use of the RIT.

One firefighter was assigned as the pump operator and monitored the pumps on both fire engines supplying water to the pre-connected attack hose lines. The training officer was the Incident Commander (IC) in charge of the operation and was stationed on the exterior of the structure monitoring and giving orders via radio communications during the exercise.

When the SAR Team entered a small room off the dining room that accessed the hallway to the fire room on the northeast corner of the structure, conditions deteriorated increasing the air temperature, and visibility dropped to zero due to heavy smoke. As the SAR Team entered the fire room AT-1 followed them into the hallway outside the fire room. Both of the Interior Safety Officers that were monitoring activities of the fire room area stated that they heard the Lieutenant of the SAR Team ask his partner if he had searched the entire room and they heard the answer yes. The Interior Safety Officer that was monitoring activities outside the fire room area was waiting to follow the SAR Team when they came out of the fire room. A Safety Officer yelled into the fire room area asking if the SAR Team was out of the fire room. Although someone answered "yes", no one knows who replied. An Interior Safety Officer was going to follow the SAR Team out of the house once they exited the fire room. That Interior Safety Officer assumed that he missed them going out of the fire room and began searching through the rest of the structure trying to find SAR Team.

At that time AT-1 began applying water to the fire room in short bursts after the IC ordered the front northeast window to the fire room to be broken out. After the window was broken out, heavy black smoke followed shortly by flames under pressure ventilated from the window as seen on the OCFRD video recording. At that time AT-2 was ordered into the structure, but could not make entry into the hallway because the small area was full of firefighters. On the video taken by OCFRD, at least one of the two firefighters that perished can be seen, with difficulty, through the window opening. Per the participants, water that had been applied to the fire room by AT-1 caused the hallway area to fill with steam. Both safety officers had to exit the structure after receiving burn injuries.

At that time the firefighter who had ventilated the fire room window came back to the same window, looked inside and pulled out the heat damaged outer shell of a firefighter's helmet. The IC at that time inquired on the radio about whom inside the structure was missing their helmet. There was no reply. The helmet actually belonged to one of the firefighters on the SAR Team.

AT-1 also had to retreat out of the hallway into the living room. During this time the IC asked several times for a report of the SAR Team and received no answer. After AT-1 was out of the hallway, AT-2 and an Interior Safety Officer entered the fire room and extinguished the fire. While AT-2 was overhauling the fire area they found a form in firefighter bunker gear face down on the floor. Both AT-2 firefighters initially thought it was the rescue mannequin, not realizing it was the Lieutenant of the SAR Team.

EXERCISE TIMELINE

10:10:55 – Interior Safety notifies IC he is ready to begin exercise
10:11:00 – IC orders SAR into Structure
10:13:09 – IC notifies AT-1 that NE window will be vented
10:14:02 – IC orders AT-2 into structure (Flashover had occurred)
10:14:41 – IC attempts radio contact with SAR
10:15:49 – AT1 reports water on the fire (Questionable)
10:15:59 – IC asks crews to advise if they need roof ventilation
10:17:34 – IC asks for SAR to report
10:18:40 – IC asks for SAR to report
10:19:33 – IC asks is someone inside missing a helmet
10:19:58 – IC asks for status of AT-1, AT-2 & SAR
10:20:04 – AT-2 reports water on the fire
10:20:45 – IC sends RIT into building and orders PAR
10:21:14 – IC acknowledges PAR on everyone except SAR
10:21:24 – AT-2 reports fire knocked down
10:23:09 – IC order evacuation of building
10:24:42 – Interior Safety Officer and AT-2 report firefighter down

When AT-2 started to evacuate they reached down to drag out what they thought was the mannequin, only to discover that it was a firefighter. After the firefighter was removed through the window the second firefighter was discovered on the floor next to the window, and was also removed through the same window. Advanced Life Support (ALS) medical treatment was administered to both injured firefighters by paramedics and they were transported to the hospital where they were pronounced dead.⁵

Findings:

1. No written plan was prepared that the participants reviewed or that the department's administration approved.
2. Accountability was not maintained at the point of entry to the fire room as it was accessed by firefighters.
3. The fire was started in a room with too much fuel for the size of the room, including a foam mattress that was added after ignition. The mattress produced considerable smoke and heat, and there was not enough ventilation for the fuel load present. Flashover was precipitated by the combination of those two factors; high fuel load and inadequate ventilation. Refer to Addendum 1 for further information regarding related NFPA 1403 information.
4. The fire room used was originally built as a one-car garage and had been converted into a room with block walls, one door and a fixed ¼" commercial grade glass window. Exit from the room was through two consecutive offset turns, through a 26" opening, then through a small room and through another small room, and then out another door into the dining room (see figure 1).
5. The layout of the house required firefighters to go through two small consecutive rooms and a narrow space to get to the fire room. This layout and the small rooms

⁵ NOTE: See the Bureau of Fire and Arson's Report for detailed statements of all participants. As might be expected, there are differences between statements – however those differences did not alter the findings herein.

made it difficult for the maneuvering of personnel, and was a contributing factor to the accountability and accessibility for crews trying to attack the fire.

6. The fire was started near the only doorway in and out of the fire room (see figure 1). Prior to the window being broken, the only point for the expanding heated smoke and fire gases to vent was through the narrow door opening and the adjacent hallway. Attack Team 1 and the inside safety officer were located there and had to evacuate due to the deterioration of conditions of high heat and dense smoke. It is possible that flashover may have occurred before the window was broken, which forced Attack Team 1 and the Safety Officers out, and the then fully engulfed room vented out the window as the path of least resistance once it was broken.



Figure 1: Photo looking SW showing fuel proximity to only doorway

7. The entire event, from the time the SAR crew entered and the first of the two firefighters were located was under fourteen minutes.
8. Immediately after the fire vented out of the window, another Attack Team was sent in, but was not given orders for a search.
9. There was a six minute timeframe from the first unanswered radio message to the SAR team until the time the RIT was deployed specifically to look for them.

10. Safety Crews did not have specific emergency procedures prior to the start of the live-fire exercise.
11. Ventilation planning and execution was ineffective and too late, possibly due to a lack of understanding of the flashover phenomenon.
12. There was no report of PASS device activations during the event or of safety checks of participants before the exercise began.
13. Radio communications between the safety crews, the participating crews and the Incident Command were reportedly less than optimal, and there did not appear to be a formal communications plan in place.

Osceola County Remediation Plan:

Under Florida Statute 633, The Division of State Fire Marshal hereby directs Osceola County Fire Rescue to comply with the following:

1. The 1992 edition of NFPA 1403 is law in Florida (see Addendum 2) and must be complied with during live-fire exercises. Osceola County has since adopted the current edition of NFPA 1403.
2. Osceola County firefighters, instructors, and safety officers shall be provided with live fire training inclusive of safety and flashover/backdraft phenomenon. (see Addendum 1). A written remediation plan must be submitted to the Division for approval within 30 days of receipt of this report.
3. Osceola County firefighters should continue training in realistic fire conditions utilizing recommendations 4 through 11 in the next section.
4. Osceola County firefighters shall have further documented training for firefighter survival skills inclusive of rapid intervention team training, emergency procedures and departmental personnel accountability procedures. A written remediation plan must be submitted to the Division for approval within 30 days of receipt of this report.

Bureau of Fire Standards & Training Recommendations

1. The current edition of NFPA 1403 should be adopted as state law by the Legislature as part of the Firefighter Occupation Safety and Health Act with additional specific instructor certification and training requirements.
2. The Bureau of Fire Standards & Training shall develop a training program leading to a certification to be required for the lead instructor and safety officer for live fire training

involving structures or fires beyond incipient levels. This excludes wildland fire training under Division of Forestry or National Wildfire Coordinating Group or similar training programs.

3. Agencies conducting “search and rescue” types of training should limit their use of live fire. Realistic conditions can be simulated without the danger of live fire.
4. When live fire is used:
 - It is preferable to have all interior crews being trained equipped with a charged hoseline
 - A safety team with a hoseline of sufficient flow (minimum of 95 GPM) to extinguish a fire involving the entire fire room must be in place to monitor the fire and the training personnel. The safety team must be in a position to monitor the progress of the crew being trained.
 - Training mannequins should be readily identifiable as such, not to be confused with a firefighter.
 - No fire room shall be used when there are not two separate means of egress/escape available.
 - Live fire used in training should never be in a position to block the main or planned secondary exit of firefighters.
 - Emergency ventilation must be planned to limit fire spread and improve tenability in the event such action is necessary. Normal room venting shall not be through the primary or secondary egress point.
 - Windows used as secondary means of egress need clear access, with the glass and impedances such as frame cross members removed. Windows can be loosely boarded to allow ventilation and be easily removed without tools from the inside or outside. No exterior obstructions shall impede egress.
5. Training fires, as with hostile fires must be ventilated sufficiently to reduce the chance of unexpected flashover and to maintain visibility at the floor level. Adequate emergency ventilation must be provided for the fire room and any combustible attic space above.
6. All Firefighters regardless of tenure should be trained to constantly identify hazards and alternative escape routes during interior fire suppression operations, inclusive of training exercises. Prior to live fire training drills, firefighters need to identify two ways out of each area.
7. Firefighters must receive specific training to recognize the signs of a flashover and backdraft, and proper ventilation techniques and/or water application to reduce the chance of flashover (see Addendum 1).
8. All participants’ protective clothing, PASS and SCBA shall be inspected for proper use and serviceability per NFPA 1403, section 4.4.

9. A formal written communications plans must be in place inclusive of alternate channels, Incident Command communications versus crew-to-crew, emergency operations, medical operations and scene to dispatch. Radio coverage shall be verified before the training exercise is initiated.
10. Every pumper or other unit equipped with a pump supplying hoselines during interior fire operations shall have an assigned pump operator present at that unit in case immediate operational changes are necessary.
11. Thermal Imaging equipment should be used to monitor fire conditions and the location of firefighters during fire training. Thermal Imaging is a valuable tool for firefighter safety, for more rapid victim search and rescue, and for fire suppression operations in hostile structural fires.

Conclusion

After review, the Office of the State Attorney, Ninth Judicial Circuit of Florida, concluded that the evidence of circumstances and events surrounding the deaths did not establish probable cause for prosecution under Chapter 782 of the Florida Statutes, relative to homicide or culpable negligence.

Osceola County has adopted NFPA 1403 in policy as of December of 2002.

The recommendations of the Bureau of Fire Standards and Training as listed are being addressed as of this writing, with initial proposals for the training and certification to follow. Recommendations for revisions to the Florida Administrative Code will be forthcoming after constituent input.

Report Preparation

This report was prepared in accordance with FS 633.801 – 633.821 by the Bureau of Fire Standards and Training of the Division of State Fire Marshal by the following personnel:

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Addendum 1 - Flashover

The NFPA Fire Protection Handbook in Chapter 10 states, “There are a number of factors that determine when flashover may occur. These include the type of fuel, the arrangement of the fuels in the room, room size, etc. Because these factors vary, the time to flashover cannot be predicted.”

While a universal definition does not exist, this event is generally associated with rapid transition in fire behavior from localized burning of fuel to involvement of all the combustibles in the enclosure. Experimental work indicates that this transition can occur when upper room temperatures are between 750 and 1112°F (400 and 600°C).”

The critical importance of flashover is explained in many firefighter training courses, such as the following: “Firefighter Fact: At best, the survival time of a firefighter in bunker gear and breathing apparatus, fully encapsulated with gloves, hood, and helmet flaps down, is estimated to be between 10 to 15 seconds.” (Reference: Firefighter’s Handbook, Delmar, 2000). Unless the firefighters can immediately exit the room or have a hoseline that can cool the fire down, they are doomed. The key to preventing firefighter deaths and injuries from flashovers is to prevent the flashover as noted in the NFPA 1403, Standard on Live Fire Training Evolutions relate to this subject:

- 4.3.5 The fuel load shall be limited to avoid conditions that could cause an uncontrolled flashover or backdraft.
- 4.3.7* The instructor-in-charge shall assess the selected fire room environment for factors that can affect the growth, development, and spread of fire. (* Refers to the annex below designated as A.4.3.7)

A.4.3.7 The instructor-in-charge is concerned with the safety of participants and the assessment of conditions that can lead to rapid, uncontrolled burning, commonly referred to as “flashover.” Flashover can trap, injure, and kill fire fighters. Conditions known to be variables affecting the attainment of flashover are as follows:

- (1) The heat release characteristics of materials used as primary fuels
- (2) The preheating of combustibles
- (3) The combustibility of wall and ceiling materials
- (4) The room geometry (e.g., ceiling height, openings to rooms)

In addition, the arrangement of the initial materials to be ignited, particularly the proximity to walls and ceilings, and the ventilation openings are important factors to be considered when assessing the potential fire growth.

Flashover is a very complex phenomenon containing several variables. The NFPA standard only touches on one, fuel load, in the standard requirements. In the annex section (*Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to*

correspond with the applicable text paragraphs.), A.4.3.7, is an explanation of other variables.

The annex material tries to summarize the other variables, other than fuel load, that have an affect on flashover. For example, adequate ventilation can prevent flashover by removing heat and carbon monoxide gases from the room. However, in a training fire, the scenario may be to produce enough smoke to obscure vision, which would directly conflict with the ventilation needed to prevent flashover. In addition, closing the door and preventing any ventilation will also prevent flashover (although this can create a situation that may cause a backdraft). This is a very complex subject with many variables. Since the NFPA 1403 standard only speaks about the effect of fuel in preventing a backdraft or flashover, the following should be included in a mandatory training program for instructors and safety officers:

- Flashover must always be considered.
- Appropriate training on techniques to prevent or reverse a flashover must be provided to lead instructors and lead safety officers who organize and supervise live fire exercises. Combustible materials that may create a very fast, hot or smoky fire should only be used with a through deliberate evaluation and analysis of the fuel load (See Bureau of Fire Standards & Training Recommendations 2 & 8).

For example: The ability to provide emergency ventilation and/or apply water directly on the main body of fire must be provided. Openings into the fire room can be closed off using materials that can be quickly removed.

- A safety hoseline crew must be pre-positioned where they have an unobstructed view of the fire allowing them to apply water directly onto the fire. One technique to accomplish this would be the opening in a wall (preferably an outside wall) of the fire room at the floor level. This would not affect the fire other than to provide additional ventilation. In most cases, except a flashover or a non-flaming fire (oxygen deprived), the visibility at the floor level would allow this hoseline crew to see the fire and any firefighters in the room.
- Portable temperature meters (thermocouples) can also be used to monitor the temperature in the room. Appropriate techniques to include the height above the floor and the maximum temperature that would indicate a possible flashover situation should be formulated. These temperature meters are used in some training center burn buildings to detect unusual and dangerously high temperatures. Consultation with subject matter experts would help facilitate this technique.
- Firefighters participating in a live fire exercise should be thoroughly briefed on the nature of a flashover and techniques for immediately (15 to 30 seconds maximum) exiting the danger area. (See Recommendations # 6, 7 & 8) For example:

- Firefighters should be equipped with a hoseline that can either be used to immediately apply water to the fire or provide an unobstructed path out of the room by following the hose. Other personnel in the building should be instructed not to block this exit path, since exiting must be immediate.
- The fire room should have access to one exit (the entry door) and also a second remote means of escape, such as a door or a window large enough for a firefighter and their SCBA to immediately exit.

NOTE: The 2002 edition of NFPA 1403 does not include Section 2-2.10 (g) “An adequate ventilation opening(s) shall be made in the roof” that was present in the previous editions, including the one adopted by Florida Administrative Code 62-256.700 (refer to addendum 2 of this document)

Addendum 2 – Current Florida Administrative Code

62-256.700 Open Burning Allowed.

(5) (a) The burning activities are conducted by a full-time municipal fire control agency in accordance with the National Fire Protection Association document, "Live Fire Training Evolutions in Structures (NFPA 1403)," as revised February 10, 1992, and hereby adopted and incorporated by reference as the accepted practice for fire training instruction. Nothing herein shall be construed as relieving any person from complying with any other applicable laws, rules and ordinances, including Chapter 590, Florida Statutes, and rules of the Division of Forestry.

Addendum 3 – Scene Photos



Figure 2 - mannequin in kitchen



Figure 3 - mattress similar to one removed from adjacent bed for use in fire room



Figure 4 - window to fire room being vented

Photos by Osceola County Sheriff's Office and from Osceola County Fire Rescue video



Figure 5 - fire room from corner opposite of entry/exit



Figure 6 – Fire room looking from entry/exit towards window



Figure 7 - living room near front entry looking towards doorway used to enter/exit the first of two small rooms before the fire room (see floor plan)