

SECTION 10

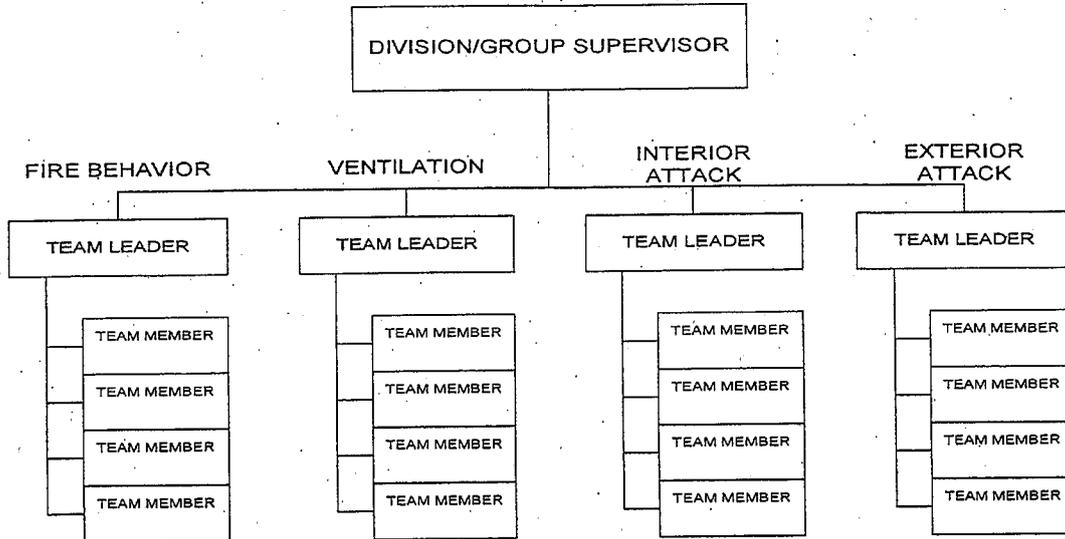


Illustration #4

Crew Leaders are responsible for keeping the team involved in all phases of the course, conducting critiques with the other instructional staff, ensuring the crew is conforming to safety regulations, and taking their crew to the staging area immediately after being released by the Division/Group Supervisor.

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SECTION 11 MAPPING THE BURN SITE

The Plans Section Chief (PSC) is responsible for developing a map showing all pertinent information for the burn. The PSC may assign a Situation Unit Leader. Here is a list of considerations:

- All building sites
 - Indicate type of construction and roofing materials
 - Indicate special hazards (Basements, chimneys, etc)
 - identify each building
 - Locate Septic Tanks, Wells
 - Identify and provide for collapse zone
- All exposures
 - Include power lines, vegetation, trees, other buildings
 - Show flammable liquid storage areas
 - Identify exposures to be saved
- Property boundaries
- Roads and access to the burn site (Include traffic plan)
- Check-in site
- Incident Command Post (ICP)
- Staging area
- Water supply, hydrants with GPMs available and static pressure, pools or other static water supply with approximate capacity, and location of portable water supply placement (fold-a-tanks, large tanks, etc.)
- Determine and map water run-off
- Holes that cannot be filled in
- Garbage or junk that cannot be moved
- Supply Unit Leader location
- Medical Unit Leader location

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- REHAB
- Student parking

Additional items to map should include exits of the burn buildings, and any potential hazards.

Once this map is completed, it should be reproduced both as a large map and many small maps. The large map will hang in the ICP for reference. The small maps can be utilized by Command Staff, Division/Group Supervisors, and Team Leaders for a ready reference.

A large map might also be posted in the staging area for directions or orientation for students. It is a good idea to cover these large maps with Mylar to protect them. This will allow note taking to be done on the map with a grease type marker. (See Illustration #5 on the following page)

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LIABILITY RELEASE FORM

DATE: _____

TO: _____ Fire Protection District / Department

FROM: _____

SUBJECT: **PLANNED LIVE FIRE SAFETY TRAINING EXERCISE**

This is to certify that the undersigned is the owner and / or legal occupant and possessor of real property commonly described as;

and the undersigned has the full authority to authorize the _____ Fire Protection District / Department to demolition the above described property by controlled burning.

The undersigned hereby authorizes the _____ Fire Protection District / Department to burn the above property. That the undersigned hereby covenants, declares, warrants and represents the following:

WHEREAS:

- * there is no insurance obligation that can be violated; and
- * there are no liens on the property; and
- * there are no legal obligations that can be violated by said burning; and
- * the undersigned has public liability and property damage insurance covering the claims of third persons for injuries and / or property damage proximately caused by said burning.

LIABILITY RELEASE FORM (Continued):

The undersigned hereby releases the _____ Fire Protection District / Department of any claim of liability that the undersigned may have in connection with the said burning, and acknowledges that such burning and all activities connected therein is performed on order of the undersigned and the undersigned agrees to be responsible therefore.

In consideration of this agreement, the undersigned does hereby covenant and agree to indemnify and hold harmless the _____ Fire Protection District / Department from any and all claims of the undersigned. Furthermore, I indemnify them or any other person or persons whomsoever for personal injuries and / or property damage arising out of or incidental to said burning inside, upon, or outside of said premises.

The undersigned agree that the _____ Fire Protection District / Department will not be held responsible for any materials removed from the premises nor will the Fire Protection District / Department be responsible for any clean up or damage to any plant, animal, human, environment or other properties.

The undersigned further states that all public utilities and other agencies that have property in the area described above have been notified of the burning and have had the opportunity of having their property removed.

SIGNED: _____ **DATE:** _____

WITNESSED: _____ **DATE:** _____
(Fire District / Department Representative)

SECTION 12 THE EIGHT BASIC EXERCISES

There are four basic exercises that must be completed in order for students to receive SFT certification in Fire Control 3A. There are additional exercises that may be added if resources and time will allow. Each exercise will be discussed in the following sections.

The 4 mandatory exercises

- Fire Behavior
- Ventilation Techniques
- Interior Attack
- Exterior Attack

Additional exercises.

- SCBA Confidence Course
- Attic Attack
- Fire Cause and Origin
- Basement Attack (if available)

As structures become more difficult to acquire, the instructor must attempt to utilize all acquired structures to their maximum potential. Other potential training exercises that may occur in the building prior to a Fire Control 3A course include but may not be limited to

- Forcible entry training
- Selective breaching and breaking
- Self rescue techniques
- Thermal Imaging Camera (TIC) training
- RIC training
- SCBA training
- Building Construction
- Building Stabilization
- Search and Rescue

NOTE: If plans are made to utilize the structure for training prior to a Fire Control 3A class, caution must be taken to minimize damage to the structure so as to ensure maximum FC 3A training and safety.

SECTION 13 FIRE BEHAVIOR

This is the first live fire exercise that the students will attend. This section of a Fire Control 3A class will be the foundation of all fire behavior witnessed by students for the rest of the day's events. The instructor should attempt to illustrate as many aspects of fire behavior to the students as possible so as to continue to build upon them throughout the class.

This exercise should begin with a brief lecture explaining to the students what fire behavior they will see in the specific room chosen, and then with the ignition of the crib, allow the students to watch the fire grow and behave as the instructor has predicted. Speaking points that shall be covered during this lecture include but are not be limited to:

- Factors influencing fire behavior
 - Amount of fuel
 - Type of fuel
 - Arrangement of fuel
 - Ratio of fuel to room or building
 - Ventilation
- Time temperature curve
- Types of fire classes
- BTU output
- Stages of fire
- Heat transfer
- Smoke
- Water application anchor points
- Barriers and Shielding
- Nozzle patterns
- Steam production
- Air flow
- Indicators
- Horizontal and vertical thermal balance
- Ember production
- Ash production
- Flame lengths
- Flammable gases

- Overhead or atmosphere control
- Roll over
- Flashover
- Backdraft

The number of students in the class will determine the potential need for more than one behavior class. It is conducted in a live fire situation, in a designated training room. Modifying or removing interior walls can increase floor space and/or allow for a better view for students participating in this exercise. Construction knowledge is key in choosing walls that can be modified.

The training room will be dark and potentially dangerous. All measures must be taken to remove any and all hazards prior to the exercise. A minimum of 2 exits shall be identified for all students. These exits may be marked both on the floors and walls. The instructor for this exercise shall be capable of providing planned, expected, and desired fire behavior before being assigned to this exercise. The instructor shall discuss anticipated fire behavior of the specific room based on fuel, construction, and all other variables and then illustrate this behavior with examples after ignition. Key points that do not occur during the various demonstrations can be discussed outside following the exercise.

During this exercise, students will be exposed to fire from incipient to the rollover stage. At the same time, the instructor will be demonstrating proper application of various nozzle patterns, and the effects of water application (steam production, thermal influence, etc). This is also an opportunity to demonstrate interior ventilation techniques using nozzle streams.

Items needed for this exercise:

- Pressurized water extinguisher or hand-pump fire extinguisher
- Attack line (Staffed by Instructors only)
- Back-up line (from a separate water source and staffed by instructors only)
- Ignitions Officer with hook
- Instructor staffing near exits

Utilize ventilation during the behavior burn to demonstrate air movement and its effect on fire travel.

Using the pump can and teaching anchor points will demonstrate the small amount of water needed to control fire.

Crib Construction

By using proper crib construction the fire can be knocked down and then allowed to build for the next demonstration. When using pallets for this class it can be very difficult to get the fire burning again if all the starter fuels are consumed too early.

NOTE: It is recommended that a crib be constructed to allow consistent flow of air through the base of the fire for this portion of the class. This will allow for demonstration of air flow, ventilation, extinguishment, and fire growth. (See illustration #)

Room set-up

Make sure that the training room is prepared for the class to be on floor. Remove all hazards that could harm a student or damage their PPE. Remove all floor coverings, carpet, and tack strips. Remove all window glass and cover with knock out panels. Remove all ceiling lights, interior mirrors and other items that may fall and cause injury during the burn. Render safe all abandoned fire extinguishing systems. Change the swing of any doors that are not removed to open outward. Cover any holes in the ceiling or walls where fire could extend. Assign instructional staff to the roof to watch for any extension to the attic space or roof fires. Mark the floors and exits with hi-visibility paint using arrows leading to the exits. Make sure that the water supplies for both the attack and back-up lines come from two different supplies.

SECTION 14 VENTILATION TECHNIQUES EXERCISE

The ventilation phase of fire fighting is second only in importance to the application of an extinguishing agent. Ventilation strategy and tactics shall be imparted to the students as a part of this exercise.

This exercise is designed to provide the student with proper methods and techniques of ventilation and an opportunity to utilize ventilation equipment. This includes using both hand tools and power equipment.

The ventilation exercise should be planned well in advance and be designed to facilitate the entire course. The instructor for this exercise should have a good working knowledge of building construction, both old and new, and show methods of determining what type of construction is utilized in a particular building. It is imperative that ventilation operations be coordinated with the fire behavior and fire attack operations.

This is a training exercise and every opportunity to anticipate fire spread and potential problems need to be addressed prior to starting operations.

Most of the time, residential buildings are the subject of FC 3A classes. The classroom for this exercise is on the roof. Inspection should be made to assure structural integrity of the roof. Some older buildings do not have ridge poles, tie boards (webs), or vertical upright supports to hold the extra weight of 20 students. You may need to rebuild or reinforce some roofs.

Safety is paramount while burning is conducted beneath the ventilation exercise. A minimum of two ladders shall be in place to aid in rapid evacuation. The addition of at least one Assistant Safety Officer is advisable. The Assistant Safety Officer is responsible for safe operations while conducting ventilation exercises on the roof.

It is strongly recommended that ventilation techniques be taught on a separate roof, or at a time that live fire is not occurring below the students.

Ensure that reliable radio communications are maintained between the Ventilation Instructors and the Fire Behavior/Interior Attack Instructors. Have an operational plan for coordinated suppression and student evacuations in the event the fire extends into the attic or other areas not intended to burn during instruction.

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During the Exterior Attack Exercise, a strip ventilation cut can be used to illustrate the effectiveness of this ventilation technique by safely positioning students inside the structure and allowing them to hold the fire at the cut with hoselines. This must be a well coordinated effort and safety personnel must be in position at all times.

As a means of accommodating the overall burn plan, it may be advantageous to put a strip ventilation cut in place prior to beginning the burn. This will allow for a predetermined location to make an offensive or defensive stand if necessary later in the day's evolution to capture a running attic fire.

Note: This is an effective means of separating larger or uniquely shaped structures for multiple day burns.

Remove all overhead obstructions such as wires, trees, etc. Make sure there is adequate room to store tools so they will not fall to the ground and possibly injure someone.

Tools might include axes, pike poles, pulaski, rubbish hooks, power tools, sledge hammers and roof ladders. The hosting and cooperating agencies attending may influence the type of tools and operational guidelines, or techniques, utilized by their respective agencies.

All students will be in full personal protective equipment while participating in ventilation operations. If live fire exists, all students must wear an SCBA.

The ventilation exercise lecture should begin while on the ground and include but not be limited to:

- Safety briefing
- Building size up
- Building construction features
- Ventilation principles
- Ventilation terminology
- Ladder placement
- Safe power equipment and tool use
- Photo Voltaic (solar panels or PV panels)

The safety briefing will include travel and escape routes on the structure and communication methods that will be used while power tools are in use including the signal to evacuate.

Each student shall be given the opportunity to use each tool.

To help identify hazardous areas, marking paint shall be utilized to show roof areas that have been cut. All personnel shall be advised to avoid all painted areas.

Stage a 1 ½" or 1 ¾" charged hose line dedicated for roof operations, while personnel are on the roof.

Ventilation Instructors and the Assistant Safety Officer shall monitor operations. Tolerate no horse play or unsafe acts.

When the roof portion of the ventilation exercise is completed, there should be several planned vent holes for later use during burning operations. If it is necessary to cover holes, use thin plywood. Do not nail these down. Pull-cords or wires may be attached to these covers for easy removal by personnel from the ground. This will enable the students to see the effects of ventilation without exposing personnel to the hazards associated with roof operations. Ensure that the pull-cord will not melt or burn between the cover and the pull point.

It is also possible to conduct an exercise on natural and mechanical ventilation. This may be done by charging the building with smoke and demonstrating positive pressure ventilation techniques. This process may be valuable during the entire course.

Example: Set up for positive pressure ventilation during interior attack. This has to be highly coordinated.

Step 1 With all exterior doors and window openings covered, interior doors open or closed appropriately, a fire is started in the rear of the building and allowed to burn.

Step 2 At a given signal, the vent crew will remove the window covers from the fire room. As this is done, the attack crew will coordinate their attack with the implementation of positive pressure ventilation. As the smoke is pushed back to the fire room, the attack crew can make entry and extinguish the fire in a more tenable environment.

Note: This is a technique of coordinating interior attack and positive pressure ventilation. When correctly implemented, this method of ventilation can be very effective. (See Illustration #6 on Page 32)

This technique will be utilized many times during the course of the day's exercises to remove smoke and heat from rooms that have been used for live fire attack.

Remember to plan the ventilation exercises to allow all students to have an opportunity to participate. This segment of the days training will be used for strategic placement of vent holes needed for the entire course.

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SECTION 15 SCBA CONFIDENCE COURSE

This exercise is designed to provide fire fighters an opportunity to experience basic performance evolutions while utilizing self-contained breathing apparatus (SCBA). This exercise is not designed to teach proper donning and doffing of SCBA. All students should be proficient in SCBA prior to participating in a FC 3A course. This exercise will teach interior firefighting survival by allowing the students the opportunity to gain confidence in proven survival techniques with emphasis on remaining calm and creating a heightened awareness in a firefighting environment. It will also assist fire fighters in getting the maximum performance from an SCBA.

A building or room utilized for this section should be safe and have more than one exit and an escape route large enough to move several students. The area should be dark even before the smoke is introduced. The class size should consist of a maximum of 10 students. All props should be of sturdy construction. Plywood can be used to cover the windows. Installation should allow the covering to be removed without trouble.

Note: If it is necessary to cover a window, use plywood or drywall. The covering must be placed on the outside and only lightly tacked into place for easy removal in case of an emergency. Also, cover all vertical and horizontal openings. If possible, cut a ventilation hole over the smoke room and cover it with plywood. This covering should be placed on the opening without tacking for easy removal if ventilation becomes necessary.

There should also be an interior hose line present with a reliable water source. If one corner of the door is cut out, it can be closed over the hose.

The tighter the area used, the smaller and cooler the fire can be to generate the necessary smoke and heat.

A Safety Officer must be present in the room during the exercise.

A crib or shopping cart are examples of acceptable methods of producing smoke. Burn materials should be both wet and dry hollow core feed hay (HCFH). A chemical smoke generator can also be used. Proper chemical smoke shall be utilized. **DO NOT USE FLAMMABLE / COMBUSTIBLE LIQUIDS IN ANY FORM DURING A FC 3A COURSE.**

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There shall be an Assistant Instructor or Trainee Instructor in the room to check and monitor the fire, and cool it if necessary, at all times.

All instructors, Safety Officer, and students should have a SCBA on prior to entering the smoke room.

Students are briefed before entering the room. All PPE will be assessed prior to allowing students to participate in the exercise.

Remember safety in this exercise is of paramount importance and will receive priority over all else.

Another method of conducting the SCBA training is to use a maze. This can be set up in an existing building using 1) a charged hose line for the students to follow and 2) a method of obscuring their vision. A safe chemical smoke is preferred for obscuring their vision, however if this is not possible, taping the mask face piece will suffice.

The exercise starts when the student is instructed on how to follow the maze by keeping contact with the hose. An item predetermined to be the victim (traffic cone, empty SCBA bottle etc.) must be located and retrieved by the students during each evolution.

The instructor should keep track of the students entry and exit times as well as the amount of air consumed for the exercise. As the student exits the drill, give these figures to them. These figures will give an indication of how the students utilize their air.

Set up the maze so that it takes about 15 minutes to complete. All students should be in full protective clothing when participating in the exercise.

Illustration #7 on Page 36 is an example of a typical maze using a three bedroom house.

Instructors wearing SCBAs must be inside to assist the students if problems develop. Each student is finished when they exit with the simulated victim. Be creative, but do not create unsafe conditions.

As an added note, have the students tell you how much hose is in the maze. This will give them an opportunity to think while they are traversing the maze.

If time permits, let students having difficulty with the exercise go through the maze a second time.

Per CAL OSHA regulations, have a mask cleaning station set up at the end of this exercise. Make students utilize this process as part of the instruction.

Speaking Points

- Donning and offing the SCBA inside a structure
- Search techniques
- Search tools
- Changing profile
- Buddy breathing
- Loss of air techniques
- Entanglement hazards and techniques
- Forcible exiting
- SCBA emergency procedures
- Visual and audible indicators
- RIC Tactics
- Situational awareness
- Self awareness

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INTERIOR ATTACK EXERCISE

This exercise is designed to provide students with methods and procedures used for direct, indirect, and combination water application on interior building fires.

The building chosen to be utilized for this exercise must be of solid construction and have more than one escape route. There should also be ample room to manipulate hose lines. Fuel used can be paper, wood, wood pallets, or hollow core feed hay (HCFH).

The use of existing fuel inside the structure (cabinetry, doors, etc.) may be done at the discretion of the AQMD having jurisdiction of the specific structure. All holes in walls and floors should be covered, and stairs and railings should be made safe. All debris that is not going to be used for the exercise should be removed. All carpeting, padding, and carpet tacking systems must be removed.

If water heaters or other closed vessels are present, they should be removed. If it is not possible to do so, the vessels should be punctured thoroughly.

Safety Note: A water heater poses a major problem in Fire Control 3A classes and should be removed. In the event it cannot be removed due to damage to the structure, numerous holes must be punctured in the water heater. This will prevent an over build-up of pressure in the heater. Care should be given in working with water heaters; they could contain asbestos which requires special handling as discussed in Section 4.

All glass should be removed from windows and interior decorations. Window openings can be covered with plywood or drywall knockout panel. The covering shall be placed on the outside of the building and secured in a manner that allows for easy removal. This will assist in quickly opening the window, both for demonstrating coordinated attack, and in case an emergency situation occurs requiring the windows use for quick escapes.

Prior to starting the exercise, bring students into the building for orientation. Explain what is going to happen, the location of the safety exits, who is the Safety Officer, and any safety precautions you may deem necessary. It is a good practice to identify all load locations with a large felt tip marker or spray paint prior to beginning the exercise. This will help both students and assistant instructors to accommodate your burn plan.

STUDENTS MUST BE FAMILIAR WITH THE LAYOUT OF THE BUILDING. THERE MUST BE NO SURPRISES.

To start the exercise, a Primary Instructor, Safety Officer, Fuel Unit Leader, and four crews must be present.

Assign a crew as the attack crew. All personnel in the attack crew must wear SCBA. The next crew will be the back-up crew. They too will wear SCBA. There must be an equal number of students on both crews. This is in case the back-up crew has to perform rescue on the attack crew. Both crews should have a hose line, each line coming from a different water supply. Each crew member **MUST** be familiar with the attached nozzles operation. Failure to do this can, and has, caused serious injury.

The next crew is the ventilation crew. They must have SCBA available but not necessarily on unless the situation dictates. They should have pike poles, appropriate ladders, axes, and anything else necessary to perform proper ventilation if, for example, there is going to be a demonstration of positive pressure ventilation.

The last crew is the fuel crew. They work under the direction of the Ignitions Officer. It is their job to refuel after each exercise. They also may need SCBA.

Illustration #8 on Page 39 depicts what a typical exercise scene may look like.

Speaking Points

- Heat shielding and barriers
- Stages of fire
- Indicators
- Air flows
- Heat transfer
- Horizontal and vertical thermal balance
- Ember production
- Ash Production
- Flame lengths
- Water application
- Production of gases
- Anchor points
- Ventilation
- Overhead control
- Roll over
- Steam production (floor and ceiling)

- Heat indicators

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SECTION 17 ATTIC ATTACK EXERCISE

Attic fires are among the more difficult types of fire faced in the fire service today. During the FC 3A course, an exercise can be conducted to demonstrate effective methods of controlling an attic fire. The attic attack exercise is not one of the required evolutions for FC 3A but, if properly presented to a class, will add invaluable experience to the students participating. There is a lot of planning and coordination involved in teaching this portion of the class. When conducting an attic attack exercise, remember to continually re-evaluate the structural integrity of the roof and ceiling area both during and after the exercise as personnel will be working under and around it for the duration of the day's evolutions.

Tools used to combat attic fires vary by department and types of construction. One of the most efficient instructional tools this exercise is an attic or piercing nozzle. This nozzle can be placed into service and address fires that have unintentionally extended into the attic during interior attack without compromising the ceiling of the room currently being used or rooms of future use. This nozzle should be left connected to a charged line during the interior exercises. It should be kept in a location known by all personnel participating in the class and should be equipped with enough hose to reach all areas of the training structure.

The demonstration on how to use this tool should be done in an area where students may also view the attic area. Show half the students how to "stick" the nozzle while the other half watch the nozzle discharge in the attic, then rotate the students. A fire may be started in the attic if conditions permit. This requires a great deal of coordination and close supervision. It is also possible to show the operation of the nozzle by piercing down through a floor into a room below. Have the students in the room below as a vantage point to witness the application of water onto a potential fire in this area. Piercing interior walls can also serve for purpose of demonstration.

Illustration #9 on page 42 provides information on how to construct your own attic nozzle. It is inexpensive and simple to manufacture. The nozzle should be approximately 5 ½ feet long. This will give the average firefighter a 13 1/2 foot reach. This should be adequate for most dwellings or small businesses. To form the end, use a vise or a power spreader to pinch the tip of the pipe. The tip is then cut at a 55° angle.

Approximately twenty 1/8" holes should be drilled in the tip. This nozzle can

be used to pierce through drywall or plaster.

Speaking points:

- Coordinated ventilation efforts with interior attack
- Initial application of water between unburned and burned
- Structural stability
- Overhead hazards (Air handling equipment)
- Tools necessary to effect a proficient attic firefight
- Many applications of a piercing nozzle. (Attics, vehicles, rubbish, etc.)
- Applying foam through a piercing nozzle

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SECTION 18 BASEMENT ATTACK EXERCISE

The opportunity to fight a basement fire during a FC 3A course is extremely valuable. While most fire departments carry a cellar nozzle, fire fighters rarely see it used properly. A FC 3A course is an opportunity to do so. A piercing nozzle may be used in this exercise also as many departments are carrying these as well. When a building with a basement is obtained, planning should include the use of it in the course.

The basement exercise usually comes after the interior attack phase is completed. A thorough inspection of the basement area must be made prior to including it as an exercise. Observe how fire will travel, how solid the construction is, what kind of entry there is into the basement, and how many exercises can be conducted.

Note: If the basement exercise is done prior to interior firefighting, particular safeguards must be in place to prevent personnel from falling through ventilation holes cut for the basement work.

The objective of this instruction is to build the fire fighter's confidence in attacking basement fires. All doors to the basement must be in proper working order. All door locking hardware shall be removed. The stairs should be strong enough to support several fire fighters in full protective gear, with charged hose lines. If a railing is used, make sure it is in safe condition. If the stairs and railing, or passage way into the basement, are not in safe order and cannot be repaired. **DO NOT ATTEMPT THIS EXERCISE.**

The basement must be thoroughly cleaned out so the only thing that will burn is what you've put there. Surprises can be dangerous. Cut a hole over the point where the fire will be located, and cover it with wood. The hole should only be large enough for a cellar or piercing nozzle. The wood covering should not be nailed down. If possible, cut a ventilation hole approximately 3' x 3' near a window on the leeward side of the building. Use wood to cover and do not nail it down.

Take only enough material into the basement to create the desired effect. This would include wood, paper, and straw. The wood might be in the form of pallets limited to 1 or 2. Place the material directly under the nozzle hole. The straw should be moist to develop a smoky fire, but not a hot fire. (See Illustration #10 on Page 45)

Take the students into the basement to become familiar with its

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configuration. Explain the exercise, and then have them practice moving in and out with full protective gear and charged hose lines.

If it is deemed unsafe to start a fire in the basement, performing the crew movement within the exercise can still help build their experience.

Three of the crews will be in SCBA. One crew will be the basement attack crew. They will be in full protective gear and have a charged 1 ½" or 1 ¾" line with a 95 gpm or larger nozzle. Safety line(s) shall be in place. (Staffed by Instructors)

Another crew operates the cellar or piercing nozzle. They also will be in full protective gear.

A third crew will be a back-up crew with full protective gear and will be set up the same as the cellar attack crew.

The fourth crew will be the ventilation crew. They will be in full protective clothing and have SCBA readily available. Their equipment will be two or more ventilation fans and a pulling tool, an appropriate length for basement ceiling height.

To start the exercise, position each crew. The Ignition Officer lights the crib. All personnel leave the basement. Make sure the fire has an adequate air supply or you may have a backdraft. It is recommended to leave the basement entry open. When the fire has reached the desired effect, use the cellar or piercing nozzle to knock the fire down. This operation should almost completely extinguish the fire. Leave the cellar or piercing nozzle flowing and have the attack crew enter the basement. At the same time, start the ventilation process.

NOTE: The use of a cellar or piercing nozzle while the attack crew is in the basement should be done at the discretion of the instructor as maintenance of a thermal layer can be a concern.

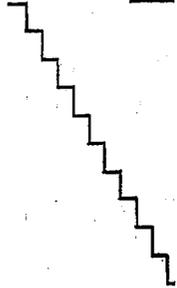
Speaking Points

- Piercing nozzles
- Cellar nozzles
- Ventilation for basement fires
- Stairwell safety
- Accessing basement fires
- Coordinated fire attack
- Thermal balance

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Open Window

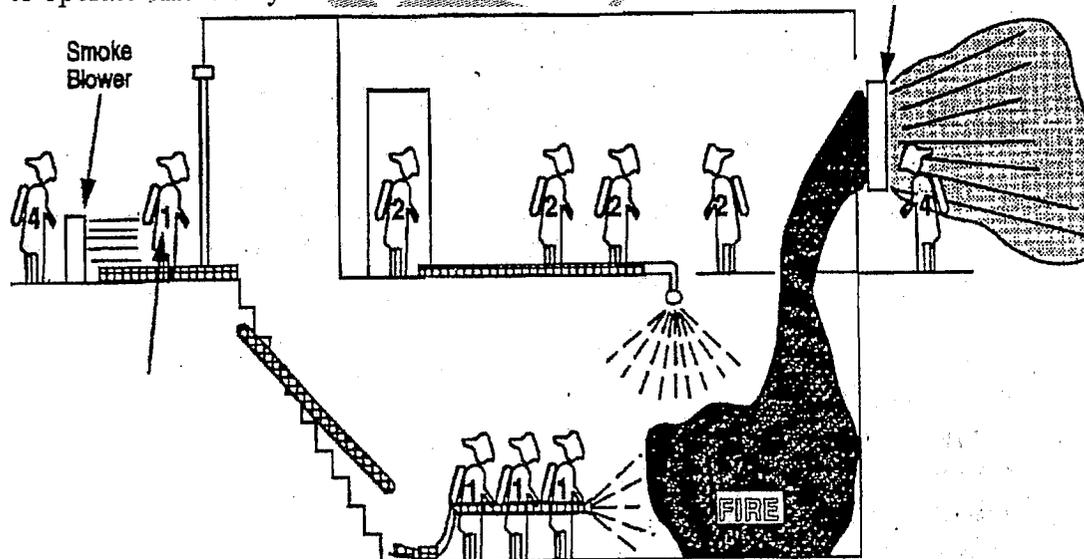


Pallets or wood with paper and wet and dry straw.



Smoke Blower

Entry firefighter should remain clear of the door to allow the smoke blower to operate effectively.



SECTION 19 FIRE CAUSE AND ORIGIN EXERCISE

Another exercise that may be included is the cause and origin exercise. A local investigator may be used as a speaker for this module. If this is done, support will be necessary to accommodate the speaker's preparation and possibly presentation of the course.

To prepare for this exercise, the building or room to be used must be free of all rubbish and debris. Ideally, the rooms used for cause and origin should be furnished as they would be if the structure were inhabited. If this is not possible for whatever reason, the class can still be effectively taught with good lecture and demonstrations in the burn rooms. Furniture to be used for this purpose can be obtained from several sources. Goodwill, the Salvation Army, and the local landfill are good sources.

If possible, each fire, when started, should be video taped. After the students have made a determination as to cause, show them the tape.

The fires should be set as both arson and accidental, i.e., frayed wires under the carpet versus flammable liquids splashed around the room. Utilize local arson investigators as speakers or for recommendations for this section. Five to seven different types of fire sets are preferred.

The fires should be set the day prior to the exercise. Someone should stay at each scene until the students arrive. When setting the fires, proper equipment and personnel should be available to assist the arson personnel.

The cause and origin exercise for firefighters can be conducted as follows. An arson instructor lets the students view each room without disturbing the scene. The students make decisions on how the fire started and spread. At this point, if resources allow, the instructor will take the students to another room set up with a monitor, video player, and chalk/white board.

Each scene is discussed and students can share their thoughts on what they think started the fires. The video is then shown of the actual causes of the fires. After viewing the video, the students are taken back to the fire scenes and the instructor takes them through the incident. Student groups should be kept small, usually 15 to 20 students.

If only one room of a structure is available for this section, more than one set can be utilized in the same room. The instructor can then walk students

through and show indicators and patterns on the various sets in the same room.

Depending on the experience level of the students, it may be appropriate to just walk through the area of your sets and point out indicators and evidence of fire cause. This too can be done by a professional investigator.

Speaking Points:

- Ignition sources
- Incendiary devices
- Evidence preservation
- Indicators
- Burn patterns
- Accelerants
- Documentation

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SECTION 20 EXTERIOR ATTACK EXERCISE

The final exercise conducted during a FC 3A course is the exterior attack exercise that will finally destroy the building. This is an all hands exercise utilizing all students from the day's training. Several considerations are necessary to prepare for this exercise. These considerations begin during the early planning stages, when determining if the structure is a viable candidate for a FC 3A course.

Exposures are the first consideration of the final burn. If they are too close, and of high value, they may pose a concern. In some cases the decision must be made not to burn the remainder of the building at all, Risk vs. Gain.

Exposure considerations include but are not limited to:

- Adjacent structures (outbuildings, garages, next door properties, etc...)
- Power lines
- Vegetation (wildland or residential)
- Traffic Hazards (freeways, highways, etc...)
- Downwind influences (hospitals, schools, airports or air traffic, Convalescent homes, sensitive commercial occupancies, etc...)

Weather can also be cause for concern before and during the final burn. Continually monitor the wind speed and direction, humidity, and temperature for changes that can negatively influence fire behavior and exposure potential.

When identifying exposures, consider location and type. Make sure there is enough water to supply the streams needed. Clear all burnable materials and debris from around the structure. This includes overhanging tree limbs. In wildland interface areas, fire breaks should be positioned prior to the day's activity as well.

Prior to ignition of the final burn, the Primary Instructor shall brief all other instructors on the final burn plan. This will include but not be limited to the following:

- Location of the fire load.
- Line placement
- Assignment of instructors to student crews.
- Instructions for the application of water to the final burn and teaching tips specific to the structure.

- Site specific hazards and or exposures.
- Communications.

Utilize the students to fire load the building. The amount of fuel load used and placement will vary based upon the acquired structure and should always be done based upon the final burn plan. Explain to the students what the final burn plan is. This will help them to understand the load placement and water application to accommodate the plan. Use available materials as much as possible. Kitchen cabinets, doors, and unused building materials from the day's evolutions will add more realism to the final burn. Consult AQMD for guidance as to the use of furnishings for fire load. Use caution not to over-load the structure, this could cause a rapid and unexpected build up of excessive heat as well as deprive the students an opportunity to witness actual fire behavior during the build up phase of the fire.

DO NOT USE ACCELERANTS. THE USE OF FLAMMABLE/COMBUSTIBLE MATERIALS DURING LIVE FIRE TRAINING IS STRICTLY FORBIDDEN.

Place instructional staff with students crews during the final burn. This is an opportunity for students to watch a fire start and spread, and to witness how long it takes to become well involved. It is also a valuable time for the instructors to answer questions about the build up, growth, and spread of fire. This is the perfect opportunity for instructors to predict fire behavior as it occurs in the presence of the students.

The final burn is a point in the instruction to show the effectiveness of various streams, including master streams. Adequate amounts of hose streams for all four sides of the fire and any exposures must be available. There should be a system of control to coordinate all hose streams.

Advance attack lines, knock down the fire, and back out. As the fire builds each time, demonstrate various attack methods. These include direct, indirect, combination, and the blitz attack utilizing a 2 ½" or master stream. The instructor should verbalize the desired effect prior to the application of water through the various attack methods so the students may also look for this effect as they advance lines and apply water. Examples of cooling eves to prevent molten tar from running down onto the firefighter during a window attack should be given. Take the time to discuss the effects of stream management and its effect of the fires behavior at this point. Examples include a fog patterns ability to push fire, the reach of a straight stream and deflection methods, controlling steam production and thermal balance etc...Line size should be discussed at this time as well as applications to different scenarios be given. Continue instruction during the exterior attack exercise until all training value has been utilized to its

fullest.

Coach the students to control the fire. Do not allow them to completely extinguish it. This will only create unnecessary delay in the exercise. Take advantage of the opportunity to critique each attack while waiting for the fire to rebuild. When exterior attacks have been completed and the building is being consumed by fire, keep hoselines in place. Water should be directed on the outside walls with a low gallonage setting. This will help the walls fold in as they are burned from the inside out.

Make certain that any masonry chimney, if present, has been undercut. Undercutting chimneys, breaking the corners of stucco walls, specific loading to address water tank towers, etc... should be done prior to the final burn as well. Have a good burn plan and execute according to that plan. Chimneys should not be allowed to stand freely following the burn. They can topple at a later time and cause damage or injury.

After the building is collapsed allow the fire to continue to consume as much flammable/combustible materials as possible prior to extinguishment. This will make overhaul much easier. Keep one or two charged hose lines available until the fire is completely out. Use this time to pick up equipment and critique the days events. Allow input from all assistant instructors. Reaffirm what the students have learned from the day's exercises.

Before turning the structure over to the property owner take the time to secure all hazards or flag them to assure safety. Secure the area with "FIRE LINE" flagging so as to have no passer-bys or children wander into the area. Masonry walls and/or chimneys that may not have fallen during the burn must be secured or made safe by knocking them down. It may be necessary to make prior arrangements with the property owner to secure heavy equipment to render safe the remains of the structure upon completion of the burn.

Note: A blanket of Class A foam over the burned area will quicken the overhaul.

Speaking Points

- Fire spread and behavior
- Exterior attack for various fire locations
- Straight stream and fog patterns
- Construction and its influence on fire behavior
- Flashover
- Exposure protection
- Various methods of exterior attack

SECTION 21 BURN SITE SECURITY

Site security starts when the buildings have been turned over to the agency conducting the training exercise. Vandals and other people are looking for salvageable items such as fixtures, doors, windows. These individuals have destroyed buildings so they were rendered useless for training.

If the class operates for more than one day, it may be necessary to have someone stay on the site until it is finished. These personnel should patrol for rekindle and possible theft. Make sure they have adequate equipment in case they have a problem, i.e., a quick attack unit, reserve engine, etc.

Request assistance from the local law enforcement agency, especially while the training is in progress. Traffic and crowd control, potential road closures, and security for firefighters and apparatus may be necessary.

A site security plan may have to be developed by the planning section. It may be a valuable asset to the course.

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SECTION 22

SUPPLEMENTAL TOOLS AND ADDITIONAL INFORMATION

Hand Pump Fire Extinguisher

Several years ago, the fire service used a very handy tool called the hand pump or pump can. It is still used in several large cities as a mop-up or attack tool. It is the forerunner of the pressurized water extinguisher. These have been very useful for FC 3A courses.

These pump cans come in three sizes – 2.5, 3, and 5 gallons. The preferred size is the 2.5 gallon size. Most of these extinguishers have a short hose as standard equipment. It is recommended you change the hose to a six foot length. This will give you more flexibility to reach those areas that are not easily accessible. These extinguishers can be purchased from various fire equipment dealers.

Hand pump extinguishers can be used for mop up and overhaul, knocking down a small fire that was not planned, stand by after hose lines have been removed, and for night team patrol.

It is recommended that all FC 3A courses have at least one hand pump extinguisher at the burn site. The addition of this tool will make instruction of interior attack much easier. A method of refilling these units should also be available.

Thermal Imaging Camera (TIC)

Another tool that can prove quite valuable is a heat sensing device. There are many on the market and most fire departments use them. The agency sponsoring the burn will probably have one for the course. If not, contact one of the manufacturers of these items and they will probably have a demo for loan.

Bresnan Distributor Nozzle

This nozzle can be used for effective application of water for basement, and attic fires. Use of this nozzle is subject to its availability.

Piercing Nozzle

This nozzle may be used during a FC 3A class during attic and basement exercises. Lecture may include the use of this nozzle for vehicle and dumpster fires as well. It should be kept in service and nearby for the interior attack exercise to rapidly apply water to the attic areas in the instance of fire extension as it will not compromise the ceiling surface other than a small hole.

Construction tools and materials

When conducting the planning session, it would be ideal to identify any other tools and equipment you might need. Supplies that should be kept available should include; dry wall (sheetrock), particle board, plywood, nails, screws, cleaning supplies for SCBA masks, tables and chairs. Tools that may be necessary include; hammers, saws, drills and screw guns, and a portable generator.

A tool of major consideration for a successful FC 3A course is some sort of ignition device. Matches, Lighters, or fusee's will serve this purpose very well.

Burn Fuels

Wood fuels in the form of lumber, or pallets, excelsior, or hollow core feed hay (HCFH) may be used for training in acquired structures and permanent burn building props found at training facilities. When using hay, the best type is hollow core feed hay (HCFH) since feed hay does not have chemicals present. When purchasing the hay, be sure to specifically ask for feed hay.

There is a problem that occurs in burn buildings, both live fire and in a burn training prop, called thermal shock. This occurs when the temperature in the fire room reaches temperatures above 600°F then is cooled rapidly by an advancing nozzle. The temperature can curve as much as 500°F in a matter of seconds. In a live fire building, this can cause damage to walls and ceilings and destroy the room for future use. In a burn building prop, this sudden shock can cause major damage to the room. It makes sense then, to use less fire load and have a fire that looks real but does not have heat extending throughout the training facility.

Note: Each pallet is capable of producing as much as 450,000 BTU's. This is based on the fact that 1 pound of wood can produce as much as 9000 BTU's. Therefore a fuel crib consisting of 3 pallets can produce as much as 1,350,000 BTU's. This is much more heat than is necessary to instruct in Fire Control 3A or 3B given the variables of room size and rate of heat production.

The purpose of this course is to demonstrate various methods of controlling fire. The instructor must be able to effectively anticipate and demonstrate fire control in a variety of construction types prior to presenting this course to the student.

We have heard instructors say, "I want them (the students), to feel the heat". If this is heard at a FC 3A /3B course, the instructor's qualifications should be questioned, as well as the instructor you hear say, "I don't feel it is a good burn unless I melt a few helmets or burn a few students". The Senior Instructor should remove these instructors from the class immediately and tell them why.

Important Note: **DO NOT USE RICE STRAW.** The shaft of this type of straw contains a minute spore which is not destroyed during combustion. In fact the spore becomes airborne and can cause damage to the lungs much the same as "valley fever."

HCFH will last for several minutes and makes a crackling sound that adds realism to the situation. HCFH can also be moistened on the top layers to produce a very smoky atmosphere. One of the best tools to use for wetting the hay is the hand pump fire extinguisher. †

There are several methods that can be used with this system to achieve various effects.

Fuel Cribs

On several occasions, the use of shopping carts containing fuels for various exercises has been mentioned. These carts can be used for smoke training or interior attack and is a very effective method for developing a fuel crib. Obtaining shopping carts can be accomplished by asking a local supermarket. Other items to consider for use as a fuel crib include a military bed spring and frame, 55 gallon drum, or any device that will allow adequate air flow into the crib.

**NEVER USE FLAMMABLE OR COMBUSTIBLE LIQUIDS WHEN
CONDUCTING ANY FIRE CONTROL 3 COURSE!**

If you have any questions on how to use the above information please contact State Fire Training for further assistance.

(INSERT THE LATEST EDITION OF NFPA 1403)

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APPENDIX B

BLANK ICS FORMS

INCIDENT OBJECTIVES	1. Incident Name	2. Date	3. Time
4. Operational Period			
5. General Control Objectives for the Incident (include alternatives)			
6. Weather Forecast for Period			
7. General Safety Message			
8. Attachments (mark if attached)			
<input type="checkbox"/> Organization List - ICS 203	<input type="checkbox"/> Medical Plan - ICS 206	<input type="checkbox"/> (Other)	
<input type="checkbox"/> Div. Assignment Lists - ICS 204	<input type="checkbox"/> Incident Map	<input type="checkbox"/>	
<input type="checkbox"/> Communications Plan - ICS 205	<input type="checkbox"/> Traffic Plan	<input type="checkbox"/>	

9. Prepared by (Planning Section Chief)	10. Approved by (Incident Commander)
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APPENDIX C

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