



SCOPE:

The Connecticut Fire Academy's Flashover Simulator is a training tool designed to provide firefighters with a safe and secure system to recognize the signs of a flashover. The burning of Class "A" combustibles will take place in the burn chamber, located three feet off the ground. Firefighters will be able to witness a fire grow from an incipient stage to flashover conditions. As the combustibles burn, the interior instructors will have the ability to control the conditions inside the simulator through the combined use of ventilation and "penciling of water." It is through this management that firefighters are able to experience a safe observation of a flashover.

PURPOSE:

The purpose of this procedure is to establish standard guidelines for conducting on-site training fires in the flashover simulator. This policy establishes the safety guidelines for the operation of the flashover simulator.

POLICY:

The flashover chamber has been designed specifically for the purpose of repeated live fire training evolution's and include safeguards that only become unacceptably hazardous through misuse and neglect.

Those individuals who have successfully completed the Connecticut Fire Academy's approved, flashover instructor course shall be allowed to serve as instructors for the flashover simulator. A minimum of four (4) instructors are required for conducting training within the flashover simulator. The flashover instructor(s) is responsible for ensuring all students understand the rules pertaining to the flashover simulator.

A safety officer shall be designated by the training division for all live fire training events involving the flashover simulator. The safety officer will monitor personnel and fire conditions, and work with Command to ensure all safety procedures are complied with, and that risk to personnel is minimized.

The safety officer shall have full authority to intervene and control or stop any aspect of the operations when in his/her judgment, a potential or real risk to personnel exists. He/she will not be assigned other duties that would distract from his/her safety responsibilities. The safety officer has the authority to suspend any member from the training as well as terminate all training evolutions based on his / her judgment and experience.

Safety officer shall conduct a protective clothing inspection for each member prior to entering the chamber. Any member not in compliance with NFPA 1971 Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, shall not be allowed to participate during live fire training.

Additional safety officers may be assigned to the training fire if the conditions dictate. Responsibilities of the safety officer(s) will include but not be limited to the prevention of unsafe acts and elimination of unsafe conditions.



Exposing recruit fire fighters to live fire conditions presents special safety considerations. All fire fighters involved in flashover chamber training fires shall have received training to meet the performance objectives of:

- Protective Breathing Apparatus
- Fire Hose, Nozzles and Appliances
- Fire Streams
- Ventilation
- Rescue
- Safety
- Fire Behavior

Students must be in good physical condition. Health problems such as heart conditions, high blood pressure, emphysema, or diabetes may prohibit participation in the trainer. If someone has a preexisting medical condition, they should consult a medical physician before participating. The proper documentation shall be completed by all participants prior to the scheduled training or the department and or participant shall not be allowed to take part in the live fire training.

Students should be well hydrated before entering the trainer. Water or some sort of sports drink should be consumed immediately after exiting the trainer. In addition, if a student feels ill or in any way not healthy, they should not participate.

All safety clothing must be in good shape. Full PPE shall be worn during all live fire exercises unless instructed to do otherwise by the teacher. No bare skin should be showing when students are ready to start. No polycarbonate helmets will be worn inside the container.

Only CFA Flashover Helmets will be permitted for use by the students and instructors entering the simulator.

All members shall have a full SCBA bottle prior to entering the flashover chamber.

The number of personnel involved in training fires inside the flashover chamber shall be limited to ten (10) personnel. To reduce risk, and assist with scene management, training fire participants shall be formed into individual teams consisting of no more than eight (8) members and supervised by two (4) qualified flashover chamber instructors.

Radio communications shall be established with all personnel delivering the training evolution.

Because communication is difficult while wearing an SCBA, talking should be kept to a minimum so that everyone will be able to hear. Should anyone need to leave, they must notify an instructor and maintain a low position while exiting.

Standing is NOT permitted during live fire training in the Flashover Simulator.

Equipment to handle emergency medical capabilities shall be maintained on-scene during training fires.

Absolutely no horseplay will be tolerated. The instructor has authority in the trainer, regardless of rank.



During training, the nozzle and hose should always be kept clear. Be sure that no one is standing or blocking free movement of the nozzle and hose line. All lines must be charged and purged of air before starting the exercise. A backup line is mandatory.

Each Flashover Simulator evolution shall have, at a minimum, the following positions filled by qualified Flashover Burn Team members:

- 1) Instructor-in-Charge
- 2) Safety Officer
- 3) Instructor(s)

Both rear exit points shall be established and maintained in the simulator. These exits shall be free of debris, fuels, and fire.

A simulator evacuation plan shall be established and communicated to all personnel involved.

Should training be stopped due to a hazardous issue, the training shall only continue once that issue has been mitigated.

The Instructor(s) shall communicate a Personnel Accountability Report (PAR) to Command at the following:

- Upon exiting the burn room
- Sudden hazardous event
- At the discretion of Command

Only Connecticut Fire Academy purchased burn materials will be allowed as fuel for the Flashover Simulator. Class A materials may be used as incipient barrel start-up materials only. This material shall be further limited to wood pallet material and hay / straw.

At no time shall any flammable, combustible liquids or “Class B” materials be ignited or burned into the simulator.



Roles and Responsibilities:

Instructor in Charge/Command

- Have final say on all matters relating to the training burn.
- Develop an Incident Action Plan (IAP).
- Conduct a pre-burn inspection of the building.
- Determine the number of hose lines and rate and duration of water flow necessary for each live fire training evolution, including amounts necessary for control, suppression and safety lines.
 - The CFA Recruit Firefighter Program will typically include, at a minimum;
 - Flashover Control Suppression hose line
 - Safety Suppression hose line
 - Clean-Up hose line
 - RIT/Safety hose line
- Stop the training exercise if the combustible nature of the environment represents a potential hazard.
- Assign the following personnel:
 - Safety Officer assigned (for each rotation)
 - Flashover Chamber Instructors
 - Fire Starter assigned (for each rotation)
 - Flashover Simulation Communicator assigned (for each rotation)
 - Flashover Door Controller
- Decide to ignite the training fire in coordination with the Safety Officer.
- Can assume the role of “Safety Officer” due to limited staffing.
- Provide adequate rotation and rehabilitation for both students and instructors.
- Ensure training structure and grounds are cleaned and returned to a safe condition.
- Complete appropriate documentation.

Safety Officer

Safety Officer shall be appointed for the duration of the training

- Have the authority, regardless of rank, to control any aspect of the operations when, in his/her opinion, a potential/actual danger, accident, or unsafe condition exists.
- Prevent unsafe acts and eliminate unsafe conditions.
- Provide for the overall safety of all involved personnel and spectators.
- Ensure personnel involved in the training have all appropriate PPE on and in place.
- Conduct a pre-burn inspection of the building with Command.
- Conduct a pre-burn briefing and a building walk through with all personnel involved to include, but not limited to:
 - Objectives
 - Responsibilities
 - Potential hazards
 - Safety considerations
 - Access and egress points, both standard and emergency
- Restrict spectators to an area free of hazards.
- Coordinate with Command prior to ignition of the fire.
- Establish additional Safety Officers if needed.



Instructor(s)

The number of instructors should be sufficient to meet the NFPA 1403 requirement of a 5:1 Student-to-Instructor ratio. There shall be a minimum of (3) burn instructors assigned during each “Flashover Burn”. A four instructor may be necessary during some burning evolutions.

General Responsibilities;

- Ensure a positive and safe learning experience for the students.
- Ensure all appropriate PPE is on and in place for all students they are supervising.
- Take a head count when students are entering and exiting the simulator to ensure appropriate fireground accountability.
- Monitor and supervise all assigned students during the live fire training evolution.
- Site and Simulator Preparation
- Supervise and conduct Training Grounds clean-up activities

Specific Roles and Responsibilities;

- Lead Burn Instructor:
 - Shall be at the front of the simulator and shall be in-charge during the burn. This instructor shall instruct the students and call for ventilation from the vertical vent instructor or door as needed. All personnel shall follow the direction of the Flashover Simulator instructor during any live burn.
- Vent Instructor(s);
 - This instructor shall be positioned at the back of the observation room on the right side. This instructor shall control the rear doors as requested by the “lead burn instructor”.
 - This instructor shall monitor and assist the students / trainees as necessary and operate the vent as instructed by the lead burn instructor.
 - Will conduct a “head” count of recruits/students entering and exiting the simulator observation area.
- Flashover Control Instructor:
 - Shall be at the front of the simulator and control the intensity of the Flashover fire.
 - Will “stoke” and maintain incipient fire barrel and shall be in-charge during the burn.



Simulator Operations:

The following procedures will be followed during all flashover-training evolutions. Deviating from these procedures may result in serious injury to personnel or damage to equipment.

- All Suppression and RIT/Safety hose lines must charged and the appropriate hose lines manned.
- An apparatus pump operator should be assigned.
- No more than eight (8) recruit/students should be allowed in the simulator during Flashover training.
- The use of a propane torch is permissible to start the incipient barrel fires for each “Flashover burn.”
- The safety officer shall inspect all personnel prior to them entering the Training Simulator for “live fire training”. This inspection shall be to insure that the personal protective equipment is appropriate, meets all applicable NFPA Standards, and that it has been properly donned and that no skin has been left exposed. The student / trainee shall then be given a student rotation number and then allowed to enter the simulator.
- Instructors shall account for recruits/students entering and exiting the simulator observation area.
- Instructors will rotate the position of the recruits/students throughout the Flashover Training Evolution.
- During the “free burning stage” of fire development and during the pre-flashover stage, **NO** student / trainee shall be allowed to stand up in the observation area. **At no time** during these stages of fire development shall anyone climb up onto, or enter the burn area.
- Should the room exceed the manufacturer’s specified temperature limit of 1500 degrees F or become untenable, no crews shall enter and adequate ventilation should be performed until temperatures return to normal operating levels.

Conclusion of Training:

The training structure and grounds should be cleaned and left in a safe condition. This may include, but not limited to:

- Conduct, or facilitate, a post-training critique.
- Flashover Chamber is cleaned and debris/garbage emptied into large dumpster.
- Equipment cleaned and put back on apparatus or in the Recruit Training Conex.
- All Recruit SCBA and cylinders shall be cleaned and refilled.
 - An effort should be made to ensure all SCBA cylinders are full at the completion of training.
- Apparatus returned to a state of readiness and parked in an appropriate location.
- Damage/broken equipment repaired or reported.
- Training grounds washed down and structure secured.



Required Fire Equipment

CFA water supply pumps (pump 1 & 2) in operation.

Two separate sources of water supply shall be established.

- Connecticut Fire Academy – Fire Pumps
- Municipal Fire hydrant

All fire suppression hose lines shall be supplied by one pumper, a minimum of 1250 GPM. The fire suppression hose lines may be supplied by CFA fire pumps.

- Flashover Control Suppression hose line
 - Low GPM Nozzle
- Safety Suppression hose line
 - 150 GPM nozzle
- Clean-up Suppression hose line
 - 150 GPM nozzle

All suppression hose lines will be operating at the correct pump pressure to attain the desired GPM.

The RIT/safety hose line shall be supplied by the municipal water source.

- RIT/Safety hose line
 - 150 GPM nozzle
 - Located near student/instructor access door of Flashover Box

Miscellaneous Equipment

CFA Propane Igniting Torch

- ✓ Check Propane Cylinder volume
- ✓ Check Hose Connections
- ✓ Check Hose Condition
- ✓ Igniter
- ✓ Secure in Cart

4 - Flat Shovels

2 - Wheel barrel

2-3 Burn/Bum Barrels

Portable Radios

- ✓ One each assigned position
- ✓ CFA Administration

Required Supplies (per burn)

Pre stage materials near back of Flashover Simulator

- 5 - full sheet of Flashover Masonite material
- 1 - 45" long sheet of Flashover Masonite material
- 1 – 51" long sheet of Flashover Masonite material
- Barrel of cut Start-up material



Flashover Simulator Checklist

Prior to conducting flashover simulator training fires, the following items must be addressed:

Burn Session Administration

- CFA Building Maintenance Notified
- CFA Training Division Scheduled and Approval
- Four (4) Qualified Instructors Present
- Instructor in Charge/Command established
 - Safety Officer assigned (for each rotation)
 - Flashover Chamber Instructors
 - Fire Starter assigned (for each rotation)
 - Flashover Simulation Communicator assigned (for each rotation)
 - Flashover Door Controller(s) assigned (for each rotation)
- Operating plan established and understood by all
- Groups/Divisions established as necessary
 - Interior
 - Rescue (RIT)
 - Safety
 - Other
- Medical Equipment on-site and staged
- Adequate fire apparatus on site including one 1250 GPM pumper
 - Location determined
- Adequate water supply (Two Sources)
 - CFA Water Supply - red fire hydrant
 - Connecticut Water (municipal) – yellow hydrant
- Fire load determined; conservative;
 - Sufficient quantity of Flashover Masonite burn material
 - Sufficient quantity start-up materials.
 - Cut pallets are the only acceptable

Burn Session Set-up

- Burn Materials Staged
- Ignition location determined
 - Set up Propane Cart
- Suppression water supply set-up
- Suppression hose lines set-up
 - Flashover Control Suppression hose line
 - Located in front of observation area
 - Back-up Suppression hose line
 - Located in port hole at Rear of Flashover Box
 - Clean out Suppression hose line
 - Located at clean out area of Flashover box
- RIT/Safety hose line set-up
 - Water supplied from Municipal Hydrant
 - Sufficient quantity of hose
 - Located near student/instructor access door of Flashover Box
 - Must be capable of reaching all sides of simulator



- Clean-up Equipment staged
- Walk through briefing conducted for all crews
- PASSPORTS collected by safety officer or Accountability system in place
- Structural Firefighting Protective Clothing inspected to NFPA 1852 standard
- SCBA and PASS alarm checked for proper functioning
- Procure and Issue (10-12) CFA Flashover Helmets to recruits/students and instructors entering the simulator.

Simulator Set-up (to be conducted prior to each rotation)

- Ensure all debris and items not related to Flashover Training are removed from box
- Inspect condition of Flashover Simulator Chambers
 - Address any deficiencies
- Load Flashover Masonite burn material
 - One - Sheet for each side
 - One - 51" panel on first door
 - One - 45" panel on second door
 - Three – Sheets for top
 - Panels may need to be shimmed with wood materials
 - 4 x 4 or pallet materials

Pre-Burn (to be conducted prior to each rotation)

- Command location identified and announced
- All radios checked for proper functioning/channel
- RIT/Safety hose line in place; manned and charged
 - Manned by minimum of two (2) recruit/students
- RIT manned by minimum of two (2) recruit/students
- Flashover simulator participants and RIT units in full protective clothing;
 - Structural Firefighting Protective Clothing is properly donned
 - SCBA and PASS alarm checked for proper functioning
- Head Count of each Recruit/Student entering the Simulator observation area.
- Flashover chamber instructors in charge of each observation team and RIT unit

Post Burn

- Radio announcement of Commencement of Training activities
- Recruit/Student accounted for
- Training De-Briefing
- Radios accounted for and functioning
- Burn material completely extinguished
- Flashover Simulator cleaned and inspected
- Training Grounds cleaned and inspected
- Equipment:
 - Inspected and returned
- Apparatus:
 - Re-fueled
 - Equipment inspected and accounted for
 - Returned Fire Station
- Protective clothing and SCBA's shall be decontaminated as necessary after use