



DEPARTMENT OF FORESTRY AND FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL
State Fire Training Division
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Date: February 20, 2020

To: **State Board of Fire Services**

From: Kevin Conant, Fire Service Training Specialist III

SUBJECT/AGENDA ACTION ITEM:

FSTEP – Fire Control 3: Structural Fire Fighting (2018) and Instructor Courses

Recommended Actions:

Approve FSTEP – Fire Control 3: Structural Fire Fighting (2018) and Instructor Courses

Background Information:

Staff is presenting this curriculum for the second reading to STEAC for approval. These integral courses are called out specifically for the Fire Fighter I curriculum in providing students an opportunity for learning the basics of fire dynamics, chemistry and physics, structural fire behavior and structural fire attack tactics, and for providing the opportunity for demonstrating the skills in preparing a fire fighter in locating, controlling, and extinguishing an interior structure fire.

The instructor courses specifically prepare the instructor to teach Fire Control 3: Live Fire Fighting (2018) through learning the requisite knowledge and demonstrating the skills for instructing fire fighters in locating, controlling, and extinguishing an interior structure fire using props, fixed facilities and/or an acquired structure.

The concept of developing new FSTEP course curriculum is with the purpose of continuing education and professional development, which was approved by STEAC on April 18, 2014. Accordingly, stakeholders identified the need for the creation of an updated structural live fire training course.

A cadre of experienced subject matter experts with extensive technical expertise in structural live fire training were selected from various agencies and backgrounds with the mission to further develop and validate the content for this FSTEP course.

Cadre Leadership

Kevin Conant, Fire Service Training Specialist III, John Black, Battalion Chief, Santa Clara County Fire Department, Allison Shaw, Cadre Editor, Sacramento State.

Development/Validation Cadre Members

Tim Adams, Battalion Chief, Anaheim Fire Department; Norm Alexander, Captain, Yocha Dehe Fire Department; David Baldwin, Battalion Chief Sacramento Fire Department; Tim Beard, Captain, Sacramento Metro Fire Department; John Flatebo, Firefighter, Corona Fire Department; Josh Janssen, Battalion Chief, CAL FIRE-BDU; James Mendoza, Captain, San Jose Fire Department; Jake Pelk, Battalion Chief, Central County FD; Jeff Seaton, Captain, San Jose FD; Mike Taylor, Assistant Chief, Sacramento FD; Kevin Tidwell, Captain, Turlock FD.

Several of the cadre members are State Fire Training Registered Instructors and all have extensive operational experience with structural live fire training. The development of the course required several multi-day sessions, over the course of three years, with additional work by the editor, cadre members and cadre lead to add the finishing touches of editing the course plans. Because this is an FSTEP Course, the development of a Certification Training Standards (CTS) was not required. However, Terminal Learning Objectives (TLO) were established and the supporting Enabling Learning Objectives (ELO) were developed from the authority of the NFPA 1001 Standard for Fire Fighter Professional Qualifications (2019), NFPA 1403: Standard on Live Fire Training Evolutions (2018); FIRESCOPE ICS 500, Structure Fire Operations (2015); and FIRESCOPE ICS 910 Fire Fighter Incident Safety and Accountability Guidelines (2013) and several others references aided as supporting documents in creating the Course Plan.

Analysis/Summary of Issue:

1. The FSTEP Fire Control 3: Structural Fire Fighting (2018) is a 24-hour course, including 15:30 (hours: minutes) of lecture/discussion and 8:30 (hours: minutes) of application/skills.
2. The Instructor: Live Fire Training – Fixed Facility (2018) is a 24-hour course, and Instructor: Live Fire Training – Acquired Structure (2018) is a 32-hour course.
3. As requested by stakeholders, the designation of senior instructor has been eliminated and the number of live burns necessary to complete an instructor task book has been reduced significantly.
4. In order to address the requirements of the updated NFPA standard, two co-requisites were added to the instructor qualifications for Fire Control 3: Structural Fire Fighting (2018). ICS-300, Intermediate ICS for expanding incidents due to the requirement for an Incident Action Plan and; Safety Officer (S-404, L954, or FDSOA Incident Safety Officer) due to the requirement of a designated Instructor/Safety Officer.
5. These courses meet and exceed the NFPA 1001 Standard for Fire Fighter Professional Qualifications (2019) and NFPA 1403 Standard on Live Fire Training Evolutions (2018) addressing significant research and development in the study of fire dynamics, chemistry and physics, structural fire behavior and structural fire attack tactics, providing the knowledge and skills that prepare a fire fighter to locate, control, and extinguish an interior structure fire.

6. This course replaces a collection of FSTEP structural firefighting courses:
 - Fire Control 1: Basic Fire Chemistry (1996)
 - Fire Control 2: Basic Operations – Structural (1996)
 - Fire Control 3A: Structural Fire Fighting in Acquired Structures (2009)
 - Fire Control 3B: Structural Fire Fighting in Live-Fire Simulators (2009)
7. Per STEAC direction, new stand-alone courses for Fire Control 1: Basic Fire Chemistry, Dynamics and Behavior, and Fire Control 2: Basic Operations – Structural are being budgeted for future curriculum development.
8. The NFPA standards identify the requirement that all fire fighters shall demonstrate a live fire job performance requirement, while improving the process and procedure for conducting live fire training evolutions, ensuring the training objectives are achieved and the exposure to health and safety hazards are mitigated and risk is minimized.
9. These courses prepare the instructor and the student with the requisite knowledge and skills to successfully demonstrate the job performance requirement of live fire tactics for a structural fire meeting and exceeding the NFPA requirements.
10. In all the activities and skills, the student to skills coach ratio is 5:1, allowing for inquiry, coaching and skill mastery.



FIRE CONTROL 3: STRUCTURAL FIRE FIGHTING (2018) AND INSTRUCTOR COURSE Implementation Plan

Issued: January 1, 2020

OVERVIEW

This document is intended to provide information for all State Fire Training (SFT) stakeholders on the new Fire Control 3: Structural Firefighting (2018), Instructor: Live Fire Training – Fixed Facility (2018), and Live Fire Training – Acquired Structure (2018) courses.

The **Fire Control 3: Structural Firefighting (2018)** course provides the student the opportunity for learning the basics of fire dynamics, chemistry and physics, structural fire behavior, structural fire attack tactics, and providing the knowledge and the opportunity for demonstrating their skills in locating, controlling, and extinguishing an interior structure fire. This new FSTEP course replaces a suite of legacy structural firefighting FSTEP courses including: the 16-hour Fire Control 1: Basic Fire Chemistry (1996), the 16-hour Fire Control 2: Basic Operations – Structural (1996), the 16-hour Fire Control 3A: Structural Fire Fighting in Acquired Structures (2009), and/or the 16-hour Fire Control 3B: Structural Fire Fighting in Live-fire Simulators curriculum.

The **Instructor: Live Fire Training – Fixed Facility (2018)** course prepares instructors to teach Fire Control 3: Live Fire Fighting (2018). This course provides the future instructors an opportunity for learning the knowledge and demonstrating the skills for instructing fire fighters in locating, controlling, and extinguishing an interior structure fire using a fixed facility. Key learning areas include an overview of the Fire Control 3: Structural Fire Fighting course plan; an introduction to live fire training; preburn planning; fire dynamics; set up and walk through; live fire training evolutions; and postburn procedures.

The **Instructor: Live Fire Training – Acquired Structure (2018)** courses prepares an instructor to teach Fire Control 3: Live Fire Fighting (2018) using an acquired structure. This course provides the students an opportunity for learning the knowledge and demonstrating the skills for instructing fire fighters in locating, controlling, and extinguishing an interior structure fire using an acquired structure. Key learning areas include an overview of the Fire Control 3: Structural Fire Fighting course plan; an introduction to acquired structure live fire training; preburn planning; fire dynamics; set up and walk through; live fire training evolutions; and postburn procedures. This course is required for instructors if using an acquired structure to teach Fire Control 3: Live Fire Fighting (2018)

The new course plans have been developed based on NFPA 1001 Standard for Fire Fighter Professional Qualifications (2019), NFPA 1403: Standard on Live Fire Training Evolutions (2018); FIRESCOPE ICS 500, Structure Fire Operations (2015); FIRESCOPE ICS 910 Fire Fighter Incident Safety and Accountability Guidelines (2013); California Health and Safety Code 41801(b) and Cal/OSHA (Title 8 CCR 3395).

Stakeholders are encouraged to study this information carefully and seek clarification from SFT if questions arise.

IMPLEMENTATION

SFT recognizes that many SFT Instructors, Accredited Academies, Agencies, and stakeholders are vested in the SFT Fire Control curriculum and, therefore, the existing Fire Control curriculum and instructor requirements will be available for those stakeholders during the transition period.

New (2018) Fire Control Curriculum Available January 1, 2020

New Courses	Hours
Fire Control 3: Structural Firefighting (2018)	24 hours
Instructor: Live Fire Training – Fixed Facility (2018)	24 hours
Instructor: Live Fire Training – Acquired Structure (2018)	32 hours

Fire Control 1 Basic Fire Chemistry (1996)..... Course Phase out December 31, 2020

Effective January 1, 2021, FSTEP Fire Control 1: Basic Fire Chemistry (1996) curriculum will be retired from the SFT course catalog and no longer available.

Fire Control 2: Basic Operations – Structural (1996) Course Phase out December 31, 2020

Effective January 1, 2021, FSTEP Fire Control 2: Basic Operations – Structural (1996), 16-hour curriculum will be retired from the SFT course catalog and no longer available.

Fire Control 3 A/B Structural Fire Fighting (2009)..... Course Phase out December 31, 2020

Effective January 1, 2021, FSTEP Fire Control 3 A/B (2009) curriculum will be retired from the SFT course catalog and no longer available.

INSTRUCTOR REQUIREMENTS

Instructor Registration Available December 2, 2019

The designation of senior instructor is eliminated in the new courses. Additionally, the number of live burns necessary to complete an instructor task book has been reduced significantly.

New registered instructors for Fire Control 3: Structural Fire Fighting (2018) shall be required to complete the following:

- SFT Registered Instructor
- SFT Fire Fighter II Certification, Company Officer Certification, or Fire Officer Certification
- Education:
 - ICS-300, Intermediate ICS for expanding incidents
 - Safety Officer: S-404 or L954, or FDSOA Incident Safety Officer
 - Fire Control 3 Structural Fire Fighting (2018)
 - Instructor: Live Fire Training – Fixed Facility (2018)
 - Instructor: Live Fire Training – Acquired Structure (2018) –
Note: this course is only required for instructors who will be delivering Fire Control 3 Structural Fire Fighting (2020) in an acquired structure.
- Held a permanent position as a fire fighter or higher within a Recognized Fire Agency in California for a minimum of three years; **or** worked in a volunteer position or paid call fire fighter with a Recognized Fire Agency in California for a minimum of six years and;

- Instructor task book completion, documenting specific expertise in structural live fire training – fixed facilities and/or acquired structures and;
- Authority Having Jurisdiction (AHJ) letter verifying AHJ's qualification to deliver live fire training.

Currency Requirement (Existing Registered Instructors) Completed by December 31, 2021

Due to the significant changes in both the NFPA standards, curriculum and the requirements to instruct, the following shall apply to existing Fire Control 3 registered instructors:

- Current Senior and Primary Instructors of Fire Control 3 A/B Structural Fire Fighting (2009) must attend the Instructor: Live Fire Training – Fixed Facility (2018) and upon course completion will be authorized to teach the Fire Control 3: Structural Fire Fighting (2018) course.
- By **December 31, 2020**, all current senior and primary instructors shall be required to provide documentation of course completion of the following education requirements:
 - a. ICS-300
 - b. Safety Officer: S-404 or L954, or FDSOA Incident Safety Officer

Instructors who do not complete Instructor: Live Fire Training – Fixed Facility (2018), ICS 300, and Safety Officer: S-404 or L954 or FDSOA Incident Safety Officer prior to **December 31, 2020** will lose their Fire Control 3 instructor credential and will be required to reapply to SFT under the new requirements.

Members of the Fire Control 3: Structural Fire Fighting (2018) curriculum cadre will be the initial instructor pool for the three new courses: Fire Control 3: Structural Fire Fighting (2018), Instructor: Live Fire Training – Fixed Facility (2018), and Instructor: Live Fire Training – Acquired Structure (2018). Additional instructors are being added as they complete the new course(s).

PACE Evaluation

Current registered senior and primary instructors of Fire Control 3 A/B Structural Fire Fighting (2009) who have documentation that demonstrates they meet or exceed the completion of all the Terminal Learning Objectives, Enabling Learning Objectives, instructor demonstrations, skills exercises and Task Book sign off requirements found in the new course(s): Instructor: Live Fire Training – Fixed Facility (2018), or Instructor: Live Fire Training – Acquired Structure, and documentation of demonstrated ability of the course completion objectives of ICS-300 and the documentation of demonstrated ability of the course completion objectives of the Safety Officer education requirements are encouraged to apply for a PACE II review. Any fees related to these PACE II review shall be waived until December 31, 2020.

SFT STAFF COORDINATION

This is a new FSTEP courses with State Fire Training. Staff may be required to facilitate the PACE process and are expecting a number of PACE II requests regarding this course. Additionally, SFT staff will work with all Fire Control 3: Structural Fire Fighting (2018) instructors to ensure the new education requirements are met to maintain registration.

POTENTIAL AGENCY IMPACTS

Accredited Regional Training Programs (ARTP), Accredited Local Academies (ALA), community colleges and all other local delivery venues need to review the curriculum and seek approval from their curriculum committee / program sponsor, as appropriate. ARTPs should review the new curriculum and discuss potential impacts with their advisory committees.



FIRE CONTROL 3: STRUCTURAL FIRE FIGHTING (2018)

Instructor Application

Overview

State Fire Training implemented the new FSTEP Fire Control 3: Structural Fire Fighting (2018) in the Spring of 2018. One of the changes in the new course was the requirement for new and existing instructors to take the Live Fire Training – Fixed Facility (2018) and/or Instructor: Live Fire Training – Acquired Structure (2018).

Registered Senior/Primary Instructors of Fire Control 3 A/B Structural Fire Fighting (2009) who have documentation to demonstrate meeting or exceeded all of the Terminal Learning Objectives, Enabling Learning Objectives, all instructor demonstrations and skills exercises as found in the Fire Control 3, (2018) course plan, Instructor: Live Fire Training – Fixed Facility (2018) course plan, and if applicable, Instructor: Live Fire Training – Acquired Structure (2018) course plan, and documentation of demonstrated ability of the course completion objectives of ICS-300 and the documentation of demonstrated ability of the course completion objectives of the Safety Officer education requirements are encouraged to apply for a PACE II review. Any fees related to PACE II review shall be waived until December 31, 2018.

Application Requirements

Submit verification of the following documents along with this application form. It is not necessary to submit SFT course diplomas or certifications if it is listed in your SFT User Portal.

Option A

Requirements for a Registered Senior/Primary Instructor of Fire Control 3 A Structural Fire Fighting (2009) who chooses to teach Fire Control 3: Structural Fire Fighting (2018) using an acquired structure.

Education

- Instructor: Live Fire Training – Fixed Facility (2018)
- Instructor: Live Fire Training – Acquired Structure (2018)
- ICS-300: Intermediate ICS for Expanding Incidents
- S-404: Safety Officer, **OR** L954: All-Hazards Position Specific Safety Officer, **OR** Incident Safety Officer (Fire Department Safety Officers Association)

Option B

Requirements for a Registered Senior/Primary Instructor of Fire Control 3 B Structural Fire Fighting (2009) who choose to teach Fire Control 3: Structural Fire Fighting (2018) using a fixed facility or props.

Education

- Instructor: Live Fire Training – Fixed Facility (2018)
- ICS-300: Intermediate ICS for Expanding Incidents
- S-404: Safety Officer, **OR** L954: All-Hazards Position Specific Safety Officer, **OR** Incident Safety Officer (Fire Department Safety Officers Association)



FIRE CONTROL 3: STRUCTURAL FIRE FIGHTING (2018)

Instructor Application

Option C

Requirements for new Fire Control 3: Structural Fire Fighting (2018) Instructors

Certification

- Fire Fighter 2 or Company Officer
- Instructor 2 or current SFT registered instructor

Education

- Fire Control 3 Structural Fire Fighting (2018)
- Instructor: Live Fire Training – Fixed Facility (2018)
- ICS-300: Intermediate ICS for Expanding Incidents
- S-404: Safety Officer, **OR** L954: All-Hazards Position Specific Safety Officer, **OR** Incident Safety Officer (Fire Department Safety Officers Association)
- Instructor: Live Fire Training – Acquired Structure (2018) –
 - Note: this course is only required for instructors who will be delivering Fire Control 3 Structural Fire Fighting (2018) in an acquired structure.

Position

- Held a permanent position as a fire fighter or higher within a Recognized Fire Agency in California for a minimum of three years; **or**
- Worked in a volunteer position or paid call fire fighter with a Recognized Fire Agency in California for a minimum of six years and;

Instructor Task Book

- Instructor: Live Fire Training Fixed Facility
- Instructor: Live Fire Training Acquired Structure
 - Note: this course is only required for instructors who will be delivering Fire Control 3 Structural Fire Fighting (2018) in an acquired structure.

Application Process

The following are the steps for submitting an instructor application:

1. Mail the certification application and supporting documents to: State Fire Training, Attn: Instructor Registration, 2251 Harvard Street, Suite 400, Sacramento, CA 95815
2. SFT conducts an application review.
 - a. If approved, SFT will add the course to your SFT User Portal.
 - b. If the candidate does not meet the eligibility requirements, SFT issues an incomplete application or denial.



FIRE CONTROL 3: STRUCTURAL FIRE FIGHTING (2018)

Instructor Application

Identification

Full Name: _____

SFT ID Number: _____

Phone (Mobile): _____

Email: _____

Course(s) Selection

Please indicate which courses you are applying to instruct:

- Fire Control 3A Structural Fire Fighting (2018) - Acquired Structure*
- Fire Control 3B Structural Fire Fighting (2018) - Fixed Facility

Option A: Senior/Primary Instructors of Fire Control 3 A Structural Fire Fighting (2009)

The following supporting documents are required with application:

Education

- Instructor: Live Fire Training – Fixed Facility (2018)
- Instructor: Live Fire Training – Acquired Structure (2018) *
- ICS-300: Intermediate ICS for Expanding Incidents
- S-404: Safety Officer, **OR** L954: All-Hazards Position Specific Safety Officer, **OR** Incident Safety Officer (Fire Department Safety Officers Association)

Option B: Senior/Primary Instructors of Fire Control 3 B Structural Fire Fighting (2009)

The following supporting documents are required with application:

Education

- Instructor: Live Fire Training – Fixed Facility (2018)
- ICS-300: Intermediate ICS for Expanding Incidents
- S-404: Safety Officer, **OR** L954: All-Hazards Position Specific Safety Officer, **OR** Incident Safety Officer (Fire Department Safety Officers Association)

Option C: New Instructors of Fire Control 3: Structural Fire Fighting (2018)

The following supporting documents are required with application:

Education

- Fire Control 3 Structural Fire Fighting (2018)
- Instructor: Live Fire Training – Fixed Facility (2018)
- Instructor: Live Fire Training – Acquired Structure (2018) *
- ICS-300: Intermediate ICS for Expanding Incidents
- S-404: Safety Officer, **OR** L954: All-Hazards Position Specific Safety Officer, **OR** Incident Safety Officer (Fire Department Safety Officers Association)



FIRE CONTROL 3: STRUCTURAL FIRE FIGHTING (2018)

Instructor Application

* Note: this course is only required for instructors who will be delivering Fire Control 3 Structural Fire Fighting (2018) in an acquired structure.

Position

- Held a permanent position as a fire fighter or higher within a Recognized Fire Agency in California for a minimum of three years; **or**
- Worked in a volunteer position or paid call fire fighter with a Recognized Fire Agency in California for a minimum of six years and;

Instructor Task Book

- Instructor: Live Fire Training Fixed Facility
- Instructor: Live Fire Training Acquired Structure
 - Note: this course is only required for instructors who will be delivering Fire Control 3 Structural Fire Fighting (2018) in an acquired structure.

*this course/task book is only required for instructors who will be delivering Fire Control 3 Structural Fire Fighting (2018) in an acquired structure.

PACE II

Provide documentation that demonstrates meeting or exceeding all of the Terminal Learning Objectives, Enabling Learning Objectives, instructor demonstrations, and skills exercises found in the Fire Control 3 Structural Fire Fighting (2018) course plan, Instructor: Live Fire Training – Fixed Facility (2018) course plan, and documentation of demonstrated ability of the course completion objectives of ICS-300 and the documentation of demonstrated ability of the course completion objectives of the Safety Officer education requirements, and if applicable the Instructor: Live Fire Training – Acquired Structure (2018) course plan.

Applicant Review

I, the undersigned, am the person applying for this certification. I hereby certify under penalty of perjury under the laws of the State of California, that all information contained in this application is true in every respect. I understand that misstatements, omissions of material facts, or falsification of information or documents may be cause for rejection.

Applicants Signature: _____ Date: _____

Acct Code: 0198-2019-4143500-4143500014-35405902-59210



Structural Fire Fighting

Course Plan

Course Details

Description:	This course provides the knowledge and skills that prepare a fire fighter to locate, control, and extinguish an interior structure fire.
Designed For:	Fire suppression personnel
Authority:	NFPA 1403: Standard on Live Fire Training Evolutions (2018) Office of the State Fire Marshal
Prerequisites:	Meet the minimum job performance requirements for Fire Fighter I in NFPA 1001: Standard for Fire Fighter Professional Qualifications related to safety; fire behavior; portable extinguishers; personal protective equipment (PPE); ladders; fire hose, appliances, and streams; overhaul; water supply; ventilation; forcible entry; and building construction (NFPA 1403 (2018)) (or) SFT Fire Fighter I certification
Standard:	Attend all class sessions and complete all required activities and skills
Hours:	Lecture: 15:30 Skills: 8:30
Hours (Total):	24:00
Maximum Class Size:	25
Instructor Level:	Primary instructor

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Instructor/Student Ratio:	Lecture: 1 primary instructor per 25 students Demonstrations: 2 primary instructors per 25 students Activities/Skills: 2 primary instructors +, Enough primary instructors to maintain a 1:5 primary instructor/skills coach ratio +, Enough skills coaches to maintain a 1:5 ratio of skills coach/student ratio
Restrictions:	See Facilities, Equipment, and Personnel requirements (page 4)
SFT Designation:	FSTEP

Required Resources

Instructor Resources

To teach this course, instructors need:

Required

- One of the following texts:
 - *Fundamentals of Fire Fighter Skills* (including Instructors Toolkit DVDs) (IAFC, Jones & Bartlett Learning, 3rd edition, ISBN: 978-1284059656)
 - *Essentials of Fire Fighting and Fire Department Operations* (Stowell, Frederick M., Murnane, Lynne; Brady Publishing, a division of Pearson Education; 6th edition; ISBN: 978-013-3140804)
 - *Fire Engineering's Handbook for Fire Fighter I and II* (including Instructor Guide and Sample Skills Drills DVDs) (Corbett, Glenn; PennWell Corporation; 1st edition; ISBN: 978-1-59370-135-2)
- *Live Fire Training: Principles and Practice* (IAFC, Jones & Bartlett Learning, 2nd edition, ISBN: 978-1284140729)
- Structure Fire Operations (ICS 500) (FIRESCOPE / <https://www.firescope.org/ics-op-guides-job-aids/ics%20500.pdf>)
- NFPA 1403: Standard on Life Fire Training Evolutions (current edition)

Recommended

- *3D Fire Fighting: Training, Techniques, and Tactics* (Fire Protection Publications, 1st edition, 978-0879392581)

Online Instructor Resources

The following instructor resources are available online at <https://osfm.fire.ca.gov/divisions/state-fire-training/instructor-registration/>

- Instructor Demonstrations (used by instructor)
 - Instructor Demonstration 1: Dust Explosion
 - Instructor Demonstration 2: Combustion
 - Instructor Demonstration 3: Pyrolysis
- Skills Exercises (distributed to students)
 - Skills Exercise 1: Combustion (required)
 - Skills Exercise 2: Risk Assessment and Door Control (required)
 - Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line (required)
 - Skills Exercise 4: Water Application (required)
 - Skills Exercise 5: Fire Attack (required)
 - Skills Exercise 6: Transitional Fire Attack (recommended)
 - Skills Exercise 7: Interior Attic Fire Attack (recommended)

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- Skills Exercise 8: Below Grade (Basement) Fire Attack (recommended)
- Skills Exercise 9: VEIS (recommended)
- Skills Exercise 10: Ventilation (recommended)
- Skills Exercise 11: Portable Water Extinguisher Attack (recommended)
- PDFs (distributed to students)
 - Firefighters Exposure to Smoke Particulates
 - Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction
 - Innovating Fire Attack Tactics
 - NIOSH Study of Firefighters Finds Increased Rates of Cancer
 - Structure Fire Operations (ICS 500)
 - Taking Action Against Cancer in the Fire Service
- Props and Structures: Planning and Preparation (used by instructor)
 - Props and Structures Matrix
 - Acquired Structure
 - Container (Class A)
 - Fixed Facility (Class A)
 - Gas-Fired Prop
 - Scalable Burn Prop
- Planning Aids and Checklists (used by instructor)
 - Acquired Structure Checklist
 - Burn Procedures Checklist
 - Crew Rotation & Accountability (50 students)
 - Crew Rotation & Accountability (30 students)
 - Incident Objectives
 - Incident Organization
 - Live Fire Worksheet
 - Medical Plan
 - Release of Liability / Hold Harmless Agreement

Student Resources

To participate in this course, students need:

- Authorization to attend the training from their fire agency or Accredited Local Academy (ALA) or Accredited Regional Training Program (ARTP)*
- Verification of meeting prerequisite requirements*
- Current fit test documentation
- Cal/OSHA compliant structural personal protective equipment (PPE) and self contained breathing apparatus (SCBA)
- Completed release of liability form

* In accordance with NFPA 1403 (2018) paragraph 4.3.3, participants who received their training from an organization or entity other than the authority having jurisdiction (AHJ) hosting the

Fire Control 3

course must present written verification of having successfully completed the minimum training requirements.

Facilities, Equipment, and Personnel

The following facilities, equipment, or personnel are required to deliver this course:

Equipment*

- **Apparatus:** A minimum of one fully outfitted NFPA compliant engine (type I or type 3)
- **Appliances and tools:** Thermal imager (optional); nozzle selection (determined by AHJ) capable of flowing a minimum 95 gallons per minute (GPM)
- **Extinguishers:** Pressurized water extinguisher; water-pressurized garden sprayer
- **Fuels:** Class A materials (non-gas-fired props); Class B fuel (gas-fired props) per manufacturer specifications
- **Hose:** 1", 1½", or 1¾" fire hose; 2½" or 3" fire hose
- **Hand tools:** Flat head axe; Halligan tool; hydrant wrench; pick head axe; long handle tool (pike pole, roof hook, rubbish hook); sledgehammer; flashlight
- **Ladders:** 10' folding ladder; 14' roof ladder; 24' extension ladder
- **Power tools:** Blower; chainsaw; generator; air compressor with fittings (or equivalent)
- **Protective equipment/clothing:** Full set of protective clothing for structural fire fighting for each student, including: bunker pants, coat, and boots; gloves and helmet; flash hood; face piece; self-contained breathing apparatus (SCBA), two fully-charged air cylinders, and manufacturer-approved SCBA sanitizing agent and cleaning agent; personal alert safety system (PASS)
- **Salvage equipment/materials:** Salvage covers or Visqueen; brooms; scoop shovels; buckets; tubs
- **Simulation equipment/materials:** Live fire training structure compliant with NFPA 1403 (2018); smoke-generating equipment (synthetic/Class A); burn barrels (modified for smoke or crib set)
- **Other supplies/equipment:** Radios; fuel and supplies for power equipment; cleaning and decontamination supplies and equipment; handheld propane torch; dumpster; power cords; lights; hammer; nails; staple gun; nail gun (optional); circular saw; reciprocating saw; fuses/road flares; construction spray paint; tape measure; drill, bits, and screws
- **Rehabilitation:** Shade; water; chairs; SCBA refill capabilities (extra cylinders or refill as needed); decontamination body wipes; soap and water; brushes
- **Water supply:** Adequate water supply per NFPA 1403 (2018) requirements

* See NFPA 1403 (2018) for additional equipment and tool requirements.

Fire Control 3

Facilities

- Standard classroom equipped for 25 students
- Whiteboards or easel pads with appropriate writing implements
- Projector with appropriate laptop connections
- Wifi/Internet access (recommended)
- At least one of the following:
 - An acquired structure
 - A non-gas-fired live fire training structure
 - A gas-fired live fire training structure
 - Must also have enough space to burn models (required when a gas-fired live training structure is the only available option)

Personnel*

- Appropriate instructor-to-student ratios for lecture and skills
 - **Lecture:** 1 primary instructor per 25 students
 - **Demonstrations:** 1 primary instructor + 1 assistant instructor (or higher) per 25 students
 - **Activities/Skills:** 2 primary instructors + enough additional assistant instructors to maintain a 1:5 instructor/student ratio

* See NFPA 1403 (2018) paragraph 4.7 for additional information about required personnel.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, resources, evaluation methods, and participation requirements for Fire Control 3: Structural Fire Fighting.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Topic 1-2: Participation Requirements

Terminal Learning Objective

At the end of this topic, a student, given a qualifications list, will be able to submit all required qualifications in order to participate in Fire Control 3: Structural Fire Fighting.

Enabling Learning Objectives

1. Identify requirements for course participation
 - Authorization to attend training from fire agency or ALA/ARTP

Fire Control 3

- Verification of meeting prerequisite requirements
 - Current fit test documentation
 - Cal/OSHA compliant structural PPE
 - Components
 - Required use
 - Capabilities and limitations
 - Completed release of liability form
2. Submit required documentation
 3. Inspect PPE prior to IDLH (immediate danger to life and health) training

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Instructor Notes

1. In accordance with NFPA 1403 (2018) paragraph 4.3.3, participants who received their training from an organization or entity other than the AHJ hosting the course must present written verification of having successfully completed the minimum training requirements.

Topic 1-3: Reducing Heat-Related Injury and Illness

Terminal Learning Objective

At the end of this topic, a student, given PPE and a live fire training environment, will be able to recognize, report, and mitigate cardiovascular and thermal strain and initiate personnel rehabilitation activities in order to prevent or reduce injury and illness during structural fire fighting.

Enabling Learning Objectives

1. Describe the importance of high aerobic fitness for safely and effectively perform fire fighting training and activity
2. Identify cardiovascular and thermal responses to fire fighting
3. Describe the impact of fire fighting activity and turnout gear on cardiovascular and thermal strain
4. Identify the impact of weather on cardiovascular and thermal strain
5. Identify warning signs for heat illnesses that may occur during fire fighting training and activity
6. Describe how to prevent injury and illness during fire fighting training and activity
 - NFPA 1584: Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises (current edition)
7. Identify risk factors for cardiovascular disease
8. Describe methods to modify or reduce risk factors for cardiovascular disease
9. Identify the goals of onsite rehabilitation

Discussion Questions

1. What are signs of heat-related injuries or illnesses on the training ground?

2. What strategies can you use to prevent thermal insult during live fire training?
3. What cooling activities can you use to mitigate thermal insult during life fire training?

Activities

1. Determined by instructor

Instructor Notes

1. *Live Fire Training: Principles and Practice* has good material.

Unit 2: Fire Dynamics

Topic 2-1: Fire Chemistry and Physics

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to identify, define, and describe fire science concepts and appropriately apply them to interior structural fire fighting activities.

Enabling Learning Objectives

1. Define terminology associated with fire chemistry
 - Fire
 - Energy
 - Pyrolysis
 - Smoldering
 - Flaming combustion
 - Conservation of mass
2. Describe differences between energy and temperature
 - British Thermal Unit (BTU)/joule
 - Celsius, Fahrenheit, Kelvin
3. Describe the concept of power
 - Joule/second = watt
 - Heat release rate (HRR)
4. Describe how physical states of matter influence fire behavior
 - All matter is made of atoms
 - States of matter
 - Gases
 - No fixed volume
 - Atoms spaced far apart and not fixed (can be compressed)
 - Heated gases expand, cooled gases contract
 - Flammable range
 - Too lean (lower explosive and flammability limit)
 - Too rich (upper explosive and flammability limit)
 - Vapor density
 - Solids
 - Fixed volume

- Atoms spaced very close to each other and fixed
- Pyrolysis
- Surface area to mass ratio
- Physical arrangement of fuel
 - Types
 - Physical orientation and proximity
- Liquids
 - Fixed volume
 - Atoms spaced very close, but not fixed
 - Flashpoint
 - Fire point
 - Ignition
 - Piloted
 - Auto
 - Vaporization
- 5. Identify products of combustion
 - Heat
 - Smoke
 - Vapors
 - Particles
 - Gases
 - “Toxic twins”
 - Hydrogen cyanide
 - Carbon monoxide
- 6. Identify methods of heat transfer
 - Conduction
 - Convection
 - Radiation
- 7. Describe the impact of oxygen concentration on life safety and fire growth
- 8. Identify the components of the fire triangle and fire tetrahedron

Discussion Questions

1. How does heat transfer affect your turnouts?
2. What actions can you take to minimize heat transfer?
3. How does opening a front door impact smoke flammability?

Activities

1. Skills Exercise 1: Combustion

Instructor Notes

1. Skills Exercise 1: Combustion is the student version of Instructor Demonstration 1: Combustion. Demonstrate the task and then walk the students through the activity while asking and answering the questions.
2. Use the following demonstrations to illustrate concepts. Engage students in individual demonstrations as appropriate.

- Solids
 - Instructor Demonstration 1: Dust Explosion (recommended)
 - Instructor Demonstration 3: Pyrolysis
 - Pyrolysis videos
 - Fire Training – What is Fire Pyrolysis?
 - <https://www.youtube.com/watch?v=-vAylSv2lUo>
(posted 6.6.15 / last confirmed 7.11.18)
 - Christmas Tree Fire Safety
 - <https://www.youtube.com/watch?v=lwBiZtfjioU>
(posted 6.25.07 / last confirmed 6.28.17)
- Gases
 - Fire Control 3: Structural Fire Fighting – The Whoosh Box with Captain James Mendoza
 - <https://vimeo.com/271589541>
(password: SFT)
- Combustion
 - Instructor Demonstration 2: Combustion

Topic 2-2: Fire Growth and Development

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to identify and describe fire growth and development concepts and appropriately apply them to interior structural fire fighting activities.

Enabling Learning Objectives

1. Describe the stages of fire
 - Traditional/legacy (time vs. temperature curve)
 - Ignition
 - Incipient stage
 - Fire plume
 - “Mushrooming” (ceiling jet)
 - Hot gas layer
 - Thermal layering
 - Relative under pressure
 - Inlet/intake
 - Relative overpressure
 - Outlet/exhaust
 - Neutral plane
 - Growth stage
 - Thermal radiation (radiant heat flux to the ground)
 - Rollover/flameover
 - Possible flashover
 - Fully developed

- Decay
 - Ventilation-limited (time vs. temperature curve)
 - Ignition
 - Incipient
 - Growth
 - Early decay
 - Oxygen depleted
 - Ventilation event (usually fire fighter intervention)
 - Rapid fire growth
 - Fully developed
 - Decay
 - Fuel depleted
2. Identify factors that influence fire behavior
- Fuel
 - Amount
 - Type
 - Arrangement
 - Air
 - Available oxygen
 - Wind velocity
 - Weather
 - Temperature
 - Humidity
 - Wind
 - Fire compartment
 - Construction
 - Thermal properties of the enclosure
 - Energy efficiency
 - Building design/floor plans
 - Square footage and cubic footage
 - Ceiling height
 - Size, number, and arrangement of ventilation openings
 - Fuel type
 - Carbohydrates (cellulosic)
 - Hydrocarbons
 - Heat of combustion
 - Fuel loading
 - Contents vs. structure fire
 - Burn regime
 - Vent limited / air controlled / air limited
 - Fuel limited / fuel controlled
3. Describe hostile fire events

Fire Control 3

- Fire gas ignition
 - Rollover
 - Flashover
 - Thermal radiation feedback
 - Smoke explosion
 - Backdraft
 - Gravity current
- Black fire

Discussion Questions

1. How do different construction techniques, materials, furnishings, and interiors impact fire behavior?
2. How does a vent-limited fire growth curve differ from a traditional/legacy fire growth curve?
 - How would you reduce the heat-release rate for each type of fire growth curve?

Activities

1. Determined by instructor

Instructor Notes

1. Demonstrate the fire growth and development principles introduced in this topic using a scalable burn prop, a Class A container or fixed facility, or an acquired structure. See the following props and structures documents for overviews and guidelines:
 - Props and Structures Matrix
 - Acquired Structure
 - Container (Class A)
 - Fixed Facility (Class A)
 - Gas-Fired Prop
 - Scalable Burn Prop
2. Engage students in individual demonstrations as appropriate.
3. ELO 2: Show video
 - New vs. Old Room Fire Final UL
 - <https://www.youtube.com/watch?v=aDNPhq5ggoE&index=34&list=WL>
(posted 12.7.10 / Last confirmed 7.7.17)

Topic 2-3: Characteristics of Smoke

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to read smoke emanating from a structure and use that reading to identify pre-phenomena conditions, fire location, and spread during interior structural fire fighting activities.

Enabling Learning Objectives

1. Describe the composition of smoke
 - Particulates
 - Gases
 - Aerosols

Fire Control 3

2. Describe the attributes of smoke
 - Volume
 - Velocity
 - Turbulent vs. laminar
 - Density
 - Color
3. Identify the hazards of smoke
 - Cold smoke
 - Black fire
 - Smoke as fuel
 - Flammability range
 - Smoke as poison
 - Carbon monoxide (CO)
 - Hydrogen cyanide (HCN)

Discussion Questions

1. What impact do CO and HCN have on fire fighters and occupants?
2. How do you avoid exposure to CO and HCN?
3. How can recognizing the attributes of smoke assist in tactical decision making?

Activities

1. Determined by instructor

Instructor Notes

1. Recommended resources
 - Video Clip: Art of Reading Smoke Vol1 Sample
 - https://www.youtube.com/watch?v=W8gJosK_BxY
(posted 11.2.16 / last confirmed 7.10.17)
 - DVD: *The Art of Reading Smoke*
 - Dave Dodson / DVD or streaming video / PennWell
(www.pennwellbooks.com)
 - Article: Firefighters Exposure to Smoke Particulates
 - See Online Instructor Resources

Topic 2-4: Water as an Extinguishing Agent

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to identify and describe concepts related to water as an extinguishing agent and apply them to interior structural fire fighting activities.

Enabling Learning Objectives

1. Identify concepts associated with water as an extinguishing agent
 - Heat
 - Latent heat of vaporization
 - Sensible heat
 - Specific heat of water

Fire Control 3

- Specific heat of steam
- 2. Describe how water and steam impact the fire tetrahedron
 - Removes (transfers) heat
 - Stops pyrolysis
 - Reduces oxygen percentage
 - Interrupts chemical chain reaction
- 3. Describe gas cooling
 - Droplet size
 - Hang time
 - Flow rate
 - Attack angle
 - Cone angle
 - Application duration
- 4. Describe surface cooling
 - Stop pyrolysis
 - Extinguish smoldering combustion
- 5. Describe cooling capacity
 - Raising water to vaporization temperature
 - Vaporization of water
- 6. Describe gas expansion and contraction
 - Fire gas/smoke
 - Steam

Discussion Questions

1. Can you push fire with water application?
 - Why or why not?
2. What value does steam production have in fire attack?
3. Why is it important to achieve full extinguishment?

Activities

1. Determined by instructor

Instructor Notes

1. Recommended resources for Discussion Question 1
 - Video: Governors Island
 - <http://www.firecompanies.com/modernfirebehavior/governors%20island%20online%20course/story.html>
(last confirmed 5.23.18)
 - Document: Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction (section 9.11 Pushing Fire, page 203)
 - See Online Instructor Resources

Unit 3: Tactical Fire Ground Considerations

Topic 3-1: Fire Ground Command and Control

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to identify the components of RECEO-VS and SLICE-RS and apply them to interior structural fire fighting activities.

Enabling Learning Objectives

1. Describe the three basic levels of command
 - Strategic (overall incident direction)
 - Tactical (assigned operational objectives)
 - Task (specific tasks assigned to companies)
2. Describe “leaders intent”
 - Task (goal or objective)
 - Purpose (why the task needs to be done)
 - End state (how it should look when successfully completed)
3. Identify the components of RECEO-VS
 - Strategic objectives
 - Rescue
 - Exposure
 - Confinement
 - Extinguishment
 - Overhaul
 - Actions of opportunity
 - Ventilation
 - Salvage
4. Identify the components of SLICE-RS
 - Tactical priorities (sequential)
 - Size up
 - Locate fire
 - Identify and control flow path
 - Cool from a safe location
 - Extinguish fire
 - Actions of opportunity
 - Rescue
 - Salvage
5. Describe the relationship between a leaders intent, RECEO-VS, and SLICE-RS

Discussion Questions

1. What is the difference between strategy and tactics?
2. How do you utilize RECEO-VS and/or SLICE-RS?
3. What is the “leaders intent”?

Activities

1. Determined by instructor

Instructor Notes

1. ELO 1 references FIREScope ICS 500 Structure Fire Operations basic command configuration
2. Recommended video: Principles of Modern Fire Attack – SLICE-RS Overview
 - URL: <https://www.youtube.com/watch?v=X80yseC2fmQ>
(posted 4.14.14 / last confirmed 7.10.17)

Topic 3-2: Size Up

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to perform a 360-degree survey and risk assessment to identify building construction, occupancy type, and hazardous materials, and evaluate smoke and fire presentation, potential victim reports, and survivability profile in order to safely implement tactical operations.

Enabling Learning Objectives

1. Identify information available prior to incident
 - Weather conditions
 - Time of day
 - Staffing levels
 - Pre-fire plans
2. Identify information obtained during 360 walk around at incident
 - Life hazards
 - Potential victim reports
 - Survivability profile
 - Occupancy type
 - Building construction and materials
 - Building entry and egress
 - Smoke and fire presentation
 - Hazards
 - Incident stabilization
 - Property conservation
 - Environmental protection
3. Describe how to perform size up activities
 - Observe and evaluate critical factors
 - Structural triage
 - Smoke conditions
 - Fire conditions
 - Lack of progress (ongoing size up)
 - Communicate via radio to command and incoming units
 - Unit designation of unit arriving on scene
 - Confirmation of location and conditions

Fire Control 3

- Life hazards and exposures
 - Brief building description
 - Brief description of action taken
 - Establish orientation (“A side”)
 - Declaration of strategy and potential
 - Obvious safety hazards
 - Identification and location of Incident Command
 - Resource requests (if needed)
 - Perform continuous size up throughout incident
4. Perform size up

Discussion Questions

1. What is the intent of a 360 walk around?
2. What should you look for during initial size up?
3. What happens if you can’t complete a full physical 360 walk around?

Activities

1. Determined by instructor

Instructor Notes

1. Use FIRESCOPE ICS 500 Structure Fire Operations as a reference
2. Recommended video: Principles of Modern Fire Attack: SLICE-RS: Size Up & Locate the Fire
 - <https://www.youtube.com/watch?v=JbnuzpBHTOE>
(posted 9.1.15 / last confirmed 7.11.17)
 - Covers Topic 3-2 and 3-3

Topic 3-3: Locate the Fire

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to locate an interior structure fire using visual indicators.

Enabling Learning Objectives

1. Identify visual indicators to make an informed decision about fire location
 - Visible fire
 - Smoke condition
 - Smoke presentation
 - Thermal images of high heat
 - Visible neutral plane
 - Low
 - Mid-opening
 - High
 - Soot stained windows
2. Locate a fire

Discussion Questions

1. How can thermal imagers be used to locate a fire?

Fire Control 3

2. Does your organization use thermal imagers for exterior size up?
 - Why or why not?
3. What indicators help locate a fire from the exterior?

Activities

1. Determined by instructor

Instructor Notes

1. Recommended video: Principles of Modern Fire Attack: SLICE-RS: Size Up & Locate the Fire
 - <https://www.youtube.com/watch?v=JbnuzpBHTOE>
(posted 9.1.15 / last confirmed 7.11.17)
 - Covers Topic 3-2 and 3-3

Topic 3-4: Identify Flow Paths and Manage Air Tracks

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to control the flow path and manage the air track during an interior structure fire that so that ventilation is carried out safely and in coordination with suppression activities.

Enabling Learning Objectives

1. Define terminology associated with flow path and air track
 - Flow path
 - Air track
 - Access
 - Coordination
 - Ventilation
 - Fire attack
 - Control entry
 - Pressure
 - Vertical flow
 - Horizontal flow
 - Laminar flow
2. Identify inlets/intakes and outlets/exhausts
 - Unidirectional vs. bidirectional
 - Actual vs. potential
3. Describe how to control flow path and manage air track
 - Directions
 - Vertical ventilation
 - Horizontal ventilation
 - Door control options
 - Compartmentalization
 - Interior and exterior doors
 - Control devices
 - Smoke curtains

Fire Control 3

- Wind control devices (WCD)
 - Natural ventilation
 - Prevailing winds
 - Construction features
 - Mechanical ventilation
 - Blower/fan
 - Hydraulic
 - Ejector
4. Describe the impact of venting a fuel-limited fire
 5. Describe the impact of venting a vent-limited fire
 6. Describe the differences between:
 - Existing ventilation
 - Unplanned ventilation
 - Tactical ventilation
 7. Describe the importance of coordinating ventilation with fire attack
 8. Identify how flow path and air track impact tactical decision making
 9. Control flow path and manage air track

Discussion Questions

1. How do the speed and direction of wind impact tactical actions?
2. How do horizontal and vertical ventilation impact fire growth?
3. What does a “smoke tunnel” indicate?
4. What are the consequences of uncoordinated ventilation?
5. How do you manage the ventilation profile?

Activities

1. Skills Exercise 10: Ventilation (recommended)

Instructor Notes

1. Demonstrate the ventilation principles introduced in this topic using a scalable burn prop, Class A container or fixed facility, gas-fired prop, or an acquired structure. See the following props and structures documents for overviews and guidelines:
 - Props and Structures Matrix
 - Acquired Structure
 - Container (Class A)
 - Fixed Facility (Class A)
 - Gas-Fired Prop
 - Scalable Burn Prop
2. Engage students in individual demonstrations as appropriate.
3. Use recommended activities with smaller groups or more advanced students
4. Show videos
 - ATF FRL - Understanding the Modern Fire Environment: Flow Paths, Fuels and Ventilation
 - <https://www.youtube.com/watch?v=8qszOGHbYL8&feature=youtu.be> (posted 4.14.14 / last confirmed 7.10.17)

Fire Control 3

- Principles of Modern Fire Attack: SLICE-RS: Identify and Control the Flow Path
 - <https://www.youtube.com/watch?v=ATuCxWj6AW8&list=PLLoaO4uE111OsyF7SY7WEZjAorZhraQs&index=3>
(posted 9.1.15 / last confirmed 7.10.17)
- 5. Recommended resource: Innovating Fire Attack Tactics
 - See Online Instructor Resources

Topic 3-5: Cool From a Safe Location

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to apply water to improve fire conditions of an interior structure fire to create safer entry conditions.

Enabling Learning Objectives

1. Describe the importance of extinguishing exterior fires before entry
2. Describe how to improve (cool) interior conditions
 - Water application from the exterior
 - Duration
 - Straight stream
 - High angle
 - Ceiling vs. windowsill
 - Maintain exhaust opening
 - Water application from the interior
 - Surface cooling
 - Gas cooling
3. Identify factors that may contraindicate an exterior attack
 - Topography
 - Weather
 - Construction features
 - Occupants
 - Animals
 - Viable rescues
 - Time delay
 - Forcible entry
 - Access issues
4. Explain how to use interior walls and objects for shielding
5. Cool atmosphere before making entry

Discussion Questions

1. What does “cooling from a safe location” mean in your organization?
 - Safe location vs. speed vs. “best” location
2. How does water application (stream pattern and technique) impact fire conditions?
3. What is a transitional fire attack?
 - What conditions make transitional fire attack more difficult?

Fire Control 3

Activities

1. Skills Exercise 6: Transitional Fire Attack (recommended)
2. Skills Exercise 11: Portable Water Extinguisher Attack (recommended)

Instructor Notes

1. Use recommended activities with smaller groups or more advanced students
2. Show video
 - ISFSI YouTube - Principle of Modern Fire Attack: SLICE-RS: Cool from a Safe Location
 - <https://www.youtube.com/watch?v=I1uAJ2TAUCA>
(posted 9.1.15 / last confirmed 7.11.17)

Topic 3-6: Extinguish the Fire

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to extinguish a fire by managing hose, assessing risk at the entry point of a fire, applying water using different techniques until extinguishment is achieved, ventilating, checking for fire extension, preserving evidence for fire investigation, confirming fire extinguishment, and implementing overhaul.

Enabling Learning Objectives

1. Describe hose management techniques
 - Line selection
 - Stretching (outside)
 - Flaking (outside)
 - Friction points
 - Advancing (inside)
 - Preloading
 - Friction points
 - Managing corners
 - Managing stairwells
2. Describe how to assess risk at the entry point to determine “go/no go” status
 - Smoke conditions
 - Heat conditions
 - Fire conditions
 - Building construction
 - Incident duration
3. Describe fire suppression process
 - Deployment
 - Hose line
 - Personnel
 - Entry
 - Door control
 - Advancement
 - Create or protect safe immediate environment while advancing to fire

- Cool travel path
 - Gas cooling (emphasis during travel)
 - Surface cooling
- Coordinate ventilation with water application
- Stream reach and penetration
 - Straight vs. fog
 - Gallons per minute
 - Water duration
 - Example: anchor, sweep, terminate
- Natural barriers and shielding
- Extinguishment
 - Attack fire
 - Surface cooling (emphasis during extinguishment)
 - Gas cooling
 - Direct attack
 - Indirect attack
 - Combination attack
 - Coordinate ventilation with water application
 - Stream reach and penetration
 - Straight vs. fog
 - Gallons per minute
 - Water duration
 - Example: anchor, sweep, terminate
 - Natural barriers and shielding
- 4. Describe post-fire knockdown activities
 - Continue appropriate ventilation
 - Check for fire extension
 - Preserve evidence for fire investigation
 - Conduct overhaul
- 5. Identify additional considerations for above grade and below grade fires
 - Features
 - Unprotected structural members
 - Structural integrity
 - Excessive storage
 - Living space
 - Void space
 - Probability of higher neutral plane (above grade)
 - Probability of lower neutral plane (below grade)
 - Actions
 - Keep spaces vent limited until water application
 - Penetrating nozzle
 - Distributor/cellar nozzle

Fire Control 3

- Protect contents (salvage operations)
 - Consider dangers of advancing through the flow path
6. Extinguish fire
 7. Implement overhaul procedures

Discussion Questions

1. What considerations go into “go/no go” decisions?
2. When is gas cooling most appropriate?
3. When is surface cooling most appropriate?
4. Why is it important to control the environment throughout the suppression process?
 - What environmental factors can the suppression team control?
5. What types of natural barriers and shields can be used during structure fires?

Activities

1. Skills Exercise 2: Risk Assessment and Door Control (required)
2. Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line (required)
3. Skills Exercise 4: Water Application (required)
4. Skills Exercise 5: Fire Attack (required)
5. Skills Exercise 7: Interior Attic Fire Attack (recommended)
6. Skills Exercise 8: Below Grade (Basement) Fire Attack (recommended)

Instructor Notes

1. Use recommended skills exercises with smaller groups of more advanced students.
2. Show videos
 - ULfirefightersafety – Eave Attack Vented
 - https://www.youtube.com/watch?v=AH_cEa9poFc
(posted 1.6.14 / last confirmed 7.11.17)
 - ULfirefightersafety – Attic Fire Tactics – Gable Attack Vented
 - <https://www.youtube.com/watch?v=Rg1oMlezdqQ>
(posted 1.6.14 / last confirmed 7.11.17)

Topic 3-7: Perform Rescue and Salvage Operations (Actions of Opportunity)

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to perform civilian rescue operations and salvage operations in coordination with suppression activities.

Enabling Learning Objectives

1. Identify considerations that impact rescue operations
 - Cooling and compartmentalization increases survivability
 - Impact of rescue on overall fire conditions
 - Evaluating credibility of information provided
2. Describe different search types
 - Primary search
 - Immediate rapid search for life
 - Area closest to fire seat
 - Area above fire floor

- Secondary search
 - Thorough, more comprehensive search
 - Performed by separate search crew from primary search
 - Often done after initial attack
 - Ensures all areas are covered
 - Targeted search (VEIS) process
 - Vent
 - Enter
 - Isolate
 - Search
3. Identify factors that have the potential to extend or reduce available search time
 - Extend search time if:
 - Smoke begins to lift
 - Visibility improves
 - Smoke lightens due to steam
 - Sound/feeling of a hose line stream hitting the ceiling beneath
 - Any decrease in heat
 - Reduce search time if:
 - Smoke does not lift
 - Smoke increases in density and color
 - Rolling black smoke moves down from ceiling to floor level
 - Increase in heat
 - Visible fire in room or extension to area through floor
 - Weakening or “spongy” floor
 - Engine company has difficulty locating fire
 - Any type of water supply issue
 4. Describe salvage operations
 - Perform simultaneously with fire fighting operations

Discussion Questions

1. What do you consider actions of opportunity?
2. In which situations would you prioritize search over suppression activities?
3. Which search methods does your organization use?
4. How can actions of opportunity change your tactical priorities?

Activities

1. Skills Exercise 9: VEIS (Vent, Enter, Isolate, Search) (recommended)

Instructor Notes

1. Use recommended activities with smaller groups or more experienced students
2. Show videos
 - ISFSI YouTube – Principles of Modern Fire Attack: SLICE-RS: Rescue
 - https://www.youtube.com/watch?v=gq13D_NRQIE–
(posted 9.1.15 / last confirmed 7.11.17)
 - Byran Martin – VES (short version)

- <https://www.youtube.com/watch?v=cV5ZU5Th1fU&index=22&list=WL>
(posted 3.30.11 / last confirmed 7.11.17)

Unit 4: Additional Tactical Fire Ground Considerations (Recommended)

Topic 4-1: Additional Tactical Fire Ground Considerations

Terminal Learning Objective

At the end of this topic, a student, given an assignment, will be able to demonstrate fire ground operations often performed by first responders during interior structure fires.

Enabling Learning Objectives

1. Describe fire ground operations for first responders
 - Rapid intervention crew (RIC)
 - Roof survival
 - Large volume structures (i.e., box stores, arenas, etc.)
 - Forcible entry
 - Rule of Air Management (ROAM)
 - Thermal imaging operations
 - Ground ladder operations
 - Drags and carries

Discussion Questions

1. What information should be included in a mayday call?
2. How does staffing affect your ability to complete tactical actions?

Activities

1. Determined by instructor

Instructor Notes

1. This recommended unit can be used with more advanced students, or as additional training opportunities while groups of students rotate through the required skills exercises.
 - There are no terminal or enabling learning objectives for these items. It is the responsibility of the instructor to develop fire ground talking points.
 - All skills exercises and instructor demonstrations must be completed in accordance with AHJ policies and procedures.
2. Recommended video
 - NFA Mayday Video
 - <https://www.youtube.com/watch?v=ISobWWcNUZU>
(posted 10.22.12 / last confirmed 7.17.17)

Unit 5: Health and Safety

Topic 5-1: Decontamination and Equipment Maintenance

Terminal Learning Objective

At the end of this topic, a student, given PPE, gear, and an assignment, will be able to complete the decontamination process, properly maintain PPE and gear, and identify potential cancer reduction actions in order to maintain short- and long-term fire fighter health and safety.

Enabling Learning Objectives

1. Identify the importance of the decontamination process
2. Identify potential cancer reduction actions
 - Use SCBA from initial attack through overhaul completion
 - Failure to wear SCBA in active and post-fire environments is the most dangerous voluntary activity in the fire service today
 - Perform gross field PPE decontamination to remove as much soot and particulates as possible
 - Do not disconnect from breathing air until after gross decontamination
 - Immediately remove as much soot as possible from head, neck, jaw, throat, underarms, and hands while still on the scene
 - Change and immediately wash clothes after a fire
 - Shower thoroughly after a fire
 - Clean PPE, gloves, hood, and helmet immediately after a fire
 - Do not take contaminated clothes or PPE home
 - Do not store contaminated clothes in vehicle
 - Decontaminate fire apparatus interior after fires
 - Keep bunker gear out of living and sleeping quarters
 - Avoid using tobacco products
 - Use sunscreen or sun block
3. Identify requirements for maintaining equipment
 - Inspect
 - Pre and post incident
 - Maintain
 - Gross decontamination
 - Cleaning
 - Inspection
 - Repair
 - Follow AHJ requirements

Discussion Questions

1. Why is it important to decontaminate your gear and your body?
2. What steps can you take to help protect yourself from exposure to carcinogens.

Fire Control 3

Activities

1. Determined by instructor

Instructor Notes

1. Reference one or more of the following
 - NIOSH Pocket Guide to Chemical Hazards (<https://www.cdc.gov/niosh/npg/>)
 - NIOSH Study of Firefighters Finds Increased Rates of Cancer (see Online Instructor Resources)
 - Taking Action Against Cancer in the Fire Service (see Online Instructor Resources)
 - Video: MU Fire and Rescue Training Institute – The Silent Killer – Firefighter Cancer
 - https://www.youtube.com/watch?v=fyZ_HQM9Z_c
(posted 2.22.16 / last confirmed 7.17.17)

Topic 5-2: Reporting Exposure, Injury, and Damaged Equipment

Terminal Learning Objective

At the end of this topic, a student, given methods of exposure reporting and an assignment, will be able to report exposure and injury in accordance with federal, state, and AHJ requirements.

Enabling Learning Objectives

1. Describe the importance of exposure and injury reporting
 - Maintain personal health and safety
 - AHJ requirements
 - Cal/OSHA requirements
 - Legal requirements
2. Identify how and/or where to report exposure
 - California Professional Firefighters (CPF) database
 - California State Firefighters Association (CSFA) database
 - AHJ-specific exposure reporting requirements
 - Personal documentation
3. Identify how and/or where to report injuries
 - Notify supervisor
 - Follow AHJ requirements
 - Follow Cal/OSHA reporting requirements
4. Identify how and/or when to report damaged equipment
 - Notify supervisor
 - Follow AHJ requirements

Discussion Questions

1. Which injuries should be reported and when?
2. What documentation does your agency use for injury or exposure?
3. Why is it important to report damaged equipment?

Activities

1. Determined by instructor

Fire Control 3

Instructor Notes

1. None

Time Table

Segment	Lecture Time	Activity Time	Total Unit Time
Unit 1: Introduction			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
Activity: Determined by instructor		0:00	
Topic 1-2: Participation Requirements			
Lecture	0:15		
Activity: Determined by instructor		0:00	
Topic 1-3: Reducing Heat-Related Injury and Illness			
Lecture	0:15		
Activity: Determined by instructor		0:00	
Unit 1 Totals	1:00	0:00	1:00
Unit 2: Fire Dynamics			
Topic 2-1: Fire Chemistry and Physics			
Lecture	3:30		
Skills Exercise 1: Combustion		0:30	
Topic 2-2: Fire Growth and Development			
Lecture	2:30		
Activity: Determined by instructor		0:00	
Topic 2-3: Characteristics of Smoke			
Lecture	0:30		
Activity: Determined by instructor		0:00	
Topic 2-4: Water as an Extinguishing Agent			
Lecture	1:00		
Activity: Determined by instructor		0:00	
Unit 2 Totals	7:30	0:30	8:00
Unit 3: Tactical Fire Ground Considerations			
Topic 3-1: Fire Ground Command and Control			
Lecture	0:30		
Activity: Determined by instructor		0:00	
Topic 3-2: Size Up			
Lecture	0:25		
Activity: Determined by instructor		0:00	
Topic 3-3: Locate the Fire			
Lecture	0:25		
Activity: Determined by instructor		0:00	

Fire Control 3

Segment	Lecture Time	Activity Time	Total Unit Time
Topic 3-4: Identify Flow Paths and Manage Air Tracks			
Lecture	0:25		
Activity: Determined by instructor		0:00	
Topic 3-5: Cool From a Safe Location			
Lecture	0:25		
Activity: Determined by instructor		0:00	
Topic 3-6: Extinguish the Fire			
Lecture	0:25		
Skills Exercise 2: Risk Assessment and Door Control		1:00	
Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line		0:45	
Skills Exercise 4: Water Application		1:00	
Skills Exercise 5: Fire Attack		0:30	
Topic 3-7: Perform Rescue and Salvage Operations (Actions of Opportunity)			
Lecture	0:25		
Activity 3-7: Determined by instructor		0:00	
Unit 3 Totals	3:00	3:15	6:15
Unit 4: Additional Tactical Fire Ground Considerations (Recommended)			
Topic 4-1: Additional Tactical Fire Ground Considerations			
Lecture	2:00		
Activity: Determined by instructor		0:00	
Unit 4 Totals	2:00	0:00	2:00
Unit 5: Health and Safety			
Topic 5-1: Decontamination and Equipment Maintenance			
Lecture	1:00		
Activity: Determined by instructor		0:00	
Topic 5-2: Reporting Exposure, Injury, and Damaged Equipment			
Lecture	1:00		
Activity: Determined by instructor		0:00	
Unit 5 Totals	2:00	0:00	2:00

Fire Control 3

Segment	Lecture Time	Activity Time	Total Unit Time
Lecture, Activity, and Unit Totals	15:30	3:45	19:15

Course Totals

Total Lecture Time (LT)	15:30
Total Skill Exercise Time (ST)	3:45
Flex Time (for longer required or additional recommended skills exercises)	4:45
Total Course Time	24:00

Note: Skills and activity time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for up to 25 students.

The Course Totals time reflects actual teaching/lecture and skills exercise time. With an additional one-hour meal period per day and a 10 minute break for every 50 minutes of teaching or skills time, the total scheduled time for this course is four days.

Acknowledgments

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Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

Combustion

Demonstration: Related to Topic 2-1: Fire Chemistry and Physics

Format: Demonstration performed by instructor with student interaction as appropriate.

Time Frame: 15-20 minutes

Description

This activity provides students with an opportunity to explore concepts related to combustion including: heat vs. energy, heat transfer mechanisms, thermal ballast, and flammable range.

Materials

- Candle (birthday candle or larger)
- Candle holder (e.g. small cups of Play-Doh)
- Lighter
- Wire mesh screen (4"x4" square made from two overlapped 4"x4" 27-gauge wire 1/8 inch mesh and taped around all four sides)
- Large metal nail (16 d, 3")
- Glass dropper
- Whiteboard, chalkboard, or easel with paper and appropriate writing implements
- Thermocouple thermometer (optional)

Instructions

Perform each step of the demonstration, asking questions and providing answers (as needed) as you go.

1. Place candle in the candleholder and light the candle.
2. Observe the wick and flame and document observations (e.g. flame has a bright yellow area, a blue area at the bottom, wick glows red at the end, etc.).
3. Estimate and document the flame's temperature.
 - How hot is the flame?
 - As a fire fighter, should you know the temperature of flame?
4. Measure the flame's temperature with the thermocouple thermometer.
 - Optional – If there are no thermocouple thermometers available, provide the answer
 - Temperature range = 1300-1400 °F
 - If a room reaches temperatures of 900 to 1200 °F at flashover, why is the room not going to flashover?

Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

- The room goes to flashover when the heat release rate reaches 0.8 to 2.0 megawatts (for an average size room). The thermometer does not measure energy.
 - How is energy measured?
 - In watts. One watt = a joule/second.
 - How many watts does the candle release?
 - 80 watts
 - So, why doesn't the room flashover?
 - The temperature of the flame is actually 2000 °F in certain small spots, but the amount of heat energy being released (80 watts) is too low to cause a transfer of energy to all of the objects in the room sufficient to raise the room temperature to 900 to 1200 °F
 - If we put 10 candles together, what would the temperature be?
 - 1300 degrees °F.
 - What is the energy release rate?
 - $80 \text{ watts} \times 10 = 100 \text{ watts}$. Temperature and energy are not the same. Temperature is related to energy; the more energy a mass of atoms has, the higher its temperature will be, but temperature alone is not a reliable indicator of energy release rate.
5. Using the mesh screen, hold the screen above the flame and lower until it cuts the flame in half horizontally. Observe the flame from above.
- Do you think the candle flame is solid or hollow?
 - The flame is hollow.
 - If the flame is hollow, what is in the hollow space?
6. Using the glass dropper, expel the air from the bulb. With the air expelled, place the tip of the glass dropper into the hollow space of the flame and slowly release the bulb to draw up the gases from the hollow space.
- What do the gas from the hollow space look like?
 - A white gas.
7. Withdraw gases from the hollow space and expel them across the flame to see if they will burn.
- Are the gases from the hollow space flammable?
 - The gases are flammable.
 - What is the gas?
 - Wax vapor from the candle.
 - How can the candle flame have flammable wax vapor surrounded by a 1300 °F flame and yet it does not burn?
 - The wax vapor is too rich to burn.

Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

- How can the wax vapor be too rich to burn?
 - The heat from the flame melts the wax into a liquid. The wick pulls up the liquid through wicking action into the fire. The high heat from the fire vaporizes the wax from the wick. The wax vapor coming off the wick displaces the air (and oxygen) from near the wick. Near the wick there is all wax vapor and not enough oxygen to burn. However, as the wax diffuses away from the wick, oxygen from the surrounding air diffuses into the wax and we achieve a flammable range in a circle around the wick.
 - Why is the end of the wick glowing red?
 - It is smoldering combustion. The wick is on fire, but the state of matter of the wick is a solid. Solids burn through smoldering combustion and release light as a red glow.
 - Why doesn't the flame go through the wire mesh?
 - The metal from the wire mesh conducts away the heat and reduces the heat below which the flame can exist.
8. Bisect the flame with the wire mesh again.
9. Light the vapors above the mesh with a lighter to demonstrate that the vapors above the mesh are flammable if given more heat energy.
- Explanation: The mesh acts as thermal ballast or a "passive". Atoms or molecules near the combustion reaction absorb heat energy and prevent it from being available for combustion. Other atoms or molecules (e.g. the nitrogen and water molecules in the air) do this all the time. If the wire mesh is hot enough, the flame will go through it.
10. Remove the wire mesh and place the large nail into the flame. Observe how the flame cannot touch the nail.
- Why?
 - The nail conducts the heat away.
 - Both the wire mesh and the nail extinguish the fire by removing heat. Think about the amount of steel in the nail and the mesh in the fire, extinguishing the fire. Which has more mass?
 - The nail.
 - Which extinguishes more fire?
 - The wire mesh.
 - Why?
 - The wire mesh has a higher surface area to mass ratio and can absorb heat energy more efficiently.
 - Application: To transfer heat from a hot gas layer into water drops, what type of drops do you want? Small drops with a high surface area to mass ratio, or large drops with a small surface area to mass ratio?

Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

Additional talking points:

- Some of the first fire fighter masks were made with wire mesh to protect a fire fighter's face from flames.
- Wire mesh was used to create the "Davy Safety Lamp" for the mining industry. Coal miners used candles to light up the pitch-dark mines, but occasionally a coalmine would release a pocket of methane gas. If the methane gas came into contact with the candle, the mine could explode. The Davy Safety Lamp prevented this by wrapping mesh around the candle. As the methane passed through the mesh, the flame would brighten, but it wouldn't be able to get past the mesh to ignite the methane bubble. This gave the miners a warning to evacuate the mine.

Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

Plans / Images / Diagrams

Initial Set Up



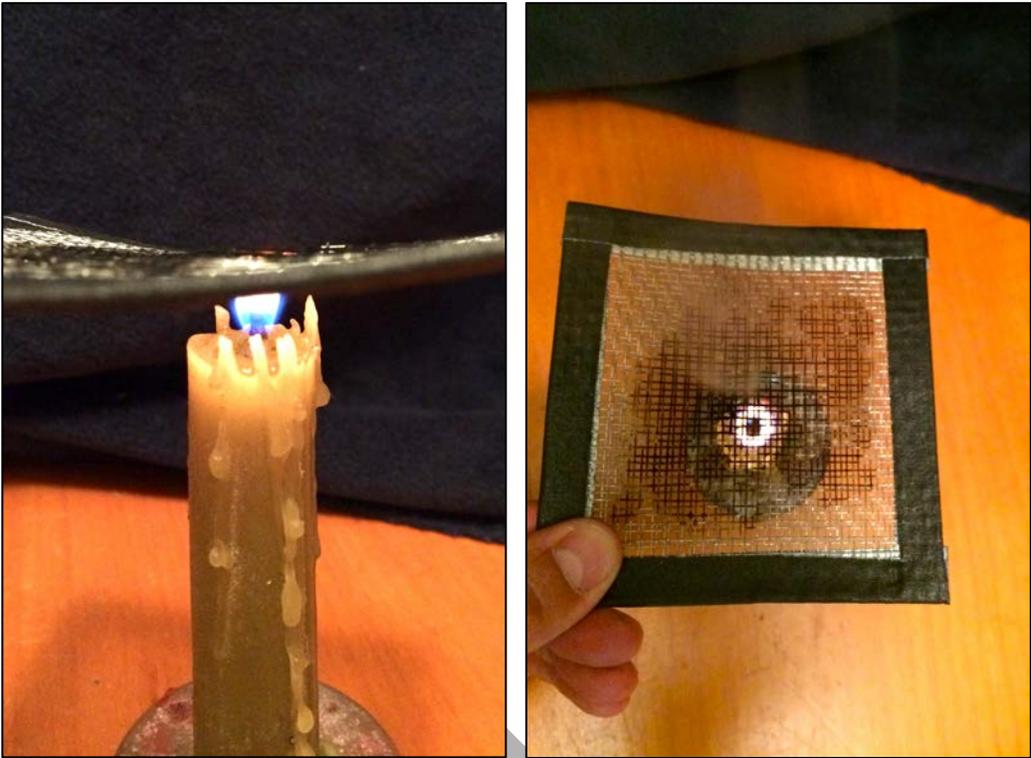
Step 4



Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

Step 5



Step 6



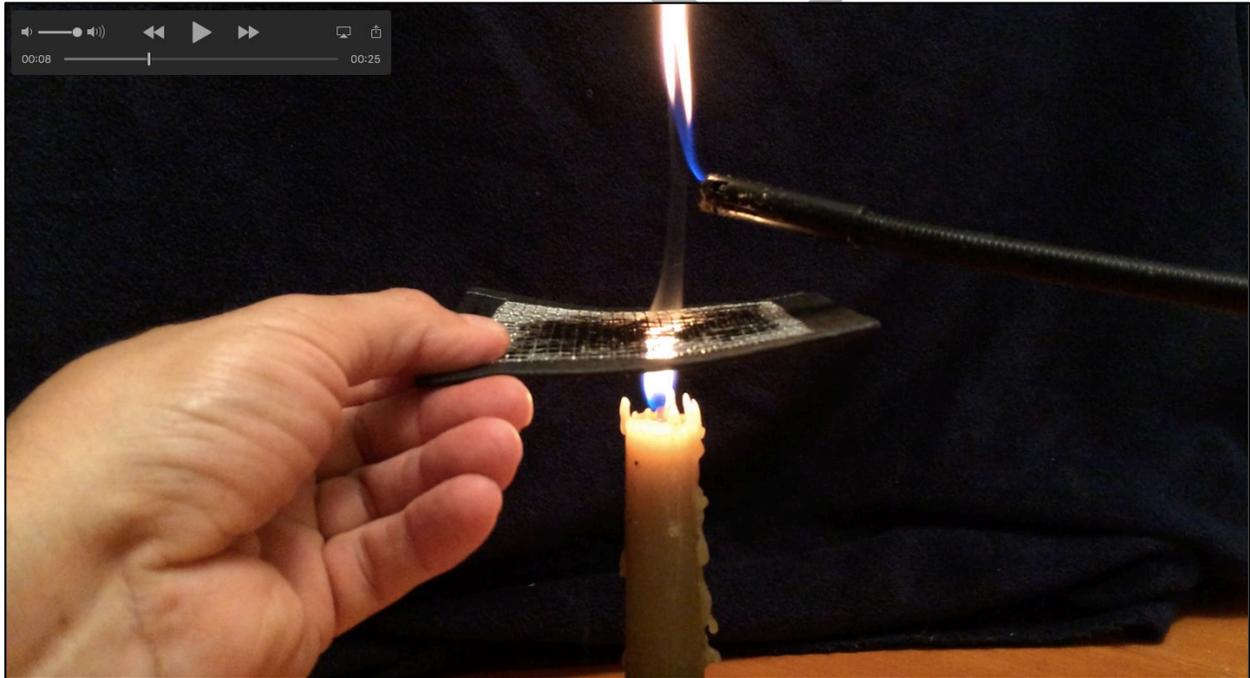
Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

Step 7



Step 9



Fire Control 3: Structural Fire Fighting

Instructor Demonstration 2: Combustion

Step 10



Fire Control 3: Structural Fire Fighting

Instructor Demonstration 3: Pyrolysis

Pyrolysis

Demonstration: Related to Topic 2-1: Fire Chemistry and Physics

Format: Demonstration performed by instructor with student interaction as appropriate

Time Frame: 20 minutes

Description

This demonstration provides students with an opportunity to observe pyrolysis, smoldering combustion, and flammability of pyrolyzates.

Materials

- 500 ml narrow mouth Erlenmeyer flask
- Wood chips
- Propane torch
- Ring stand
- Large clamp
- Stick lighter

Instructions

1. Place the wood chips in the flask.
2. Place the flask into clamp on the ring stand.
3. Begin heating the bottom of the flask with the torch.
4. Observe the initial vapors coming out of the wood.
 - These are water vapor.
5. Discuss how the vapors coming from the wood are displacing the air and oxygen that was inside the flask.
6. Try to ignite the vapors coming out of the flask with the lighter.
 - Early on the vapors are not flammable due to a combination of high water vapor in the pyrolyzates gases and the pyrolyzate vapors being outside the flammable range.
7. Continue to heat the flask to derive more pyrolyzate vapors from the wood.
8. Keep trying to ignite the vapors.
 - Eventually the vapors will become flammable.
9. Pour out the wood chips and observe.
 - Note how the wood chips are now black in color and some might be smoldering. What do we call this substance? Charcoal. Henry Ford made charcoal from sawdust leftovers from the production of the Model T. He compressed the pyrolyzed sawdust into briquettes.
10. Discuss smoldering combustion.
 - Smoldering occurs when a solid-state fuel burns at the surface. It emits a red glow instead of a flame.

Fire Control 3: Structural Fire Fighting

Instructor Demonstration 3: Pyrolysis

11. Pass some of the pyrolyzed pieces of wood around.
 - Notice how light (weight) they are having lost a lot of mass during the pyrolysis process.
12. Light some of the pyrolyzed wood chips on fire with the stick lighter.
 - Notice the ash forming after the smoldering combustion.
 - What is ash? Ash is the minerals (e.g. magnesium) that the plant took in from the soil that don't burn off to become CO₂ and H₂O but rather metal oxides.

Instructor Notes

- Use caution and wear leather gloves when handling the hot flask.
- Be careful to not put the hot glass flask onto a cold metal surface
- Try to keep instructors and students out of the smoke.

Fire Control 3: Structural Fire Fighting

Instructor Demonstration 3: Pyrolysis

Plans / Images / Diagrams

Initial Set Up



Steps 3, 4, and 5



Fire Control 3: Structural Fire Fighting

Instructor Demonstration 3: Pyrolysis

Step 6



Steps 9 and 10



Fire Control 3: Structural Fire Fighting

Instructor Demonstration 3: Pyrolysis

Step 12



Fire Control 3: Structural Fire Fighting

Instructor Demonstration 1: Dust Explosion

Dust Explosion

Demonstration: Related to Topic 2-1: Fire Chemistry and Physics

Format: Demonstration performed by instructor with student interaction as appropriate

Time Frame: 10 minutes

Description

This demonstration provides students with an opportunity to observe how high surface-to-mass ratios impact burning characteristics.

Materials

- Ring stand
- Acrylic cylinder (3 feet long, 2 inch diameter)
- Material to affix cylinder to ring stand (packing tape, etc.)
- Candle or long stick lighter
- PPE (coat, gloves, and eyewear)
- Powdered coffee creamer

Instructions

1. Affix acrylic cylinder to ring stand. Leave a gap underneath the cylinder sufficient to place the candle or put the flame end of the stick lighter.
2. With either the candle burning or the stick lighter lit inside the acrylic cylinder, sprinkle the coffee creamer into the cylinder.
 - Why does the creamer burn so fast?
 - High surface-to-mass ratio

Instructor Notes

- Do not put your hands or any part of your body near the top or bottom cylinder openings.
- Use a dry powdered creamer without clumps.
- Perform demonstration in a low light environment for better visual impact.

Fire Control 3: Structural Fire Fighting

Instructor Demonstration 1: Dust Explosion

Plans / Images / Diagrams



Fire Control 3: Structural Fire Fighting

Props and Structures: Props and Structures Matrix

Props and Structures Matrix

Use this table to determine which structures and/or props can be used to demonstrate or execute the Instructor Demonstrations and Skills Exercises.	Classroom or Parking Lot	Scalable Burn Prop	Container(s) (Class A)	Fixed Facility (Class A)	Gas-Fired Prop	Acquired Structure
	Topic					
2-1: Fire Chemistry and Physics	X					
2-2: Fire Growth and Development		X	X	X		X
2-3: Characteristics of Smoke		X	X	X		X
2-4: Water as an Extinguishing Agent		X	X	X	X	X
3-4: Identify Flow Paths and Manage Air Tracks		X	X	X		X
Exercise		Skills Exercises				
1: Combustion	X					
2: Risk Assessment and Door Control			X	X	X	X
3: Stretching, Flaking, and Advancing an Attack Line			X	X	X	X
4: Water Application			X	X	X	X
5: Fire Attack			X	X	X	X
6: Transitional Attack			X	X	X	X
7: Interior Attic Fire Attack			X	X	X	X
8: Below Grade (Basement) Fire Attack			X	X	X	X
9: VEIS			X	X	X	X
10: Ventilation			X	X	X	X
11: Portable Water Extinguisher Attack			X	X	X	X

Fire Control 3: Structural Fire Fighting

Props and Structures: Scalable Burn Prop

Scalable Burn Prop

This is a list of the Instructor Demonstrations and Skill Exercises that can be completed using a scalable burn prop. All props, materials, and actions should be prepared, used, or carried out in accordance with the requirements of NFPA 1403 Standard on Live Fire Training Evolutions (2018).

Structure/Prop Preparation

- Assemble or acquire before class begins

Materials

- Full structural PPE including SCBA
- Scalable burn prop
- Cribbing or fuel source
- Handheld propane torch and fuel
- Water can and water
- Sawhorses and table

Formats

- Instructors perform Instructor Demonstrations with student interaction as appropriate.
- Students perform Skills Exercises under direct instructor supervision.

Instructor Demonstrations

The knowledge and skills from the following topics can be demonstrated using a scalable burn prop.

- Topic 2-2: Fire Growth and Development
- Topic 2-3: Characteristics of Smoke
- Topic 2-4: Water as an Extinguishing Agent
- Topic 3-4: Identify Flow Paths and Manage Air Tracks

Skills Exercises

None of the student skills exercises can be executed using a scalable burn prop.

Safety

- Conduct safety briefing
- Keep a watchful eye on participants and ensure their safety
- Ensure that students understand all instructions

Fire Control 3: Structural Fire Fighting

Props and Structures: Scalable Burn Prop

Plans / Images / Diagrams

Numerous single and multi-chamber burn prop designs are available online. Secure or assemble a scalable burn prop that best meets your training needs.

Sample Single Chamber



Fire Control 3: Structural Fire Fighting

Props and Structures: Scalable Burn Prop

Sample Multi-Chamber (Four-Chamber Dollhouse)



Fire Control 3: Structural Fire Fighting

Skills Exercise 1: Combustion

Combustion

Demonstration: Related to Topic 2-1: Fire Chemistry and Physics

Format: Individual or pairs

Time Frame: 15-20 minutes

Description

This activity provides students with an opportunity to explore concepts related to combustion including: heat vs. energy, heat transfer mechanisms, thermal ballast, and flammable range.

Materials

- Per student (or pair)
 - Candle (birthday candle or larger)
 - Candle holder (e.g. small cups of Play-Doh)
 - Lighter
 - Wire mesh screen (4"x4" square made from two overlapped 4"x4" 27-gauge wire 1/8 inch mesh and taped around all four sides)
 - Large metal nail (16 d, 3")
 - Glass dropper
- Whiteboard, chalkboard, or easel with paper and appropriate writing implements
- Thermocouple thermometer (optional)

Instructions

Working individually or in pairs:

1. Place candle in the candleholder and light the candle.
2. Observe the wick and flame and document observations (e.g. flame has a bright yellow area, a blue area at the bottom, wick glows red at the end, etc.).
3. Estimate and document the flame's temperature.
4. Measure the flame's temperature with the thermocouple thermometer.
5. Using the mesh screen, hold the screen above the flame and lower until it cuts the flame in half horizontally. Observe the flame from above.
6. Using the glass dropper, expel the air from the bulb. With the air expelled, place the tip of the glass dropper into the hollow space of the flame and slowly release the bulb to draw up the gases from the hollow space.

Fire Control 3: Structural Fire Fighting

Skills Exercise 1: Combustion

7. Withdraw gases from the hollow space and expel them across the flame to see if they will burn.
8. Bisect the flame with the wire mesh again.
9. Light the vapors above the mesh with a lighter to demonstrate that the vapors above the mesh are flammable if given more heat energy.
10. Remove the wire mesh and place the large nail into the flame. Observe how the flame cannot touch the nail.

Fire Control 3: Structural Fire Fighting

Skills Exercise 2 – Risk Assessment and Door Entry

Risk Assessment and Door Entry

Activity: Related to Topic 3-6: Extinguish the Fire

Format: Small group (minimum two individuals)

Time Frame: 1 hour (per group rotation)

Description

This activity provides students with an opportunity to respond to a simulated or real fire and initiate door control, conduct a risk assessment, determine if attack team can make a safe entry, begin cooling the environment, and enter the fire compartment.

Materials

- Full PPE including SCBA
- 1½" diameter attack line (or larger diameter)
- Water supply
 - Must meet NFPA requirements for activity objectives
- Irons kit
- Pike pole
- Thermal imager (optional)
- Door prop or door in training prop/tower

Instructions

1. Stretch hose lines to the door prop or door in training prop/tower
2. Flake hose line for entry
3. Stage tools at the entry area
4. Conduct size-up
 - Consider controlling openings
 - Exterior application of water
 - Rescues
 - Hazards
5. Communicate attack plan to team
6. Prepare attack line for entry
 - Bleed the air
 - Pump operator sets the pressure
 - Verify gallons per minute (gpm) and nozzle pattern
7. Prepare team for entry
8. Cool door and area above door
9. Read heat signature off door
10. Control door and check if locked

Fire Control 3: Structural Fire Fighting

Skills Exercise 2 – Risk Assessment and Door Entry

- If locked, force entry and control
11. Work as a team to open door and look high and low
 - When looking high
 - Note smoke volume, velocity, density, color, or fire
 - If smoke ignites, hit with water and close door
 - When looking middle
 - Visualize neutral plane
 - Identify outlets
 - When looking low
 - Life (victims)
 - Layout (of the room or building, plan route)
 - Location (of the fire)
 12. Cool the upper part of the room and close the door
 13. Share information and make “go/no go” decision
 - No go = high velocity smoke
 - Continue cooling from the door and reassess
 - Add exterior attack and reassess
 - Attempt attack from different entry location
 - Go = low velocity smoke
 - Open door and begin cooling ahead of you
 14. Make entry and pull ceiling if appropriate to check for fire in attic space

Fire Control 3: Structural Fire Fighting

Skills Exercise 2 – Risk Assessment and Door Entry

Instructor Notes (Remove before distributing to students)

1. Communicate clearly during safety walk through and PPE checks.
2. Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
3. Never use live persons as victims in an IDLH environment.

Talking Points (Remove before distributing to students)

1. Entry team, look high first (greatest danger) and then low.
2. Door control techniques: hose strap, Halligan, axe.
 - Consider how hose straps might interfere with forcible entry, or team entry.
3. Entry team located on “hinge side” of the door, for crew protection, maximum gas, and surface cooling.
4. Open door wide enough to actually see inside and gather useful information about victims, layout, and fire location.
 - You will be giving the fire oxygen when you do this, but it is worth the information you gain.
5. Look at the door and windows surrounding the entry point for indicators of heat: drooping window coverings, condensation, smoke stain, flame/glow, paint peeling, charred wood, warped door or framing.

Fire Control 3: Structural Fire Fighting

Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line

Stretching, Flaking, and Advancing an Attack Line

Activity: Related to Topic 3-6: Extinguishing the Fire

Format: Small group (minimum three people)

Time Frame: 45 minutes (per group rotation)

Description

This activity provides students with an opportunity to stretch, flake, and advance the initial attack line from an apparatus to the point of entry and then into a training prop or structure while reinforcing basic hose management skills.

Materials

- Full PPE including SCBA (instructors and students)
 - SCBA is optional if stretching in non-IDLH conditions
- Water supply
 - Must meet NFPA requirements for activity objectives
- Hose line
 - 150 feet of 1½" or 1¾" structural fire hose (or enough to meet objective)
- Nozzle(s)
- A prop, building, rooms, or other simulated structural floor plan

Instructions:

Stretching and Flaking

1. Deploy hose from hose bed in accordance with AHJ policies and procedures.
2. Stretch hose to desired location.
3. Ensure attack line is out of the potential IDLH.
4. Position hose where attack team has a more "global view" than just the entry point.
5. Flake hose so that hose is laid toward the entry point.

Advancing the Hose Line

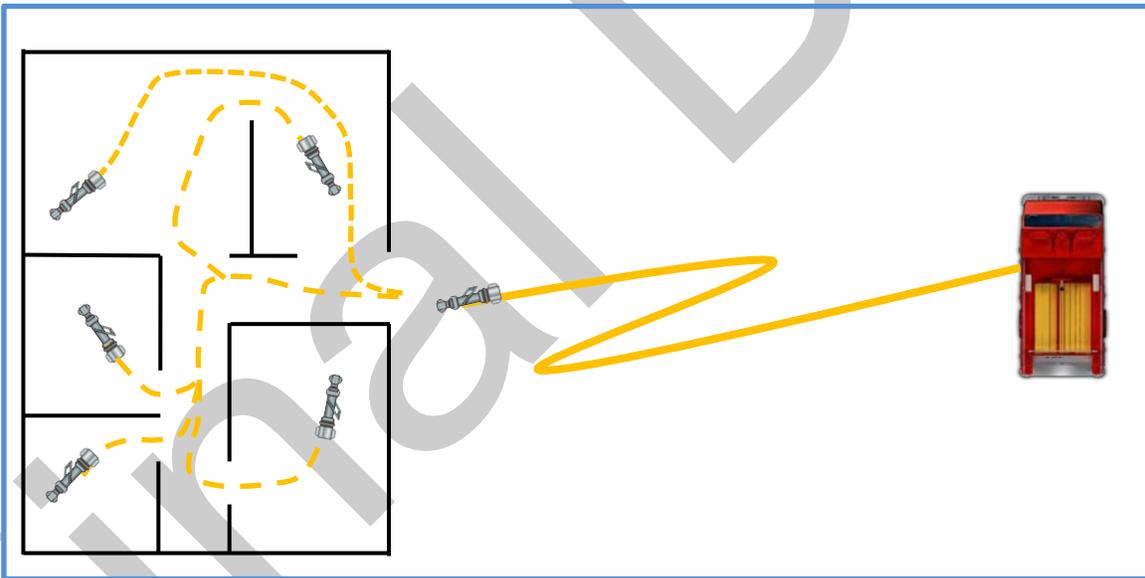
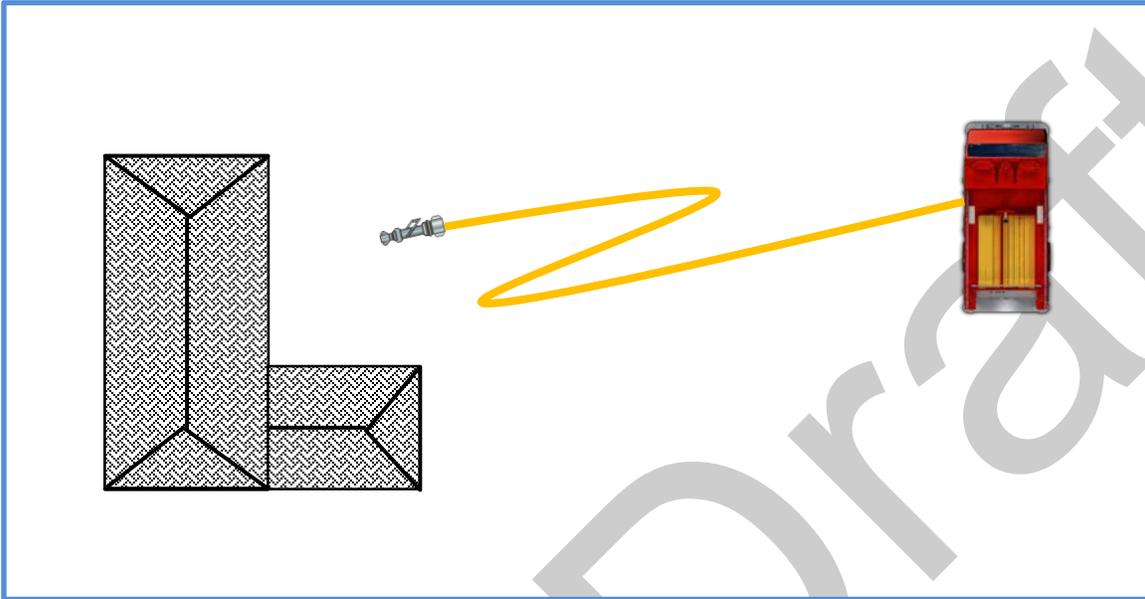
1. Review fire fighter positions and responsibilities on the hand line.
2. Assign a fire fighter to one of the three hose line positions.
3. Bleed hose of entrapped air and check pattern before entering.
4. Advance charged hose line to desired location.
5. Pause occasionally to flow water in the room or area.
6. Open and flow nozzle.
7. Shut down and withdraw from room.

Repeat the drill until all fire fighters have rotated through all three positions.

Fire Control 3: Structural Fire Fighting

Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line

Activity Illustration



Fire Control 3: Structural Fire Fighting

Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line

Instructor Notes (Remove before distributing to students)

1. Review the basic positions on the hose line using AHJ terminology
 - **Nozzle firefighter**
 - First person on the line
 - Responsible for the nozzle and first 50 feet of hose line during initial stretch
 - Responsible for operating the nozzle at the direction of the officer
 - Operates the stream in the straight stream “right to fight” configuration
 - **2nd on the hose line** (e.g. officer, back-up fire fighter)
 - Second person on the line, directly behind nozzle fire fighter
 - Responsible for “backing-up” the nozzle fire fighter by absorbing nozzle reaction
 - Eyes and ears of the nozzle team
 - Directs nozzle fire fighter and water application
 - **3rd on the hose line** (e.g. back-up fire fighter, control fire fighter, door fire fighter)
 - Third person on the line
 - Located outside the building
 - Responsible for flaking the remaining hose line during initial stretch
 - Responsible for chasing kinks during advancement
 - Responsible for moving hose line forward during advancement
2. Review basic hose handling techniques
 - **Nozzle firefighter**
 - Hold nozzle in front of body at arm’s length
 - Kneel on hose-side knee
 - Lock hose against body with elbow under arm
 - Off hand (hand opposite hose side of body) supports hose behind coupling, palm up
 - Hand does not stay on bail
 - Completely open or close nozzle (no penciling)
 - Rotate nozzle in clockwise motion
 - Advance hose using different techniques
 - Crawling, duck walk, leg forward, etc.
 - **2nd on the hose line**
 - Mirror nozzle fire fighter with hose on same side, kneeling directly behind nozzle fire fighter
 - Use same hose hold technique as nozzle fire fighter
 - Lock hose against body
 - Absorb nozzle reaction by leaning into nozzle fire fighter if necessary
 - Use Pin and Hit technique if needed (kneel on hose to reduce nozzle reaction)

Fire Control 3: Structural Fire Fighting

Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line

- **3rd on the hose line**
 - Manage hose outside of structure
 - Pre-load room or hallway
 - Chase kinks
 - Wedge door open

Final Draft

Fire Control 3: Structural Fire Fighting

Skills Exercise 4 – Water Application

Water Application

Activity: Related to Topic 3-6: Extinguish the Fire

Format: Small group

Time Frame: 1 hour (per group rotation)

Description

This activity provides students with an opportunity to practice gas cooling and surface cooling using water application techniques.

Materials

- Full PPE including SCBA
- Drill ground
- Burn room or prop
- Class A or Class B combustible materials
- Water supply (must meet NFPA requirements for activity objectives)
- Engine
- Charged hose line(s)
- Combination nozzle (required)
- Smooth bore tip (optional)
- Duct tape (optional)

Instructions

Gas Cooling with Fog Cone – Drill Ground

1. Create a cone pattern of approximately 30 to 45-degrees.
2. Select a low gallons-per-minute (gpm) setting such as 30-60 gpm.
3. Set nozzle pressure to 100 pounds per square inch (psi).
4. Hold nozzle high, near the bottom of the smoke layer, or about eye level.
5. Perform a “pulse” by opening the bail fully and closing the bail quickly.
 - Short pulse = 1-2 seconds
 - Long pulse = 2-4 seconds (or longer)
6. Aim at an identified target.
7. Apply water at targets, staying within the walls and ceiling or confines of target.
8. Practice long and short pulses.

Fire Control 3: Structural Fire Fighting

Skills Exercise 4 – Water Application

Gas Cooling with a Fog Cone – Burn Room/Prop

Gas (Flame) Cooling (smoke layer with rollover/flameover)

1. Cool the smoke/flame layer with long and short pulses.
 - Flames in smoke layer will disappear as the water cools the fire gases, providing a clear visual indicator of successful cooling.

Smoke Cooling (smoke layer with minimal rollover/flameover)

1. Cool smoke layer with long and short pulses to maintain a low temperature smoke layer.

Gas Cooling with a Straight or Solid Stream – Drill Ground

1. Use charged hose line.
2. Create a straight or solid stream.
3. Open bail and strike the upper part of the walls and ceiling in an “n” pattern, moving the stream down the length of the room.
4. Apply stream to cover majority of the surface area.

Gas Cooling with a Straight or Solid Stream – Burn Room/Prop

Gas (Flame) Cooling (smoke layer with rollover/flameover)

1. Cool the smoke/flame layer with a straight or solid stream in an “n” pattern moving down the length of the burn room/prop.
 - Flames in smoke layer will disappear as the water cools the walls, providing a clear visual indicator of successful cooling.

Smoke Cooling (smoke layer with minimal rollover/flameover)

1. Cool smoke layer with a straight or solid stream in an “n” pattern moving down the length of the burn room/prop to maintain a low temperature smoke layer.

Surface Cooling/Extinguishment with a Straight or Solid Stream – Drill Ground or Burn Room/Prop

1. Control overhead conditions.
2. Create a straight or solid stream.
3. Open bail and aim stream at upper part of walls and ceiling at a steep angle above simulated burning materials.
4. Lower stream angle to coat all visible surfaces of simulated burning materials.

Fire Control 3: Structural Fire Fighting

Skills Exercise 4 – Water Application

Instructor Notes (Remove before distributing to students)

1. Communicate clearly during safety walk through and PPE checks.
2. Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
3. Never use live persons as victims in an IDLH environment.
4. Have students use familiar hose loads, nozzles, and deployment methods or those used by the AHJ.
5. Instructor uses a separate hose line to maintain safe and stable conditions.
6. For gas cooling with a straight or solid stream, protect the fire with a baffle to avoid extinguishment.
7. When working with burn rooms or props, use ventilation openings to maintain tenable conditions.

Talking Points (Remove before distributing to students)

1. Gas cooling: The intent of gas cooling is to create and apply small water droplets (approximately 200-350 micrometers in diameter or drops that stay suspended 3-4 seconds in the air) into the most volume of the smoke layer, without the droplets to striking the walls or ceiling.
2. Long pulse: The intent of the long pulse is to cool a compartment of significant length.
 - Cone angle will be narrower (30 degrees) so that the water cone can reach a longer length.
 - Duration of the water application should be until water droplets reach the far wall.
 - Because of the narrower cone, multiple applications may be needed to cover the width of a large compartment such as an open living room/dining room, whereas a narrow cone may cover the width of a narrow compartment, such as a hallway, with one application of water.
 - Water application will be into the smoke layer, aimed just below the ceiling, avoiding striking walls, and closing the bail as water begins to strike vertical wall.
3. Short pulse: The intent of the short pulse is to cool your immediate environment, or a short distance from you, perhaps into a transition area such as from a room into the first part of the hallway, or an entryway into a house.
 - Cone angle will be wider (30-45 degrees) allowing it to cover more width but with less reach.
 - Duration of water application will be short to avoid striking the walls/ceiling.
 - Application will be into the smoke layer, just below the ceiling and will stop as water begins to strike a wall or ceiling.

Fire Control 3: Structural Fire Fighting

Skills Exercise 4 – Water Application

4. While quickly opening and closing the bail is normally not recommended for large flow lines because of the resulting “water hammer,” smaller flows do not create enough water hammer to harm the pump valves.
5. After completing the flame cooling exercise, a student should never see rollover/flameover again. Having overhead flames indicates that the environment has not been successfully cooled and controlled prior to approach and is a warning sign of impending flashover.
6. In the flame cooling exercise, if students see the burning fuel, they are probably gas cooling *and* surface cooling. Gas cooling and surface cooling are different processes, but both may result in flames being extinguished.
 - When using a fog pattern to flame cool, the surface-cooling component should be relatively small.
7. Don’t assume students know the nozzle. Practice patterns and discuss techniques outside of a live fire environment.
8. During live fire exercises have students rotate through each nozzle position.

Fire Control 3: Structural Fire Fighting

Skills Exercise 5 – Fire Attack

Fire Attack

Activity: Related to:

- Topic 3-1: Fire Ground Command and Control
- Topic 3-2: Size Up
- Topic 3-3: Locate the Fire
- Topic 3-4: Identify Flow Paths and Manage Air Tracks
- Topic 3-5: Cool From a Safe Location
- Topic 3-6: Extinguish the Fire

Format: Small group (minimum two individuals)

Time Frame: 15-30 minutes (per group rotation)

Description

This activity provides students with an opportunity to size up and locate an interior structure fire, identify flow paths and manage air tracks, cool from a safe location, and extinguish a fire.

Materials

- Full PPE including SCBA
- Prop, acquired structure, or training facility
- Apparatus, equipment, and support materials appropriate for prop/facility and activity objectives

Instructions

1. Perform size up.
 - Evaluate a six-sided structure
2. Locate the fire.
 - Exterior size up (using TIC if available)
 - Determine size and material of fire
 - Contents
 - Structural components
 - Determine appropriate hose line
3. Control flow path and manage air tracks.
 - Identify exhaust/inlet
 - Smoke movement
 - Unidirectional or bi-directional flow
 - Coordinate and control vent openings
 - Door control
 - Manage existing openings
 - Ventilate in coordination with suppression activities

Fire Control 3: Structural Fire Fighting

Skills Exercise 5 – Fire Attack

4. Cool from a safe location.
 - Apply various water application techniques
 - “Reset” (cool) interior conditions (if indicated)
 - Cool atmosphere before entry (if indicated)
5. Extinguish the fire.
 - Stretch hose line
 - Flake hose line
 - Advance hose line
 - Perform risk assessment at entry point
 - Bleed line
 - Check nozzle
 - Create or protect safe immediate environment while advancing to fire

Fire Control 3: Structural Fire Fighting

Skills Exercise 5 – Fire Attack

Instructor Notes (Remove before distributing to students)

- Communicate clearly during safety walk through and PPE checks.
- Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
- Never use live persons as victims in an IDLH environment.
- Each student must complete this exercise in the nozzle fire fighter position at least once.
- This template can be used for multiple scenarios to allow each student to rotate through all three hose line positions under different conditions.

Fire Control 3: Structural Fire Fighting

Skills Exercise 6 – Transitional Fire Attack

Transitional Fire Attack

Activity: Related to Topic 3-5: Cooling from a Safe Location

Format: Small group (minimum one individual – exterior / two individuals - interior)

Time Frame: 1 hour (per group rotation)

Description

This activity provides students with an opportunity to size-up a live fire scenario and utilize transitional attack methods to reset interior conditions of a structure fire by starting an offensive exterior fire attack and transitioning to an interior fire attack.

Materials

- Full PPE including SCBA
- Prop, acquired structure, or training facility
- Hose line with nozzle capable of flowing at least 95 gallons per minute (gpm)
- Water supply (must meet NFPA requirements for activity objectives)
- Proper safety line

Instructions

1. Size up and set up for an offensive exterior fire attack through a window
2. Apply water from the exterior to cool and reset interior conditions
3. Transition to an interior fire attack
4. Contain and extinguish fire

Fire Control 3: Structural Fire Fighting

Skills Exercise 6 – Transitional Fire Attack

Instructor Notes (Remove before distributing to students)

1. Communicate clearly during safety walk through and PPE checks.
2. Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
3. Never use live persons as victims in an IDLH environment.
4. Have students use familiar hose loads, nozzles, and deployment methods or those used by the AHJ.
5. Ensure students are applying exterior hose streams at proper angle and duration.
6. Ensure students conduct proper gas and surface cooling during interior water application.
7. Discuss factors that may indicate or contraindicate a transitional attack.

Fire Control 3: Structural Fire Fighting

Skills Exercise 7 – Interior Attic Fire Attack

Interior Attic Fire Attack

Activity: Related to Topic 3-6: Extinguish the Fire

Format: Individual or Small Group

Time Frame: 1 hour (per group rotation)

Description

This activity provides students with an opportunity to respond to a simulated attic fire and conduct a coordinated offensive fire attack using proper techniques to communicate ventilation needs, apply water, and perform overhaul and salvage operations.

Materials

- Full PPE including SCBA
- 1½" hose or better
- Pushing and pulling tools
- Salvage equipment (ladders, hall runners, salvage covers, etc.)
- Drywall/ plaster ceiling or prop ceiling with drywall access points
- Furniture
- Smoke generator if available

Instructions

1. Stretch hose lines to the simulated fire room with a confirmed attic fire.
2. Perform appropriate salvage operations in conjunction with fire attack.
3. Appropriately apply water according to AHJ and industry standards.
 - Side wall attack: apply water through rafter bays against sidewalls
 - Center hall attack: apply water through rafter bays down center hallways
 - Scuttle attack: access attic through scuttle holes
 - Multi-room attack: create small ceiling openings in multiple locations throughout the house and direct fog streams into attic space
4. Effectively communicate with ventilation group (instructor) for ventilation needs.

Fire Control 3: Structural Fire Fighting

Skills Exercise 7 – Interior Attic Fire Attack

Instructor Notes (Remove before distributing to students)

- When designing your prop, create areas where students can pull the ceiling and check for extension. These areas can be just small enough for the nozzle to fit or as wide as a 4' x 4' sheet of drywall. Make sure rafter spacing and drywall attachment is consistent with normal construction specifications.
- Have students use the hose loads, nozzles, and deployment methods that they are accustomed to or that are used by the department hosting the event.
- Stress the importance of small inspection holes in the ceiling from entrance into the structure to the point of fire attack.
- Have students appropriately conduct salvage operations consistent with industry standards.
- Reinforce the importance of discipline with overhaul, water application, and ventilation operations. With attic fires it is important to limit unnecessary damage to the interior and its contents while fighting the fires.
- Stress the importance of coordinated ventilation (allowing the steam to do its job).
- Discuss the appropriate way to check for extension during overhaul operations.

Prop Design (Remove before distributing to students)



Fire Control 3: Structural Fire Fighting

Skills Exercise 8 – Below Grade (Basement) Fire Attack

Below Grade (Basement) Fire Attack

Activity: Related to Topic 3-6: Extinguish the Fire

Format: Individual or small group

Time Frame: 45 minutes (per group rotation)

Description

This activity provides students with an opportunity to respond to a simulated below grade (basement) fire and conduct a coordinated offensive fire attack using proper techniques to locate, communicate ventilation needs, apply water, and perform overhaul and salvage operations.

Materials

- Full PPE including SCBA
- Prop, acquired structure, or training facility
- 1½" hose or larger, capable of flowing a minimum of 95 gallons per minute (gpm)
- Apparatus
- Water supply (must meet NFPA requirements for activity objectives)
- Forcible entry tools
- Cellar nozzle (optional)

Instructions

Size Up

1. Complete a 360 size up (confirm below grade fire).
2. Determine attack strategy.
 - Indirect (step 3)
 - Direct (step 8)

Indirect Attack

3. Locate or create openings into basement/lower level to apply water.
 - Remove or break existing windows
 - Apply piercing nozzles / cellar nozzles
4. Stretch hose line to existing or created opening.
5. Recognize and communicate the need for coordinated ventilation.
6. Apply water stream through openings from a safe location.
7. Transition to direct attack (step 8).

Direct Attack

8. Stretch a hose line to entry point.
9. Position hose line for attack.
10. Recognize and communicate the need for coordinated ventilation.

Fire Control 3: Structural Fire Fighting

Skills Exercise 8 – Below Grade (Basement) Fire Attack

11. Attack fire quickly and aggressively
 - Sound each step and stay low as you progress.
 - May encounter high heat while progressing down the stairwell.
12. Extinguish fire.
13. Identify potential overhaul and salvage operations.

Final Draft

Fire Control 3: Structural Fire Fighting

Skills Exercise 8 – Below Grade (Basement) Fire Attack

Instructor Notes (Remove before distributing to students)

1. Communicate clearly during safety walk through and PPE checks.
2. Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
3. Never use live persons as victims in an IDLH environment.
4. Stress importance of a complete 360 to identify sub divisions, fire, and below grade windows.
5. Have students anticipate number of hose lines and their intended purpose: attack, back up, exposure.
6. Have students use familiar hose loads, nozzles, and deployment methods or those used by the host AHJ.
7. Stress the importance of coordinated ventilation.
8. Discuss different ways of ventilating a below grade fire.
9. Discuss methods to check for extension during overhaul operations.
10. Identify hazards and risks associated with below grade fires.

Fire Control 3: Structural Fire Fighting

Skills Exercise 9 – VEIS (Vent, Enter, Isolate, Search)

VEIS (Vent, Enter, Isolate, Search)

Activity: Related to Topic 3-7: Perform Rescue and Salvage Operations (Actions of Opportunity)

Format: Pairs of two

Time Frame: 1 hour (per group rotation)

Description

This activity provides students with an opportunity to gain a basic understanding and recognition of opportunities to perform a VEIS operation in a controlled IDLH (immediate danger to life and health) or artificial smoke-filled environment as part of an overall search plan.

Materials

- Full PPE including SCBA (instructors and students)
- One or two-story training prop (acquired, non-gas, gas)
- Class A or Class B environment and/or artificial smoke environment
- Smoke barrel or smoke machine
- Class A burn materials
- Flashlight
- Thermal image camera
- Mannequin
- Extension ladder
- Irons
- Long tool (pike pole, roof hook, etc.)

Instructions

Work in teams of two students to perform a VEIS operation.

1. Select best location (bedroom windows away from fire, etc.).
2. Communicate plan to command (instructor).
3. Approach and enter room.
 - Place ladder to windowsill.
 - (Student A) Secure ladder and remain at ladder base until Student B enters the room.
 - (Student B) Climb ladder and use long tool to vent window.
 - Ensure sash, glass, and any window treatments are removed (vent).
 - Allow room to breathe.
 - Often occurs while window is cleared
4. Read room for conditions, visibility, benchmarks, and victims.
5. Prior to entry, sound and gently sweep floor under window.

Fire Control 3: Structural Fire Fighting

Skills Exercise 9 – VEIS (Vent, Enter, Isolate, Search)

- Use long tool to mark exit window.
- 6. Make entry and move immediately to door (enter).
 - If door is visible, move directly to door and close it (isolate).
 - If low/no visibility, use left or right hand wall movement to reach door.
 - Even if you encounter a victim, YOU MUST ISOLATE AREA.
- 7. (Student A) Climb latter and remain on exterior.
 - Communicate/assist with navigation by using voice and thermal imaging camera (TIC) from window.
- 8. (Student B) Search entire area thoroughly and rapidly (search).
 - Maintain frequent communication with Student A.
- 9. If a victim is located, communicate and immediately call for assistance.
- 10. Exit through entry after completing search.

Student A and B should rotate positions and repeat the activity.

Fire Control 3: Structural Fire Fighting

Skills Exercise 9 – VEIS (Vent, Enter, Isolate, Search)

Instructor Notes (Remove before distributing to students)

- Communicate clearly during safety walk through and PPE checks.
- Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
- Never use live persons as victims in an IDLH environment.
- Maintain focus on risk vs. gain, benchmarks, and proper VEIS deployment procedures.
- Refer back to video from classroom portion on VEIS techniques.
- Discuss any local AHJ variants to VEIS performance.

Talking Points (Remove before distributing to students)

1. Types of Search During Fire Attack
 - Primary Search: Immediate rapid and thorough search for life
 - Areas of immediate concern:
 - Area closest to seat of fire
 - Above fire floor
 - Secondary Search: A thorough and more comprehensive search, ensuring all areas are covered
 - Often done after initial fire attack
 - Performed by a separate search crew from the primary search
2. Vent-Enter-Isolate-Search (VEIS)
 - Enter through an exterior opening, often a window
 - Isolate the airflow into the room (if possible)
 - Rapidly search the area
 - Exit quickly
3. “Good” Benchmarks
 - Smoke begins to lift and visibility improves
 - Smoke lightens due to steam
 - Sound /feeling of a hose line stream hitting the ceiling beneath you
 - Any decrease in heat
4. “Bad” Benchmarks
 - Smoke does not lift and increases in density and color
 - Rolling black smoke moving down from ceiling to floor level
 - Increase in heat
 - Visible fire in room or extension to area through the floor
 - Weakening or “spongy” floor
 - Engine company having difficulty locating fire
 - Any type of water supply issue

Fire Control 3: Structural Fire Fighting

Skills Exercise 10 – Ventilation

Ventilation

Activity: Related to Topic 3-4: Identify Flow Paths and Manage Air Tracks

Format: Small Group

Time Frame: 1 hour (per group rotation)

Description

This activity provides students with an opportunity to control flow paths and manage air tracks as part of a coordinated effort during a live fire incident. This may include horizontal and vertical ventilation.

Materials

- Full PPE (instructors and students)
- Class A or Class B environment and/or artificial smoke environment
- Smoke barrel or smoke machine
- Class A burn materials (see recommended burn material and set up)
- Flashlight
- Thermal image camera
- Chain Saw
- Circular Saw
- Extension ladder
- Irons
- Long tool

Instructions

1. Perform size up to identify any existing natural ventilation.
2. Identify type of ventilation needed based on simulated incident.
3. Tactically ventilate the structure to control flow path
 - Horizontal ventilation: door control (interior and exterior), windows, etc.
 - Vertical ventilation: cutting hole in roof, etc.
4. Coordinate efforts with interior attack crews.

Fire Control 3: Structural Fire Fighting

Skills Exercise 10 – Ventilation

Instructor Notes (Remove before distributing to students)

- See Skills Exercise 4: Fire Attack for additional materials and instructions if ventilation is conducted as part of a larger IDLH (immediate danger to life and health) activity.
- Communicate clearly during safety walk through and PPE checks.
- Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
- Never use live persons as victims in an IDLH environment.
- Maintain focus on risk vs. gain, benchmarks, and proper ladder deployment procedures.
- Discuss any local AHJ variants to ventilation performance.
- Ensure that students identify flow paths prior to tactical ventilation attempts.
- Ensure ventilation is coordinated between interior attack crews and ventilation crews.

Talking Points (Remove before distributing to students)

1. Terminology
 - Flow path
 - Air track
 - Access
 - Coordination
 - Ventilation
 - Fire attack
 - Control entry
 - Pressure
 - Vertical flow
 - Horizontal flow
 - Laminar flow
2. Identify inlets/intakes and outlets/exhausts
 - Unidirectional vs. bidirectional
 - Actual vs. potential
3. How to control flow path and manage air track
 - Directions
 - Vertical ventilation
 - Horizontal ventilation
 - Door control options
 - Compartmentalization
 - Interior and exterior doors
 - Control devices
 - Smoke curtains
 - Wind control devices (WCD)
 - Natural ventilation

Fire Control 3: Structural Fire Fighting

Skills Exercise 10 – Ventilation

- Prevailing winds
 - Construction features
 - Mechanical ventilation
 - Blower/fan
 - Hydraulic
 - Ejector
4. Impact of venting a fuel-limited fire vs. a vent-limited fire
 5. Differences between:
 - Existing ventilation
 - Unplanned ventilation
 - Tactical ventilation
 6. Importance of coordinating ventilation with fire attack
 7. Impact of flow path on tactical decision making

Fire Control 3: Structural Fire Fighting

Skills Exercise 11: Portable Water Extinguisher Attack

Portable Water Extinguisher Attack

Activity: Related to Topic 3-5: Cool from a Safe Location

Format: Small group

Time Frame: 10 minutes (per group rotation)

Description

This activity provides students with an opportunity to extinguish Class A combustibles with a portable water extinguisher.

Materials

- Full PPE including SCBA
- Prop, acquired structure, or training facility
- Class A combustibles
- Portable water extinguishers
- Pressurized air source

Instructions

1. Using a portable water extinguisher, knock down fire.
 - Do not fully extinguish if continuing the burn.

Fire Control 3: Structural Fire Fighting

Skills Exercise 11: Portable Water Extinguisher Attack

Instructor Notes (Remove before distributing to students)

1. Communicate clearly during safety walk through and PPE checks.
2. Keep a watchful eye on participants and ensure their safety. Take all necessary safety precautions to create a safe training environment.
3. Remind students how to correctly operate extinguisher prior to entering the burn room.
4. Remind extinguisher operator to use the stream's reach to keep distance between extinguisher operator and fire.

Talking Points (Remove before distributing to students)

1. During the beginning growth phase of the fire ask, "Do you think the extinguisher can extinguish a fire of this size fire?" Continue to ask as the fire grows.
2. After extinguishment, ask, "How effective was the water extinguisher at the early growth stages of the fire?" and "How effective was the water extinguisher in the later phases of fire development?"



Instructor: Live Fire Training – Acquired Structure

Course Plan

Course Details

- Description:** This curriculum is an **optional, yet additional** prerequisite in preparing an instructor to teach Fire Control 3: Live Fire Fighting (2018) using an acquired structure. This course provides the students an opportunity for learning the knowledge and demonstrating the skills for instructing fire fighters in locating, controlling, and extinguishing an interior structure fire using an acquired structure. Key learning areas include an overview of the Fire Control 3: Structural Fire Fighting course plan; an introduction to acquired structure live fire training; preburn planning; fire dynamics; set up and walk through; live fire training evolutions; and postburn procedures.
- Designed For:** Individuals who wish to conduct NFPA-compliant live fire training in an acquired structure or qualify to teach State Fire Training’s Fire Control 3: Structural Fire Fighting course
- Authority:** NFPA 1403: Standard on Live Fire Training Evolutions (2018)
California Health and Safety Code 41801(b)
Cal/OSHA (Title 8 CCR 3395)
- Prerequisites:** Fire Control 3: Structural Fire Fighting, or Fire Control 3A (2009), or Fire Control 3B (2009)
Instructor: Live Fire Training – Fixed Facility
Authorization to attend training from fire agency or ALA/ARTP
Verification of meeting NFPA 1403 (2018 / 4.3.1) live fire training prerequisite requirements (SFT Fire Fighter 1 certification waives this requirement)
Current SCBA fit test documentation
Cal/OSHA compliant structural PPE
Completed release of liability form
- Standard:** Attend all class sessions and complete all mandatory activities and skills
- Hours:** Lecture: 8 hours
Application: 24 hours

ILFT-AS

Instructional Hours (Total): 32 hours (minimum)

Maximum Class Size: 20

Instructor Level: Primary instructor

Instructor/Student Ratio: Two primary instructors at all times

Additional requirements (per NFPA 1403)

- One instructor for each functional crew of five students
- One instructor for each backup line
- One additional instructor for each additional functional assignment

Restrictions: See Facilities, Equipment, and Personnel requirements (page 6)

SFT Designation: FSTEP

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Required Resources

Instructor Resources

To teach this course, instructors need:

- *Live Fire Training: Principles and Practice*
(Jones & Bartlett Learning, 1st ed. revised, ISBN: 978-1-284-04123-1)
- *3D Fire Fighting: Training, Techniques, and Tactics*
(Fire Protection Publications, Oklahoma State University, 1st ed., ISBN: 0-87939-258-4)

Additional recommended resources:

- *Enclosure Fires* (Lars-Göran Bengtsson)
Available for download at: <https://www.msb.se/en/Products/Publications/Publications-from-the-SRSA/Enclosure-fires/>

Online Instructor Resources

The following instructor resources are available online at

<https://osfm.fire.ca.gov/divisions/state-fire-training/instructor-registration/>

- Fire Control 3: Structural Fire Fighting course plan (and supporting documentation)
 - Instructor Demonstration 1 – Dust Explosion
 - Instructor Demonstration 2 – Combustion
 - Instructor Demonstration 3 – Pyrolysis
 - Props and Structures – Matrix
 - Props and Structures – Acquired Structure
 - Props and Structures – Container (Class A)
 - Props and Structures – Fixed Facility (Class A)
 - Props and Structures – Gas-Fired Prop
 - Props and Structures – Scalable Burn Prop
 - Skills Exercise 1 – Combustion
 - Skills Exercise 2 – Risk Assessment and Door Entry
 - Skills Exercise 3 – Stretching, Flaking, and Advancing and Attack Line
 - Skills Exercise 4 – Water Application
 - Skills Exercise 5 – Fire Attack
 - Skills Exercise 6 – Transitional Fire Attack
 - Skills Exercise 7 – Interior Attic Fire Attack
 - Skills Exercise 8 – Below Grade (Basement) Fire Attack
 - Skills Exercise 9 – VEIS
 - Skills Exercise 10 – Ventilation
 - Skills Exercise 11 – Portable Water Extinguisher Attack
- Documents
 - Cal/OSHA Employer Sample Procedures for Heat Illness Prevention
 - FIRESCOPE – ICS 910: Firefighter Incident Safety and Accountability Guidelines

- ILFT-AS - Live Fire Training Burn Plan Outline
- Videos
 - Normalisation of Deviance – IAFF – Part I (Mike Mullane)
 - Normalisation of Deviance – IAFF – Part II (Mike Mullane)
- Activities
 - Activity 5-4: Building Fuel Packages for Fire Behavior Evolutions
 - Activity 5-4: Building Fuel Packages for Fire Attack Evolutions

Student (Instructor Trainee) Resources

To participate in this course, all instructor trainees need:

- NFPA 1403: Standard on Live Fire Training Evolutions (current edition)
- *Live Fire Training: Principles and Practice* (Jones & Bartlett Learning, 1st Edition Revised, ISBN: 978-1-284-04123-1)
- A copy of his or her agency's heat and illness prevention plan
- Full structural PPE and SCBA

Instructor trainees participating in this course through their academy or agency in-house training will have all documentation, PPE, and SCBA verification provided by the AHJ.

Instructor trainees participating in this course through open enrollment must provide:

- Authorization to attend the training, including a statement of insurance for participant
 - Submit a letter verifying demonstrated competency in donning SCBA, donning PPE, and hose handling skills
 - If the class will be coordinated through a community college, the college may provide additional insurance for participants and instructional staff
- Current SCBA fit test documentation
- A minimum of Cal/OSHA compliant PPE in good repair (provided by the participant's agency)
- Release of liability

Facilities, Equipment, and Personnel

The following facilities, equipment, or personnel are required to deliver this course:

Equipment*

- **Apparatus:** A minimum of one fully outfitted NFPA compliant engine (type I or type 3)
- **Appliances and tools:** Thermal imager (optional); nozzle selection (determined by AHJ) capable of flowing a minimum 95 gallons per minute (GPM)
- **Extinguishers:** Pressurized water extinguisher; water-pressurized garden sprayer
- **Fuels:** Class A materials (non-gas-fired props)
- **Hose:** 1", 1½", or 1¾" fire hose; 2½" or 3" fire hose

- **Hand tools:** Flat head axe; Halligan tool; hydrant wrench; pick head axe; long handle tool (pike pole, roof hook, rubbish hook); sledgehammer; flashlight
- **Ladders:** 10' folding ladder; 14' roof ladder; 24' extension ladder
- **Power tools:** Blower; chainsaw; generator; air compressor with fittings (or equivalent)
- **Protective equipment/clothing:** Full set of protective clothing for structural fire fighting for each student, including: bunker pants, coat, and boots; gloves and helmet; flash hood; face piece; self-contained breathing apparatus (SCBA), two fully-charged air cylinders, and manufacturer-approved SCBA sanitizing agent and cleaning agent; personal alert safety system (PASS)
- **Salvage equipment/materials:** Salvage covers or Visqueen; brooms; scoop shovels; buckets; tubs
- **Simulation equipment/materials:** Live fire training structure compliant with NFPA 1403 (2018); smoke-generating equipment (synthetic/Class A); burn barrels (modified for smoke or crib set)
- **Other supplies/equipment:** Radios; fuel and supplies for power equipment; cleaning and decontamination supplies and equipment; handheld propane torch; dumpster; power cords; lights; hammer; nails; staple gun; nail gun (optional); circular saw; reciprocating saw; fuses/road flares; construction spray paint; tape measure; drill, bits, and screws
- **Rehabilitation:** Shade; water; chairs; SCBA refill capabilities (extra cylinders or refill as needed); decontamination body wipes; soap and water; brushes
- **Water supply:** Adequate water supply per NFPA 1403 (2018) requirements

* See NFPA 1403 (2018 or current edition) for additional equipment and tool requirements.

Facilities

- Standard classroom equipped for 20 students
- Whiteboards or easel pads with appropriate writing implements
- Projector with appropriate laptop connections
- Wi-Fi/Internet access (recommended)
- An acquired structure capable of meeting all learning objectives
 - Structure must be clean, free of biohazards, and structurally sound

Personnel*

- Two primary instructors at all times
- Additional requirements (per NFPA 1403)
 - One instructor for each functional crew of five students
 - One instructor for each backup line
 - One additional instructor for each additional functional assignment

* See NFPA 1403 (2018) paragraph 4.7 for additional information about required personnel.

Time Table

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.5	0	
Unit 1 Totals	0.5	0	0.5
Unit 2: Review of Fire Control 3: Structural Fire Fighting			
Topic 2-1: Key Elements of Delivering Fire Control 3: Structural Fire Fighting	1.0	0	
Unit 2 Totals	1.0	0	1.0
Unit 3: Introduction to Live Fire Training			
Topic 3-1: NFPA Standards and Legal Considerations	0.25	0	
Topic 3-2: Cardiovascular and Thermal Strain of Fire Fighting	0.25	0	
Topic 3-3: Developing and Incident within an Incident (IWI) Plan	0.25	0.25	
Unit 3 Totals	0.75	0.25	1.0
Unit 4: Preburn Planning			
Topic 4-1: Conducting an Initial Site Evaluation	0.5	1.0	
Topic 4-2: Developing a Comprehensive Burn Plan ("Burn Book")	1.5	1.0	
Topic 4-3: Conducting Preburn Preparations	0.5	2.0	
Topic 4-4: Preparing an Acquired Structure	0.5	8.0	
Topic 4-5: Fire Behavior in an Acquired Structure	0.5	2.0	
Unit 4 Totals	3.5	14.0	17.5
Unit 5: Set Up and Walk Through			
Topic 5-1: Implementing an Incident Action Plan	0.25	0.25	
Topic 5-2: Securing a Water Supply	0.25	1.0	
Topic 5-3: Conducting an Instructor Briefing and Preburn Walk Through	0.25	1.0	
Topic 5-4: Building Fuel Packages	0.25	1.0	
Topic 5-5: Conducting a Student Preburn Walk Through	0.25	1.0	
Unit 6 Totals	1.25	4.25	5.5
Unit 6: Delivering Live Fire Training Evolutions in an Acquired Structure			
Topic 6-1: Operating as Instructor in Charge (Command and Control)	0.25	0	
Topic 6-2: Safety Operations	0.25	0.5	
Topic 6-3: Igniting Fuel Packages	0	0.25	

Segment	Lecture	Application	Unit Total
Topic 6-4: Reviewing Required Fire Control 3 Skills Exercises in an Acquired Structure	0	2.75	
Topic 6-5: Reviewing Optional Fire Control 3 Skills Exercises in an Acquired Structure	0	1.0	
Unit 6 Totals	0.5	4.5	5.0
Unit 7: Postburn Procedures			
Topic 7-1: Postburn Procedures	0.5	1.0	
Unit 7 Totals	0.5	1.0	1.5
Summative Assessment			
There is no summative assessment	0	0	
Assessment Totals	0	0	0
Course Totals	8.0	24.0	32.0

Time Table Key

1. The Time Table documents the amount of time required to deliver the content included in the course plan.
2. Time is documented using the quarter system: 15 min. = .25 / 30 min. = .50 / 45 min. = .75 / 60 min. = 1.0.
3. The Course Totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment). It is the instructor’s responsibility to add this time based on the course delivery schedule.
4. Application (activities, skills exercises, and formative testing) time will vary depending on the number of students enrolled and the acquired structure selected for training. The Application time documented is based on the maximum class size identified in the Course Details section.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, an instructor trainee will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, resources, evaluation methods, and participation requirements.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Review of Fire Control 3: Structural Fire Fighting

Topic 2-1: Key Elements of Delivering Fire Control 3: Structural Fire Fighting

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a course plan and requirements, will be able to identify the goals and objectives for students enrolled in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course and the requirements for instructor training and student participation.

Enabling Learning Objectives

1. Identify the key elements and training objectives of the Fire Control 3: Structural Fire Fighting course plan
 - Course Details
 - Required Resources
 - Units and Topics
 - Props and Structures documents
 - Instructor Demonstrations
 - Skills Exercises
2. Identify desirable traits of a live fire training instructor
 - Intrinsic motivation
 - Lifelong learner
 - Humility
 - Good listener
 - Respected by peers
 - Communication skills
 - Problem-solving skills
 - Aptitude for science
3. Identify SFT requirements for Fire Control 3: Structural Fire Fighting instructors
4. Identify requirements for student participation in Fire Control 3: Structural Fire Fighting
 - Authorization to attend training from fire agency or ALA/ARTP
 - Verification of meeting prerequisite requirements
 - SFT Fire Fighter I certification waives this requirement
 - Current SCBA fit test documentation
 - Cal/OSHA compliant structural PPE
 - Components
 - Required use
 - Capabilities and limitations
 - Completed release of liability form

Discussion Questions

1. How does a terminal learning objective differ from an enabling learning objective?
2. Are there any circumstances under which you would let a student who does not meet the course prerequisites participate in live fire training?

3. What must a student have to participate in Fire Control 3: Structural Fire Fighting?

Activities

1. Determined by instructor

Instructor Notes

1. This topic is intended to be a brief review of the content found in Unit 2 of the Instructor: Live Fire Training – Fixed Facility course. For complete content, please reference that course plan.
2. Distribute a copy of the Fire Control 3: Structural Fire Fighting course plan and all supporting documents to all instructor trainees.

FINAL DRAFT

Unit 3: Introduction to Live Fire Training

Topic 3-1: NFPA Standards and Legal Considerations

Terminal Learning Objective

At the end of this topic, an instructor trainee, given laws, standards, policies, and procedures, will be able to implement live fire training in an acquired structure in accordance with NFPA 1403, Cal/OSHA, and authority having jurisdiction (AHJ) requirements.

Enabling Learning Objectives

1. Identify the significance of NFPA standards
2. Describe the contents of NFPA 1403
3. Describe how to apply NFPA 1403 to Fire Control 3: Structural Fire Fighting
 - Instructor preparation
 - Student qualifications
 - Site requirements
 - Safety requirements
 - Inspections and notifications
4. Identify legal requirements associated with live fire training
 - Cal/OSHA
 - Property owner
 - AHJ
 - Local air pollution control district (APCD) or air quality management district (AQMD)

Discussion Questions

1. What portions of NFPA 1403 address live fire training in an acquired structures?
2. What additional staffing roles are required by NFPA 1403 for live fire training in an acquired structure?
3. What legal requirements need to be considered when conducting live fire training with acquired structures?

Application

1. Given a copy of NFPA 1403 and a specific chapter assignment, have instructor trainees break into small groups, review their assigned chapter, and report back to group on the key paragraphs.

Instructor Notes

1. Use the activity to have students direct the learning for ELO 2.

Topic 3-2: Cardiovascular and Thermal Strain of Fire Fighting

Terminal Learning Objective

At the end of this topic, an instructor trainee, given PPE, a live fire training evolution, and an acquired structure, will be able to minimize thermal and cardiovascular strain during live fire training.

Enabling Learning Objectives

1. Describe cardiovascular and thermal responses to fire fighting
2. Describe how different components impact cardiovascular and thermal strain
 - Fire fighting activity
 - Turnout gear
 - Weather
3. Describe warning signs for heat illnesses that may occur during live fire activity
4. Describe how to prevent injuries and heat illness during fire fighting training and activity
5. Describe the importance of modifiable risk factors for cardiovascular disease and ways to decrease those factors
6. Describe the dangers associated with exposure to smoke and particulate matter
7. Describe the importance of proper on-site decontamination, hygiene, gear cleaning, and showers

Discussion Questions

1. What are some signs of rhabdomyolysis or other heat-related injuries/illnesses on the training ground?
2. What strategies can prevent thermal insult during live fire training?
3. What cooling activities can you perform to reduce thermal insult during live fire training?

Application

1. Determined by instructor

Instructor Notes

1. This topic is intended to be a brief review of the content found in Topic 3-2 of the Instructor: Live Fire Training – Fixed Facility course. For complete content, please reference that course plan.
2. See the current editions of NFPA 1582: Standard on Comprehensive Occupational Medical Programs for Fire Departments, NFPA 1583: Standard on Health-Related Fitness Programs for Fire Department Members (current edition), NFPA 1584: Rehabilitation Process for Members During Emergency Operations and Training Exercises (current edition), Title 8 California Code of Regulations (T8 CCR) Section 3395 – Heat Illness Prevention Standard for content.
3. Give students a copy of Cal/OSHA’s Employer Sample Procedures for Heat Illness Prevention (current edition).
 - See Online Instructor Resources
4. Use instructor trainee agency heat and illness prevention plans as examples.

Topic 3-3: Developing an Incident Within an Incident (IWI) Plan

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a proposed live fire training evolution, will be able to develop and communicate an incident within an incident (IWI) plan for a live fire training evolution in an acquired structure in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify factors that contribute to an IWI, line of duty injury, or death during live fire training
2. Describe how to mitigate common factors that can lead to line of duty injury and death during live fire training
3. Describe the purpose of the IWI plan
4. Describe how respond to an IWI, serious injury, or line of duty death

Discussion Questions

1. How has a line of duty injury or death impacted you or your agency?
2. Why is it important to have an IWI plan in place before live fire training?
3. How does your agency handle cell phones and helmet cameras during an IWI?
4. What actions and events need to be documented during and after an IWI?

Application

1. Given a line of duty injury or death report from *Live Fire Training: Principles and Practice*, NIOSH, or another source, have instructor trainees work in small groups to analyze the report and identify the factors that contributed to the injury or death. Have instructor trainees create a presentation to share with the group (on that day or as a homework assignment to present the next day).

Instructor Notes

1. This topic is intended to be a brief review of the content found in Topic 3-3 of the Instructor: Live Fire Training – Fixed Facility course. For complete content, please reference that course plan.
2. Have instructor trainee watch all or portions of the following videos to demonstrate why avoiding complacency and lowered standards is crucial to safety:
 - Normalisation of Deviance – IAFF - Part I (Mike Mullane)
 - Normalisation of Deviance – IAFF – Part II (Mike Mullane)
3. Supporting documentation for ELO 5
 - FIRESCOPE – ICS 910: Firefighter Incident Safety and Accountability Guidelines

Unit 4: Preburn Planning

Topic 4-1: Conducting an Initial Site Evaluation

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a proposed live fire training evolution, will be able to evaluate an acquired structure in order to determine if the site fulfills the training objectives with minimal mitigation requirements in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify the requirements of a viable live fire training site

- Water supply
- Structural integrity
 - Maintenance and structural stability
 - Visual damage inspection
 - Free of biohazards
- Site preparation and cleanup
- Space for logistics
 - Staging area
 - Burn area
 - Rehabilitation area
 - Parking

2. Describe conditions that could impact site use

- Inadequate water supply
- Exposure concerns
- Hazards
- Weather
- Public or political impact
- Environmental impact
 - Smoke mitigation
 - Run off plan
- Location or proximity
 - Sensitive populations
 - Schools
 - Child care facilities
 - Elder care facilities
 - Protected buildings
 - Transportation corridors
 - Highways
 - Public transit
- Burn impact and anticipated outcomes
- Burn project timeline

- Property owner responsibilities
 - Grant deed
 - Title search
 - Proof of cancellation of fire insurance
 - Demolition permit with AHJ
 - Environmental mitigation
- AHJ hold harmless agreement
- 3. Identify site evaluation communication and notification needs
 - Determined by AHJ
 - Vary by structure and location
- 4. Identify site evaluation documentation needs
 - Determined by AHJ
 - Vary by structure and location

Discussion Questions

1. Why is it important to conduct an initial site evaluation?
2. What conditions might deter you from using a live fire training site?
 - What solutions might mitigate these conditions?
3. In your jurisdiction, who needs to be notified before you conduct a live fire training evolution in an acquired structure?

Application

1. Given an acquired structure burn site and a proposed training assignment, have students conduct a site evaluation to answer the following questions.
 - Does it meet the requirements of a viable live fire training site for the assignment?
 - Are there any concerns?
 - What solutions could mitigate these concerns?

Instructor Notes

1. ELO 1: NFPA 1403 has a “Site Inspection Worksheet – Residential Properties” document to use for evaluating a building’s structural integrity and potential hazards.
2. The proposed training assignments for the instructor trainee activity should come from the Instructor Demonstrations or Skills Exercises from Fire Control 3: Structural Fire Fighting.

Topic 4-2: Developing a Comprehensive Burn Plan (“Burn Book”)

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to assemble a comprehensive burn plan (often referred to as a “burn book”) that contains all documentation necessary to conduct a live fire training evolution in an acquired structure in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe the purpose of a live fire burn plan
 - Ensures that no part of the training process is overlooked

- Promotes fire and life safety
 - Fulfills NFPA, SFT, and AHJ requirements
 - Demonstrates due diligence
 - Limits liability
2. Identify the components of a live fire burn plan (“burn book”)
- SFT course-related documents
 - Burn information
 - Written plans
 - Incident Action Plan (IAP)
 - Incident Within an Incident (IWI) (emergency plan)
 - Preburn
 - Smoke
 - Rehabilitation
 - Visual plans
 - Property/site
 - Structure
 - Permits
 - Notifications
 - Insurance
 - Permissions/approvals
 - Checklists
 - Maps
 - Policies
 - Reports
 - Critical correspondence
3. Identify records-retention requirements for burn plans
- SFT policies
 - AHJ policies
 - Exposure
 - Time of employment + 30 years (Title 8 CCR Section 3204)
 - Medical records = 30 years (OSHA)
 - Injury / Line of duty death
 - Cal/OSHA 300 Log = 5 years
 - Cal/OSHA 301 Incident Report = 5 years
 - Medical records = 30 years (OSHA)

Discussion Questions

1. What is the purpose of a comprehensive burn plan?
2. What should you include in a burn plan?
3. How long are you required to keep the burn plan after training?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. Use the Live Fire Training Burn Plan Outline document as an example. Distribute it to the students to use as a checklist when developing their own burn book.
2. ELO 3: OSHA recordkeeping requirements (29 CFR 1904)
3. Bring sample burn books for instructor trainees to review

Topic 4-3: Conducting Preburn Preparations

Terminal Learning Objective

At the end of this topic, an instructor trainee, given an acquired structure and a live fire training evolution, will be able to develop a preburn plan and conduct preburn planning requirements in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify basic components of a preburn plan
 - Site plan drawings including all exposures
 - Floor plan detailing all rooms, hallways, exterior openings
 - Command post location
 - Apparatus positions
 - Hose and backup line positions
 - Emergency escape route locations
 - Emergency evacuation assembly area location
 - Ingress and egress routes for emergency vehicles
2. Describe preburn planning requirements
 - Develop preburn plan
 - Identify required number of instructors
 - Identify proper fuel loads
 - Determine available water supply
 - Additional requirements per NFPA 1142
 - Percentage involved
 - Exposure calculation
 - Additional floors
 - Determine required fire flow for the acquired structure and exposure buildings
 - National Fire Academy (NFA) fire flow calculation = $(\text{length} \times \text{width})/3 \times \text{percent involvement}$
 - Iowa rate of flow formula = $(\text{length} \times \text{width} \times \text{height})/100$
 - Determine required reserve flow (50 percent of fire flow)
 - Obtain apparatus pumps that meet or exceed required fire flow for building and exposures
 - Establish separate water sources for attack and backup hose lines
 - Obtain weather reports and update with changes
 - Designate and mark parking areas

- Establish communication plan and obtain radios
- Establish medical plan
- Establish decontamination plan
- Complete any other AHJ requirements

Discussion Questions

1. How do you determine appropriate water supply?
2. How do you determine the appropriate instructor numbers for a live fire training evolution in an acquired structure?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. Most of the ELO content comes from “Preburn Planning” on the “Live Fire Evolution Sample Checklist” from NFPA 1403.

Topic 4-4: Preparing an Acquired Structure

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to prepare an acquired structure for live fire training in order to fulfill training objectives in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe how to prepare an acquired structure for live fire training
 - Complete visual damage inspection
 - Secure utilities and have meters pulled by utility company
 - Check and operate windows and doors, open or close as needed
 - Check and operate other training structure components
 - Implement Cal/OSHA fall protection requirements
 - Eliminate or mitigate hazards
 - Biohazards, hives, and vermin
 - Exterior hazards
 - Trash
 - Trees and brush
 - Surrounding vegetation
 - Chimney
 - Fuel tanks and closed vessels
 - Cisterns, wells, and cesspools/septic systems
 - Porches and outside steps
 - Interior Hazards
 - Wall, window, and ceiling coverings
 - Furniture and appliances
 - HVAC, dead loads, and chimneys
 - Glass (including windows)

- Staircases
 - Toxic materials
 - Any other exterior and interior hazards
- Protect structural members by covering holes in walls and ceilings
- Place erosion control measures (if applicable)
- Provide site markings for visual communication and hazard identification
 - Photo document all interior and exterior prep and markings prior to burn
- Identify building features
 - Flow paths
 - Extension avenues
 - Attic extension
 - Wind impact
 - Stairwell control
- Identify ventilation profiles
- Prepare fuel package
 - Size at approved locations
- Complete any other AHJ requirements
- Complete required documentation

Discussion Questions

1. How much time does it take to prepare an acquired structure in your AHJ?
2. Who approves fuel packages in your AHJ?
 - How do you document a fuel package?
3. What type of structural integrity issues need to be mitigated before qualifying an acquired structure?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. Most of the ELO content comes from the acquired structure requirements and worksheets in NFPA 1403.

Topic 4-5: Fire Behavior in an Acquired Structure

Terminal Learning Objective

At the end of this topic, an instructor trainee, given knowledge of fire chemistry and physics, a live fire training evolution, and an acquired structure, will be able to anticipate how fire will move through an acquired structure in order to plan appropriate safety and suppression tactics and know when a fire has grown beyond the scope of the training evolution.

Enabling Learning Objectives

1. Describe how physical states of matter influence fire behavior
 - Gases
 - Solids
 - Liquids
2. Identify products of combustion

- Heat
 - Smoke
3. Identify methods of heat transfer
 - Conduction
 - Convection
 - Radiation
 4. Describe the impact of oxygen concentration on life safety and fire growth
 5. Identify the components of the fire triangle and fire tetrahedron
 6. Describe the stages of fire
 - Traditional/legacy (time vs. temperature curve)
 - Ventilation-limited (time vs. temperature curve)
 7. Identify factors that influence fire behavior
 - Fuel
 - Air
 - Weather
 - Fire compartment
 - Burn regime
 8. Describe hostile fire events
 - Fire gas ignition
 - Black fire
 9. Describe the composition of smoke
 - Particulates
 - Gases
 - Aerosols
 10. Describe the attributes of smoke
 - Volume
 - Velocity
 - Density
 - Color
 11. Identify the hazards of smoke
 - Cold smoke
 - Black fire
 - Smoke as fuel
 - Smoke as poison
 12. Identify concepts associated with water as an extinguishing agent
 - Heat
 - Specific heat of water
 - Specific heat of steam
 13. Describe how water and steam impact the fire tetrahedron
 - Removes (transfers) heat (heat)
 - Stops pyrolysis (fuel)

- Reduces oxygen percentage (oxygen)
 - Interrupts chemical chain reaction (chemical chain reaction)
14. Describe gas cooling
- Droplet size
 - Hang time
 - Flow rate
 - Attack angle
 - Cone angle
 - Application duration
15. Describe surface cooling
- Stop pyrolysis
 - Extinguish smoldering combustion
16. Describe cooling capacity
- Raising water to vaporization temperature
 - Vaporization of water
17. Describe gas expansion and contraction
- Fire gas/smoke
 - Steam

Discussion Questions

1. What actions can you take to minimize heat transfer?
2. How do different construction techniques, materials, furnishings, and interiors impact fire behavior?
3. How can recognizing the attributes of smoke assist in tactical decision making?
4. How do you avoid exposure to CO and HCN?
5. Can you push fire with water application?
 - Why or why not?
6. What value does steam production have in fire attack?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. This topic is intended to be a brief review of the content found in Unit 5 of the Instructor: Live Fire Training – Fixed Facility course. Direct the content toward anticipating fire behavior in an acquired facility. For in-depth fire behavior content, please reference that course plan.

Unit 5: Set Up and Walk Through

Topic 5-1: Implementing an Incident Action Plan

Terminal Learning Objective

At the end of this topic, an instructor trainee, given ICS forms and live fire training evolutions, will be able to develop and implement an incident action plan (IAP) for a live fire training course in an acquired structure in accordance with the policies and the procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe how to complete the ICS forms that make up an IAP
 - ICS 201: Incident Briefing
 - ICS 204: Assignment List
 - ICS 205: Incident Radio Communications Plan
 - ICS 206: Medical Plan
 - ICS 215: Operational Planning Worksheet
 - ICS 215A: Incident Action Plan Safety Analysis

Discussion Questions

1. How does the complexity of an acquired structure impact an IAP?
2. How does the IAP differ from the comprehensive burn plan (“burn book”)?

Application

1. Given a proposed live fire training course with multiple evolutions and an acquired structure, divide the class into groups and have each group complete one ICS form. Have students share their results with the group.

Instructor Notes

1. None

Topic 5-2: Securing a Water Supply

Terminal Learning Objective

At the end of this topic, an instructor trainee, given an acquired structure and a live fire training evolution, will be able to secure a water supply with sufficient rate and duration for control and extinguishment of the training fire, backup lines to protect personnel, and protection of exposed property.

Enabling Learning Objectives

1. Describe minimum water supply requirements for live fire training evolutions including water for:
 - Control and extinguishment of fire
 - Exposure control
 - Backup line(s) to protect personnel
 - Protecting utilities at property lines
 - Dust abatement
2. Identify hose line placement for live fire training evolutions based on:

- Training objectives
- Fuel package
- Number of evolutions/training stations running simultaneously
- Exposure protection
- Unforeseen situations

Discussion Questions

1. Who is responsible for the ensuring adequate water supply?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. None

Topic 5-3: Conducting an Instructor Briefing and Preburn Walk Through

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution and an acquired structure, will be able to conduct an instructor briefing and a preburn walk through with all instructors and personnel supporting the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe the instructor walkthrough process
 - Identify crew and instructor assignments
 - Incident commander
 - Safety officer
 - Medical team
 - “2 in/2 out”
 - Smoke mitigation plan/impact
 - Instructor in charge
 - Instructor(s)
 - Instructor trainee(s)
 - Fire control team
 - Ignition officer
 - Water supply officer
 - Pump operator(s)
 - Logistics
 - Instructor in charge briefs all participating instructors
 - Incident action plan (IAP)
 - Incident within an incident plan (IWI)
 - Structure layout
 - Extension avenues
 - Attic extension
 - Wind impact
 - Stairwell control

- Crew and instructor assignments
 - Participant rotations
- Safety officer briefs all participating instructors
 - Safety plan
 - Current and anticipated weather
 - Evacuation signal and procedures
 - Review final “Go/No-Go Checklist”
 - Check PPE
 - Check training communications channels
 - Review decontamination plan
- Initiate site plan
 - Command post
 - Logistics
 - Food/water
 - SCBA air
 - Restrooms/hand washing
 - Apparatus
 - Position vehicles
 - Deploy hose lines
 - Rehabilitation/medical
 - Shade/hydration
 - Decontamination
- Issue final notifications and approvals
 - Communications center
 - Adjoining jurisdictions (if applicable)
 - Law enforcement (if applicable)
 - Impacted populations

Discussion Questions

1. What types of weather would impact the decision to burn?
2. When do you make the final “go/no-go” decision?
3. What considerations go into a smoke mitigation plan for live burns in an acquired structure?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. None

Topic 5-4: Building Fuel Packages

Terminal Learning Objective

At the end of this topic, an instructor trainee, given fuel materials, an acquired structure, and a live fire training evolution, will be able to build a fuel load that is sufficient in material, size, and scale for the structure and meets the objectives of the live fire training evolution.

Enabling Learning Objectives

1. Identify authorized fuel materials per NFPA 1403
2. Identify unauthorized fuel materials per NFPA 1403
3. Identify factors (openings, building materials, room size, etc.) that impact fire growth development and spread
 - Select fuel loads to avoid uncontrolled flashover or backdraft conditions
4. Identify appropriate locations for fuel packages
5. Describe how to build fuel packages that are the appropriate type, orientation, and size to meet live fire training evolution objectives

Discussion Questions

1. How do fuel packages used for an acquired structure differ from fuel packages used for a fixed facility or prop?
2. What factors impact the type and size of fuels used to make fuel packages?

Application

1. Activity 5-4: Building Fuel Packages for Fire Behavior Evolutions
2. Activity 5-4: Building Fuel Packages for Fire Attack Evolutions

Instructor Notes

1. For ELO 5, consider breaking the class into groups to address fuel packages appropriate for different rooms in an acquired structure.

Topic 5-5: Conducting a Student Preburn Walk Through

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution and an acquired structure, will be able to conduct a preburn walk through with all students participating the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe preburn “walkthrough” procedures
 - Brief all participants
 - Training objectives
 - Structure layout
 - Demonstrate door and window operations
 - Identify primary and secondary egress
 - Crew and instructor assignments
 - Participant rotations
 - Safety briefing
 - Evacuation signal and procedures
 - Decontamination procedures
 - Check all hose lines
 - Sufficient size for area of fire involvement
 - Adequate number for personnel
 - Charged and test flowed

- Supervised by qualified instructors
 - Student staffing is not permitted
- Position necessary tools and equipment
- Check participants
 - All equipment properly worn
 - SCBA with adequate volume
- Communications check per communications plan
- 2. Identify NFPA 1403 standards related to playing the role of a victim during live fire training
 - No person shall be inside without a partner/buddy system
 - Rescue mannequins in fire fighter PPE shall be specially marked

Discussion Questions

1. Who is responsible for performing PPE checks on Fire Control 3: Structural Fire Fighting students prior to entry into a live fire training?
2. Under what circumstances can you use people as victims during live fire training?
3. What is your AHJ's evacuation signal?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. Most of the ELO content comes from "Preburn Procedures" from NFPA 1403.

Unit 6: Delivering Live Fire Training Evolutions in an Acquired Structure

Topic 6-1: Operating as Instructor in Charge (Command and Control)

Terminal Learning Objective

At the end of this topic, an instructor trainee, given an incident action plan, live fire training evolutions, and an acquired structure, will be able to operate as the “instructor in charge” of a live fire training course, supervising instructors and maintaining unity of command and span of control.

Enabling Learning Objectives

1. Describe the qualifications of an instructor in charge
 - NFPA 1403
2. Describe the roles and responsibilities of an instructor in charge
 - Assign instructors to functional crews, backup lines, and functional assignments
 - Rest and rehabilitation of participants and instructors
 - Medical monitoring of participants and instructors
 - Instructor assignments and rotation schedule
 - Verify instructor qualifications to deliver live fire training in acquired structures
 - Assign extra instructors to mitigate extreme weather, large class size, or long class duration
 - Maintain awareness of weather conditions
 - Perform final weather check before ignition
 - Additional requirements for conducting live fire training evolutions with flow path and ventilation-controlled conditions
3. Describe the roles and responsibilities of an instructor
 - Verify PPE is worn according to manufacturers instructions
 - Monitor and supervise students during live fire evolutions

Discussion Questions

1. What are the roles and responsibilities of the instructor in charge?
2. Is the instructor in charge also the incident commander?
3. What is the difference between an instructor and an instructor in charge?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. None

Topic 6-2: Safety Operations

Terminal Learning Objective

At the end of this topic, an instructor trainee, given an incident action plan laws and regulations, and a live fire training evolution, will be able to operate as the safety officer; plan, communicate, and oversee student rotations; and be able to implement the “2 in/2 out” or rapid intervention crew/company (RIC) requirement for a live fire training evolution

so that hazards and associated risks are identified, unsafe acts are prevented, and unsafe conditions are mitigated and the training evolution provides the greatest opportunity for meeting objectives while minimizing student risk.

Enabling Learning Objectives

1. Describe how to operate as a safety officer during a live fire training evolution
 - Qualifications
 - Roles and responsibilities
 - Specialized training
2. Describe how to plan, communicate, and oversee student rotations
 - Planning is impacted by:
 - Number of students
 - Training objectives
 - Structure
 - When to communicate rotations
 - Prior to IDLH conditions
 - What to communicate
 - Timing
 - Tasks
 - Travel routes
 - Primary and secondary egress
 - Order of operations
 - Emergency plans
 - Emergency assembly point
 - Hazards and risks
 - Postburn procedures
 - Meeting location
 - Decontamination
 - Conditions to watch for
 - Panic
 - PPE malfunction or failure
 - Low air alarms
 - Excessive heat release
 - Unintended fire conditions
3. Identify legislation and operations pertaining to “2 in/2 out” requirements
 - 29 CFR 1910.134(g)(4)(i)
 - Conditions that require a “2 out” team
 - Roles and responsibilities of the “2 out” team
 - Type of PPE worn by the “2 out” team
 - Appropriate staging locations for the “2 out” team

Discussion Questions

1. Can a safety officer have other assignments during live fire training?

2. When would it be appropriate to have more than one safety officer during live fire training?
3. Under what conditions should an instructor interrupt a live fire training evolution?
4. Under what conditions would you activate the “2 out” team?
5. How are RIC and “2 out” teams similar or different?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. This topic is intended to be a brief review of the content found in Topics 7-2, 7-3, and 7-4 of the Instructor: Live Fire Training – Fixed Facility course. For complete content, please reference that course plan.
2. Although there is no formal activity for this learning objective, the instructor trainees can practice to implement the “2 in/2 out” or rapid intervention crew/company (RIC) requirement during any live fire activities or demonstrations conducted as part of this course.

Topic 6-3: Igniting Fuel Packages

Terminal Learning Objective

At the end of this topic, an instructor trainee, given NFPA 1403, fuel materials, and an ignition source, will be able to ignite, maintain, and control a live fire and verbally describe the roles and responsibilities of an ignition officer.

Enabling Learning Objectives

1. Identify the members of a fire control team
2. Describe the role and responsibilities of an ignition officer
3. Describe the roles and responsibilities of the other members of a fire control team
4. Describe required PPE for the fire control team
5. Describe hose line requirements for the fire control team
6. Identify who makes the decision to ignite
7. Identify who ignites the fuel package
8. Describe how to light fuel packages based on:
 - Characteristics of room finishes
 - Fuel type
 - Physical arrangement/path of least resistance
 - Lighting sequence
 - Training objectives
9. Identify safety considerations associated with ignition
 - Ensure flame area is clear of personnel prior to ignition
 - Alternate ignition officer responsibilities after each ignition

Discussion Questions

1. To whom does the ignition officer report?
2. What is the minimum number of members for a fire control team?

Application

1. Have students practice ignition using the fuel packages developed during Activity 5-4: Building Fuel Packages for Fire Behavior Evolutions and Activity 5-4: Building Fuel Packages for Fire Attack Evolutions.

Instructor Notes

1. None

Topic 6-4: Reviewing Required Fire Control 3 Skills Exercises in an Acquired Structure

Terminal Learning Objective

At the end of this topic, an instructor trainee, given demonstrations of Fire Control 3: Structural Fire Fighting course plan Skills Exercises and associated equipment and materials, will be able to set up and evaluate students completing the required Fire Control 3: Structural Fire Fighting Skills Exercises in an acquired structure in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify the objectives a student must meet in order to successfully complete Skills Exercise 2: Risk Assessment and Door Entry
2. Describe how to set up Skills Exercise 2: Risk Assessment and Door Entry
3. Identify the objectives a student must meet in order to successfully complete Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line
4. Describe how to set up Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line
5. Identify the objectives a student must meet in order to successfully complete Skills Exercise 4: Water Application
6. Describe how to set up Skills Exercise 4: Water Application
7. Identify the objectives a student must meet in order to successfully complete Skills Exercise 5: Fire Attack
8. Describe how to set up Skills Exercise 5: Fire Attack

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. Demonstrate how to set up and teach each required Fire Control 3: Structural Fire Fighting student skills exercise.
2. Allow time for a question and answer session after each demonstration.

Topic 6-5: Reviewing Optional Fire Control 3 Skills Exercises in an Acquired Structure

Terminal Learning Objective

At the end of this topic, an instructor trainee, given demonstrations of Fire Control 3: Structural Fire Fighting course plan Skills Exercises and associated equipment and materials, will be able to set up and evaluate students completing the optional Fire Control 3: Structural Fire Fighting Skills Exercises in an acquired structure in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify the objectives a student must meet in order to successfully complete Skills Exercise 6: Transitional Fire Attack
2. Describe how to set up Skills Exercise 6: Transitional Fire Attack
3. Identify the objectives a student must meet in order to successfully complete Skills Exercise 7: Interior Attic Fire Attack
4. Describe how to set up Skills Exercise 7: Interior Attic Fire Attack
5. Identify the objectives a student must meet in order to successfully complete Skills Exercise 8: Below Grade (Basement) Fire Attack
6. Describe how to set up Skills Exercise 8: Below Grade (Basement) Fire Attack
7. Identify the objectives a student must meet in order to successfully complete Skills Exercise 9: VEIS
8. Describe how to set up Skills Exercise 9: VEIS
9. Identify the objectives a student must meet in order to successfully complete Skills Exercise 10: Ventilation
10. Describe how to set up Skills Exercise 10: Ventilation
11. Identify the objectives a student must meet in order to successfully complete Skills Exercise 11: Portable Water Extinguisher Attack
12. Describe how to set up Skills Exercise 11: Portable Water Extinguisher Attack

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. Demonstrate how to set up and teach each optional Fire Control 3: Structural Fire Fighter student skills exercise.
2. Allow time for a question and answer session after each demonstration.

Unit 7: Postburn Procedures

Topic 7-1: Postburn Procedures

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution and an acquired structure, will be able to conduct postburn procedures in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe postburn procedures
 - Account for all personnel
 - Overhaul remaining fires and confirm extinguishment
 - Decontaminate, inspect, and rehabilitate
 - Personnel
 - PPE
 - Equipment
 - Inspect training facilities for stability and hazards
 - Secure training facilities
 - Conduct training critique (after action review/AAR)
 - Complete records and reports
 - Photo document interior and exterior after each training evolution and again after clean up procedures prior to releasing property to owners
 - Demobilize resources and personnel
 - Complete any other AHJ requirements
 - Release property to owner
 - Close out notifications

Discussion Questions

1. Why is it important to check the students' gear before and after live fire training?
2. How do you document an injury acquired during training?
3. What steps can you take to minimize exposure during decontamination?
4. What records and reports are required after a burn in an acquired structure?

Application

1. Determined by instructor and acquired structure site selection

Instructor Notes

1. Most of the ELO content comes from "Postburn Procedures" on the "Live Fire Evolution Sample Checklist" from NFPA 1403.

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How to Read a Course Plan

A course plan identifies the details, logistics, resources, and training and education content for an individual course. Whenever possible, course content is directly tied to a national or state standard. SFT uses the course plan as the training and education standard for an individual course. Individuals at fire agencies, academies, and community colleges use course plans to obtain their institution's consent to offer course and provide credit for their completion. Instructors use course plans to develop syllabi and lesson plans for course delivery.

Course Details

The Course Details segment identifies the logistical information required for planning, scheduling, and delivering a course.

Required Resources

The Required Resources segment identifies the resources, equipment, facilities, and personnel required to delivery the course.

Unit

Each Unit represents a collection of aligned topics. Unit 1 is the same for all SFT courses. An instructor is not required to repeat Unit 1 when teaching multiple courses within a single instructional period or academy.

Topics

Each Topic documents a single Terminal Learning Objective and the instructional activities that support it.

Terminal Learning Objective

A Terminal Learning Objective (TLO) states the instructor's expectations of student performance at the end of a specific lesson or unit. Each TLO includes a task (what the student must be able to do), a condition (the setting and supplies needed), and a standard (how well or to whose specifications the task must be performed). TLOs target the performance required when students are evaluated, not what they will do as part of the course.

Enabling Learning Objectives

The Enabling Learning Objectives (ELO) specify a detailed sequence of student activities that make up the instructional content of a lesson plan. ELOs cover the cognitive, affective, and psychomotor skills students must master in order to complete the TLO.

Discussion Questions

The Discussion Questions are designed to guide students into a topic or to enhance their understanding of a topic. Instructors may add to or adjust the questions to suit their students.

Application

The Application segment documents experiences that enable students to apply lecture content through cognitive and psychomotor activities, skills exercises, and formative testing. Application experiences included in the course plan are required. Instructors may add additional application experiences to suit their student population if time permits.

Instructor Notes

The Instructor Notes segment documents suggestions and resources to enhance an instructor's ability to teach a specific topic.

CTS Guide Reference

The CTS Guide Reference segment documents the standard(s) from the corresponding Certification Training Standard Guide upon which each topic within the course is based. This segment is eliminated if the course is not based on a standard.

Instructor: Live Fire Training Acquired Structure

Instructor Task Book [Month Year]



California Department of Forestry and Fire Protection
Office of the State Fire Marshal
State Fire Training

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Purpose and Process

Purpose

The State Fire Training Instructor: Live Fire Training – Acquire Structure instructor trainee task book is a performance-based document. It lists the minimum Job Performance, Certification, Education, and Position requirements a candidate must meet in order to teach Fire Control 3: Structural Fire Fighting using an acquired structure.

Initiation and Completion Process

Candidate Responsibilities

The candidate is the individual pursuing instructor registration.

The candidate shall:

1. Complete the “Candidate” and “Task Book Initiation Requirements” sections on the Task Book Initiation page.
 - Please print.
2. Complete a block on the Signature Verification page with an original wet-ink signature.
3. Complete all Experience requirements.
4. Complete all Position requirements.
5. Obtain the registered instructor’s signature as approval to open the task book using the “Task Book Initiation Approval” section on the Task Book Initiation page.
 - A candidate may not obtain evaluation signatures for any job performance requirements completed prior to the registered instructor initiation approval date.
6. Sign and date the “Candidate” verification section on the Review and Approval page with an original wet-ink signature.
7. Complete all Job Performance Requirements.
 - Ensure that an evaluator initials, signs, and dates each task to verify completion.
8. Obtain his or fire chief’s original wet-ink signature on the “Candidate’s Fire Chief” verification section on the Review and Approval page.
9. Create and retain a physical or scanned digital copy of the complete task book.
10. Submit the completed task book and any supporting documentation to State Fire Training when registering to instruct Fire Control 3: Structural Fire Fighting.

It is the candidate’s responsibility to routinely check the State Fire Training website for updates and addendums to open task books. When State Fire Training issues an update or addendum to an open task book, that update, or addendum is required for task book completion.

A candidate should not submit a task book until he or she has completed all requirements and obtained all signatures. State Fire Training will reject and return an incomplete task book.

Evaluator Responsibilities

An evaluator is any individual who verifies that the candidate can satisfactorily execute a job performance requirement.

A qualified evaluator is a State Fire Training Registered Instructor in Fire Control 3: Structural Fire Fighting.

An instructor task book may have more than one evaluator.

All evaluators shall:

1. Complete a block on the Signature Verification page with an original wet-ink signature.
2. Review and understand the candidate's instructor task book requirements and responsibilities.
3. Verify the candidate's successful completion of one or more job performance requirements through observation or review.
 - A candidate may not obtain evaluation signatures for any job performance requirements completed prior to the fire chief's initiation approval date.
 - Sign all appropriate lines in the instructor task book with an original wet-ink signature or approved digital signature (e.g. DocuSign or Adobe Sign; a scanned copy of a signature is not acceptable) to record demonstrated performance of tasks.

Registered Instructor Responsibilities

The State Fire Training Registered Instructor of the Instructor: Live Fire Training – Acquire Structure course is the individual who reviews and confirms the completion of a candidate's task book initiation requirements.

The registered instructor shall:

1. Review and understand the candidate's instructor task book requirements and responsibilities.
2. Verify that the candidate has met all requirements and prerequisites prior to initiating the candidate's task book.
3. Open the candidate's task book by signing the "Task Book Initiation Approval" section on the Task Book Initiation page with a wet-ink signature.

Fire Chief (or Fire Technology Director) Responsibilities

The fire chief (or authorized designee) is the individual who reviews and confirms the completion of a candidate's instructor task book.

The fire chief (or authorized designee) shall:

4. Review and understand the candidate's instructor task book requirements and responsibilities.
5. Verify that the candidate has met all requirements and prerequisites.
6. Verify that the candidate has obtained the appropriate signatures to verify successful completion of each job performance requirement.
7. Sign and date the "Fire Chief" verification section on the Review and Approval page with an original wet-ink signature.
 - If signing as an authorized designee, verify that your signature is on file with State Fire Training.

Submission and Review Process

A candidate should not submit a task book until he or she has completed all requirements and obtained all signatures. State Fire Training will reject and return an incomplete task book.

Submit the completed task book and any supporting documentation to State Fire Training.

Office of the State Fire Marshal
State Fire Training
Attn: Instructor Registration
2251 Harvard Street, Suite 400
Sacramento, CA 95815

State Fire Training reviews all submitted task books.

If the task book is complete, State Fire Training will authorize the task book and retain a digital copy of the authorized task book in the candidate's career file.

If the task book is incomplete, State Fire Training will return the task book with a notification indicating what needs to be completed prior to resubmission.

Completion of this instructor task book is one step in the instructor registration process. Please refer to the *State Fire Training Procedures Manual* for the complete list of qualifications required to teach Fire Control 3: Structural Fire Fighting in an acquired structure.

Task Book Initiation

The instructor trainee task book may be initiated on the final day of the Instructor: Live Fire Training – Acquire Structure course.

Each JPR shall be conducted, reviewed, and validated after the candidate initiates the task book.

This task book must be completed within three years of initiation.

Candidate

Name: _____

SFT ID Number: _____

Fire Agency: _____

Task Book Initiation Requirements

The following requirements must be completed prior to opening this task book.

Certification

Fire Fighter II or Company Officer

Complete

Instructor II, or Current Registered Instructor with State Fire Training

Education

ICS-300

Complete

Safety Officer, S-404, or Safety Officer, L-954, or FDSOA Incident Safety Officer

Fire Control 3A: Structural Fire Fighting in Acquired Structure (2009) or;

Fire Control 3: Structural Fire Fighting (2018)

Instructor: Live Fire Training – Fixed Facility (2018)

Instructor: Live Fire Training – Acquire Structure (2018)

Position

Fire Fighter for three (3) years full-time, or six (6) years volunteer.

Complete

Task Book Initiation Approval

SFT Registered Instructor: _____
Registered Instructor Live Fire Training Acquire Structure Printed Name

I, the undersigned, am the person authorized to verify the candidate has successfully completed the Instructor: Live Fire Training – Acquire Structure course and verify the candidate’s task book requirements and to initiate this task book in partial fulfillment of the requirements to teach Fire Control 3: Structural Fire Fighting. I hereby certify under penalty of perjury under the laws of the State of California, that the completion of all requirements to open the task book documented herein are true in every respect. I understand that misstatements, omissions of material facts, or falsification of information or documents may be cause for rejection.

Registered Instructor Live Fire Training Acquire Structure Signature

Date

Signature Verification

The following individuals are SFT registered Fire Control 3: Structural Fire Fighting instructors and have the authority to verify portions of this instructor task book using the signature recorded below.

Please print except for the Signature line. Print and add additional signature pages as needed.

Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____

Task Book Requirements

Job Performance Requirements

This instructor task book includes the training objectives included in the Instructor Live Fire Training – Acquire Structure course plan, which is based on NFPA 1403: Standard on Live Fire Training Evolutions (2018).

The candidate must complete each job performance requirement (JPR) in accordance with the standards of the authority having jurisdiction (AHJ) or the National Fire Protection Association (NFPA), whichever is more restrictive.

Each task must be performed twice.

- The two instances must occur during two different courses.
- The same evaluator cannot sign off on the same task twice.

Examples of correct and incorrect evaluation:

Correct: Task completed during two separate courses and evaluated by two separate individuals.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ
b. Identify components of a live fire burn plan (“burn book”)	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ

Incorrect: Task completed twice during one course but evaluated by two separate individuals.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ
b. Identify components of a live fire burn plan (“burn book”)	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ

Incorrect: Task completed during two separate courses but evaluated by the same individual.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS
b. Identify components of a live fire burn plan (“burn book”)	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS

Job Performance Requirements

Introduction to Fire Control 3: Structural Fire Fighting

2. Identify the goals and objectives for students enrolled in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify Course Details						
b. Identify Required Resources						
c. Identify key terminology						
d. Identify Units and Topics						
e. Identify Props and Structures documents						
f. Identify Instructor Demonstrations						
g. Identify Skills Exercises						
3. Identify the State Fire Training (SFT) requirements for becoming a registered SFT Fire Control 3: Structural Fire Fighting instructor.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify desirable traits of live fire training instructors						
b. Identify SFT requirements for Fire Control 3: Structural Fire Fighting instructors						

4. Describe student requirements for enrollment in Fire Control 3: Structural Fire Fighting	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Authorization to attend training from fire agency or ALA/ARTP						
b. Verification of meeting prerequisite requirements						
c. Current SCBA fit test documentation						
d. Cal/OSHA compliant structural PPE						
e. Completed release of liability form						

Introduction to Live Fire Training

5. Implement live fire training in accordance with NFPA 1403, Cal/OSHA, and authority having jurisdiction (AHJ) requirements.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify significance of NFPA standards						
b. Describe contents of NFPA 1403						
c. Describe how to apply NFPA 1403 to Fire Control 3: Structural Fire Fighting						
d. Identify legal requirements associated with live fire training						

6. Minimize thermal and cardiovascular strain during live fire training.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe why aerobic fitness is necessary to perform fire fighting activity						
b. Describe cardiovascular and thermal responses to fire fighting						
c. Describe how fire fighting activity and turnout gear impact cardiovascular and thermal strain						
d. Describe how weather impacts cardiovascular and thermal strain						
e. Describe warning signs for heat illnesses that may occur in live fire training and activity						
f. Describe how to prevent injuries and heat illness during fire fighting training and activity						
g. Describe risk factors for cardiovascular disease						
h. Describe importance of modifiable risk factors for cardiovascular disease and ways to decrease those factors						
i. Describe goals of on-site rehabilitation						
j. Describe dangers associated with exposure to smoke and particulate matter						
k. Describe importance of proper on-site decontamination, hygiene, gear cleaning, and showers						

7. Develop and communicate an incident within an incident (IWI) plan for a live fire training evolution in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify factors that contribute to an IWI, line of duty injury, or death during live fire training						
b. Describe how to mitigate common factors that can lead to line of duty injury and death during live fire training						
c. Describe purpose of IWI plan						
d. Describe relationship between instructor and AHJ hosting the live fire						
e. Describe how respond to an IWI, serious injury, or line of duty death						

Preburn Planning

8. Evaluate acquired structure training sites in order to select a site that fulfills the training objectives with minimal mitigation requirements in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify requirements of a viable live fire training site						
b. Describe conditions that could impact site use						
c. Identify site evaluation communication and notification needs						
d. Identify site evaluation documentation needs						

9. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
d. Describe purpose of a live fire burn plan						
e. Identify components of a live fire burn plan (“burn book”)						
f. Identify records-retention requirements for burn plans						
10. Develop a preburn plan and conduct preburn planning requirements for an acquired structure in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify basic components of a preburn plan						
b. Describe preburn planning requirements						
11. Prepare an acquired structure for live fire training in order to fulfill training objectives in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to prepare an acquired structure for live fire training						

Fire Behavior

12. Teach students how to identify, define, and describe fire science concepts and appropriately apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how physical states of matter influence fire behavior						
b. Identify products of combustion						
c. Identify methods of heat transfer						
d. Describe the impact of oxygen concentration of life safety and fire growth						
e. Identify the components of the fire triangle and fire tetrahedron						
13. Teach students how to identify and describe fire growth and development concepts and appropriately apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe stages of fire						
b. Identify factors that influence fire behavior						
c. Describe hostile fire events						

14. Teach students how to read smoke emanating from a structure and use that reading to identify pre-phenomena conditions, fire location, and spread during interior structural fire fighting activities, in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe composition of smoke						
b. Describe attributes of smoke						
c. Identify hazards of smoke						
15. Teach students how to identify and describe concepts related to water as an extinguishing agent and apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify concepts associated with water as an extinguishing agent						
b. Describe how water and steam impact fire tetrahedron						
c. Describe gas cooling						
d. Describe surface cooling						
e. Describe cooling capacity						
f. Describe gas expansion and contraction						

Set Up and Walk Through

16. Develop and implement an incident action plan (IAP) for a live fire training course in accordance with the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to complete an ICS 201: Incident Briefing form						
b. Describe how to complete an ICS 204: Assignment List form						
c. Describe how to complete an ICS 205: Incident Radio Communications Plan form						
d. Describe how to complete an ICS 206: Medical Plan form						
e. Describe how to complete an ICS 215: Operational Planning Worksheet form						
f. Describe how to complete an ICS 215A: Incident Action Plan Safety Analysis form						
17. Secure a water supply with sufficient rate and duration for control and extinguishment of the training fire, backup lines to protect personnel, and protection of exposed property.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe minimum water supply requirements for live fire training evolutions						
b. Identify hose line placement for live fire training evolutions						

18. Conduct an instructor briefing and a preburn walk through with all instructors and personnel supporting the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to identify crew and instructor assignments						
b. Describe how instructor in charge briefs all participating instructors						
c. Describe how safety officer briefs all participating instructors						
d. Describe how to initiate site plan						
e. Describe how to Issue final notifications and approvals						
19. Build a fuel load that is sufficient in material, size, and scale for the prop or facility and meets the objectives of the live fire training evolution.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify authorized fuel materials per NFPA 1403						
b. Identify unauthorized fuel materials per NFPA 1403						
c. Identify factors that impact fire growth development and spread						
d. Identify appropriate locations for fuel packages						
e. Describe how to build fuel packages that are the appropriate type, orientation, and size to meet live fire training evolution objectives						

20. Conduct a preburn walk through with all students participating the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to brief all participants						
b. Describe how to check all hose lines						
c. Describe how to position necessary tools and equipment						
d. Describe how to check participants						
e. Describe how to conduct a communications check per communications plan						
f. Describe how to check all hose lines						
g. Identify NFPA 1403 standards related to playing the role of a victim during live fire training						

Delivering Live Fire Training Evolutions

21. Operate as the “instructor in charge” of a live fire training course, supervising instructors and maintaining unity of command and span of control.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe qualifications of an instructor in charge						
b. Describe roles and responsibilities of an instructor in charge						
c. Describe roles and responsibilities of an instructor						

Safety Operations

22. Operate as the safety officer for a live fire training course so that hazards and associated risks are identified, unsafe acts are prevented, and unsafe conditions are mitigated.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe qualifications of a safety officer						
b. Describe roles and responsibilities of a safety officer						
c. Describe specialized training required for a live fire training safety officer						
23. Plan, communicate, and oversee student rotations for a live fire training evolution in a manner that provides the greatest opportunity for meeting objectives while minimizing student risk.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to plan student rotations						
b. Describe when to communicate rotations with students						
c. Describe what to communicate to students						
d. Describe conditions to watch for during a live fire training evolution						
24. Implement the “2 in/2 out” or rapid intervention crew/company (RIC) requirement during a live fire training evolution.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify legislation that sets “2 in/2 out” requirements						
b. Identify conditions that require a “2 out” team						
c. Describe roles and responsibilities of the “2 out” team						
d. Identify type of PPE worn by the “2 out” team						
e. Identify appropriate staging locations for the “2 out” team						

Igniting Fuel Packages

25. Ignite, maintain, and control a live fire and verbally describe the roles and responsibilities of an ignition officer.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify members of a fire control team						
b. Describe role and responsibilities of an ignition officer						
c. Describe roles and responsibilities of the other members of a fire control team						
d. Describe required PPE for the fire control team						
e. Describe hose line requirements for the fire control team						
f. Identify who makes the decision to ignite						
g. Identify who ignites the fuel package						
h. Describe how to light fuel packages						
i. Identify safety considerations associated with ignition						

Set Up and Evaluating Student Skills

26. Set up and evaluate students completing the required Fire Control 3: Structural Fire Fighting Skills Exercises in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify objectives a student must meet in order to successfully complete Skills Exercise 2: Risk Assessment and Door Entry						
b. Describe how to set up Skills Exercise 2: Risk Assessment and Door Entry						
c. Identify objectives a student must meet in order to successfully complete Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line						
d. Describe how to set up Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line						
e. Identify objectives a student must meet in order to successfully complete Skills Exercise 4: Water Application						
f. Describe how to set up Skills Exercise 4: Water Application						
g. Identify objectives a student must meet in order to successfully complete Skills Exercise 5: Fire Attack						
h. Describe how to set up Skills Exercise 5: Fire Attack						

27. Set up and evaluate students completing the optional Fire Control 3: Structural Fire Fighting Skills Exercises in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify objectives a student must meet in order to successfully complete Skills Exercise 6: Transitional Fire Attack						
b. Describe how to set up Skills Exercise 6: Transitional Fire Attack						
c. Identify objectives a student must meet in order to successfully complete Skills Exercise 7: Interior Attic Fire Attack						
d. Describe how to set up Skills Exercise 7: Interior Attic Fire Attack						
e. Identify objectives a student must meet in order to successfully complete Skills Exercise 8: Below Grade (Basement) Fire Attack						
f. Describe how to set up Skills Exercise 8: Below Grade (Basement) Fire Attack						
g. Identify objectives a student must meet in order to successfully complete Skills Exercise 9: VEIS						
h. Describe how to set up Skills Exercise 9: VEIS						
i. Identify objectives a student must meet in order to successfully complete Skills Exercise 10: Ventilation						
j. Describe how to set up Skills Exercise 10: Ventilation						
k. Identify objectives a student must meet in order to successfully complete Skills Exercise 11: Portable Water Extinguisher Attack						
l. Describe how to set up Skills Exercise 11: Portable Water Extinguisher Attack						

Postburn Procedures

28. Conduct postburn procedures in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to account for all personnel						
b. Describe how to overhaul remaining fires						
c. Describe how to decontaminate, inspect, and rehabilitate						
d. Describe how to inspect training facilities for stability and hazards						
e. Describe how to secure training facilities						
f. Describe how to conduct training critique (after action review/AAR)						
g. Describe how to complete records and reports						
h. Describe how to demobilize resources and personnel						
i. Describe how to complete any other AHJ requirements						
j. Describe how to release property to owner						
k. Describe how to issue close out notifications						

Certification

The candidate meets the following requirements for certification.

- Fire Fighter II or Company Officer
- Instructor II or current SFT registered instructor

Education

The candidate meets the following requirements for education.

- ICS-300 Intermediate ICS for Expanding Incidents
- Safety Officer S-404, or Safety Officer, L-954, or FDSOA Incident Safety Officer
- Fire Control 3A: Structural Fire Fighting in Acquired Structures (2009), or Fire Control 3: Structural Fire Fighting (2018)
- Instructor: Live Fire Training – Fixed Facility
- Instructor: Live Fire Training – Acquired Structure

Position

The candidate meets the following qualifications for position. Performing in an acting capacity does not qualify.

Position	Agency	Appointment Date
Fire Fighter for three (3) years full-time, or six (6) years volunteer		

FIRE CONTROL 3 – Burn Procedures

Go / No Go Checklist

Burn # _____ Date: _____

PREBURN

- | | |
|---|--|
| <input type="checkbox"/> Training structure inspected to determine structural integrity | <input type="checkbox"/> Minimum of two exits |
| <input type="checkbox"/> Hazards that could cause harm or damage PPE removed | <input type="checkbox"/> Water supplies for both the attack and backup lines come from two different sources |
| <input type="checkbox"/> Windows operational and unlocked | <input type="checkbox"/> Attack line and back up line shall be differentiated |
| <input type="checkbox"/> Doors operational and unlocked | <input type="checkbox"/> Appropriate type and amount of fuel |
| | <input type="checkbox"/> Emergency medical services |

BRIEFING

- | | |
|---|---|
| <input type="checkbox"/> All participants briefed prior to ignition | <input type="checkbox"/> Communication plan discussed |
| <input type="checkbox"/> Instructor and participant walkthrough | <input type="checkbox"/> Evacuation signal and meeting location |
| <input type="checkbox"/> Instructor and participant assignments | <input type="checkbox"/> PPE checked |
| <input type="checkbox"/> Command post, staging and rehab areas identified | <input type="checkbox"/> SCBA has adequate air supply |

SAFETY MESSAGE

- We are dealing with live fire today. The fire does not know this is a training burn. Do not let your guard down
- Identify, intervene and report any unsafe acts or conditions
- Listen to Instructions and Instructors at all times, if directions are unclear ask the instructor
- Report ALL injuries regardless of how minor
- At the completion of the training and/or if we have an emergency we will meet at **(Specify Location)**
- All participants including instructors stay hydrated, drinking water can be found at **(Specify Location)**
- Safety gear required at all times
- **TREAT ALL PASS DEVICES AS REAL ACTIVATIONS**

LIGHTING PROCEDURES

- Primary instructor will discuss the evolution with the Ignition Officer and Interior Safety**
 - When ready the Primary Instructor will request **“permission to light”**
- Interior Safety will ensure the following prior to each evolution:**
 - Fuel load is appropriate
 - Attack line / backup line are operational and staffed
 - Exits are unobstructed

Once completed, Interior Safety will advise the Safety Officer that **“interior is ready to go fire in the hole”**
- The Safety Officer will ensure the following prior to each evolution:**
 - Overall scene safety
 - Water supplies are staffed and operational. RIC is ready
 - PPE check prior to participants entering building
 - Confirm PAR numbers with Interior Safety (# instructors, # students for a total of #)
 - Once completed, the Safety Officer will advise the IC that **“we’re ready to go fire in the hole”**

COMPLETED BY _____

SIGNATURE _____

DATE & TIME _____

FIRE CONTROL 3- CREW ROTATION & ACCOUNTABILITY

25 student class

Burn # _____

Date: _____

		Group 1	Group 2	Group 3	Group 4	Group 5
Stations						

(/) Indicates that crew is in progress (X) Indicates the crew has completed

CREW ACCOUNTABILITY

Group 1
1.
2.
3.
4.
5.
Staff:
Staff:

Group 2
1.
2.
3.
4.
5.
Staff:
Staff:

Group 3
1.
2.
3.
4.
5.
Staff:
Staff:

Group 4
1.
2.
3.
4.
5.
Staff:
Staff:

Group 5
1.
2.
3.
4.
5.
Staff:
Staff:

Overhead Staff
1.
2.
3.
4.
5.
6.
7.

Fire Control 3: Structural Fire Fighting

Props and Structures: Acquired Structure

Acquired Structure

This is a list of the instructor demonstrations and skill exercises that can be completed using an acquired structure. All props, materials, and actions should be prepared, used, or carried out in accordance with the requirements of NFPA 1403 Standard on Live Fire Training Evolutions (2018).

Structure/Prop Preparation

- Acquire and prepare before class begins

Materials

- Full structural PPE including SCBA
- Class A materials (per current NFPA 1403)
- Pumping apparatus with ladder and hose compliment
- Back-up line
- RIC complement
- Primary and adjunct instructor-to-student ratio (NFPA 1403)
- Ignitions Officer (NFPA 1403)
- Safety Officer (NFPA 1403)
- Forcible entry tools
- Rehabilitation area

Formats

- Instructors perform Instructor Demonstrations with student interaction as appropriate.
- Students perform Skills Exercises under direct instructor supervision.

Instructor Demonstrations

The knowledge and skills from the following topics can be demonstrated in an acquired structure.

- Topic 2-2: Fire Growth and Development
- Topic 2-3: Characteristics of Smoke
- Topic 2-4: Water as an Extinguishing Agent
- Topic 3-4: Identify Flow Paths and Manage Air Tracks

Skills Exercises

The following student skills exercises can be executed in an acquired structure.

Required

- Skills Exercise 1: Combustion
- Skills Exercise 2: Risk Assessment and Door Entry
- Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line

Fire Control 3: Structural Fire Fighting

Props and Structures: Acquired Structure

- Skills Exercise 4: Water Application
- Skills Exercise 5: Fire Attack

Recommended

- Skills Exercise 6: Transitional Fire Attack
- Skills Exercise 7: Interior Attic Fire Attack
- Skills Exercise 8: Below Grade (Basement) Fire Attack
- Skills Exercise 9: VEIS
- Skills Exercise 10: Ventilation
- Skills Exercise 11: Portable Water Extinguisher Attack

Safety

- Cover established and approved Incident Action Plan
- Conduct NFPA safety briefing
- Communicate clearly during safety walkthrough and PPE checks
- Keep a watchful eye on participants and ensure their safety
- Never use live persons as victims in an IDLH environment
- Ensure that students understand all instructions



Instructor: Live Fire Training - Fixed Facility

Course Plan

Course Details

Description: This course provides the knowledge and skills that prepare an instructor to teach fire fighters how to locate, control, and extinguish an interior structure fire in a fixed facility. Key learning areas include an overview of the Fire Control 3: Structural Fire Fighting course plan; an introduction to live fire training; preburn planning; fire dynamics; set up and walk through; live fire training evolutions; and postburn procedures.

Designed For: Individuals who wish to conduct NFPA-compliant live fire training or qualify to teach State Fire Training’s Fire Control 3: Structural Fire Fighting course

Authority: NFPA 1403: Standard on Live Fire Training Evolutions (2018)
California Health and Safety Code 41801(b)
Cal/OSHA (Title 8 CCR 3395)

Prerequisites: Fire Control 3: Structural Fire Fighting, or Fire Control 3A (2009), or Fire Control 3B (2009)
Authorization to attend training from fire agency or ALA/ARTP
Verification of meeting NFPA 1403 (2018 / 4.3.1) live fire training prerequisite requirements (SFT Fire Fighter I certification waives this requirement)
Current SCBA fit test documentation
Cal/OSHA compliant structural PPE
Completed release of liability form

Standard: Attend all class sessions and complete all mandatory activities and skills

Hours: Discussion: 13.75 hours (13 hours and 45 minutes)
Application: 10.25 hours (10 hours and 15 minutes)

Instructional Hours (Total): 24 hours

Maximum Class Size: 20

ILFT-FF

Instructor Level:	Primary instructor
Instructor/Student Ratio:	Two primary instructors at all times Additional requirements (per NFPA 1403) <ul style="list-style-type: none">• One instructor for each functional crew of five students• One instructor for each backup line• One additional instructor for each additional functional assignment
Restrictions:	See Facilities, Equipment, and Personnel requirements (page 5)
SFT Designation:	FSTEP

Required Resources

Instructor Resources

To teach this course, instructors need:

- NFPA 1403: Standard on Live Fire Training Evolutions (current edition)
- NFPA 1582: Standard on Comprehensive Occupational Medical Programs for Fire Departments (current edition)
- NFPA 1583: Standard on Health-Related Fitness Programs for Fire Department Members (current edition)
- NFPA 1584: Rehabilitation Process for Members During Emergency Operations and Training Exercises (current edition)
- Title 8 California Code of Regulations (T8 CCR) Section 3395 – Heat Illness Prevention Standard
- *Live Fire Training: Principles and Practice* (Jones & Bartlett Learning, 1st ed. revised, ISBN: 978-1-284-04123-1)
- *3D Fire Fighting: Training, Techniques, and Tactics* (Fire Protection Publications, Oklahoma State University, 1st ed., ISBN: 0-87939-258-4)

Additional recommended resources:

- *Enclosure Fires* (Lars-Göran Bengtsson)
Available for download at: <https://www.msb.se/en/Products/Publications/Publications-from-the-SRSA/Enclosure-fires/>

Online Instructor Resources

The following instructor resources are available online at

<https://osfm.fire.ca.gov/divisions/state-fire-training/instructor-registration/>

- Fire Control 3: Structural Fire Fighting course plan (and supporting documentation)
 - Instructor Demonstration 1 – Dust Explosion
 - Instructor Demonstration 2 – Combustion
 - Instructor Demonstration 3 – Pyrolysis
 - Props and Structures – Matrix
 - Props and Structures – Acquired Structure
 - Props and Structures – Container (Class A)
 - Props and Structures – Fixed Facility (Class A)
 - Props and Structures – Gas-Fired Prop
 - Props and Structures – Scalable Burn Prop
 - Skills Exercise 1 – Combustion
 - Skills Exercise 2 – Risk Assessment and Door Entry
 - Skills Exercise 3 – Stretching, Flaking, and Advancing and Attack Line
 - Skills Exercise 4 – Water Application
 - Skills Exercise 5 – Fire Attack

- Skills Exercise 6 – Transitional Fire Attack
- Skills Exercise 7 – Interior Attic Fire Attack
- Skills Exercise 8 – Below Grade (Basement) Fire Attack
- Skills Exercise 9 – VEIS
- Skills Exercise 10 – Ventilation
- Skills Exercise 11 – Portable Water Extinguisher Attack
- Documents
 - Cal/OSHA Employer Sample Procedures for Heat Illness Prevention
 - Firefighter Exposure to Smoke Particulates
 - FIRESCOPE – ICS 910: Firefighter Incident Safety and Accountability Guidelines
 - Impact of Fire Attack Utilizing Interior and Exterior Steams on Firefighter Safety and Occupational Survival: Full Scale Experiments
 - Impact of Fire Attack Utilizing Interior and Exterior Streams on Firefighter Safety and Occupational Survival: Water Mapping
 - Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction (section 9.11 Pushing Fire, page 203)
 - ILFTFF - Live Fire Training Burn Plan Outline
- Videos
 - Art of Reading Smoke Vol1 Sample (Fire Engineering, November 2, 2016)
 - Christmas Tree Fire Safety (LinglestownFireCo35 / June 25, 2007)
 - Four Compartment Fire Behavior Burn Box (State Fire Training / 2018)
 - New vs. Old Room Fire Final UL (jarhead 96 / December 17, 2010)
 - Normalisation of Deviance – IAFF – Part I (Mike Mullane)
 - Normalisation of Deviance – IAFF – Part II (Mike Mullane)
 - Oxidation: The Chemical Process of Fire (FireNerd / 2018)
 - Pyrolysis: Decomposition of Solid Substances with Heat (Fire Gear)
 - Single Compartment Fire Behavior Burn Box (State Fire Training / 2018)
 - What is Fire Pyrolysis? (Fire Training / June 6, 2015)
 - Whoosh Box Fire Behavior Burn Box (State Fire Training / May 2018)
 - UL: Modern vs. Legacy Fuel (Firehouse / November 6, 2015)
- Activities
 - Activity 6-4: Building Fuel Packages for Fire Behavior Evolutions
 - Activity 6-4: Building Fuel Packages for Fire Attack Evolutions

Student (Instructor Trainee) Resources

To participate in this course, all instructor trainees need:

- NFPA 1403: Standard on Live Fire Training Evolutions (current edition)
- *Live Fire Training: Principles and Practice*
(Jones & Bartlett Learning, 1st Edition Revised, ISBN: 978-1-284-04123-1)
- A copy of his or her agency's heat and illness prevention plan
- Full structural PPE and SCBA

Instructor trainees participating in this course through their academy or agency in-house training will have all documentation, PPE, and SCBA verification provided by the AHJ.

Instructor trainees participating in this course through open enrollment must provide:

- Authorization to attend the training, including a statement of insurance for participant
 - Submit a letter verifying demonstrated competency in donning SCBA, donning PPE, and hose handling skills
 - If the class will be coordinated through a community college, the college may provide additional insurance for participants and instructional staff
- Current SCBA fit test documentation
- A minimum of Cal/OSHA compliant PPE in good repair (provided by the participant's agency)
- Release of liability

Facilities, Equipment, and Personnel

The following facilities, equipment, or personnel are required to deliver this course:

Equipment*

- **Apparatus:** A minimum of one fully outfitted NFPA compliant engine (type I or type 3)
- **Appliances and tools:** Thermal imager (optional); nozzle selection (determined by AHJ) capable of flowing a minimum 95 gallons per minute (GPM)
- **Extinguishers:** Pressurized water extinguisher; water-pressurized garden sprayer
- **Fuels:** Class A materials (non-gas-fired props); Class B fuel (gas-fired props) per manufacturer specifications
- **Hose:** 1", 1½", or 1¾" fire hose; 2½" or 3" fire hose
- **Hand tools:** Flat head axe; Halligan tool; hydrant wrench; pick head axe; long handle tool (pike pole, roof hook, rubbish hook); sledgehammer; flashlight
- **Ladders:** 10' folding ladder; 14' roof ladder; 24' extension ladder
- **Power tools:** Blower; chainsaw; generator; air compressor with fittings (or equivalent)
- **Props:** Scalable props adequate to demonstrate principles outlined in Unit 5: Fire Dynamics
- **Protective equipment/clothing:** Full set of protective clothing for structural fire fighting for each student, including: bunker pants, coat, and boots; gloves and helmet; flash hood; face piece; self-contained breathing apparatus (SCBA), two fully-charged air cylinders, and manufacturer-approved SCBA sanitizing agent and cleaning agent; personal alert safety system (PASS)
- **Salvage equipment/materials:** Salvage covers or Visqueen; brooms; scoop shovels; buckets; tubs
- **Simulation equipment/materials:** Live fire training structure compliant with NFPA 1403 (2018); smoke-generating equipment (synthetic/Class A); burn barrels (modified for smoke or crib set)

- **Other supplies/equipment:** Radios; fuel and supplies for power equipment; cleaning and decontamination supplies and equipment; handheld propane torch; dumpster; power cords; lights; hammer; nails; staple gun; nail gun (optional); circular saw; reciprocating saw; fuses/road flares; construction spray paint; tape measure; drill, bits, and screws
- **Rehabilitation:** Shade; water; chairs; SCBA refill capabilities (extra cylinders or refill as needed); decontamination body wipes; soap and water; brushes
- **Water supply:** Adequate water supply per NFPA 1403 (2018) requirements

* See NFPA 1403 (2018 or current edition) for additional equipment and tool requirements.

Facilities

- Standard classroom equipped for 20 students
- Whiteboards or easel pads with appropriate writing implements
- Projector with appropriate laptop connections
- Wi-Fi/Internet access (recommended)
- At least one of the following:
 - A non-gas-fired live fire training structure
 - A gas-fired live fire training structure
 - Must also have enough space to burn models (required when a gas-fired live training structure is the only available option)

Personnel*

- Two primary instructors at all times
- Additional requirements (per NFPA 1403)
 - One instructor for each functional crew of five students
 - One instructor for each backup line
 - One additional instructor for each additional functional assignment

* See NFPA 1403 (2018) paragraph 4.7 for additional information about required personnel.

Time Table

Segment	Lecture	Application (Activity/Skill)	Formative Assessment	Unit Total
Unit 1: Introduction				
Topic 1-1: Orientation and Administration	0.5	0	0	
Unit 1 Totals	0.5	0	0	0.5
Unit 2: Introduction to Fire Control 3: Structural Fire Fighting				
Topic 2-1: Fire Control 3: Structural Fire Fighting Course Plan	0.25	0	0	
Topic 2-2: Fire Control 3: Structural Fire Fighting Instructor Requirements	0.25	0	0	
Topic 2-3: Fire Control 3: Structural Fire Fighting Student Requirements	0.25	0	0	
Unit 2 Totals	0.75	0	0	0.75
Unit 3: Introduction to Live Fire Training				
Topic 3-1: NFPA Standards and Legal Considerations	1.0	0	0	
Topic 3-2: Cardiovascular and Thermal Strain of Fire Fighting	0.25	0	0	
Topic 3-3: Developing and Incident within an Incident (IWI) Plan	0.25	0	0	
Unit 3 Totals	1.5	0	0	1.5
Unit 4: Preburn Planning				
Topic 4-1: Conducting an Initial Site Evaluation	0.25	0.25	0	
Topic 4-2: Developing a Comprehensive Burn Plan ("Burn Book")	1.0	0.5	0	
Topic 4-3: Conducting Preburn Preparations	0.5	0.5	0	
Topic 4-4: Preparing a Training Structure	0.5	0.5	0	
Unit 4 Totals	2.25	1.75	0	4.0
Unit 5: Fire Dynamics				
Topic 5-1: Fire Chemistry and Physics	1.5	1.0	0	
Topic 5-2: Fire Growth and Development	1.0	0	0	
Topic 5-3: Characteristics of Smoke	0.25	0	0	
Topic 5-4: Water as an Extinguishing Agent	0.75	0	0	

Segment	Lecture	Application (Activity/Skill)	Formative Assessment	Unit Total
Topic 5-5: Fire Control 3 Classroom Instructor Demonstrations	0	0.75	0	
Topic 5-6: Fire Control 3 Fireground Instructor Demonstrations	1.25	0	0	
Unit 5 Totals	4.75	1.75	0	6.5
Unit 6: Set Up and Walk Through				
Topic 6-1: Implementing an Incident Action Plan	0.25	0.5	0	
Topic 6-2: Securing a Water Supply	0.25	0	0	
Topic 6-3: Conducting an Instructor Briefing and Preburn Walk Through	0.5	0	0	
Topic 6-4: Building Fuel Packages	0.5	1.0	0	
Topic 6-5: Conducting a Student Preburn Walk Through	0.25	0.25	0	
Unit 6 Totals	1.75	1.75	0	3.5
Unit 7: Delivering Live Fire Training Evolutions				
Topic 7-1: Operating as Instructor in Charge (Command and Control)	0.25	0	0	
Topic 7-2: Operating as Safety Officer	0.25	0	0	
Topic 7-3: Implementing Student Rotations	0.25	0	0	
Topic 7-4: Implementing the 2 In/2 Out or RIC Requirement	0.25	0	0	
Topic 7-5: Igniting Fuel Packages	0.25	0	0	
Topic 7-6: Executing and Evaluating Required Fire Control 3 Skills Exercises	0	2.00	0	
Topic 7-7: Executing and Evaluating Optional Fire Control 3 Skills Exercises	0	3.0	0	
Unit 7 Totals	1.25	5.00	0	7.5
Unit 8: Postburn Procedures				
Topic 8-1: Postburn Procedures	1.0	0	0	
Unit 8 Totals	1.0	0	0	1.0
Summative Assessment				
There is no summative assessment	0	0	0	
Assessment Totals	0	0	0	0
Course Totals	13.75	10.25	0	24:00

Note: Course totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment).

Note: Skills and activity time will vary depending on the number of students in the program. It is important to remember that the suggested skill hours are for up to 20 students.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, an instructor trainee will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, resources, evaluation methods, and participation requirements.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Introduction to Fire Control 3: Structural Fire Fighting

Topic 2-1: Fire Control 3: Structural Fire Fighting Course Plan

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a course plan, will be able to identify the goals and objectives for students enrolled in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course.

Enabling Learning Objectives

1. Identify the Course Details
2. Identify the Required Resources
 - Textbooks and documents
 - Equipment
 - Personnel
 - NFPA 1403 requirements
 - Authority having jurisdiction (AHJ) requirements
3. Describe key terminology
 - Terminal learning objective
 - Enabling learning objective
 - Instructor Demonstration
 - Skills Exercise
4. Identify the Units and Topics
5. Identify the Props and Structures documents
6. Identify the Instructor Demonstrations
7. Identify the Skills Exercises
 - Required exercises
 - Recommended exercises

Discussion Questions

1. How does a terminal learning objective differ from an enabling learning objective?

Activities

1. Determined by instructor

Instructor Notes

1. Distribute a copy of the Fire Control 3: Structural Fire Fighting course plan and all supporting documents to all instructor trainees.
2. Instructor Demonstrations are covered in more detail in Unit 5: Fire Dynamics.
3. Skills Exercises are covered in more detail in Unit 7: Delivering Live Fire Training Evolutions.

Topic 2-2: Fire Control 3: Structural Fire Fighting Instructor Requirements

Terminal Learning Objective

At the end of this topic, an instructor trainee, given instructor requirements, will be able to identify the State Fire Training (SFT) requirements for becoming a registered SFT Fire Control 3: Structural Fire Fighting instructor.

Enabling Learning Objectives

1. Identify desirable traits of a live fire training instructor
 - Intrinsic motivation
 - Lifelong learner
 - Humility
 - Good listener
 - Respected by peers
 - Communication skills
 - Problem-solving skills
 - Aptitude for science
2. Identify SFT requirements for Fire Control 3: Structural Fire Fighting instructors
 - Certification
 - SFT certified Fire Fighter II
 - SFT primary instructor qualifications
 - *State Fire Training Procedures Manual*
 - Coursework
 - Fire Control 3: Structural Fire Fighting (2019) or Fire Control 3A (2009) or Fire Control 3B (2009)
 - S-404 Safety Officer or GEL-954 Safety Officer
 - From FEMA, NWCG, or SFT
 - ICS-300: Intermediate ICS for Expanding Incidents
 - Instructor: Live Fire Training - Fixed Facility
 - Required of all Fire Control 3: Structural Fire Fighting instructors
 - Instructor: Live Fire Training - Acquired Structure
 - Only required for those who wish to teach Fire Control 3: Structural Fire Fighting using an acquired structure for live fire training evolutions
 - Teaching
 - Teach Fire Control 3: Structural Fire Fighting (2019) two times under the supervision of a registered instructor
 - Instructor trainee task book
 - Initiated on the final day of Instructor: Live Fire Training - Fixed Facility
 - The mechanism through which instructor trainees demonstrate proficiency of the knowledge and skills identified and described in Instructor: Live Fire Training – Fixed Facility
 - Each task must be performed twice
 - The two instances must occur during two different courses

- The same evaluator cannot sign off on the same task twice
 - Task books must be completed within three years of initiation
 - Experience
 - Full-time paid fire fighter performing suppression duties within a recognized fire agency in California for a minimum of three years
 - Part-time/volunteer fire fighter performing suppression duties within a recognized fire agency in California for a minimum of six years
 - Authority having jurisdiction (AHJ) verification
 - A letter from the instructor trainee’s AHJ verifying the individual’s qualifications to deliver live fire training

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Instructor Notes

1. See examples for correct and incorrect task book performance and signatures.

Correct: Task completed during two separate courses and evaluated by two separate individuals.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ
b. Identify components of a live fire burn plan (“burn book”)	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ

Incorrect: Task completed twice during one course and evaluated by two separate individuals.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials

a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ
b. Identify components of a live fire burn plan ("burn book")	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ

Incorrect: Task completed during two separate courses and evaluated by the same individual.

1. Assemble a comprehensive burn plan ("burn book") that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS
b. Identify components of a live fire burn plan ("burn book")	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS

Topic 2-3: Fire Control 3: Structural Fire Fighting Student Requirements

Terminal Learning Objective

At the end of this topic, an instructor trainee, given the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan, will be able to describe student enrollment requirements.

Enabling Learning Objectives

1. Identify requirements for student participation in Fire Control 3: Structural Fire Fighting
 - Authorization to attend training from fire agency or ALA/ARTP
 - Verification of meeting prerequisite requirements
 - SFT Fire Fighter I certification waives this requirement
 - Current SCBA fit test documentation
 - Cal/OSHA compliant structural PPE
 - Components
 - Required use
 - Capabilities and limitations
 - Completed release of liability form

Discussion Questions

1. Are there any circumstances under which you would let a student who does not meet the course prerequisites participate in live fire training?

Activities

1. Determined by instructor

Instructor Notes

1. None

Unit 3: Introduction to Live Fire Training

Topic 3-1: NFPA Standards and Legal Considerations

Terminal Learning Objective

At the end of this topic, an instructor trainee, given laws, standards, policies, and procedures, will be able to implement live fire training in accordance with NFPA 1403, Cal/OSHA, and authority having jurisdiction (AHJ) requirements.

Enabling Learning Objectives

1. Identify the significance of NFPA standards
2. Describe the contents of NFPA 1403
3. Describe how to apply NFPA 1403 to Fire Control 3: Structural Fire Fighting
 - Instructor preparation
 - Student qualifications
 - Site requirements
 - Safety requirements
 - Inspections and notifications
4. Identify legal requirements associated with live fire training
 - Cal/OSHA
 - Property owner
 - AHJ
 - Local air pollution control district (APCD) or air quality management district (AQMD)

Discussion Questions

1. How is the current edition of NFPA 1403 different from the previous edition?
2. What are the minimum staffing roles required by NFPA 1403 for live fire training?
3. What legal requirements need to be considered when conducting live fire training with:
 - Fixed facilities?
 - Acquired facilities?

Activities

1. Given a copy of NFPA 1403 and a specific chapter assignment, have students break into small groups, review their assigned chapter, and report back to group on the key paragraphs.

Instructor Notes

1. Use the activity to have students direct the learning for ELO 2.

Topic 3-2: Cardiovascular and Thermal Strain of Fire Fighting

Terminal Learning Objective

At the end of this topic, an instructor trainee, given PPE and a live fire training evolution, will be able to minimize thermal and cardiovascular strain during live fire training.

Enabling Learning Objectives

1. Describe why aerobic fitness is necessary to perform fire fighting activity
2. Describe cardiovascular and thermal responses to fire fighting
3. Describe how fire fighting activity and turnout gear impact cardiovascular and thermal strain
4. Describe how weather impacts cardiovascular and thermal strain
5. Describe warning signs for heat illnesses that may occur in live fire training and activity
6. Describe how to prevent injuries and heat illness during fire fighting training and activity
7. Describe the risk factors for cardiovascular disease
8. Describe the importance of modifiable risk factors for cardiovascular disease and ways to decrease those factors
9. Describe the goals of on-site rehabilitation
10. Describe the dangers associated with exposure to smoke and particulate matter
11. Describe the importance of proper on-site decontamination, hygiene, gear cleaning, and showers

Discussion Questions

1. What are some signs of rhabdomyolysis or other heat-related injuries/illnesses on the training ground?
2. What strategies can prevent thermal insult during live fire training?
3. What cooling activities can you perform to reduce thermal insult during live fire training?

Activities

1. Determined by instructor

Instructor Notes

1. Standards to reference during this topic:
 - NFPA 1582: Standard on Comprehensive Occupational Medical Programs for Fire Departments
 - NFPA 1583: Standard on Health-Related Fitness Programs for Fire Department Members
 - NFPA 1584: Rehabilitation Process for Members During Emergency Operations and Training Exercises
 - Title 8 California Code of Regulations (T8 CCR) Section 3395 – Heat Illness Prevention Standard
2. Give students a copy of Cal/OSHA's Employer Sample Procedures for Heat Illness Prevention (current edition).
 - See Online Instructor Resources
3. Use instructor trainee agency heat and illness prevention plans as examples.

Topic 3-3: Developing an Incident Within an Incident (IWI) Plan

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a proposed live fire training evolution, will be able to develop and communicate an incident within an incident (IWI) plan for a live fire training evolution in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify factors that contribute to an IWI, line of duty injury, or death during live fire training
2. Describe how to mitigate common factors that can lead to line of duty injury and death during live fire training
3. Describe the purpose of the IWI plan
4. Describe the relationship between the instructor and the AHJ hosting the live fire training when responding to an IWI
 - Consistent open communication
 - Instructor shall follow the AHJ's policies and procedures
 - Agree to and document IWI plan
 - Share IWI plan with all live fire training participants
5. Describe how respond to an IWI, serious injury, or line of duty death
 - Broadcast "emergency traffic"/"mayday" and stop training
 - Initiate notifications
 - Emergency services
 - AHJ
 - Secure the scene
 - Secure and document evidence
 - PPE
 - Ignition material
 - Fuel package
 - Applicable equipment
 - Collect personal statements
 - Prohibit participants from leaving training site
 - Activate Critical Incident Stress Debriefing/Management (CISD)
 - Initiate notifications
 - Cal/OSHA (Occupational Health and Safety Administration)
 - Law enforcement
 - AHJ's risk management program
 - Serious Accident Review Team (SART)
 - Control information flow
 - Request public information officer (PIO) support
 - Release only pertinent information
 - Control information release (public, press, social media)
 - Document everything

Discussion Questions

1. How has a line of duty injury or death impacted you or your agency?
2. Why is it important to have an IWI plan in place before live fire training?
3. How does your agency handle cell phones and helmet cameras during an IWI?
4. What actions and events need to be documented during and after an IWI?

Activities

1. Given a line of duty injury or death report from *Live Fire Training: Principles and Practice*, NIOSH, or another source, have instructor trainees work in small groups to analyze the report and identify the factors that contributed to the injury or death. Have instructor trainees create a presentation to share with the group (on that day or as a homework assignment to present the next day).

Instructor Notes

1. Have instructor trainee watch all or portions of the following videos to demonstrate why avoiding complacency and lowered standards is crucial to safety:
 - Normalisation of Deviance – IAFF - Part I (Mike Mullane)
 - Normalisation of Deviance – IAFF – Part II (Mike Mullane)
2. Supporting documentation for ELO 5
 - FIRESCOPE – ICS 910: Firefighter Incident Safety and Accountability Guidelines

Unit 4: Preburn Planning

Topic 4-1: Conducting an Initial Site Evaluation

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a proposed live fire training evolution, will be able to evaluate fixed facility training sites in order to select a site that fulfills the training objectives with minimal mitigation requirements in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify the requirements of a viable live fire training site
 - Water supply
 - Structural integrity of building or prop
 - Maintenance and five-year inspection records
 - Visual damage inspection
 - Site preparation and cleanup
 - Space for logistics
 - Staging area
 - Burn area
 - Rehabilitation area
 - Parking
2. Describe conditions that could impact site use
 - Inadequate water supply
 - Exposure concerns

- Hazards
 - Weather
 - Public or political impact
 - Environmental impact
 - Smoke mitigation
 - Run off plan
 - Location or proximity
 - Sensitive populations
 - Protected buildings
 - Transportation corridors
3. Identify site evaluation communication and notification needs
 - Determined by AHJ
 - Vary by prop and facility type
 4. Identify site evaluation documentation needs
 - Determined by AHJ
 - Vary by prop and facility type

Discussion Questions

1. Why is it important to conduct an initial site evaluation?
2. What conditions might deter you from using a live fire training site?
 - What solutions might mitigate these conditions?
3. In your jurisdiction, who needs to be notified before you conduct a live fire training evolution?

Activities

1. Given a potential site (physical location or by video) and a proposed training assignment, have students conduct a site evaluation to answer the following questions.
 - Does it meet the requirements of a viable live fire training site for the assignment?
 - Are there any concerns?
 - What solutions could mitigate these concerns?

Instructor Notes

1. ELO 1: NFPA 1403 has a “Live Structural Fire Training Facility Inspection” document to use for evaluating a building’s structural integrity.
2. The proposed training assignments for the instructor trainee activity should come from the Instructor Demonstrations or Skills Exercises from Fire Control 3: Structural Fire Fighting.

Topic 4-2: Developing a Comprehensive Burn Plan (“Burn Book”)**Terminal Learning Objective**

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to assemble a comprehensive burn plan (often referred to as a “burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe the purpose of a live fire burn plan
 - Ensures that no part of the training process is overlooked
 - Promotes fire and life safety
 - Fulfills NFPA, SFT, and AHJ requirements
 - Demonstrates due diligence
 - Limits liability
2. Identify the components of a live fire burn plan (“burn book”)
 - SFT course-related documents
 - Burn information
 - Written plans
 - Incident Action Plan (IAP)
 - Incident Within an Incident (IWI) (emergency plan)
 - Preburn
 - Smoke
 - Rehabilitation
 - Visual plans
 - Property/site
 - Building
 - Prop
 - Permits
 - Notifications
 - Insurance
 - Permissions/approvals
 - Checklists
 - Maps
 - Policies
 - Reports
 - Critical correspondence
3. Identify records-retention requirements for burn plans
 - SFT policies
 - AHJ policies
 - Exposure
 - Time of employment + 30 years (Title 8 CCR Section 3204)
 - Medical records = 30 years (OSHA)
 - Injury / Line of duty death
 - Cal/OSHA 300 Log = 5 years
 - Cal/OSHA 301 Incident Report = 5 years
 - Medical records = 30 years (OSHA)

Discussion Questions

1. What is the purpose of a comprehensive burn plan?
2. What should you include in a burn plan?

3. How long are you required to keep the burn plan after training?

Activities

1. Determined by instructor

Instructor Notes

1. Use the Live Fire Training Burn Plan Outline document as an example. Distribute it to the students to use as a checklist when developing their own burn book.
2. ELO 3: OSHA recordkeeping requirements (29 CFR 1904)
3. Bring sample burn books for instructor trainees to review.

Topic 4-3: Conducting Preburn Preparations

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to develop a preburn plan and conduct preburn planning requirements in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify basic components of a preburn plan
 - Site plan drawings including all exposures
 - Floor plan detailing all rooms, hallways, exterior openings
 - Command post location
 - Apparatus positions
 - Hose and backup line positions
 - Emergency escape route locations
 - Emergency evacuation assembly area location
 - Ingress and egress routes for emergency vehicles
2. Describe preburn planning requirements
 - Develop preburn plan
 - Identify required number of instructors
 - Identify proper fuel loads
 - Determine available water supply
 - Additional requirements per NFPA 1142
 - Percentage involved
 - Exposure calculation
 - Additional floors
 - Determine required fire flow for the training prop or facility and exposure buildings
 - National Fire Academy (NFA) fire flow calculation = $(\text{length} \times \text{width})/3 \times \text{percent involvement}$
 - Iowa rate of flow formula = $(\text{length} \times \text{width} \times \text{height})/100$
 - Determine required reserve flow (50 percent of fire flow)
 - Obtain apparatus pumps that meet or exceed required fire flow for building and exposures
 - Establish separate water sources for attack and backup hose lines
 - Obtain periodic weather reports

- Designate and mark parking areas
- Establish communication plan and obtain radios
- Establish medical plan
- Establish decontamination plan
- Complete any other AHJ requirements

Discussion Questions

1. How do you determine appropriate water supply?
2. How do you determine the appropriate instructor numbers for a live fire training evolution?

Activities

1. Determined by instructor

Instructor Notes

1. Most of the ELO content comes from “Preburn Planning” on the “Live Fire Evolution Sample Checklist” from NFPA 1403.

Topic 4-4: Preparing a Training Structure

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to prepare a training prop or structure for live fire training in order to fulfill training objectives in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe how to prepare a training structure for live fire training
 - Complete visual damage inspection
 - Secure utilities
 - Check and operate windows and doors, open or close as needed
 - Check and operate other training structure components
 - Implement Cal/OSHA fall protection requirements
 - Remove unnecessary interior and exterior debris
 - Eliminate or mitigate hazards
 - Toxic materials
 - Hives and vermin
 - Trees, brush, and surrounding vegetation
 - Any other exterior and interior hazards
 - Prepare fuel package
 - Initiate startup procedures (gas-fired props)
 - Complete any other AHJ requirements
 - Complete required documentation

Discussion Questions

1. How much time does it take to prepare the training facilities or props in your AHJ?
2. Who approves fuel packages in your AHJ?
 - How do you document a fuel package?

3. What type of structural integrity issues need to be mitigated before qualifying a fixed facility?

Activities

1. Determined by instructor

Instructor Notes

1. Most of the ELO content comes from “Training Structure Preparation” on the “Live Fire Evolution Sample Checklist” from NFPA 1403.

Topic 4-5: Operating and Maintaining Gas-Fired Props and Facilities

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a gas-fired prop or facility, will be able to describe how to operate and maintain a gas-fired prop in accordance with NFPA 1403, manufacturer specifications, and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe how to operate gas-fired props or facilities
 - NFPA requirements
 - AHJ requirements
 - Manufacturer specifications
2. Describe the burning characteristics of gas-fired props or facilities
3. Identify common safety features of gas-fired props or facilities
4. Identify logistical needs of using gas-fired props or facilities for live fire training
 - Personnel
 - Fuel requirements
 - Calibration procedures
5. Describe how to maintain gas-fired props or facilities

Discussion Questions

1. How do you become authorized to operate a gas-fired prop or facility?
2. What are the benefits and limitations of gas-fired props or facilities?

Activities

1. Determined by instructor

Instructor Notes

1. None

Unit 5: Fire Dynamics

Topic 5-1: Fire Chemistry and Physics

Terminal Learning Objective

At the end of this topic, an instructor trainee, given terminal and enabling learning objectives, will be able to teach students how to identify, define, and describe fire science concepts and appropriately apply them to interior structural fire fighting activities in

accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.

Enabling Learning Objectives

1. Define terminology associated with fire chemistry
 - Fire
 - Energy
 - Pyrolysis
 - Smoldering
 - Flaming combustion
 - Conservation of mass
2. Describe differences between energy and temperature
 - British Thermal Unit (BTU)/joule
 - Celsius, Fahrenheit, Kelvin
3. Describe the concept of power
 - Joule/second = watt
 - Heat release rate (HRR)
4. Describe how physical states of matter influence fire behavior
 - All matter is made of atoms
 - States of matter
 - Gases
 - No fixed volume
 - Atoms spaced far apart and not fixed (can be compressed)
 - Heated gases expand, cooled gases contract
 - Flammable range
 - Too lean (lower explosive and flammability limit)
 - Too rich (upper explosive and flammability limit)
 - Vapor density
 - Solids
 - Fixed volume
 - Atom spaced very close to each other and fixed
 - Pyrolysis
 - Surface area to mass ratio
 - Physical arrangement of fuel
 - Types
 - Physical orientation and proximity
 - Liquids
 - Fixed volume
 - Atoms spaced very close, but not fixed
 - Flashpoint
 - Fire point
 - Ignition
 - Piloted

- Auto
 - Vaporization
- 5. Identify products of combustion
 - Heat
 - Smoke
 - Vapors
 - Particles
 - Gases
 - “Toxic twins”
 - Hydrogen cyanide
 - Carbon monoxide
- 6. Identify methods of heat transfer
 - Conduction
 - Convection
 - Radiation
- 7. Describe the impact of oxygen concentration on life safety and fire growth
- 8. Identify the components of the fire triangle and fire tetrahedron

Discussion Questions

1. What is the difference between temperature and energy?
2. How does heat transfer affect turnouts?
3. What actions can you take to minimize heat transfer?
4. How does opening a door affect the flammability of smoke?

Activities

1. Determined by instructor

Instructor Notes

1. Use the following demonstrations from the Fire Control 3: Structural Fire Fighting course plan to illustrate fire science concepts. Engage instructor trainees in individual demonstrations as appropriate. Instructor trainees will have a chance to replicate these demonstrations in Topic 5-5: Fire Control 3 Classroom Instructor Demonstrations.
 - Solids
 - Instructor Demonstration 1: Dust Explosion
 - Instructor Demonstration 3: Pyrolysis
 - Pyrolysis videos:
 - What is Fire Pyrolysis? (Fire Training / June 6, 2015)
 - Pyrolysis: Decomposition of Solid Substances with Heat (Fire Gear)
 - Christmas Tree Fire Safety (LinglestownFireCo35 / June 25, 2007)
 - Gases
 - Video: Whoosh Box Fire Behavior Burn Box (State Fire Training / May 2018)
 - Combustion
 - Instructor Demonstration 2: Combustion
 - Video: Oxidation: The Chemical Process of Fire (FireNerd / 2018)

Topic 5-2: Fire Growth and Development

Terminal Learning Objective

At the end of this topic, an instructor trainee, given terminal and enabling learning objectives, will be able to teach students how to identify and describe fire growth and development concepts and appropriately apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.

Enabling Learning Objectives

1. Describe the stages of fire
 - Traditional/legacy (time vs. temperature curve)
 - Ignition
 - Incipient stage
 - Fire plume
 - “Mushrooming” (ceiling jet)
 - Hot gas layer
 - Thermal layering
 - Relative underpressure
 - Inlet/intake
 - Relative overpressure
 - Outlet/exhaust
 - Neutral plane
 - Growth stage
 - Thermal radiation (radiant heat flux to the ground)
 - Rollover/flameover
 - Possible flashover
 - Fully developed
 - Decay
 - Ventilation-limited (time vs. temperature curve)
 - Ignition
 - Incipient
 - Growth
 - Early decay
 - Oxygen depleted
 - Ventilation event (usually fire fighter intervention)
 - Rapid fire growth
 - Fully developed
 - Decay
 - Fuel depleted
2. Identify factors that influence fire behavior
 - Fuel
 - Amount
 - Type

- Arrangement
 - Air
 - Available oxygen
 - Wind velocity
 - Weather
 - Temperature
 - Humidity
 - Wind
 - Fire compartment
 - Construction
 - Thermal properties of the enclosure
 - Energy efficiency
 - Building design/floor plans
 - Square footage and cubic footage
 - Ceiling height
 - Size, number, and arrangement of ventilation openings
 - Fuel type
 - Carbohydrates (cellulosics)
 - Hydrocarbons
 - Heat of combustion
 - Fuel loading
 - Contents vs. structure fire
 - Burn regime
 - Vent limited / air controlled / air limited
 - Fuel limited / fuel controlled
3. Describe hostile fire events
- Fire gas ignition
 - Rollover
 - Flashover
 - Thermal radiation feedback
 - Smoke explosion
 - Backdraft
 - Gravity current
 - Black fire

Discussion Questions

1. How do different construction techniques, materials, furnishings, and interiors impact fire behavior?
2. How does a vent-limited fire growth curve differ from a traditional/legacy fire growth curve?
 - How would you reduce the heat-release rate for each type of fire growth curve?

Activities

1. Determined by instructor

Instructor Notes

1. Demonstrate the fire growth and development principles introduced in this topic using a scalable burn prop, Class A container, or fixed facility. Engage instructor trainees in individual demonstrations as appropriate. See the following props and structures documents for overviews and guidelines:
 - Props and Structures Matrix
 - Container (Class A)
 - Fixed Facility (Class A)
 - Gas-Fired Prop
 - Scalable Burn Prop
2. ELO 2 – Recommended videos
 - New vs. Old Room Fire Final UL (jarhead 96 / December 17, 2010)
 - UL: Modern vs. Legacy Fuel (Firehouse / November 6, 2015)

Topic 5-3: Characteristics of Smoke**Terminal Learning Objective**

At the end of this topic, an instructor trainee, given terminal and enabling learning objectives, will be able to teach students how to read smoke emanating from a structure and use that reading to identify pre-phenomena conditions, fire location, and spread during interior structural fire fighting activities, in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.

Enabling Learning Objectives

1. Describe the composition of smoke
 - Particulates
 - Gases
 - Aerosols
2. Describe the attributes of smoke
 - Volume
 - Velocity
 - Turbulent vs. laminar
 - Density
 - Color
3. Identify the hazards of smoke
 - Cold smoke
 - Black fire
 - Smoke as fuel
 - Flammability range
 - Smoke as poison
 - Carbon monoxide (CO)
 - Hydrogen cyanide (HCN)

Discussion Questions

1. How can recognizing the attributes of smoke assist in tactical decision making?

2. What impact do CO and HCN have on fire fighters and occupants?
3. How do you avoid exposure to CO and HCN?

Activities

1. Determined by instructor

Instructor Notes

1. Recommended resources
 - Video: Art of Reading Smoke Vol1 Sample (Fire Engineering, November 2, 2016)
 - DVD: The Art of Reading Smoke
 - Dave Dodson / DVD or streaming video / PennWell (www.pennwellbooks.com)
 - Article: Firefighters Exposure to Smoke Particulates
 - See Online Instructor Resources
2. Reference the characteristics of smoke during demonstrations using a scalable burn prop, Class A container, or fixed facility. Engage instructor trainees in individual demonstrations as appropriate.

Topic 5-4: Water as an Extinguishing Agent**Terminal Learning Objective**

At the end of this topic, an instructor trainee, given terminal and enabling learning objectives, will be able to teach students how to identify and describe concepts related to water as an extinguishing agent and apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.

Enabling Learning Objectives

1. Identify concepts associated with water as an extinguishing agent
 - Heat
 - Latent heat of vaporization
 - Sensible heat
 - Specific heat of water
 - Specific heat of steam
2. Describe how water and steam impact the fire tetrahedron
 - Removes (transfers) heat (heat)
 - Stops pyrolysis (fuel)
 - Reduces oxygen percentage (oxygen)
 - Interrupts chemical chain reaction (chemical chain reaction)
3. Describe gas cooling
 - Droplet size
 - Hang time
 - Flow rate
 - Attack angle
 - Cone angle
 - Application duration

4. Describe surface cooling
 - Stop pyrolysis
 - Extinguish smoldering combustion
5. Describe cooling capacity
 - Raising water to vaporization temperature
 - Vaporization of water
6. Describe gas expansion and contraction
 - Fire gas/smoke
 - Steam

Discussion Questions

1. Can you push fire with water application?
 - Why or why not?
2. What value does steam production have in fire attack?
3. Why is it important to achieve full extinguishment?

Activities

1. Determined by instructor

Instructor Notes

1. Recommended resources for Discussion Question 1
 - Video: Scientific Research for the Development of More Effective Tactics: Governors Island Experiments (July 2012)
(<https://ulfirefightersafety.org/resources.html#training/scientific-research-for-the-development-of-more-effective-tactics-governors-island-experiments>)
 - Document: Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction (section 9.11 Pushing Fire, page 203)
 - See Online Instructor Resources
 - Fire Safety Research Institute (FSRI) Study: Impact of Fire Attack Utilizing Interior and Exterior Steams on Firefighter Safety and Occupational Survival: Full Scale Experiments
 - See Online Instructor Resources
 - Fire Safety Research Institute (FSRI) Study: Impact of Fire Attack Utilizing Interior and Exterior Streams on Firefighter Safety and Occupational Survival: Water Mapping
 - See Online Instructor Resources
2. Reference using water as an extinguishing agent during demonstrations using a scalable burn prop, Class A container, gas-fired prop or fixed facility. Engage instructor trainees in individual demonstrations as appropriate.

Topic 5-5: Fire Control 3 Classroom Instructor Demonstrations**Terminal Learning Objective**

At the end of this topic, an instructor trainee, given the Fire Control 3: Structural Fire Fighting course plan Instructor Demonstrations and associated equipment and materials, will be able to demonstrate principles of fire dynamics in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe how to set up and demonstrate Instructor Demonstration 1: Dust Explosion
2. Describe how to set up and demonstrate Instructor Demonstration 2: Combustion
3. Describe how to set up and demonstrate Instructor Demonstration 3: Pyrolysis

Discussion Questions

1. Determined by instructor

Activities

1. Divide instructor trainees into groups. Have different groups set up and demonstrate/teach the Fire Control 3: Structural Fire Fighting course plan Instructor Demonstrations to the class.
 - Instructor Demonstration 1: Dust Explosion
 - Instructor Demonstration 2: Combustion
 - Instructor Demonstration 3: Pyrolysis

Instructor Notes

1. None

Topic 5-6: Fire Control 3 Fireground Instructor Demonstrations

Terminal Learning Objective

At the end of this topic, an instructor trainee, given the Fire Control 3: Structural Fire Fighting course plan and associated equipment and materials, will be able to demonstrate principles of fire dynamics in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe how to set up and demonstrate the principles taught in Topic 2-2: Fire Growth and Development
2. Describe how to set up and demonstrate the principles taught in Topic 2-3: Characteristics of Smoke
3. Describe how to set up and demonstrate the principles taught in Topic 2-4: Water as an Extinguishing Agent
4. Describe how to set up and demonstrate the principles taught in Topic 3-4: Identify Flow Paths and Manage Air Tracks

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Instructor Notes

1. The topic numbers and titles listed in the ELOs above correspond to the Fire Control 3: Structural Fire Fighting course plan, not this course plan.
2. Use scalable props on the fireground to teach the instructor trainees how to demonstrate these principles when teaching the Fire Dynamics unit of Fire Control 3: Structural Fire Fighting. Allow time for a question and answer session after each demonstration.

- Video Resources
 - Whoosh Box Fire Behavior Burn Box (State Fire Training / 2018)
 - Single Compartment Fire Behavior Burn Box (State Fire Training / 2018)
 - Four Compartment Fire Behavior Burn Box (State Fire Training / 2018)

Unit 6: Set Up and Walk Through

Topic 6-1: Implementing an Incident Action Plan

Terminal Learning Objective

At the end of this topic, an instructor trainee, given ICS forms and live fire training evolutions, will be able to develop and implement an incident action plan (IAP) for a live fire training course in accordance with the policies and the procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe how to complete the ICS forms that make up an IAP
 - ICS 201: Incident Briefing
 - ICS 204: Assignment List
 - ICS 205: Incident Radio Communications Plan
 - ICS 206: Medical Plan
 - ICS 215: Operational Planning Worksheet
 - ICS 215A: Incident Action Plan Safety Analysis

Discussion Questions

1. How does the complexity of a live fire training course impact an IAP?
2. How does the IAP differ from the comprehensive burn plan (“burn book”)?

Activities

1. Given a proposed live fire training course with multiple evolutions, divide the class into groups and have each group complete one ICS form. Have students share their results with the group.

Instructor Notes

1. None

Topic 6-2: Securing a Water Supply

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a prop or facility and a live fire training evolution, will be able to secure a water supply with sufficient rate and duration for control and extinguishment of the training fire, backup lines to protect personnel, and protection of exposed property.

Enabling Learning Objectives

1. Describe minimum water supply requirements for live fire training evolutions including water for:
 - Control and extinguishment of training fire

- Backup line(s) to protect personnel
 - Protecting exposed property
2. Identify hose line placement for live fire training evolutions based on:
 - Training objectives
 - Fuel package
 - Number of evolutions/training stations running simultaneously
 - Exposure protection
 - Unforeseen situations
 3. Identify conditions that allow for a single source water supply

Discussion Questions

1. Who is responsible for the ensuring adequate water supply?

Activities

1. Determined by instructor

Instructor Notes

1. None

Topic 6-3: Conducting an Instructor Briefing and Preburn Walk Through

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to conduct an instructor briefing and a preburn walk through with all instructors and personnel supporting the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe the instructor walkthrough process
 - Identify crew and instructor assignments
 - Incident commander
 - Safety officer
 - Medical team
 - “2 in/2 out”
 - Instructor in charge
 - Instructor(s)
 - Instructor trainee(s)
 - Fire control team
 - Ignition officer
 - Water supply officer
 - Pump operator(s)
 - Logistics
 - Instructor in charge briefs all participating instructors
 - Incident action plan (IAP)
 - Incident within an incident plan (IWI)
 - Training structure/prop layout
 - Crew and instructor assignments

- Participant rotations
- Safety officer briefs all participating instructors
 - Safety plan
 - Current and anticipated weather
 - Evacuation signal and procedures
 - Review final “Go/No-Go Checklist”
 - Check PPE
 - Check training communications channels
 - Review decontamination plan
- Initiate site plan
 - Command post
 - Logistics
 - Food/water
 - SCBA air
 - Restrooms/hand washing
 - Apparatus
 - Position vehicles
 - Deploy hose lines
 - Rehabilitation/medical
 - Shade/hydration
 - Decontamination
- Issue final notifications and approvals
 - Communications center
 - Adjoining jurisdictions (if applicable)
 - Law enforcement (if applicable)
 - Impacted populations

Discussion Questions

1. What types of weather would impact the decision to burn?
2. When do you make the final “go/no-go” decision?

Activities

1. Determined by instructor

Instructor Notes

1. None

Topic 6-4: Building Fuel Packages

Terminal Learning Objective

At the end of this topic, an instructor trainee, given fuel materials, a prop or facility, and a live fire training evolution, will be able to build a fuel load that is sufficient in material, size, and scale for the prop or facility and meets the objectives of the live fire training evolution.

Enabling Learning Objectives

1. Identify authorized fuel materials per NFPA 1403
2. Identify unauthorized fuel materials per NFPA 1403

3. Identify factors (openings, building materials, room size, etc.) that impact fire growth development and spread
 - Select fuel loads to avoid uncontrolled flashover or backdraft conditions
4. Identify appropriate locations for fuel packages
5. Describe how to build fuel packages that are the appropriate type, orientation, and size to meet live fire training evolution objectives

Discussion Questions

1. What are the impacts of placing fuel packages near entrances or exits?
2. What factors impact the type and size of fuels used to make fuel packages?

Activities

1. Activity 6-4: Building Fuel Packages for Fire Behavior Evolutions
2. Activity 6-4: Building Fuel Packages for Fire Attack Evolutions

Instructor Notes

1. For ELO 5, consider breaking the class into groups to address fuel packages appropriate for different types of props and facilities using photos and examples.

Topic 6-5: Conducting a Student Preburn Walk Through**Terminal Learning Objective**

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to conduct a preburn walk through with all students participating the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe preburn “walkthrough” procedures
 - Brief all participants
 - Training objectives
 - Training structure/prop layout
 - Demonstrate door and window operations
 - Crew and instructor assignments
 - Participant rotations
 - Safety briefing
 - Evacuation signal and procedures
 - Decontamination procedures
 - Check all hose lines
 - Sufficient size for area of fire involvement
 - Adequate number for personnel
 - Charged and test flowed
 - Supervised by qualified instructors
 - Position necessary tools and equipment
 - Check participants
 - All equipment properly worn
 - SCBA with adequate volume

- Communications check per communications plan
- 2. Identify NFPA 1403 standards related to playing the role of a victim during live fire training
 - No person shall be a victim
 - Rescue mannequins in fire fighter PPE shall be specially marked

Discussion Questions

1. Who is responsible for performing PPE checks on Fire Control 3: Structural Fire Fighting students prior to entry into a live fire area?
2. Under what circumstances can you use people as victims during live fire training?
3. What is your AHJ's evacuation signal?

Activities

1. Determined by instructor

Instructor Notes

1. Most of the ELO content comes from "Preburn Procedures" on the "Live Fire Evolution Sample Checklist" from NFPA 1403.

Unit 7: Delivering Live Fire Training Evolutions

Topic 7-1: Operating as Instructor in Charge (Command and Control)

Terminal Learning Objective

At the end of this topic, an instructor trainee, given an incident action plan and live fire training evolutions, will be able to operate as the "instructor in charge" of a live fire training course, supervising instructors and maintaining unity of command and span of control.

Enabling Learning Objectives

1. Describe the qualifications of an instructor in charge
 - NFPA 1403
2. Describe the roles and responsibilities of an instructor in charge
 - Assign instructors to functional crews, backup lines, and functional assignments
 - Rest and rehabilitation of participants and instructors
 - Medical monitoring of participants and instructors
 - Instructor assignments and rotation schedule
 - Verify instructor qualifications to deliver live fire training
 - Assign extra instructors to mitigate extreme weather, large class size, or long class duration
 - Maintain awareness of weather conditions
 - Perform final weather check before ignition
 - Additional requirements for conducting live fire training evolutions with flow path and ventilation-controlled conditions
3. Describe the roles and responsibilities of an instructor
 - Verify PPE is worn according to manufacturers instructions
 - Monitor and supervise students during live fire evolutions

Discussion Questions

1. What are the roles and responsibilities of the instructor in charge?
2. Is the instructor in charge also the incident commander?
3. What is the difference between an instructor and an instructor in charge?

Activities

1. Determined by instructor

Instructor Notes

1. None

Topic 7-2: Operating as Safety Officer

Terminal Learning Objective

At the end of this topic, an instructor trainee, given an incident action plan and live fire training evolutions, will be able to operate as the safety officer for a live fire training course so that hazards and associated risks are identified, unsafe acts are prevented, and unsafe conditions are mitigated.

Enabling Learning Objectives

1. Describe the qualifications of a safety officer
 - NFPA 1403
2. Describe the roles and responsibilities of a safety officer
 - Review the comprehensive burn plan (“burn book”)
 - Review the IAP
 - Review the IWI plan
 - Review the medical plan
 - Review the personnel rehabilitation plan
 - Review the decontamination plan
 - Ensure accountability of personnel
 - Prevent unsafe acts
 - Eliminate unsafe conditions
3. Describe specialized training required for a live fire training safety officer
 - Gas-fired props
 - Flow path and ventilation-controlled conditions

Discussion Questions

1. Can a safety officer have other assignments during live fire training?
2. When would it be appropriate to have more than one safety officer during live fire training?

Activities

1. Determined by instructor

Instructor Notes

1. Although there is no formal activity for this learning objective, the instructor trainees can practice operating as a safety officer during any live fire activities or demonstrations conducted as part of this course.

Topic 7-3: Implementing Student Rotations

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to plan, communicate, and oversee student rotations for a live fire training evolution in a manner that provides the greatest opportunity for meeting objectives while minimizing student risk.

Enabling Learning Objectives

1. Describe how to plan student rotations
 - Impacted by number of students
 - Impacted by training objectives
 - Impacted by prop or facility
2. Describe when to communicate rotations with students
 - Prior to IDLH conditions
3. Describe what to communicate to students
 - Timing
 - Tasks
 - Travel routes
 - Primary and secondary egress
 - Order of operations
 - Emergency plans
 - Emergency assembly point
 - Hazards and risks
 - Postburn procedures
 - Meeting location
 - Decontamination
4. Describe conditions to watch for during a live fire training evolution
 - Panic
 - PPE malfunction or failure
 - Low air alarms
 - Excessive heat release
 - Unintended fire conditions

Discussion Questions

1. Under what conditions should an instructor interrupt a live fire training evolution?
2. What procedures does your agency follow for PPE or SCBA malfunction or failure?

Activities

1. Determined by instructor

Instructor Notes

1. Although there is no formal activity for this learning objective, the instructor trainees can practice implementing student rotations during any live fire activities or demonstrations conducted as part of this course.

Topic 7-4: Implementing the “2 In/2 Out” or RIC Requirement

Terminal Learning Objective

At the end of this topic, an instructor trainee, given laws, regulations, and a live fire training evolution, will be able to implement the “2 in/2 out” or rapid intervention crew/company (RIC) requirement during a live fire training evolution.

Enabling Learning Objectives

1. Identify legislation that sets “2 in/2 out” requirements
 - 29 CFR 1910.134(g)(4)(i)
2. Identify conditions that require a “2 out” team
3. Describe the roles and responsibilities of the “2 out” team
4. Identify the type of PPE worn by the “2 out” team
5. Identify appropriate staging locations for the “2 out” team

Discussion Questions

1. Under what conditions would you activate the “2 out” team?
2. How are RIC and “2 out” teams similar or different?

Activities

1. Determined by instructor

Instructor Notes

1. Although there is no formal activity for this learning objective, the instructor trainees can practice to implement the “2 in/2 out” or rapid intervention crew/company (RIC) requirement during any live fire activities or demonstrations conducted as part of this course.

Topic 7-5: Igniting Fuel Packages

Terminal Learning Objective

At the end of this topic, an instructor trainee, given NFPA 1403, fuel materials, and an ignition source, will be able to ignite, maintain, and control a live fire and verbally describe the roles and responsibilities of an ignition officer.

Enabling Learning Objectives

1. Identify the members of a fire control team
2. Describe the role and responsibilities of an ignition officer
3. Describe the roles and responsibilities of the other members of a fire control team
4. Describe required PPE for the fire control team
5. Describe hose line requirements for the fire control team
6. Identify the makes the decision to ignite
7. Identify who ignites the fuel package
8. Describe how to light fuel packages based on:
 - Fuel type
 - Physical arrangement
 - Lighting sequence
 - Training objectives
9. Identify safety considerations associated with ignition

- Ensure flame area is clear of personnel prior to ignition
- Alternate ignition officer responsibilities after each ignition

Discussion Questions

1. To whom does the ignition officer report?
2. What is the minimum number of members for a fire control team?

Activities

1. Have students practice ignition using the fuel packages developed during Activity 6-4: Building Fuel Packages for Fire Behavior Evolutions and Activity 6-4: Building Fuel Packages for Fire Attack Evolutions.

Instructor Notes

1. None

Topic 7-6: Executing and Evaluating Required Fire Control 3 Skills Exercises

Terminal Learning Objective

At the end of this topic, an instructor trainee, given demonstrations of Fire Control 3: Structural Fire Fighting course plan Skills Exercises and associated equipment and materials, will be able to set up and evaluate students completing the required Fire Control 3: Structural Fire Fighting Skills Exercises in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify the objectives a student must meet in order to successfully complete Skills Exercise 2: Risk Assessment and Door Entry
2. Describe how to set up Skills Exercise 2: Risk Assessment and Door Entry
3. Identify the objectives a student must meet in order to successfully complete Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line
4. Describe how to set up Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line
5. Identify the objectives a student must meet in order to successfully complete Skills Exercise 4: Water Application
6. Describe how to set up Skills Exercise 4: Water Application
7. Identify the objectives a student must meet in order to successfully complete Skills Exercise 5: Fire Attack
8. Describe how to set up Skills Exercise 5: Fire Attack

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Instructor Notes

1. Demonstrate how to set up and teach each required Fire Control 3: Structural Fire Fighting student skills exercise.
2. Allow time for a questions and answer session after each demonstration.

Topic 7-7: Executing and Evaluating Optional Fire Control 3 Skills Exercises

Terminal Learning Objective

At the end of this topic, an instructor trainee, given demonstrations of Fire Control 3: Structural Fire Fighting course plan Skills Exercises and associated equipment and materials, will be able to set up and evaluate students completing the optional Fire Control 3: Structural Fire Fighting Skills Exercises in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Identify the objectives a student must meet in order to successfully complete Skills Exercise 6: Transitional Fire Attack
2. Describe how to set up Skills Exercise 6: Transitional Fire Attack
3. Identify the objectives a student must meet in order to successfully complete Skills Exercise 7: Interior Attic Fire Attack
4. Describe how to set up Skills Exercise 7: Interior Attic Fire Attack
5. Identify the objectives a student must meet in order to successfully complete Skills Exercise 8: Below Grade (Basement) Fire Attack
6. Describe how to set up Skills Exercise 8: Below Grade (Basement) Fire Attack
7. Identify the objectives a student must meet in order to successfully complete Skills Exercise 9: VEIS
8. Describe how to set up Skills Exercise 9: VEIS
9. Identify the objectives a student must meet in order to successfully complete Skills Exercise 10: Ventilation
10. Describe how to set up Skills Exercise 10: Ventilation
11. Identify the objectives a student must meet in order to successfully complete Skills Exercise 11: Portable Water Extinguisher Attack
12. Describe how to set up Skills Exercise 11: Portable Water Extinguisher Attack

Discussion Questions

1. Determined by instructor

Activities

1. Determined by instructor

Instructor Notes

1. Demonstrate how to set up and teach each optional Fire Control 3: Structural Fire Fighter student skills exercise.
2. Allow time for a questions and answer session after each demonstration.

Unit 8: Postburn Procedures

Topic 8-1: Postburn Procedures

Terminal Learning Objective

At the end of this topic, an instructor trainee, given a live fire training evolution, will be able to conduct postburn procedures in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).

Enabling Learning Objectives

1. Describe postburn procedures
 - Account for all personnel
 - Overhaul remaining fires
 - Decontaminate, inspect, and rehabilitate
 - Personnel
 - PPE
 - Equipment
 - Inspect training facilities for stability and hazards
 - Secure training facilities
 - Conduct training critique (after action review/AAR)
 - Complete records and reports
 - Demobilize resources and personnel
 - Complete any other AHJ requirements
 - Release property to owner
 - Close out notifications

Discussion Questions

1. Why is it important to check the students' gear before and after live fire training?
2. How do you document an injury acquired during training?
3. What steps can you take to minimize exposure during decontamination?
4. What records and reports are required after a burn?

Activities

1. Determined by instructor

Instructor Notes

1. Most of the ELO content comes from "Postburn Procedures" on the "Live Fire Evolution Sample Checklist" from NFPA 1403.

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Instructor: Live Fire Training Fixed Facility

Instructor Task Book [Month Year]



California Department of Forestry and Fire Protection
Office of the State Fire Marshal
State Fire Training

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Purpose and Process

Purpose

The State Fire Training Instructor: Live Fire Training – Fixed Facility instructor trainee task book is a performance-based document. It lists the minimum Job Performance, Certification, Education, and Position requirements a candidate must meet in order to teach Fire Control 3: Structural Fire Fighting.

Initiation and Completion Process

Candidate Responsibilities

The candidate is the individual pursuing instructor registration.

The candidate shall:

1. Complete the “Candidate” and “Task Book Initiation Requirements” sections on the Task Book Initiation page.
 - Please print.
2. Complete a block on the Signature Verification page with an original wet-ink signature.
3. Complete all Experience requirements.
4. Complete all Position requirements.
5. Obtain the registered instructor’s signature as approval to open the task book using the “Task Book Initiation Approval” section on the Task Book Initiation page.
 - A candidate may not obtain evaluation signatures for any job performance requirements completed prior to the initiation approval date.
6. Sign and date the “Candidate” verification section on the Review and Approval page with an original wet-ink signature.
7. Complete all Job Performance Requirements.
 - Ensure that an evaluator initials, signs, and dates each task to verify completion.
8. Obtain his or fire chief’s original wet-ink signature on the “Candidate’s Fire Chief” verification section on the Review and Approval page.
9. Create and retain a physical or scanned digital copy of the complete task book.
10. Submit the completed task book and any supporting documentation to State Fire Training when registering to instruct Fire Control 3: Structural Fire Fighting.

It is the candidate’s responsibility to routinely check the State Fire Training website for updates and addendums to open task books. When State Fire Training issues an update or addendum to an open task book, that update, or addendum is required for task book completion.

A candidate should not submit a task book until he or she has completed all requirements and obtained all signatures. State Fire Training will reject and return an incomplete task book.

FINAL DRAFT

Evaluator Responsibilities

An evaluator is any individual who verifies that the candidate can satisfactorily execute a job performance requirement.

A qualified evaluator is a State Fire Training Registered Instructor in Fire Control 3: Structural Fire Fighting.

An instructor task book may have more than one evaluator.

All evaluators shall:

1. Complete a block on the Signature Verification page with an original wet-ink signature.
2. Review and understand the candidate's instructor task book requirements and responsibilities.
3. Verify the candidate's successful completion of one or more job performance requirements through observation or review.
 - A candidate may not obtain evaluation signatures for any job performance requirements completed prior to the initiation approval date.
 - Sign all appropriate lines in the instructor task book with an original wet-ink signature or approved digital signature (e.g. DocuSign or Adobe Sign; a scanned copy of a signature is not acceptable) to record demonstrated performance of tasks.

Registered Instructor Responsibilities

The State Fire Training Registered Instructor of the Instructor: Live Fire Training – Fixed Facility course is the individual who reviews and confirms the completion of a candidate's task book initiation requirements.

The registered instructor shall:

1. Review and understand the candidate's instructor task book requirements and responsibilities.
2. Verify that the candidate has met all requirements and prerequisites prior to initiating the candidate's task book.
3. Open the candidate's task book by signing the "Task Book Initiation Approval" section on the Task Book Initiation page with a wet-ink signature.

Fire Chief (or Fire Technology Director) Responsibilities

The fire chief (or authorized designee) is the individual who reviews and confirms the completion of a candidate's instructor task book.

The fire chief (or authorized designee) shall:

4. Review and understand the candidate's instructor task book requirements and responsibilities.
5. Verify that the candidate has met all requirements and prerequisites.
6. Verify that the candidate has obtained the appropriate signatures to verify successful completion of each job performance requirement.
7. Sign and date the "Fire Chief" verification section on the Review and Approval page with an original wet-ink signature.
 - If signing as an authorized designee, verify that your signature is on file with State Fire Training.

Submission and Review Process

A candidate should not submit a task book until he or she has completed all requirements and obtained all signatures. State Fire Training will reject and return an incomplete task book.

Submit the completed task book and any supporting documentation to State Fire Training.

Office of the State Fire Marshal
State Fire Training
Attn: Instructor Registration
2251 Harvard Street, Suite 400
Sacramento, CA 95815

State Fire Training reviews all submitted task books.

If the task book is complete, State Fire Training will authorize the task book and retain a digital copy of the authorized task book in the candidate's career file.

If the task book is incomplete, State Fire Training will return the task book with a notification indicating what needs to be completed prior to resubmission.

Completion of this instructor task book is one step in the instructor registration process. Please refer to the *State Fire Training Procedures Manual* for the complete list of qualifications required to teach Fire Control 3: Structural Fire Fighting.

Task Book Initiation

The instructor trainee task book may be initiated on the final day of the Instructor: Live Fire Training – Fixed Facility course.

Each JPR shall be conducted, reviewed, and validated after the candidate initiates the task book.

This task book must be completed within three years of initiation.

Candidate

Name: _____

SFT ID Number: _____

Fire Agency: _____

Task Book Initiation Requirements

The following requirements must be completed prior to opening this task book.

Certification

Fire Fighter II or Company Officer

Complete

Instructor II, or Current Registered Instructor with State Fire Training

Education

ICS-300

Complete

Safety Officer, S-404, or Safety Officer, L-954, or FDSOA Incident Safety Officer

Fire Control 3B: Structural Fire Fighting in Live-fire Simulators (2009) or;

Fire Control 3: Structural Fire Fighting (2018)

Instructor: Live Fire Training – Fixed Facility (2018)

Position

Fire Fighter for three (3) years full-time, or six (6) years volunteer.

Complete

Task Book Initiation Approval

SFT Registered Instructor: _____
Registered Instructor Live Fire Training Fixed Facility Printed Name

I, the undersigned, am the person authorized to verify the candidate has successfully completed the Instructor: Live Fire Training – Fixed Facility course and verify the candidate’s task book requirements and to initiate this task book in partial fulfillment of the requirements to teach Fire Control 3: Structural Fire Fighting. I hereby certify under penalty of perjury under the laws of the State of California, that the completion of all requirements to open the task book documented herein are true in every respect. I understand that misstatements, omissions of material facts, or falsification of information or documents may be cause for rejection.

Registered Instructor Live Fire Training Fixed Facility Signature

Date

Signature Verification

The following individuals are SFT registered Fire Control 3: Structural Fire Fighting instructors and have the authority to verify portions of this instructor task book using the signature recorded below.

Please print except for the Signature line. Print and add additional signature pages as needed.

Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____
Name: _____	Name: _____
Job Title: _____	Job Title: _____
Organization: _____	Organization: _____
Signature: _____	Signature: _____

Task Book Requirements

Job Performance Requirements

This instructor task book includes the training objectives included in the Instructor Live Fire Training – Fixed Facility course plan, which is based on NFPA 1403: Standard on Live Fire Training Evolutions (2018).

The candidate must complete each job performance requirement (JPR) in accordance with the standards of the authority having jurisdiction (AHJ) or the National Fire Protection Association (NFPA), whichever is more restrictive.

Each task must be performed twice.

- The two instances must occur during two different courses.
- The same evaluator cannot sign off on the same task twice.

Examples of correct and incorrect evaluation:

Correct: Task completed during two separate courses and evaluated by two separate individuals.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ
b. Identify components of a live fire burn plan (“burn book”)	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	BBB123	5/15/18	CWJ

Incorrect: Task completed twice during one course but evaluated by two separate individuals.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ
b. Identify components of a live fire burn plan (“burn book”)	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	AAA123	2/8/18	CWJ

Incorrect: Task completed during two separate courses but evaluated by the same individual.

1. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe purpose of a live fire burn plan	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS
b. Identify components of a live fire burn plan (“burn book”)	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS
c. Identify records-retention requirements for burn plans	AAA123	2/8/18	JAS	BBB123	5/15/18	JAS

Job Performance Requirements

Introduction to Fire Control 3: Structural Fire Fighting

2. Identify the goals and objectives for students enrolled in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify Course Details						
b. Identify Required Resources						
c. Identify key terminology						
d. Identify Units and Topics						
e. Identify Props and Structures documents						
f. Identify Instructor Demonstrations						
g. Identify Skills Exercises						
3. Identify the State Fire Training (SFT) requirements for becoming a registered SFT Fire Control 3: Structural Fire Fighting instructor.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify desirable traits of live fire training instructors						
b. Identify SFT requirements for Fire Control 3: Structural Fire Fighting instructors						

4. Describe student requirements for enrollment in Fire Control 3: Structural Fire Fighting	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Authorization to attend training from fire agency or ALA/ARTP						
b. Verification of meeting prerequisite requirements						
c. Current SCBA fit test documentation						
d. Cal/OSHA compliant structural PPE						
e. Completed release of liability form						

Introduction to Live Fire Training

5. Implement live fire training in accordance with NFPA 1403, Cal/OSHA, and authority having jurisdiction (AHJ) requirements.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify significance of NFPA standards						
b. Describe contents of NFPA 1403						
c. Describe how to apply NFPA 1403 to Fire Control 3: Structural Fire Fighting						
d. Identify legal requirements associated with live fire training						

6. Minimize thermal and cardiovascular strain during live fire training.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe why aerobic fitness is necessary to perform fire fighting activity						
b. Describe cardiovascular and thermal responses to fire fighting						
c. Describe how fire fighting activity and turnout gear impact cardiovascular and thermal strain						
d. Describe how weather impacts cardiovascular and thermal strain						
e. Describe warning signs for heat illnesses that may occur in live fire training and activity						
f. Describe how to prevent injuries and heat illness during fire fighting training and activity						
g. Describe risk factors for cardiovascular disease						
h. Describe importance of modifiable risk factors for cardiovascular disease and ways to decrease those factors						
i. Describe goals of on-site rehabilitation						
j. Describe dangers associated with exposure to smoke and particulate matter						
k. Describe importance of proper on-site decontamination, hygiene, gear cleaning, and showers						

7. Develop and communicate an incident within an incident (IWI) plan for a live fire training evolution in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify factors that contribute to an IWI, line of duty injury, or death during live fire training						
b. Describe how to mitigate common factors that can lead to line of duty injury and death during live fire training						
c. Describe purpose of IWI plan						
d. Describe relationship between instructor and AHJ hosting the live fire						
e. Describe how respond to an IWI, serious injury, or line of duty death						

Preburn Planning

8. Evaluate fixed facility training sites in order to select a site that fulfills the training objectives with minimal mitigation requirements in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify requirements of a viable live fire training site						
b. Describe conditions that could impact site use						
c. Identify site evaluation communication and notification needs						
d. Identify site evaluation documentation needs						

9. Assemble a comprehensive burn plan (“burn book”) that contains all documentation necessary to conduct a live fire training evolution in accordance with NFPA standards and the policies and procedures of State Fire Training (SFT) and the authority having jurisdiction (AHJ).	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
d. Describe purpose of a live fire burn plan						
e. Identify components of a live fire burn plan (“burn book”)						
f. Identify records-retention requirements for burn plans						
10. Develop a preburn plan and conduct preburn planning requirements in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify basic components of a preburn plan						
b. Describe preburn planning requirements						
11. Prepare a training prop or structure for live fire training in order to fulfill training objectives in accordance with NFPA standards and the policies and procedures of the authority having jurisdiction (AHJ).	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to prepare a training structure for live fire training						

12. Describe how to operate and maintain a gas-fired prop in accordance with NFPA 1403, manufacturer specifications, and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to operate gas-fired props or facilities						
b. Describe burning characteristics of gas-fired props or facilities						
c. Identify common safety features of gas-fired props or facilities						
d. Identify logistical needs of gas-fired props or facilities for live fire training						
e. Describe how to maintain gas-fired props or facilities						

Fire Dynamics

13. Teach students how to identify, define, and describe fire science concepts and appropriately apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Define terminology associated with fire chemistry						
b. Describe differences between energy and temperature						
c. Describe concept of power						
d. Describe how physical states of matter influence fire behavior						
e. Identify products of combustion						
f. Identify methods of heat transfer						

g. Describe impact of oxygen concentration on life safety and fire growth						
h. Identify components of fire triangle and fire tetrahedron						
14. Teach students how to identify and describe fire growth and development concepts and appropriately apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe stages of fire						
b. Identify factors that influence fire behavior						
c. Describe hostile fire events						
15. Teach students how to read smoke emanating from a structure and use that reading to identify pre-phenomena conditions, fire location, and spread during interior structural fire fighting activities, in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.	1st Evaluation			2nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe composition of smoke						
b. Describe attributes of smoke						
c. Identify hazards of smoke						

16. Teach students how to identify and describe concepts related to water as an extinguishing agent and apply them to interior structural fire fighting activities in accordance with content identified in the State Fire Training (SFT) Fire Control 3: Structural Fire Fighting course plan.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify concepts associated with water as an extinguishing agent						
b. Describe how water and steam impact fire tetrahedron						
c. Describe gas cooling						
d. Describe surface cooling						
e. Describe cooling capacity						
17. Demonstrate principles of fire dynamics in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to set up and demonstrate Instructor Demonstration 1: Dust Explosion						
b. Describe how to set up and demonstrate Instructor Demonstration 2: Combustion						
c. Describe how to set up and demonstrate Instructor Demonstration 3: Pyrolysis						
d. Describe how to set up and demonstrate the principles taught in Topic 2-2: Fire Growth and Development						
e. Describe how to set up and demonstrate the principles taught in Topic 2-3: Characteristics of Smoke						
f. Describe how to set up and demonstrate the principles taught in Topic 2-4: Water as an Extinguishing Agent						
g. Describe how to set up and demonstrate the principles taught in Topic 3-4: Identify Flow Paths and Manage Air Tracks						

Set Up and Walk Through

18. Develop and implement an incident action plan (IAP) for a live fire training course in accordance with the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to complete an ICS 201: Incident Briefing form						
b. Describe how to complete an ICS 204: Assignment List form						
c. Describe how to complete an ICS 205: Incident Radio Communications Plan form						
d. Describe how to complete an ICS 206: Medical Plan form						
e. Describe how to complete an ICS 215: Operational Planning Worksheet form						
f. Describe how to complete an ICS 215A: Incident Action Plan Safety Analysis form						
19. Secure a water supply with sufficient rate and duration for control and extinguishment of the training fire, backup lines to protect personnel, and protection of exposed property.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe minimum water supply requirements for live fire training evolutions						
b. Identify hose line placement for live fire training evolutions						
c. Identify conditions that allow for a single source water supply						

20. Conduct an instructor briefing and a preburn walk through with all instructors and personnel supporting the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to identify crew and instructor assignments						
b. Describe how instructor in charge briefs all participating instructors						
c. Describe how safety officer briefs all participating instructors						
d. Describe how to initiate site plan						
e. Describe how to Issue final notifications and approvals						
21. Build a fuel load that is sufficient in material, size, and scale for the prop or facility and meets the objectives of the live fire training evolution.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify authorized fuel materials per NFPA 1403						
b. Identify unauthorized fuel materials per NFPA 1403						
c. Identify factors that impact fire growth development and spread						
d. Identify appropriate locations for fuel packages						
e. Describe how to build fuel packages that are the appropriate type, orientation, and size to meet live fire training evolution objectives						
f. Identify authorized fuel materials per NFPA 1403						

22. Conduct a preburn walk through with all students participating the live fire training evolution in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to brief all participants						
b. Describe how to check all hose lines						
c. Describe how to position necessary tools and equipment						
d. Describe how to check participants						
e. Describe how to conduct a communications check per communications plan						
f. Describe how to check all hose lines						
g. Identify NFPA 1403 standards related to playing the role of a victim during live fire training						

Delivering Live Fire Training Evolutions

23. Operate as the “instructor in charge” of a live fire training course, supervising instructors and maintaining unity of command and span of control.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe qualifications of an instructor in charge						
b. Describe roles and responsibilities of an instructor in charge						
c. Describe roles and responsibilities of an instructor						

24. Operate as the safety officer for a live fire training course so that hazards and associated risks are identified, unsafe acts are prevented, and unsafe conditions are mitigated.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe qualifications of a safety officer						
b. Describe roles and responsibilities of a safety officer						
c. Describe specialized training required for a live fire training safety officer						
25. Plan, communicate, and oversee student rotations for a live fire training evolution in a manner that provides the greatest opportunity for meeting objectives while minimizing student risk.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to plan student rotations						
b. Describe when to communicate rotations with students						
c. Describe what to communicate to students						
d. Describe conditions to watch for during a live fire training evolution						
26. Implement the “2 in/2 out” or rapid intervention crew/company (RIC) requirement during a live fire training evolution.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify legislation that sets “2 in/2 out” requirements						
b. Identify conditions that require a “2 out” team						
c. Describe roles and responsibilities of the “2 out” team						
d. Identify type of PPE worn by the “2 out” team						
e. Identify appropriate staging locations for the “2 out” team						

27. Ignite, maintain, and control a live fire and verbally describe the roles and responsibilities of an ignition officer.	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify members of a fire control team						
b. Describe role and responsibilities of an ignition officer						
c. Describe roles and responsibilities of the other members of a fire control team						
d. Describe required PPE for the fire control team						
e. Describe hose line requirements for the fire control team						
f. Identify who makes the decision to ignite						
g. Identify who ignites the fuel package						
h. Describe how to light fuel packages						
i. Identify safety considerations associated with ignition						

28. Set up and evaluate students completing the required Fire Control 3: Structural Fire Fighting Skills Exercises in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify objectives a student must meet in order to successfully complete Skills Exercise 2: Risk Assessment and Door Entry						
b. Describe how to set up Skills Exercise 2: Risk Assessment and Door Entry						
c. Identify objectives a student must meet in order to successfully complete Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line						
d. Describe how to set up Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line						
e. Identify objectives a student must meet in order to successfully complete Skills Exercise 4: Water Application						
f. Describe how to set up Skills Exercise 4: Water Application						
g. Identify objectives a student must meet in order to successfully complete Skills Exercise 5: Fire Attack						
h. Describe how to set up Skills Exercise 5: Fire Attack						
29. Set up and evaluate students completing the optional Fire Control 3: Structural Fire Fighting Skills Exercises in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Identify objectives a student must meet in order to successfully complete Skills Exercise 6: Transitional Fire Attack						
b. Describe how to set up Skills Exercise 6: Transitional Fire Attack						

c. Identify objectives a student must meet in order to successfully complete Skills Exercise 7: Interior Attic Fire Attack						
d. Describe how to set up Skills Exercise 7: Interior Attic Fire Attack						
e. Identify objectives a student must meet in order to successfully complete Skills Exercise 8: Below Grade (Basement) Fire Attack						
f. Describe how to set up Skills Exercise 8: Below Grade (Basement) Fire Attack						
g. Identify objectives a student must meet in order to successfully complete Skills Exercise 9: VEIS						
h. Describe how to set up Skills Exercise 9: VEIS						
i. Identify objectives a student must meet in order to successfully complete Skills Exercise 10: Ventilation						
j. Describe how to set up Skills Exercise 10: Ventilation						
k. Identify objectives a student must meet in order to successfully complete Skills Exercise 11: Portable Water Extinguisher Attack						
l. Describe how to set up Skills Exercise 11: Portable Water Extinguisher Attack						

Postburn Procedures

30. Conduct postburn procedures in accordance with NFPA 1403 and the policies and procedures of the authority having jurisdiction (AHJ).	1 st Evaluation			2 nd Evaluation		
	Course Code	Date	Initials	Course Code	Date	Initials
a. Describe how to account for all personnel						
b. Describe how to overhaul remaining fires						

c. Describe how to decontaminate, inspect, and rehabilitate						
d. Describe how to inspect training facilities for stability and hazards						
e. Describe how to secure training facilities						
f. Describe how to conduct training critique (after action review/AAR)						
g. Describe how to complete records and reports						
h. Describe how to demobilize resources and personnel						
i. Describe how to complete any other AHJ requirements						
j. Describe how to release property to owner						
k. Describe how to issue close out notifications						

FINAL DRAFT

Certification

The candidate meets the following requirements for certification.

- Fire Fighter II or Company Officer
- Instructor II or current SFT registered instructor

Education

The candidate meets the following requirements for education.

- ICS-300
- Safety Officer S-404, or Safety Officer, L-954, or FDSOA Incident Safety Officer
- Fire Control 3B: Structural Fire Fighting in Live-fire Simulators (2009), or Fire Control 3: Structural Fire Fighting (2018)
- Instructor: Live Fire Training – Fixed Facility

Position

The candidate meets the following qualifications for position. Performing in an acting capacity does not qualify.

Position	Agency	Appointment Date
Fire Fighter for three (3) years full-time, or six (6) years volunteer		

FIRE CONTROL 3 – Burn Procedures

Go / No Go Checklist

Burn # _____ Date: _____

PREBURN

- | | |
|---|--|
| <input type="checkbox"/> Training structure inspected to determine structural integrity | <input type="checkbox"/> Minimum of two exits |
| <input type="checkbox"/> Hazards that could cause harm or damage PPE removed | <input type="checkbox"/> Water supplies for both the attack and backup lines come from two different sources |
| <input type="checkbox"/> Windows operational and unlocked | <input type="checkbox"/> Attack line and back up line shall be differentiated |
| <input type="checkbox"/> Doors operational and unlocked | <input type="checkbox"/> Appropriate type and amount of fuel |
| | <input type="checkbox"/> Emergency medical services |

BRIEFING

- | | |
|---|---|
| <input type="checkbox"/> All participants briefed prior to ignition | <input type="checkbox"/> Communication plan discussed |
| <input type="checkbox"/> Instructor and participant walkthrough | <input type="checkbox"/> Evacuation signal and meeting location |
| <input type="checkbox"/> Instructor and participant assignments | <input type="checkbox"/> PPE checked |
| <input type="checkbox"/> Command post, staging and rehab areas identified | <input type="checkbox"/> SCBA has adequate air supply |

SAFETY MESSAGE

- We are dealing with live fire today. The fire does not know this is a training burn. Do not let your guard down
- Identify, intervene and report any unsafe acts or conditions
- Listen to Instructions and Instructors at all times, if directions are unclear ask the instructor
- Report ALL injuries regardless of how minor
- At the completion of the training and/or if we have an emergency we will meet at **(Specify Location)**
- All participants including instructors stay hydrated, drinking water can be found at **(Specify Location)**
- Safety gear required at all times
- **TREAT ALL PASS DEVICES AS REAL ACTIVATIONS**

LIGHTING PROCEDURES

- Primary instructor will discuss the evolution with the Ignition Officer and Interior Safety**
 - When ready the Primary Instructor will request **“permission to light”**
- Interior Safety will ensure the following prior to each evolution:**
 - Fuel load is appropriate
 - Attack line / backup line are operational and staffed
 - Exits are unobstructedOnce completed, Interior Safety will advise the Safety Officer that **“interior is ready to go fire in the hole”**
- The Safety Officer will ensure the following prior to each evolution:**
 - Overall scene safety
 - Water supplies are staffed and operational. RIC is ready
 - PPE check prior to participants entering building
 - Confirm PAR numbers with Interior Safety (# instructors, # students for a total of #)
 - Once completed, the Safety Officer will advise the IC that **“we’re ready to go fire in the hole”**
- The Incident Commander will perform a communications check and then give permission for ignition**

COMPLETED BY

SIGNATURE

DATE & TIME

FIRE CONTROL 3- CREW ROTATION & ACCOUNTABILITY

25 student class

Burn # _____

Date: _____

		Group 1	Group 2	Group 3	Group 4	Group 5
Stations						

(/) Indicates that crew is in progress (X) Indicates the crew has completed

CREW ACCOUNTABILITY

Group 1
1.
2.
3.
4.
5.
Staff:
Staff:

Group 2
1.
2.
3.
4.
5.
Staff:
Staff:

Group 3
1.
2.
3.
4.
5.
Staff:
Staff:

Group 4
1.
2.
3.
4.
5.
Staff:
Staff:

Group 5
1.
2.
3.
4.
5.
Staff:
Staff:

Overhead Staff
1.
2.
3.
4.
5.
6.
7.

Fire Control 3: Structural Fire Fighting

Props and Structures: Container (Class A)

Container (Class A)

This is a list of the instructor demonstrations and skill exercises that can be completed using a Class A container. All props, materials, and actions should be prepared, used, or carried out in accordance with the requirements of NFPA 1403 Standard on Live Fire Training Evolutions (2018).

Structure/Prop Preparation

- Assemble or acquire before class begins
- Must, at a minimum, include a window and a door

Materials

- Full structural PPE including SCBA
- Class A structure (non-gas fired)
- Class A burn materials
- Ignition devices
- Water supply
- Pumping apparatus
- Nozzles
- Scoop shovel
- Broom
- Appropriate lighting

Formats

- Instructors perform Instructor Demonstrations with student interaction as appropriate.
- Students perform Skills Exercises under direct instructor supervision.

Instructor Demonstrations

The knowledge and skills from the following topics can be demonstrated in a Class A container.

- Topic 2-2: Fire Growth and Development
- Topic 2-3: Characteristics of Smoke
- Topic 2-4: Water as an Extinguishing Agent
- Topic 3-4: Identify Flow Paths and Manage Air Tracks

Skills Exercises

The following student skills exercises can be executed in a Class A container.

Required

- Skills Exercise 1: Combustion
- Skills Exercise 2: Risk Assessment and Door Entry
- Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line
- Skills Exercise 4: Water Application

Fire Control 3: Structural Fire Fighting

Props and Structures: Container (Class A)

- Skills Exercise 5: Fire Attack

Recommended

- Skills Exercise 6: Transitional Fire Attack
- Skills Exercise 7: Interior Attic Fire Attack
- Skills Exercise 8: Below Grade (Basement) Fire Attack
- Skills Exercise 9: VEIS
- Skills Exercise 10: Ventilation
- Skills Exercise 11: Portable Water Extinguisher Attack

Safety

- Cover established and approved Incident Action Plan
- Conduct NFPA safety briefing
- Communicate clearly during safety walkthrough and PPE checks
- Ensure that students understand all instructions
- Keep a watchful eye on participants and ensure their safety
- Never use live persons as victims in an IDLH environment

Fire Control 3: Structural Fire Fighting

Props and Structures: Fixed Facility (Class A Compatible)

Fixed Facility (Class A Compatible)

This is a list of the instructor demonstrations and skill exercises that can be completed using a concrete or metal fixed training facility. All props, materials, and actions should be prepared, used, or carried out in accordance with the requirements of NFPA 1403 Standard on Live Fire Training Evolutions (2018).

Structure/Prop Preparation

- Assemble, acquire, or schedule before class begins

Materials

- Full structural PPE including SCBA
- Ladders
- Hose and nozzles
- Water supply
- Smoke machine (if available)
- OSB/Plywood
- Lumber and building materials
- Drywall
- Fire fighting tools (pushing, pulling, prying)
- Rope
- Lights

Formats

- Instructors perform Instructor Demonstrations with student interaction as appropriate.
- Students perform Skills Exercises under direct instructor supervision.

Instructor Demonstrations

The knowledge and skills from the following topics can be demonstrated in a Class A compatible fixed facility.

- Topic 2-2: Fire Growth and Development
- Topic 2-3: Characteristics of Smoke
- Topic 2-4: Water as an Extinguishing Agent
- Topic 3-4: Identify Flow Paths and Manage Air Tracks

Skills Exercises

The following student skills exercises can be executed in a Class A compatible fixed facility.

Required

- Skills Exercise 1: Combustion
- Skills Exercise 2: Risk Assessment and Door Entry
- Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line

Fire Control 3: Structural Fire Fighting

Props and Structures: Fixed Facility (Class A Compatible)

- Skills Exercise 4: Water Application
- Skills Exercise 5: Fire Attack

Recommended

- Skills Exercise 6: Transitional Fire Attack (recommended)
- Skills Exercise 7: Interior Attic Fire Attack (recommended)
- Skills Exercise 8: Below Grade (Basement) Fire Attack (recommended)
- Skills Exercise 9: VEIS (recommended)
- Skills Exercise 10: Ventilation (recommended)
- Skills Exercise 11: Portable Water Extinguisher Attack (recommended)

Safety

- Cover established and approved Incident Action Plan
- Conduct NFPA safety briefing
- Communicate clearly during safety walkthrough and PPE checks
- Keep a watchful eye on participants and ensure their safety
- Never use live persons as victims in an IDLH environment
- Ensure that students understand all instructions

Fire Control 3: Structural Fire Fighting

Props and Structures: Fixed Facility (Class A Compatible)

Plans / Images / Diagrams



Fire Control 3: Structural Fire Fighting

Props and Structures: Gas-Fired Props

Gas-Fired Props

This is a list of the instructor demonstrations and skill exercises that can be completed using a gas-fired prop. All props, materials, and actions should be prepared, used, or carried out in accordance with the requirements of NFPA 1403 Standard on Live Fire Training Evolutions (2018).

Structure/Prop Preparation

- Assemble, acquire, or schedule before class begins

Materials

- Full structural PPE including SCBA
- Class B fuel
- Qualified prop operator
- Hose and nozzles
- Water supply
- Smoke machine (if available)
- Fire fighting tools (pushing, pulling, prying)
- Lighting
- Ladder

Formats

- Instructors perform Instructor Demonstrations with student interaction as appropriate.
- Students perform Skills Exercises under direct instructor supervision.

Instructor Demonstrations

The knowledge and skills from the following topics can be demonstrated in a gas-fired prop.

- Topic 2-4: Water as an Extinguishing Agent

Skills Exercises

The following student skills exercises can be executed using a gas-fired prop.

Required

- Skills Exercise 1: Combustion
- Skills Exercise 2: Risk Assessment and Door Entry
- Skills Exercise 3: Stretching, Flaking, and Advancing an Attack Line
- Skills Exercise 4: Water Application
- Skills Exercise 5: Fire Attack

Recommended

- Skills Exercise 6: Transitional Fire Attack
- Skills Exercise 7: Interior Attic Fire Attack
- Skills Exercise 8: Below Grade (Basement) Fire Attack

Fire Control 3: Structural Fire Fighting

Props and Structures: Gas-Fired Props

- Skills Exercise 9: VEIS
- Skills Exercise 10: Ventilation
- Skills Exercise 11: Portable Water Extinguisher Attack

Safety

- Cover established and approved Incident Action Plan
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Plans / Images / Diagrams

