



COURSE INFORMATION AND REQUIRED MATERIALS

Course: Fire Inspector 1C: Systems and Equipment, Hazards, and Emergency Planning (2011) CFSTES
Hours: 32:00 (29:00 instruction/3:00 testing)
Designed For: The entry-level inspector
Description: Upon completion of this course the student will have a basic knowledge of existing fixed fire suppression systems; existing fire detection and alarm systems; portable fire extinguishers; incidental storage, handling, and use of hazardous materials, flammable and combustible liquids, and gases; hazardous conditions involving equipment, processes, and operations; emergency planning and preparedness measures; and inspections related to tents, canopies and temporary membrane structures.
Prerequisites: Fire Inspector 1B: Introduction to Fire and Life Safety
Certification: 80%
Standard: Fire Inspector I
Class Size: 30
Restrictions: None

REQUIRED STUDENT MATERIALS	EDITION	PUBLISHER
▪ California Fire Code	Current	ICC
▪ Fire Inspection and Code Enforcement	Seventh	FPP
REQUIRED INSTRUCTOR MATERIALS		
▪ California Building Code	Current	ICC
▪ California Fire Code (w/ Title 19 excerpts)	Current	ICC
▪ California Code of Regulations (CCR) Title 19	Current	OAL or Barclays
▪ Inspection and Code Enforcement Instructor Resource Kit	Seventh	FPP
▪ Protecting Your Home from Wildfire with Jack Cohen	---	USFS
▪ Video clip of the MGM fire (1978)	---	History

PUBLISHER CONTACT INFORMATION		
Barclays	Barclays	www.west.thompson.com
ICC	International Code Council	http://www.iccsafe.org/STORE/Pages/default.aspx
FPP	Fire Protection Publications	www.ifsta.org
History	Engineering Disasters	www.history.com
OAL	Office of Administrative Law	www.oal.ca.gov/publications.htm
USFS	USFS Rocky Mountain Research Station	www.fs.fed.us/rm/publications/titles/videos/protecting.html

FIRE INSPECTOR 1C COURSE PLAN

Course Objectives: to provide the student with:

- a) An introduction to existing fixed fire suppression systems
- b) An introduction to existing fire detection and alarm systems
- c) An introduction to portable fire extinguishers
- d) An introduction to incidental storage, handling, and use of hazardous materials, flammable and combustible liquids, and gases
- e) An introduction to hazardous conditions involving equipment, processes, and operations
- f) An introduction to emergency planning and preparedness measures
- g) An introduction to inspections related to tents, canopies and temporary membrane structures

Course Content 29:00

Unit 1: Introduction

Topic 1-1: Orientation and Administration 0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify the classroom and facility requirements along with the course completion requirements.



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Enabling Learning Objectives (ELO):

1. Identify facility and classroom requirements
 - Start and end times
 - Breaks
 - Bathrooms
 - Facility evacuation requirements
 - Other requirements
2. Identify the course completion requirements for Fire Inspector 1A: The Role of the Fire Inspector
 - 80% is required on all formative and summative tests
 - Reading assignments
 - Completion of class activities

Discussion Questions

1. What are formative and summative tests?

Activities

1. To be determined by the instructor

Unit 2: Existing Fixed Fire Suppression Systems

Topic 2-1: Water-Based Fire Protection Systems..... 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify the types and components of water-based fire protection systems, types and components of standpipes, stationary fire pumps, and the operations of fixed fire suppression systems; describe periodic inspection and testing; and verify deficiencies.

Enabling Learning Objectives (ELO):

1. Identify the types and components of water-based fire protection systems, including:
 - Automatic sprinklers
 - Water spray
 - Water mist
 - Foam water
2. Identify the types and components of standpipes, including:
 - Classifications
 - Wet and dry pipe systems
3. Identify stationary fire pumps, including:
 - Types
 - Components
 - Drivers (engine or motor)
 - Controllers
4. Describe periodic inspection and testing, including:
 - Determining the adequacy of fire protection based on the hazard present
 - Common components to inspect
 - Documentation
 - Other considerations
 - California adoption of NFPA 25
 - CCR Title 19
5. Identify the operations of fixed fire suppression systems, including:
 - Automatic fire sprinklers
 - Fire pumps
 - Standpipes
6. Describe how to verify deficiencies, including:
 - Observation and documentation



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- Reporting
- Resolving or referring

Discussion Questions

1. Is a water spray system the same as a fire sprinkler system?
2. Where do you find a dry pipe fire sprinkler system?
3. How often does the code require fire pump testing? Who can do the testing?
4. When does the code require inspection, testing, and maintenance for a fire sprinkler system?

Activities

1. To be determined by instructor.

Topic 2-2: Special-Agent Fire Extinguishing Systems 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify system types, components, locations, and process; describe periodic inspection and testing; and verify deficiencies.

Enabling Learning Objectives (ELO):

1. Identify system types and components, including:
 - Dry chemical
 - Wet chemical
 - Clean agent
 - CO2 systems
 - Foam systems
2. Identify locations and process, including:
 - Flammable and combustible liquids and gases
 - Water reactive
 - Food preparation equipment
 - File storage
 - Sensitive electronic equipment
 - Electrical transformers and switches
3. Describe periodic inspection and testing, including:
 - Determining the adequacy of fire protection based on the hazard present
 - Common components to inspect
 - Other considerations
 - CCR, Title 19, chapter 5
4. Describe how to verify deficiencies, including:
 - Observation and documentation
 - Reporting
 - Resolving or referring

Discussion Questions

1. What is the most common application for a wet chemical fire extinguishing system?
2. What is the most common application for a dry chemical fire extinguishing system?
3. What is the most common application for a clean agent fire extinguishing system?

Activities

1. To be determined by instructor.

Unit 3: Existing Fire Detection and Alarm Systems

Topic 3-1: Fire Alarm Systems and Components 3:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify detection and alarm system components, alarm-initiating devices, notification methods, when panels must be monitored, and the types of signals transmitted.

Enabling Learning Objectives (ELO):

1. Identify detection and alarm system components, including:



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- Fire alarm control units
 - Power supplies
 - Initiating devices
 - Alerting devices
 - Auxiliary control interface
2. Identify alarm-initiating devices, including:
 - Smoke detectors
 - Heat detectors
 - Pilot sprinkler
 - Manual pull stations
 - Flame detectors
 - Water flow switches
 - Gas detectors
 3. Identify notification methods, including:
 - Public mode
 - Private mode
 4. Identify when panels must be monitored, including:
 - Supervised
 - Non-supervised
 5. Identify the types of signals that are transmitted, including:
 - Supervisory
 - System trouble
 - Alarms

Discussion Questions

1. What is the difference between an initiating and a notification appliance?
2. What is the difference between a supervisory and a trouble signal?
3. What types of signals does the code require be transmitted to a central station?
4. What is the difference between a public mode and a private mode fire alarm system?
5. When is a fire alarm system required to be monitored?

Activities

1. To be determined by instructor.

Topic 3-2: Inspection, Testing, and Maintenance 0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to observe the service, testing/maintenance, and periodic inspections process.

Enabling Learning Objectives (ELO):

1. Describe how to observe the service, testing/maintenance, and periodic inspection process, including:
 - Conducting the visual observation of components
 - Determining panel readiness
 - Confirming that all initiating devices are unobstructed
 - Reviewing the owner's documentation of periodic inspections
 - Reviewing any third-party notices of deficiencies in the system
 - Verifying deficiencies, including:
 - Observation and documentation
 - Reporting
 - Resolving or referring

Discussion Questions

1. When can a fire alarm system be disabled?
2. Who should be notified when a fire alarm system is disabled?



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3. What is the inspection interval for inspection of a fire alarm system?

Activities

1. Given a hypothetical scenario, complete an NFPA 72 Inspection and Testing form.

Unit 4: Portable Fire Extinguishers

Topic 4-1: Components and Operation 1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify fire classifications of portable fire extinguishers; determine fire extinguisher ratings; describe portable fire extinguisher components; identify agents used in portable fire extinguishers; identify portable fire extinguisher types; describe selection and location methods and properly use a portable fire extinguisher.

Enabling Learning Objectives (ELO):

1. Identify fire classifications of portable fire extinguishers
 - A, B, C, D, K
2. Describe how to determine fire extinguisher ratings
3. Describe portable fire extinguisher components
4. Identify agents used in portable fire extinguishers, including:
 - Water
 - CO₂
 - Foam
 - Dry chemical
 - Wet chemical
 - Clean agents
5. Identify portable fire extinguisher types, including:
 - Stored pressure
 - Cartridge operated
 - Pump operated
6. Describe selection and location methods, including:
 - Hazard
 - Travel distance
 - Size
 - Mounting height requirements
7. Describe the proper use of a portable fire extinguisher on a fire (PASS)
 - Pull the pin
 - Aim at the base of the fire
 - Squeeze the handle
 - Sweep the nozzle from side to side

Discussion Questions

1. How often should an inspector do a visual inspection of a fire extinguisher?
2. When does the code require a hydrostatic test for a fire extinguisher?
3. What are the classifications of fire as it relates to the classification of a fire extinguisher?

Activities

1. Activity 3-1: Portable Fire Extinguisher Ratings

Topic 4-2: Inspection, Testing, and Maintenance 1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to service, inspect, and test a portable fire extinguisher.

Enabling Learning Objectives (ELO):

1. Describe the service, testing/maintenance and periodic inspection process, including:
 - Verifying pressure



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- Checking inspection tag(s)
- Identifying service intervals (CCR, Title 19, chapter 3)
- Checking service collar
- Checking the seal
- Identifying hydrostatic test identification
- Verifying any deficiencies
 - Observe and document
 - Report
 - Resolve or refer
- Checking for obstructions

Discussion Questions

1. How many tags are required on a fire extinguisher?
2. When does the code require a licensed technician to inspect a fire extinguisher?

Activities

1. To be determined by instructor.

Unit 5: Incidental Storage, Handling, and Use of Hazardous Materials, Flammable and Combustible Liquids, and Gases

Topic 5-1: Classification and Properties 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify physical and chemical properties of liquids, gases, and solids; describe physical and health hazards of highly toxic, toxic, and corrosive materials; identify ways to determine chemical information; and identify the common components of a Material Safety Data Sheet.

Enabling Learning Objectives (ELO):

1. Define solid, liquid and gas
2. Identify physical properties of liquids, gases and solids, including:
 - Color
 - Smell
 - Freezing point
 - Boiling point
 - Melting point
 - Opacity
 - Viscosity
 - Density
 - Specific gravity
 - Vapor density
 - Vapor pressure
 - Water solubility
 - Flammable/explosive range
 - Flashpoint
 - Evaporation rate
3. Identify chemical properties of liquids, gases and solids, including:
 - Heat of combustion
 - Reactivity with water
 - pH scale
4. Describe the physical hazards of:
 - Explosives and blasting agents
 - Flammable and combustible liquids
 - Flammable solids and gases
 - Organic peroxide materials



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- Oxidizer materials
 - Pyrophoric materials
 - Unstable (reactive) materials
 - Water reactive solids and liquids
 - Cryogenic fluids
 - Combustible fibers
5. Describe the health hazards of:
- Highly toxic materials
 - Toxic materials
 - Corrosive materials
6. Identify ways to determine chemical information, including:
- Material Safety Data Sheet
 - Labels
 - Shipping documents
 - References (ERG, NIOSH, etc.)
 - Handling
7. Identify the common components of a Material Safety Data Sheet, including:
- Chemical identity
 - Manufacturer information
 - Hazardous ingredients
 - Physical and chemical characteristics
 - Fire and explosion hazard data
 - Reactivity data
 - Health hazard data
 - Precautions for safe handling and use
 - Control measures

Discussion Questions

1. What chemical properties have a significant impact on code requirements?
2. How do you classify a chemical?
3. Where can you find the properties for a specific chemical?

Activities

1. Given several MSDS examples, ask students to classify products.

Topic 5-2: Applicable Codes, Standards and Requirements 3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify applicable codes and standards that regulate hazardous materials, requirements for hazardous material incidental storage, and CUPA reporting requirements for an individual hazardous material; and verify, document, and resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Identify applicable codes and standards that regulate hazardous materials, including:
 - California Fire Code
 - California Building Code
 - NFPA
2. Identify requirements to allow incidental storage of hazardous materials, including:
 - Maximum allowable quantities
 - CFC Table 2703.1.1 (1-4)
 - CFC Table 2703.11.1
 - Permissible quantities
 - Labeling



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- Storage
 - Handling and use
 - Waste
3. Identify the reporting requirements for a Certified Unified Program Agency (CUPA) for an individual hazardous material in excess of:
 - 55 gallons
 - 200 cubic feet
 - 500 pounds
 4. Describe US Department of Transportation (DOT) transportation methods, including:
 - Highway
 - Rail
 - Air
 - Waterways
 5. Describe how to verify deficiencies, including:
 - Observation and documentation
 - Reporting in accordance with jurisdictional codes, standards, and policies
 - Referring to appropriate level when necessary

Discussion Questions

1. What is the difference between quantities requiring a permit and maximum allowable quantities?
2. What fire-code-regulated activities does the CUPA control?

Activities

1. Given various scenarios, determine if the quantity and type of chemical exceeds the maximum allowable.

Unit 6: Hazardous Conditions Involving Equipment, Processes, and Operations

Topic 6-1: Recognition of Hazardous Conditions 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe safe operations, practices, and techniques; identify the applicable AHJ codes, standards, and policies; identify unsafe behaviors and conditions; and verify deficiencies.

Enabling Learning Objectives (ELO):

1. Describe the safe operations practices and techniques, including:
 - Dust production
 - Flammable and combustible materials
 - Hazardous materials storage and handling
 - Ignition sources
 - Unsafe housekeeping
 - Vapor recovery
2. Identify the applicable codes, standards and policies of the jurisdiction
3. Identify unsafe behaviors such as:
 - Poor housekeeping
 - Ignoring ignition sources
 - Open burning
 - Improper electricity use
 - Careless use of flammable and combustible liquids
4. Identify unsafe conditions such as:
 - Electrical hazards
 - Material storage facilities
 - Heating, ventilating and air-conditioning equipment systems
 - Cooking equipment
 - Industrial furnaces and ovens



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- Powered industrial trucks
- 5. Describe how to verify deficiencies, including:
 - Observation and documentation
 - Reporting
 - Resolving or referring

Discussion Questions

1. When does the code allow open burning?
2. What common fire hazards are often found during an inspection?
3. When does the code require fabrics to be flame retardant? What code regulates fabrics?

Activities

1. To be determined by instructor.

Unit 7: Emergency Planning and Preparedness Measures

Topic 7-1: Emergency Evacuation and Relocation Requirements and Elements..... 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify occupancies required to have an evacuation plan; describe the elements of an evacuation plan; identify the frequency with which fire drills must be practiced (Title 19 & CFC 405.2); identify special considerations based on specific occupancies; and verify deficiencies.

Enabling Learning Objectives (ELO):

1. Identify what occupancies are required to have an evacuation plan, including:
 - K-12 schools
 - High-rise buildings
 - Hospitals
 - Care facilities
 - Hotels
 - Organized camps
 - Office buildings with two or more stories
 - Covered malls
 - (See CCR Title 19, article 1, section 3.09)
2. Describe the elements of an evacuation plan, including:
 - Evacuation routes: maps identifying current location and egress routes
 - Types of evacuations (partial vs. full)
 - Monitor duties when evaluating a fire drill
 - Occupant duties in participating in fire drills
 - Human behavior during fire and other emergencies
3. Identify the frequency with which fire drills must be practiced (Title 19 & CFC 405.2)
4. Identify special considerations based on specific occupancies:
 - Safe dispersal area for buildings, including:
 - Minimum of 50 feet from building
 - Five square feet per person
 - Hospitals are designed to shelter patients in place by compartmentalization (discuss the design and shelter in-place concept)
5. Describe how to verify deficiencies, including:
 - Observation and documentation
 - Reporting
 - Resolving or referring

Discussion Questions

1. How often should a high-rise building have a fire drill?
2. What is the required frequency of fire drills for public schools?



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3. In what code can you find the public school fire drill requirements?

Activities

1. To be determined by the instructor.

Topic 7-2: Conducting an Emergency Evacuation Drill..... 1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify the human behavior that occurs during fires and other emergencies; define considerations to conduct or evaluate fire drills; conduct a fire drill; and identify issues to cover in a post-drill debriefing.

Enabling Learning Objectives (ELO):

1. Identify the human behavior that occurs during fires and other emergencies, including:
 - Panic
 - Apathy
 - It is a misdemeanor offense to fail to respond to an evacuation order as part of an emergency or fire drill (see CCR, Title 19, section 3.10)
 - Exit imprinting
 - People tend to leave the way they came in
2. Define the considerations to conduct or evaluate fire drills, including:
 - Should be generally scheduled in advance
 - Conduct during business hours
 - Coordinate with the local agency
 - Notify dispatch of the drill, time and location
3. Describe conducting a fire drill, including:
 - Observing and documenting participants' actions
 - Verifying evacuation as prescribed by plan
4. Identify issues to cover in a post-drill debriefing, including:
 - Occupant accountability and participation
 - Time needed to evacuate the building as prescribed in the plan
 - Did the fire drill follow the written plan
 - Methods to improve fire drill plan
 - Identify revisions to improve the fire drill plan

Discussion Questions

1. Who should a fire inspector notify before observing a fire drill?
2. How can a fire inspector motivate people to participate in a fire drill?

Activities

1. Conduct a surprise class fire drill and discuss participant behavior.

Unit 8: Tents, Canopies, and Temporary Membrane Structures

Topic 8-1: Tents, Canopies and Temporary Membrane Structures 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define tent, canopy, and temporary membrane structure; identify the state requirements for tents, canopies, and other temporary membrane structures; and identify when the California Building Code regulates a tent, canopy, or membrane structure.

Enabling Learning Objectives (ELO):

6. Define the following terms:
 - Tent
 - Canopy
 - Temporary membrane structure
7. Identify the state requirements for tents, canopies and other temporary membrane structures (10 persons or greater) (see CCR, Title 19, chapter 2, article 3), including:
 - Vehicle parking



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- Location on site
 - Structural requirements
 - Prohibited smoking
 - Fireworks and open flame
 - Fire extinguishers and other fire protection equipment
 - Fire safety personnel
 - Abatement of fire and panic hazards
 - Exit requirements
 - Cooking and heating equipment
 - Flame resistance
 - Labeling of tents
8. Identify when the California Building Code regulates a tent, canopy or membrane structure

Discussion Questions

1. What is the difference between a tent and a canopy?
2. What occupant load requires the presence of fire safety personnel?
3. What canopy size does the code exempt from permitting and regulation?

Activities

1. To be determined by instructor.

Summative Testing.....	1:00
Formative Testing.....	2:00
