



COURSE INFORMATION AND REQUIRED MATERIALS

Course: Fire Inspector 2D: Hazardous Materials, Operations, and Processes (2011) CFSTES
Hours: 32:00 (29:00 instruction/3:00 testing)
Designed For: The certified Fire Inspector I advancing to the Fire Inspector II classification
Description: Upon completion of this course, the student will be familiar with hazardous materials; maximum allowable quantities; requirements for storage, handling, use and dispensing; hazardous materials management plans; and how to evaluate industrial hazards and processes.
Prerequisites: Fire Inspector 2A: Fire Prevention Administration
Certification: 80%
Standard: Fire Inspector II
Class Size: 30
Restrictions: None

REQUIRED STUDENT MATERIALS	EDITION	PUBLISHER
▪ California Building Code	Current	ICC
▪ California Fire Code	Current	ICC
▪ Fire Inspection and Code Enforcement	Seventh	FPP
REQUIRED INSTRUCTOR MATERIALS		
▪ California Building Code	Current	ICC
▪ California Fire Code	Current	ICC
▪ California Code of Regulations (CCR) Title 19	Current	OAL or Barclays
▪ Inspection and Code Enforcement Instructor Resource Kit	Seventh	FPP

PUBLISHER CONTACT INFORMATION		
Barclays	Barclays	www.west.thompson.com
FPP	Fire Protection Publications	www.ifsta.org
ICC	International Code Council	http://www.iccsafe.org/STORE/Pages/default.aspx
OAL	Office of Administrative Law	www.oal.ca.gov/publications.htm

FIRE INSPECTOR 2D COURSE PLAN

Course Objectives: to provide the student with...

- a) A review of hazardous materials
- b) An introduction to hazardous material maximum allowable quantities
- c) General provisions for hazardous materials
- d) Information about storage requirements
- e) Information about storage, use, and dispensing
- f) An introduction to hazardous materials management plans
- g) The ability to evaluate industrial hazards and processes

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.

Enabling Learning Objectives (ELO):

1. Identify facility and classroom requirements
 - Start and end times
 - Breaks
 - Restrooms
 - Food locations



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- Smoking locations
 - Emergency procedures
 - Electronic devices
 - Special needs and accommodations
 - Other requirements
2. Review the course syllabus
- Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process (80% is required on all summative tests)
 - Assignments and activities
 - Required student resources
 - Class participation requirements

Discussion Questions

1. What are formative and summative tests?

Activities

1. To be determined by the instructor

Unit 2: Hazardous Materials Review

Topic 2-1: Hazardous Materials Review 1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define the terms “liquid,” “gas”, and “solid”; identify physical and chemical properties of liquids, gases, and solids; describe chemical reactions; and describe the physical and health hazards of various hazardous materials.

Enabling Learning Objectives (ELO):

1. Define liquid, gas, and solid
2. Identify physical properties of liquids, gases, and solids
3. Identify chemical properties of liquids, gases, and solids
4. Describe chemical reactions of liquids, gases, and solids
5. Describe the physical hazards of:
 - Explosives and blasting agents
 - Flammable and combustible liquids
 - Flammable solids and gases
 - Organic peroxide materials
 - Oxidizer materials
 - Pyrophoric materials
 - Unstable (reactive) materials
 - Water reactive solids and liquids
 - Cryogenic fluids
 - Combustible fibers
6. Describe the health hazards of:
 - Highly toxic materials
 - Toxic materials
 - Corrosive materials

Discussion Questions

1. What is a solid? A liquid? A gas?
2. How would you classify a product with more than one hazardous property?

Activities

1. Match US Department of Transportation labels with various hazardous materials and products.



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Unit 3: Maximum Allowable Quantities

Topic 3-1: Determining Maximum Allowable Quantities..... 3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define and determine maximum allowable quantity.

Enabling Learning Objectives (ELO):

1. Define “maximum allowable quantity”
2. Describe how to determine maximum allowable quantity
 - Determine a product’s hazard classification
 - Determine a product’s physical state
 - Identify an appropriate unit of measure
 - Determine which table to use to determine maximum allowable quantity
 - CFC Table 2703.1.1(1) – Hazardous Material Posing a Physical Hazard
 - CFC Table 2703.1.1(2) – Hazardous Material Posing a Health Hazard
 - CFC Table 2703.1.1(3) – Physical Hazard in an Outdoor Control Area
 - CFC Table 2703.1.1(4) – Health Hazard in an Outdoor Control Area
 - CFC Table 2703.11.1 – Indoor and Outdoor Control Area in Group M and S Occupancies
 - Apply table footnotes

Discussion Questions

1. What is a “maximum allowable quantity”?
2. What happens if maximum allowable quantities are exceeded?

Activities

1. Given an MSDS sheet and the appropriate tables, determine MAQ for various products.

Topic 3-2: Control Areas..... 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe control areas; evaluate control areas as they related to hazardous materials storage; and identify, document, verify, and report or resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Describe control areas
2. Describe how to evaluate control areas as they related to hazardous materials storage
 - Apply CFC Table 2703.8.3.2 – Design and Number of Control Areas
3. Describe how to identify, document, verify, and report or resolve deficiencies

Discussion Questions

1. What kind of fire-rated wall defines control areas?
2. What is the purpose of a control area?

Activities

1. Given a multi-story floor plan and an inventory of hazardous materials, list the maximum allowable quantity for each material assuming those materials are stored on the 6th floor.

Unit 4: General Provisions for Hazardous Materials

Topic 4-1: Codes and General Provisions..... 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify applicable CFC chapters for hazardous materials and other agencies that have requirements and jurisdiction related to hazardous materials and flammable and combustible liquids and gases; describe general requirements for quantities not exceeding maximum allowable quantities per control area; and identify, document, verify, and report or resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Identify the applicable CFC chapter for hazardous materials:
 - Hazardous materials – CFC, chapter 27
 - Compressed gases – CFC, chapter 30



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- Corrosive materials – CFC, chapter 31
 - Cryogenic fluids – CFC, chapter 32
 - Flammable and combustible liquids – CFC, chapter 34
 - Flammable solids – CFC, chapter 36
 - Highly toxic and toxic materials – CFC, chapter 37
 - Liquefied petroleum gases – CFC, chapter 38
 - Organic peroxides – CFC, chapter 39
 - Oxidizers – CFC, chapter 40
 - Unstable materials – CFC, chapter 43
 - Water-reactive solids and liquids – CFC, chapter 44
 - Radioactive materials – Nuclear Regulatory Commission
2. Identify other agencies that have requirements and jurisdiction related to hazardous materials and flammable and combustible liquids and gases
 3. Describe general requirements for quantities not exceeding maximum allowable quantities per control area, including:
 - Systems, equipment, and processes
 - Hazard identification signs
 - Ignition sources
 - Construction requirements
 - General safety precautions
 - Handling and transportation
 - Group M storage and display
 - Group S storage
 - Outdoor control areas
 4. Describe how to identify, document, verify, and report or resolve deficiencies

Discussion Questions

1. In what occupancy types might you find these hazardous materials?
2. What hazard identification sign does indoor storage require?
3. Why are special requirements applied to Group M and Group S occupancies?

Activities

1. To be determined by instructor.

Unit 5: Storage Requirements

Topic 5-1: General Storage Provisions 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe storage provisions and compatibility and fire protection systems and equipment approved for the material; and identify, document, verify, and report or resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Describe storage provisions and compatibility, including:
 - Indoor vs. outdoor
 - Storage vs. in use
 - Shelving
 - Container
 - Portable tank
 - Stationary tank
 - Secondary containment requirements
 - Specific requirements depending on storage location
 - Ventilation requirements for indoor storage areas



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- Separation requirements, including:
 - Incompatible materials
 - Property lines
 - Distance to buildings
 - Clearance from combustibles
 - Explosion control requirements
 - Stand-by emergency power requirements
 - Weather protection requirements
2. Describe fire protection systems and equipment approved for the material
 3. Describe how to identify, document, verify, and report or resolve deficiencies

Discussion Questions

1. What is considered a portable tank?
2. What is the proper distance from a fire station to locate an aboveground protected diesel storage tank?

Activities

1. To be determined by instructor.

Unit 6: Handling, Use, and Dispensing

Topic 6-1: General Provisions for Handling, Use and Dispensing 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe safe handling, use, and dispensing practices and procedures; evaluate alternate protection measures for storage, handling, and use of hazardous materials; and identify, document, verify, and report or resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Describe safe handling, use, and dispensing practices and procedures, including:
 - Requirements for separating incompatible materials
 - Non-combustible floor requirements
 - Spill control and secondary containment requirements
 - Limit control requirements
 - Temperature
 - Pressure
 - Stand-by or emergency power requirements
 - Supervision requirements
 - Manual alarm
 - Detection and automatic fire extinguishing system
 - Lighting requirements
 - Ventilation requirements
 - Liquid transfer requirements
 - Indoor dispensing and use requirements
 - Explosion control requirements
 - Outdoor dispensing and use requirements
 - Clearance from combustibles requirements
 - Weather protection requirements
 - Emergency alarm requirements
2. Describe how to evaluate alternate protection measures for storage, handling, and use of hazardous materials to ensure the proposed protection level is equivalent to the intent of applicable codes and standards
 - The alternate level of protection must provide equivalent or greater protection than the applicable code or standard

3. Describe how to identify, document, verify, and report or resolve deficiencies

Discussion Questions

1. Is an emergency alarm for hazardous materials part of the fire alarm system?



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2. What handling, use, and dispensing information from your inspection can assist in pre-fire planning?
3. Which of these requirements is unique to H occupancies?

Activities

1. To be determined by instructor.

Unit 7: Hazardous Materials Management Plans

Topic 7-1: Hazardous Materials Management Plan 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe the requirements for, and contents of, a Hazardous Materials Management Plan; evaluate compliance with regulations related to reporting unauthorized discharges of hazardous materials; and review records to evaluate compliance with general safety regulations related to personnel training and emergency procedures for sites storing or using hazardous materials.

Enabling Learning Objectives (ELO):

1. Describe the requirements for, and contents of, a Hazardous Materials Management Plan, including:
 - Requirements
 - As determined by AHJ
 - Contents
 - Storage and use areas
 - Maximum amount stored or used in each area
 - Range of container sizes
 - Location of emergency, isolation and mitigation valves and devices
 - Product conveying piping containing liquids or gases
 - On and off valve positions
 - Storage plan
 - Location and type of on-site emergency equipment
2. Describe how to evaluate compliance with regulations related to reporting unauthorized discharges of hazardous materials, including:
 - Mandatory notification of fire code official
 - CCR Title 19 Sections 2703 and 2705
 - CFC Sections 2703.3.1.1 – 2703.3.1.4
3. Describe how to review records to evaluate compliance with general safety regulations related to personnel training and emergency procedures for sites storing or using hazardous materials, including:
 - Being familiar with chemical characteristics of materials
 - Being aware of necessary action for mitigation

Discussion Questions

1. When is a Hazardous Materials Management Plan required?
2. What are the components of a Hazardous Materials Management Plan?

Activities

1. Review a sample Hazardous Materials Management Plan for completeness and accuracy.

Unit 8: Industrial Hazards and Processes

Topic 8-1: Industrial Hazards and Processes Evaluation 5:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify the applicable CFC chapter for industrial hazards and processes; evaluate code compliance for industrial hazards and processes; evaluate hazardous conditions involving equipment, processes, or operations; describe accepted fire protection practices and safe housekeeping practices; identify reference materials related to protection of hazardous processes and code enforcement; and verify and resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Identify the applicable CFC chapter for industrial hazards and processes:
 - CFC Chapter 3



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2. Describe how to evaluate code compliance for industrial hazards and processes, including:
 - Welding
 - Flammable finishes
 - Dipping and coating
 - Quenching
 - Dry cleaning
 - Dust hazards
 - Asphalt and tar kettles
 - Semiconductor/electronic manufacturing
 - Motion picture and television production
 - Aviation facilities
 - Fruit ripening
 - Fumigation
 - Woodworking
 - Waste handling
 - Industrial ovens
3. Describe how to evaluate hazardous conditions involving equipment, processes, or operations, including:
 - Identifying hazard condition
 - Reviewing applicable codes and standards
 - Identifying code violations
4. Describe accepted fire protection practices related to industrial hazards and processes
5. Describe safe housekeeping practices related to industrial hazards and processes
6. Identify reference materials related to protection of hazardous processes and code enforcement
7. Describe how to verify and resolve deficiencies, including:
 - Observation and documentation
 - Reporting in accordance with jurisdictional policies
 - Taking appropriate action to gain code compliance
 - Referring to the appropriate level when necessary

Discussion Questions

1. Where would you find the code requirements for spraying operations?
2. When does the fire code not regulate a dry cleaning establishment?
3. Where would you find permit requirements for hazardous processes?

Activities

1. To be determined by instructor.

Topic 8-2: Alternative Protection Measures 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate alternative protection measures for equipment, operations, or processes; and describe fire protection systems, inherent hazards, and safety precautions related to alternative protection measures.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate alternate protection measures for equipment, operations, or processes to ensure the proposed protection level is equivalent to the intent of applicable codes and standards
 - Alternate level of protection must provide equivalent or greater protection than the applicable code or standard
2. Describe fire protection systems required for alternative protection measures
3. Describe inherent hazards related to alternative protection measures
4. Describe safety precautions necessary for alternative protection measures

Discussion Questions

1. What kind of alternative protection measures can you use for hazardous processes?



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Activities

1. To be determined by instructor.

Topic 8-3: Fire Protection Plans and Practices 1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to evaluate fire protection plans and practices for a facility housing a complex process or operation.

Enabling Learning Objectives (ELO):

1. Describe how to evaluate fire protection plans and practices for a facility housing a complex process or operation, including:
 - Determining fire growth potential
 - Level of protection appropriate for hazard
 - In accordance with applicable standards and the policies of the jurisdiction
2. Describe evacuation procedures

Discussion Questions

1. What process would you use to evaluate a fire protection plan for a complex process?

Activities

1. To be determined by instructor.

Summative Testing 1:00

Formative Testing 2:00