



COURSE SYLLABUS

CFSTES

- Course:** Fire Inspector 2B: New Construction for the Fire Inspector
- Hours:** 32:00 (30:00 = instruction / 2:00 = 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 complex means of egress and calculating occupant loads; construction features including those required in a wildland urban interface environment; identifying and verifying the proper installation of new fire protection systems and equipment; and evaluating emergency plans and procedures.
- Prerequisites:** Fire Inspector 2A: Fire Prevention Administration
- Passing Criteria:** 80%
- Certification:** Fire Inspector II
- Class Size:** 30
- Restrictions:** None

REQUIRED STUDENT MATERIALS	EDITION	PUBLISHER
▪ California Fire Code	current	International Code Council (ICC)
▪ California Building Code	current	International Code Council (ICC)
▪ <i>Fire Inspection and Code Enforcement</i>	7th	IFSTA
REQUIRED INSTRUCTOR MATERIALS	EDITION	PUBLISHER
▪ California Building Code	current	International Code Council (ICC)
▪ California Fire Code	current	International Code Council (ICC)
▪ California Code of Regulations (CCR) Title 19	current	Online: www.oal.ca.gov/publications.htm Print: Barclays (www.west.thompson.com)
▪ <i>Inspection and Code Enforcement Instructor Resource Kit</i>	7th	IFSTA

FIRE INSPECTOR 2B: NEW CONSTRUCTION FOR THE FIRE INSPECTOR COURSE SYLLABUS

Course Objectives: to provide the student with...

- Information about means of egress and calculating occupant loads
- Information about construction features, including those required in a wildland urban interface environment
- An opportunity to identify and verify the proper installation of new fire protection systems and equipment
- An opportunity to evaluate emergency plans and procedures

Course Content..... 32:00

Unit 1: Introduction

Topic 1: Orientation and Administration 0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):

- Identify the requirements of the facility that is hosting the program
- Will complete all required paperwork for State Fire Training and the organization that is hosting the class.

Discussion Questions

- To be determined by instructor

Activities

- Complete State Fire Paperwork and Organizational paperwork

Evaluation: Formative Test, Summative Test

Unit 2: Occupant Load and Means of Egress (CTS: 2-3)

Topic 1: Occupant Loads 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to calculate the occupant load of a multi-use building and assess alternative methods to adjust occupant loads.

Enabling Learning Objectives (ELO):

1. Describe how to calculate the occupant load of a multi-use building, including:
 - Identifying the function of each area to be evaluated
 - Determining the correct occupant load factor based on Table 1004.1.1 – Maximum Floor Area Allowable Per Occupant (CFC or CBC)
 - Describing how to determine square footage, including:
 - Gross square footage
 - Net square footage
 - Design occupant load
 - Areas with fixed seating
 - Areas without fixed seating
 - Increased occupant load
 - Posting of occupant load
 - Exiting from multiple levels and egress convergence
 - Outdoor areas
 - Multiple occupancies
2. Describe how to assess alternative methods to adjust occupant loads, including:
 - Evaluating the space and its intended use(s)
 - Keeping occupant load in compliance with applicable codes and standards
 - Identifying solutions to increase occupant loads on a case-by-case basis as determined by the local fire authority

Discussion Questions

1. Can you allow the number of occupants to exceed the maximum occupant load?

Activities

1. Activity 2-1: Occupant Load

Evaluation: Formative Test, Summative Test

Topic 2: Complex Means of Egress 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe exit access, exits and exit discharge on plans and during field inspections; describe complex means of egress components; analyze egress components; and resolve egress deficiencies.

Enabling Learning Objectives (ELO):

1. Describe the egress elements of a building or portion of a building, including:
 - Exit access
 - Exit
 - Exit discharge
2. Describe complex means of egress components, including:
 - Accessible means of egress
 - Area of refuge
 - Common path of egress travel
 - Corridor
 - Exit enclosure
 - Exit passageway
 - Egress width and distribution
 - Emergency lighting
 - Accessible means of egress
 - Door swing
 - Door operations, locks, and latches
 - Panic hardware
 - Stairway width
 - Stairway treads and risers
 - Exit signs: visual and tactile

- Stairway and ramp handrails
 - Guards
 - Egress through intervening spaces
 - Common path of egress travel
 - Number of exit or exit access doorways
 - Egress separation
 - Travel distance
 - Corridor construction
 - Number of exits
 - Vertical exit enclosures
 - Exit passageways
 - Horizontal exits
 - Exterior exit stairways
 - Egress from assembly occupancies
3. Describe how to analyze egress components of a building or portion of a building, including:
- Verifying that they meet applicable codes and standards
 - Verifying proper maintenance
4. Describe the process for resolving deficiencies, including:
- Verification
 - Documentation
 - Taking appropriate action to gain code compliance
 - Reporting or referring accordance with jurisdictional codes and standards

Discussion Questions

1. What are some common egress violations?
2. Can you allow the number of occupants to exceed the maximum occupancy load?

Activities

(Instructor to develop)

1. Given a set of plans, review the existing system for a list of criteria.

Evaluation: Formative Test, Summative Test

Unit 3: Construction Features (CTS: 2-1)

Topic 1: Construction Features 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe building construction features and the concept of performance-based versus prescriptive design. The student will also be able to use approved plans to evaluate a building's area, height, occupancy classification and construction type; evaluate that life safety systems comply with construction documents; evaluate construction types required for additions or remodels; and resolve deficiencies.

Enabling Learning Objectives (ELO):

1. Describe building construction features, including:
 - Construction types
 - Basic allowable height
 - Basic allowable area
 - Fire-rated assemblies
 - Fire-rated construction
 - Manufacturer specifications
 - Design/listing criteria, including:
 - ASTM E119
 - ASTM E84
 - UL 555S
 - SFM 12-7A-2
2. Describe how to evaluate a building's area, height, occupancy classification and construction type, using an approved set of plans, to verify that the building is in accordance with applicable codes and standards
3. Describe the concept of performance-based versus prescriptive design, including:

- Materials testing
 - Technical analysis
 - Human-factor studies
 - Fire protection engineering principles
4. Describe how to evaluate compliance with construction documents to ensure that the life safety systems and building service equipment are installed, inspected and tested to perform as described in the engineering documents and the operation and maintenance manual that accompanies the performance-based design
 5. Describe how to evaluate the construction type required for an addition or remodeling project based on applicable codes and standards, including:
 - Allowable area
 - Allowable height
 - Appropriate construction type
 - Sprinkler requirements
 6. Describe the procedures for resolving deficiencies, including:
 - Identifying deficiencies
 - Referencing applicable codes and standards
 - Documenting deficiencies
 - Reporting a summary of deficiencies
 - Verifying corrective actions
 - Identifying alternate methods and materials for compliance

Discussion Questions

1. Does the code allow wood in a Type III structure?
2. What is performance-based design?
3. How do you resolve deficiencies identified in plan review?
4. If a building addition exceeds allowable height or area, to whom should an inspector refer the project?

Activities

1. Activity 3-1: Construction Features

Evaluation: Formative Test, Summative Test

Topic 2: Construction Features for Wildland Urban Interface Areas..... 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe building construction features required in a wildland urban interface environment.

Enabling Learning Objectives (ELO):

1. Describe building construction features required in a wildland urban interface environment, including:
 - Ignition-resistant construction
 - Roofing
 - Vents
 - Exterior coverings
 - Exterior doors and windows
 - Decking
 - Ancillary structures

Discussion Questions

1. Why do structures in a wildland urban interface environment require different construction features?

Activities

(Instructor to develop)

1. Given pictures of structures in a wildland urban interface, identify compliant and non-compliant construction features.

Evaluation: Formative Test, Summative Test

Unit 4: New Fire Protection Systems and Equipment (CTS: 2-8)

Topic 1: Installation of a New Water-Based Fire Protection System 6:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe codes and standards for a water-based extinguishing system and observe and verify field conditions to ensure proper

installation.

Enabling Learning Objectives (ELO):

1. Describe codes and standards for a water-based extinguishing system, including:
 - Automatic sprinkler systems
 - Commercial
 - Residential
 - Standpipes
 - Fire pumps
 - Water spray systems
 - Water mist systems
 - Foam-water systems
 - Underground fire service mains
2. Describe the field conditions that must be observed and verified to ensure the proper installation of a water-based fire extinguishing system, including:
 - Installation techniques
 - Hangers and bracing
 - Fittings, valves and connections
 - Head spacing
 - Flushing
 - Hydrostatic testing
 - Performance-based design
 - Manufacturer specifications
 - Commissioning and acceptance test of completed installations
 - NFPA 13
 - NFPA 14
 - NFPA 20
 - NFPA 24

Discussion Questions

1. What are the differences between NFPA 13, 13D and 13R automatic sprinkler systems?

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 2: Installation of a New Special-Agent System 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe codes and standards for a special-agent system and observe and verify field conditions to ensure proper installation.

Enabling Learning Objectives (ELO):

1. Describe codes and standards for a special-agent system, including:
 - Dry chemical
 - Wet chemical
 - Clean agent
 - CO₂ systems
 - Foam systems
2. Describe the field conditions that must be observed and verified to ensure the proper installation of a special-agent system, including:
 - Installation techniques
 - Performance-based design
 - Manufacturer specifications
 - Commissioning and acceptance test of completed installations

Discussion Questions

1. What type of hazard would require a UL 300 system?
2. What type of hazard would require a dry chemical system?
3. Where would you find a clean agent system?

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 3: Installation of a New Fire Detection and Alarm System 4:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe codes and standards for, and the components of, fire detection and alarm systems, and observe and verify field conditions to ensure proper installation.

Enabling Learning Objectives (ELO):

1. Describe codes and standards for a fire detection and alarm system
2. Describe the components of a fire detection and alarm system, including:
 - Control unit
 - Detection
 - Notification
 - Power supply
 - Wiring and wiring methods
 - Auxiliary devices
3. Describe the field conditions that must be observed and verified to ensure the proper installation of a fire detection and alarm system, including:
 - Installer qualifications
 - Installation techniques
 - Performance-based design
 - Manufacturer specifications
 - Commissioning and acceptance test inspection of completed installations

Discussion Questions

1. In a mixed-use occupancy, do all of the occupancies require a fire alarm system?

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Topic 4: Deficiency Verification and Resolution..... 1:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to verify and resolve deficiencies related to new fire protection systems and equipment.

Enabling Learning Objectives (ELO):

1. Describe how deficiencies are verified, including:
 - Observation, analysis and documentation
 - Reporting in accordance with the policies of the jurisdiction
2. Describe the procedures for resolving deficiencies, including:
 - Taking appropriate action based on the findings to gain code compliance
 - Referring to appropriate level when necessary

Discussion Questions

1. Can an inspector issue a temporary use clearance if a fire alarm system does not successfully comply with all of the components of a commissioning test?

Activities

1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Unit 5: Emergency Planning and Preparedness Procedures (CTS: 2-5)

Topic 1: Evaluating Emergency Plans and Procedures..... 2:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify occupancies that require emergency evaluation plans, agency and individual roles in developing and implementing emergency evaluation plans, other incidents that may require an inspector to participate in an emergency evaluate plan and information sources for emergency plans. The student will also be able to recommend criteria for and evaluate and emergency evaluation plan.

Enabling Learning Objectives (ELO):

1. Identify occupancies that require emergency evacuation plans, 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. Identify agency and individual roles in developing and implementing emergency evacuation plans, including:
 - Authority having jurisdiction
 - Owner / operator
 - Joint Commission on Accreditation of Hospitals (hospitals only)
 3. Identify information sources and criteria for emergency evacuation plans, including:
 - California Fire Code
 - CCR Title 19
 - NFPA 101
 - Joint Commission on Accreditation of Hospitals (hospitals only)
 4. Describe how to evaluate emergency evacuation plans, including:
 - Meets applicable codes and standards
 - Is applicable to occupancy
 - Contains all required elements
 - Exercised as required by code
 - Maintains records
 5. Identify other incidents that may require an inspector to participate in an emergency evacuation plan, including:
 - Large scale fire incidents
 - Wildland urban interface fires
 - Natural disasters
 - Terrorism

Discussion Questions

1. What is the role of an AHJ in the development of an evacuation plan?
2. What are some acceptable locations for an evacuation area?

Activities

(Instructor to develop)

1. Evaluate sample emergency evacuation plans.

Evaluation: Formative Test, Summative Test

Activity 2-1: Occupant Load

References

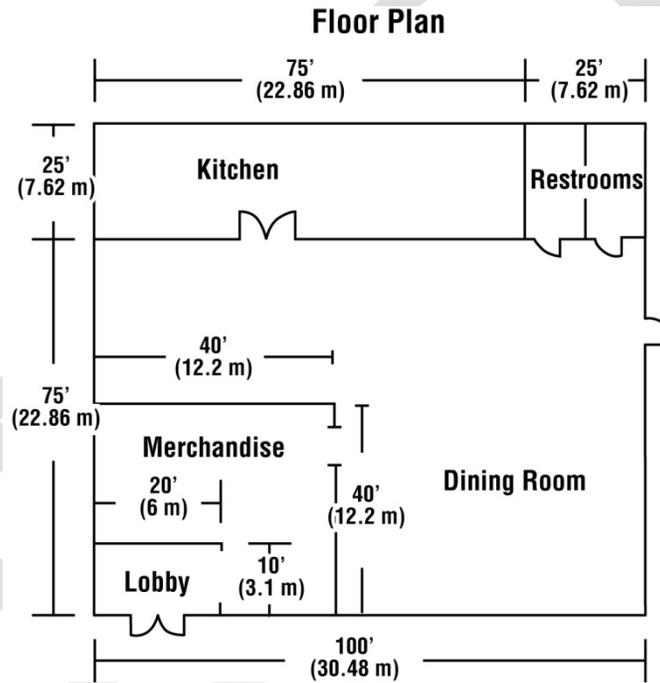
Fire Inspection and Code Enforcement, 7th Edition, pp. 278-282
NFPA® 1031, 5.3.1, 5.4.2

Introduction

The term *occupant load* refers to the total number of persons who may occupy a building or a portion of it at any one time. For purposes of fire and life safety, inspectors must be able to determine the occupant load of existing occupancies during field inspections.

Task

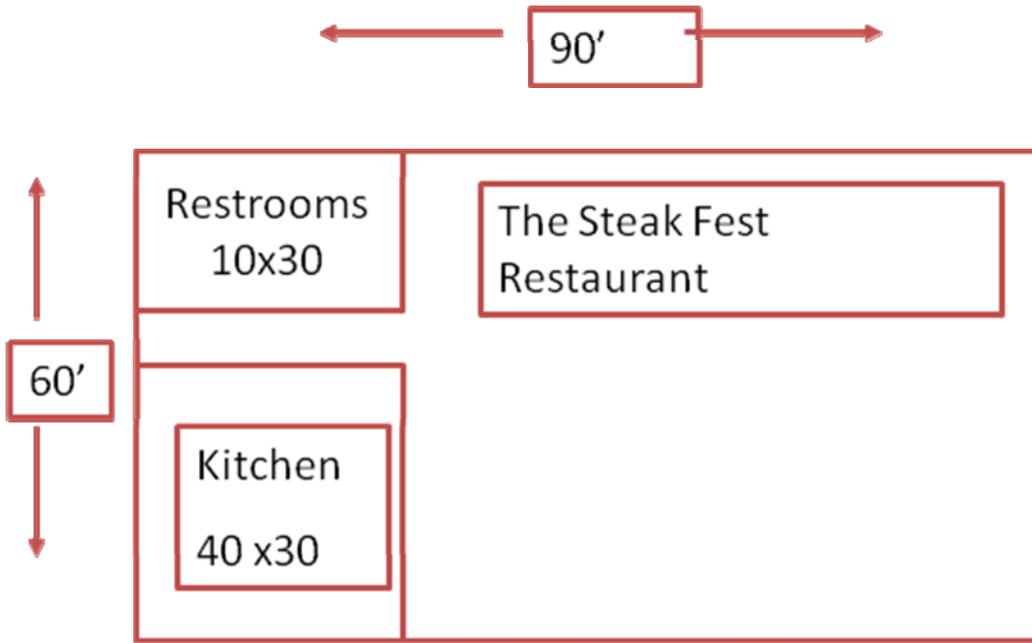
Study the restaurant floor plan below.
Answer the questions regarding occupant load that follow.



1. What is the occupant load of the kitchen?
2. What is the occupant load of the dining room?
3. What is the occupant load of the lobby?
4. What is the occupant load of the merchandise area?
5. What is the occupant load of the entire building?

Activity 3-1: Construction Features

Using the diagram given below, answer the following questions.
For each answer, cite the appropriate code reference.



Question	Answer	Code Reference
1. What occupant load factor should be used?	_____	_____
2. What is the square footage of the restaurant dining area?	_____	_____
3. What is the occupant load of the restaurant dining area?	_____	_____
4. What is the occupant load of the kitchen?	_____	_____
5. How many exists are required for the restaurant?	_____	_____
6. What kind of door hardware is required on the exit doors?	_____	_____
7. Draw in the approximate location of the required exit(s).	_____	_____
8. What is the occupancy classification of this building?	_____	_____