



# Fire Protection and Life Safety Systems Plan Review

## Course Plan

### Course Details

<b>Certification:</b>	Plan Examiner
<b>CTS Guide:</b>	Plan Examiner (May 2015)
<b>Description:</b>	This course provides the knowledge and skills that prepare a plan examiner to evaluate fire flow compliance and identify requirements and review installation plans for fire protection and life safety systems.
<b>Designed For:</b>	Those desiring to become a plan examiner
<b>Prerequisites:</b>	Plan Examiner 1A: Building Plan Review
<b>Standard:</b>	Complete all activities and formative tests Complete all summative tests with a minimum score of 80%
<b>Hours:</b>	Lecture: 18:30 Activities: 7:30 Testing: 1:00
<b>Hours (Total):</b>	27:00
<b>Maximum Class Size:</b>	25
<b>Instructor Level:</b>	Primary Instructor
<b>Instructor/Student Ratio:</b>	1:25
<b>Restrictions:</b>	None
<b>SFT Designation:</b>	CFSTES

### Required Resources

#### Instructor Resources

To teach this course, instructors need:

- *California Building Code*
  - Publisher: International Code Council (ICC)
  - Edition: edition currently adopted by the California Building Standards Commission (CBSC)
- *California Fire Code*
  - Publisher: ICC
  - Edition: edition currently adopted by the CBSC
- *Fire Detection and Suppression Systems*
  - Publisher: International Fire Service Training Association (IFSTA)
  - Edition: 4<sup>th</sup> edition
- NFPA 13: Standard for the Installation of Fire Sprinkler Systems
  - Publisher: National Fire Protection Association (NFPA)
  - Edition: edition currently adopted by the CBSC
- NFPA 14: Standard for the Installation of Standpipe and Hose Systems
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- NFPA 17A: Standard for Wet Chemical Extinguishing Systems
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- NFPA 24: Standard for the Installation of Private Fire Service Mains and Their Appurtenances
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- NFPA 72: National Fire Alarm and Signaling Code
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- Engineers scale
- Architectural scale
- Calculator

#### Online Instructor Resources

The following instructor resources are available online at <http://osfm.fire.ca.gov/training/SFTCurriculum.php>

- Fire Protection and Life Safety Systems Plan Review course plan

### Student Resources

To participate in this course, students need:

- *California Building Code*
  - Publisher: International Code Council (ICC)
  - Edition: edition currently adopted by the California Building Standards Commission (CBSC)
- *California Fire Code*
  - Publisher: ICC
  - Edition: edition currently adopted by the CBSC
- NFPA 13: Standard for the Installation of Fire Sprinkler Systems
  - Publisher: National Fire Protection Association (NFPA)
  - Edition: edition currently adopted by the CBSC
- NFPA 14: Standard for the Installation of Standpipe and Hose Systems
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- NFPA 17A: Standard for Wet Chemical Extinguishing Systems
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- NFPA 72: National Fire Alarm and Signaling Code
  - Publisher: NFPA
  - Edition: edition currently adopted by the CBSC
- Engineers scale
- Architectural scale
- Calculator

### Facilities, Equipment, and Personnel

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

- A large room with tables to accommodate full-size plans for up to 25 students
- Internet access for instructor and students
- Two sets of plans, specifications and details for each student or student group (At a minimum documents should be sufficient to meet the objectives of the SFT-recommended Activities for topics 2-1, 3-1, and 3-2 as well as any other activities designed by the instructor)
  - One set for course activities
  - One set for testing

### 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 in the course syllabus.

##### 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. What is a formative test? What is a summative test?

##### Activities

1. To be determined by the instructor

#### Topic 1-2: Plan Examiner Certification Process

##### Terminal Learning Objective

At the end of this topic, a student will be able to identify different levels in the Plan Examiner certification track and the courses and requirements for certification, and be able to describe the certification task book and testing process.

##### Enabling Learning Objectives

1. Identify the different levels of certification in the Plan Examiner certification track
2. Identify the courses required for Plan Examiner certification

## Plan Examiner 1B

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- Plan Examiner 1A: Building Plan Review
  - Plan Examiner 1B: Fire Protection and Life Safety Systems Plan Review
  - Plan Examiner 1C: Hazards and Special Operations Plan Review
3. Identify any other requirements for Plan Examiner certification
  4. Describe the certification task book process
    - Complete all prerequisites and course work
    - Submit application and fees and request certification task book
    - Complete all job performance requirements included in the task book
    - Must have identified evaluator verify individual task completion via signature
    - Must have Fire Chief or authorized representative verify task book completion via signature
    - Must be employed by a California Fire Agency in the position prior to submitting completed task book to State Fire Training
  5. Describe the certification testing process
    - Complete course work
    - Schedule online certification exam
    - Schedule skills evaluation test

### Discussion Questions

1. How many levels are there in the Plan Examiner certification track? What are they?

### Activities

1. To be determined by the instructor

## Unit 2: Fire Flow

### Topic 2-1: Evaluating Fire Flow Compliance

#### Terminal Learning Objective

At the end of this topic, a student, given a plan, codes and standards, and fire flow test results, will be able to evaluate code compliance for required fire flow and hydrant location and spacing, verifying correct hydrant location, determining required fire flow, and identifying, documenting, and reporting deficiencies in accordance with jurisdictional policies and procedures.

#### Enabling Learning Objectives

1. Identify standard civil engineering symbols
2. Describe the types of water supply and distribution systems
3. Discuss components of public and private water supply systems, including:
  - Water meters
  - Backflow prevention
  - Fire hydrants
  - Valves and pipes
  - Other devices that can impact fire flow
4. Describe water distribution system test methods

5. Analyze the effects of friction loss and elevation on water flow
6. Discuss the potential impact of state health regulations on fire flow
7. Identify applicable codes and standards related to fire flow in the jurisdiction
8. Interpret fire flow test results
9. Determine fire hydrant locations and spacing
10. Read fire flow graphs

### Discussion Questions

1. How should fire flow be distributed through multiple hydrants?
2. How do fire flow requirements vary in rural versus urban areas and/or commercial versus residential buildings?

### Activities

1. Given civil drawings and the *California Fire Code*, have students determine compliance for fire flow hydrants along fire apparatus access.

**CTS Guide Reference:** CTS 3-5

## Unit 3: Fire Protection and Life Safety Systems

### Topic 3-1: Identifying Requirements for Fire Protection or Life Safety Systems

#### Terminal Learning Objective

At the end of this topic, a student, given a set of plans, will be able to identify the requirements for a fire protection or life safety system, identifying, documenting, and reporting deficiencies in accordance with jurisdictional policies and procedures.

#### Enabling Learning Objectives

1. Identify applicable code requirements for:
  - Life safety systems
    - Fire alarm
    - Smoke control
  - Fire extinguishers
  - Fire protection systems
    - Sprinkler (with and without foam)
      - Wet
      - Dry
      - Pre-action
      - Deluge
    - Standpipe
    - Engineered and pre-engineered
      - Clean agent
      - Dry chemical
      - Dry powder
      - Wet chemical
      - CO<sub>2</sub>
      - Water wash

- Mist
  - Fire pumps
2. Identify the symbols used on a set of plans
  3. Identify the components of basic plans or shop drawings
    - Title page
    - Legend
    - General notes
    - Cut sheet
    - Listing sheet
    - Specifications
    - Calculations
  4. Apply codes and standards

### Discussion Questions

1. How much contact should a plan examiner have with a designer during the review process?

### Activities

1. Given a set of plans, have students evaluate the scope.

**CTS Guide Reference:** CTS 3-1

## Topic 3-2: Reviewing Fire Protection and Life Safety System Installation Plans

### Terminal Learning Objective

At the end of this topic, a student, given a plan submittal, will be able to evaluate fire protection and life safety system installation plans, identifying, documenting, and reporting deficiencies in accordance with applicable codes and standards and jurisdictional policies and procedures.

### Enabling Learning Objectives

1. Describe basic physical science as it relates to fire behavior and fire suppression
2. Identify basic system design criteria and applicable codes and standards for life safety systems
  - Fire alarm
  - Smoke management
  - Communication
3. Identify basic system design criteria and applicable codes and standards for fire protection systems
  - Fire underground
  - Fire pumps
  - Fire sprinklers
  - Standpipes
  - Engineered and pre-engineered
4. Describe material listing requirements and specifications
5. Identify installation components of fire protection and life safety systems
  - Fire alarm

- Initiation device
- Notification device
- Control panel
- Annunciators
- Backup power
- Conductors/wire
- Communicators
- Smoke management
  - Controllers
  - Dampers
  - Annunciators
  - Interlocks
  - Fans
  - Exhaust
  - Initiation device
- Communication
  - Firemen phones
  - Refuge area communication
  - Repeaters
    - External
    - Internal
  - Public address
- Fire underground
  - Pipe
  - Thrust block
  - Valves
  - Fire department connection
  - Cathodic protection
    - Mastic
    - Wrap
- Fire pumps
  - Controllers
  - Fuel system
  - Prime movers
  - Hangers and braces
  - Pressure maintenance (jockey) pump
- Fire sprinkler
  - Pipe
  - Hangers
  - Braces
  - Heads
  - Valves

- Standpipes
    - Pipe
    - Valves
      - Pressure reducing
      - Restrictor plates
      - Outlets
    - Hangers and braces
    - Hose
    - Nozzles
    - Fire department connection
  - Engineered and pre-engineered
    - Pipe
    - Valves
    - Nozzles
    - Heads
    - Hangers and braces
    - Interlocks
    - Fire alarm initiation device
    - System notification device
    - Abort switch
    - Agent
    - Agent container
    - Mixer/proportioner
6. Describe engineering calculations for fire suppression and life safety systems
  7. Describe acceptance inspection and testing of completed installations
  8. Verify calculations
    - Engineering
    - Battery
    - Voltage drop
    - Seismic
    - Thrust block
  9. Review specifications
  10. Classify occupancies for fire suppression systems
    - Light hazard
    - Ordinary hazard
    - Extra hazard
    - Special occupancy hazard
  11. Classify commodity classes
    - I
    - II
    - III
    - IV

## Plan Examiner 1B

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- High hazard commodities
- Plastics
  - Group A
  - Group B
  - Group C
- Mixed Commodities

12. Interpret and apply codes and standards

### Discussion Questions

1. What should be considered when specifying the location of fire department connections (FDCs)?
2. How does occupancy classification influence the need for fire protection and life safety systems?

### Activities

1. Given shop drawings for a fire alarm system, a fire sprinkler system, and a pre-engineered system, have each student evaluate each system for compliance with the minimum codes and standards.

**CTS Guide Reference:** CTS 3-9

## Time Table

Segment	Lecture Time	Activity Time	Total Unit Time
<b>Unit 1: Introduction</b>			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
Activity 1-1: Determined by instructor		0:00	
Topic 1-2: Plan Examiner Certification Process			
Lecture	0:30		
Activity 1-2: Determined by instructor		0:00	
<b>Unit 1 Totals</b>	<b>1:00</b>	<b>0:00</b>	<b>1:00</b>
<b>Unit 2: Fire Flow</b>			
Topic 2-1: Evaluating Fire Flow Compliance			
Lecture	1:30		
Activity 2-1: Recommended by SFT		1:00	
<b>Unit 2 Totals</b>	<b>1:30</b>	<b>1:00</b>	<b>2:30</b>
<b>Unit 3: Fire Protection and Life Safety Systems</b>			
Topic 3-1: Identifying Requirements for Fire Protections and Life Safety Systems			
Lecture	1:00		
Activity 3-1: Recommended by SFT		00:30	
Topic 3-2: Reviewing Fire Protection and Life Safety System Installation Plans			
Lecture	15:00		
Activity 3-2: Recommended by SFT		6:00	
<b>Unit 3 Totals</b>	<b>16:00</b>	<b>6:30</b>	<b>22:30</b>
<b>Lecture, Activity, and Unit Totals:</b>	<b>18:30</b>	<b>7:30</b>	<b>26:00</b>

### Course Totals

Total Lecture Time (LT)	18:30
Total Activity Time (AT)	7:30
Total Testing Time (TT)	1:00
<b>Total Course Time</b>	<b>27:00</b>