



Aerial Apparatus Operations (2024)

Course Plan

Course Details

Certification:	Aerial Apparatus Driver/Operator (2024)
CTS Guide:	Fire Apparatus Driver/Operator (2024)
Description:	This course provides the knowledge and skills needed to operate and perform preventive maintenance on an aerial apparatus. Topics include routine testing, inspections, and servicing functions on systems and components unique to an aerial apparatus; maneuvering, positioning, and stabilizing an aerial apparatus; maneuvering, positioning, and lowering the aerial ladder; and deploying and operating an elevated master stream.
Designed For:	Personnel who drive and operate a fire department aerial apparatus
Course Prerequisites:	OSFM certified Fire Fighter 1 or certified Fire Fighter 2 tenured path (Appointment to the rank of Officer (Lieutenant or higher) waives this prerequisite. Appointment to the CAL FIRE rank of Fire Apparatus Engineer is equivalent to Officer level. Performing in an "acting" capacity does not fulfill this requirement.) FADO 1A: Fire Apparatus Driver/Operator (2017 or newer) FADO 1B: Pumping Apparatus Operations (2017 or newer) One of the following driver's licenses: Class C fire fighter endorsed, Commercial A, or Commercial B Experience driving an aerial apparatus (recommended)
Standard:	Complete all skills, activities, and tests Complete the summative test with a minimum score of 80%
Hours (Total):	40 hours (20 lecture / 19 application / 1 testing)
Maximum Class Size:	30
Instructor Level:	SFT Aerial Apparatus Driver/Operator Registered Instructor
Instructor/Student Ratio:	1:30 (lecture) / 1:8 (application)
Restrictions:	Sufficient fire apparatus and space to accommodate classroom and skills training
SFT Designation:	CFSTES

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Required Resources

Instructor Resources

To teach this course, instructors need:

- One of the following textbooks
 - *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, current edition)
 - *Pumping and Aerial Apparatus Driver/Operator Handbook* (IFSTA, current edition)
- Maintenance and inspection forms
- Manufacturer's specifications and requirements

Online Instructor Resources

The following instructor resources are available online at <https://osfm.fire.ca.gov/what-we-do/state-fire-training/professional-certifications>:

- Aerial Apparatus Operations required activities
 - Activity 3-1: Maneuver and Position an Aerial Apparatus
 - Activity 3-2: Stabilize an Aerial Apparatus
 - Activity 3-3: Maneuver and Position an Aerial Ladder from Each Control Station
 - Activity 3-4: Lower an Aerial Ladder Using the Emergency Operation System
 - Activity 3-5: Deploy and Operate Using an Elevated Master Stream

Student Resources

To participate in this course, students need:

- Textbook selected by the instructor
- Personal protective equipment (minimum = long pants, wildland jacket, gloves, helmet, footwear with toe protection)

Facilities, Equipment, and Personnel

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

- Standard learning environment or facility
 - Writing board or paper conference pads
 - Markers, erasers
 - Computer or tablet with presentation or other viewing software
 - Amplification devices
 - Projector and screen
- Sufficient aerial apparatus to accommodate the number of students in the class
 - If the aerial apparatus includes a tiller, the tiller position must be operated by a Skills Coach who has already completed FADO 1C (Aerial) and 1D (Tiller), not a student in this course

- Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-5
- Facility and/or location with space sufficient to accommodate maneuvering the apparatus and deploying the aerial, stabilizing the apparatus and transferring power, maneuvering, stabilizing, and lowering the aerial device, deploy and operate an elevated master stream
- Pressurized water source
- Tools and equipment for inspection and testing
- Personal protective equipment (students)

Timetable

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.5	0.0	
Topic 1-2: Aerial Apparatus Driver/Operator Certification	0.5	0.0	
Unit 1 Totals	1.0	0.0	1.0
Unit 2: Preventative Maintenance			
Topic 2-1: Perform Visual and Operation Checks	6.0	1.0	
Unit 2 Totals	6.0	1.0	7.0
Unit 3: Operations			
Topic 3-1: Maneuver and Position an Aerial Apparatus	4.0	*	
Topic 3-2: Stabilize an Aerial Apparatus	1.5	*	
Topic 3-3: Maneuver and Position an Aerial Device from Each Control Station	3.5	*	
Topic 3-4: Lower an Aerial Device Using the Emergency Operating System	2.0	*	
Topic 3-5: Deploy and Operate an Elevated Master Stream	2.0	*	
Unit 3 Totals	13.0	18.0	31.0
Summative Assessment			
Determined by AHJ or educational institution	0.0	1.0	1.0
Skills Practice (Lab / Sets and Reps)			
Determined by AHJ or educational institution	0.0	0.0	0.0
Course Totals	20.0	20.0	40.0

* Individual application time determined by instructor for a total of 18 hours for Unit 3. Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-5.

Timetable Key

- The Timetable documents the amount of time required to deliver the content included in the course plan.
- Time is documented using the quarter system:
 - 15 min. = 0.25 hours
 - 30 min. = 0.50 hours
 - 45 min. = 0.75 hours
 - 60 min. = 1.00 hours

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. The Application time documented is based on the maximum class size identified in the Course Details section.
5. Summative Assessments are determined and scheduled by the authority having jurisdiction. These are not the written or psychomotor State Fire Training certification exams. These are in-class assessments to evaluate student progress and calculate course grades.

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, skills exercises, 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 and skills exercises
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 1-2: Aerial Apparatus Driver/Operator Certification

Terminal Learning Objective

At the end of this topic a student will be able to identify the requirements for Fire Apparatus Driver/Operator – Aerial Apparatus certification and be able to describe the certification task book and examination process.

Enabling Learning Objectives

1. Identify different levels of certification in the Fire Apparatus Driver/Operator certification track
 - Pumping Apparatus
 - Aerial Apparatus
 - Tillered Apparatus
 - Wildland Fire Apparatus
 - Water Tender
2. Identify the prerequisites for certification
 - One of the following:
 - OSFM Fire Fighter 1 certification **or**
 - Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer (Performing in an “acting” capacity does not fulfill this requirement.) **and**
 - Valid Class C Firefighter Endorsed **or** Commercial A **or** Commercial B driver’s license (per California Vehicle Code, Section 12804.11)
3. Identify the courses required for certification
 - FADO 1A: Fire Apparatus Driver/Operator (2015 or newer)
 - FADO 1B: Pumping Apparatus Operations (2015 or newer)
 - FADO 1C: Aerial Apparatus Operations (2015 or newer)
4. Identify the exams required for certification
 - No exams outside of class formative and summative testing
5. Identify the task book requirements for certification
 - Pumping Apparatus Certification Task Book (2024)
 - Aerial Apparatus Certification Task Book (2024)
6. Identify the experience requirements for certification (both required)
 - A minimum of one year full-time paid or two years’ volunteer or part-time paid experience in a recognized California fire agency with the primary responsibility as a Pumping Apparatus Driver/Operator **and**
 - A minimum of one year full-time paid or two years’ volunteer or part-time paid experience in a recognized California fire agency with the primary responsibility as a driver/operator on the apparatus for which the candidate seeks certification
7. Identify the position requirements for certification
 - The position requirement is met when the applicant fulfills the role of the specific duties as defined by the fire chief
8. Describe the certification task book process
9. Describe the certification testing process

- Not applicable

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Preventative Maintenance

Topic 2-1: Performing and Documenting Visual and Operation Checks

Terminal Learning Objective

At the end of this topic a student, given an aerial apparatus, tools and equipment, maintenance and inspection forms, manufacturer specifications and requirements, and AHJ policies and procedures, will be able to perform and document visual and operation tests, inspections, and servicing functions specified in the following list (cable systems (if applicable), aerial device hydraulic systems, slides and rollers, stabilizing systems, aerial device safety systems, breathing air systems, communication systems) in addition to those specified in 11.2.1 of NFPA 1010 (2024) so that the operational readiness of the aerial apparatus is verified.

Enabling Learning Objectives

1. Identify manufacturer specifications and requirements
2. Identify AHJ policies and procedures
 - Frequency
 - Standard
 - Documentation requirements
3. Identify vehicle systems and components
 - Battery(ies)
 - Braking system
 - Coolant system
 - Electrical system
 - Fuel
 - Hydraulic fluids
 - Oil
 - Tires
 - Steering system
 - Belts
 - Tools, appliances, and equipment
 - Built-in safety features
4. Describe systems and components unique to an aerial apparatus
 - Aerial electrical systems
 - Aerial hydraulic systems
 - Emergency power unit (EPU)
 - Aerial safety systems
 - Aerial ladder
 - Aerial waterway
 - 5th-wheel connection (if applicable)
 - Breathing air systems
 - Cable systems (if applicable)
 - Communication systems

- Slides and rollers
 - Stabilizing systems
5. Operate tools and equipment
 6. Inspect aerial apparatus and components
 7. Recognize system problems and out-of-service criteria
 8. Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements

Discussion Questions

1. How often should you perform maintenance and inspections on an aerial apparatus?
2. What maintenance and inspection operations are performed on an aerial:
 - Ladder system?
 - Waterway?
 - Stabilizing jacks?
3. What issues will take an aerial device out of service?
4. How often is your aerial ladder recertified? By whom?

Application

1. Given an aerial apparatus and inspection forms, divide students into small groups, have each group perform an aerial apparatus inspection and present their findings.

Instructor Notes

1. ELO 4: If you are using a single-chassis, non-tillered apparatus, skip the 5th-wheel connection.
2. Bring materials for the Application.

CTS Guide Reference: 7-1

Unit 3: Operations

Topic 3-1: Maneuvering and Positioning an Aerial Apparatus

Terminal Learning Objective

At the end of this topic a student, given an aerial apparatus, an incident location, a situation description, and an assignment will be able to maneuver and position an aerial apparatus so that the apparatus is positioned for correct aerial device deployment.

Enabling Learning Objectives

1. Describe uses of an aerial device
2. Identify aerial apparatus capabilities and limitations
 - Reach
 - Tip load
 - Angle of inclination
 - Angle from chassis axis
3. Describe the effects of topography, ground, and weather conditions on deployment
4. Describe aerial apparatus placement options for:
 - Roof access
 - Rescue
 - High point
 - Water tower
 - Ventilation
5. Identify communication needs between aerial driver/operator and crew
6. Determine load limit of the aerial device
 - Read and understand an aerial ladder load chart
7. Determine a correct position for the apparatus
8. Maneuver the apparatus into the correct position
9. Avoid obstacles to operations

Discussion Questions

1. What considerations go into stabilizer deployment?
2. How should an aerial apparatus be placed at a/an _____ incident? (ELO 4)
3. What are the minimum and maximum degree of slope allowable to maintain full aerial capabilities?
4. Can you operate below grade? If yes, how far?

Application

1. Activity 3-1: Maneuver and Position an Aerial Apparatus

Instructor Notes

1. None

CTS Guide Reference: 8-1

Topic 3-2: Stabilizing an Aerial Apparatus

Terminal Learning Objective

At the end of this topic a student, given a positioned aerial apparatus and manufacturer's specifications and requirements, will be able to stabilize an aerial apparatus so that power can be transferred to the aerial hydraulic system and the aerial can be deployed.

Enabling Learning Objectives

1. Describe aerial apparatus hydraulic stabilizing systems
2. Identify manufacturer's specifications and requirements for stabilization
 - A-frame
 - H configuration
 - Torque box
3. Identify stabilization requirements
 - Manufacturer specifications and requirements
4. Identify reasons for short jacking and its limitations
5. Describe the effects of topography and ground conditions on stabilization
6. Transfer power from the aerial apparatus engine to the hydraulic system
7. Operate aerial apparatus stabilization devices

Discussion Questions

1. What factors should you consider when placing your stabilizers?
2. What is short jacking? When is it used?
3. Where do you place your chock blocks?
4. Do you need to raise the tires off the ground for proper stabilization?

Application

1. Activity 3-2: Stabilize an Aerial Apparatus

Instructor Notes

1. None

CTS Guide Reference: 8-2

Topic 3-3: Maneuvering and Positioning an Aerial Ladder from Each Control Station

Terminal Learning Objective

At the end of this topic a student, given a stabilized aerial apparatus, an incident location, a situation description, and an assignment, will be able to maneuver and position the aerial ladder from each control station (if applicable) so that the ladder is positioned to accomplish the assignment.

Enabling Learning Objectives

1. Describe aerial ladder hydraulic systems
2. Describe hydraulic pressure relief systems
3. Identify gauges and controls
4. Describe cable systems
5. Describe communications systems
6. Describe electrical systems
7. Describe emergency power unit (EPU) systems
8. Explain locking systems
 - Cable dog locks
 - Holding valves
9. Describe platform stabilization
10. Describe manual rotation and lowering systems
11. Describe aerial safety systems
12. Describe system overrides and the hazards of using overrides
13. Describe safe operational limitations of the given aerial
14. Describe aerial safety procedures
15. Describe operations near electrical hazards and overhead obstructions
16. Raise, rotate, extend, align rungs, and position to a specified location and lock
17. Lock, unlock, retract, rotate, lower, and bed the aerial

Discussion Questions

1. What is your jurisdiction's policy for operating near power lines?
2. How do you decrease ladder fatigue and damage when operating the aerial?
3. What hazards are associated with a supported aerial?
4. What happens if you operate multiple levers at the same time?
5. What is the closed or retracted measurement of your aerial?
6. What ladder position offers the most stability? Why?
7. If there is a hydraulic failure, what holds the ladder in position?
8. Under what type of conditions would you use your overrides? What hazards and/or liability does that create?

Application

1. Activity 3-3: Maneuver and Position an Aerial Ladder from Each Control Station

Instructor Notes

1. None

CTS Guide Reference: CTS 8-3

Topic 3-4: Lowering an Aerial Ladder Using the Emergency Operating System

Terminal Learning Objective

At the end of this topic a student, given a deployed aerial device, will be able to lower an aerial ladder using the emergency operating system so that the ladder is lowered to its bedded position.

Enabling Learning Objectives

1. Describe emergency power units (EPU)
 - Gauges and controls
 - Capabilities
 - Limitations
 - Aerial hydraulic systems
 - Stabilizing systems
2. Describe how to operate manual rotation and lowering systems
 - Identify controls
 - Activate EPU
 - Operate manual hydraulic levers
 - Engage override power unit
3. Describe safety procedures specific to the aerial
4. Rotate and position to center
5. Unlock, retract, rotate, lower, and bed the aerial using the emergency operating system

Discussion Questions

1. What is an EPU? Where is it? What is its maximum running time?
2. Who manages the emergency power unit?
3. What the operating limitations of an aerial ladder?

Application

1. Activity 3-4: Lower an Aerial Ladder Device Using the Emergency Operating System

Instructor Notes

1. None

CTS Guide Reference: CTS 8-4

Topic 3-5: Deploying and Operating an Elevated Master Stream

Terminal Learning Objective

At the end of this topic a student, given a stabilized aerial, a pumping apparatus, a pressurized water source, a master stream device, and a desired flow, will be able to deploy and operate an elevated master stream so the stream is effective and the aerial and master stream device are operated correctly.

Enabling Learning Objectives

1. Describe types of elevated master stream devices and waterways
2. Describe how to operate master stream devices
 - Manually
 - Remotely
3. Describe nozzle reaction
4. Describe range of operation
5. Describe waterway locking systems
6. Describe how to stow a ladder with a pre-plumbed waterway
 - Stow nozzle before bedding ladder
 - Retract ladder (nozzle open)
7. Identify communication needs between aerial driver/operator, pump driver/operator, and crew
8. Identify weight limitations
9. Describe a removeable/temporary ladder pipe master stream
 - Remove nozzle before bedding ladder
 - Manage and stow hose as ladder retracts
 - Manage valves or other appliances
10. Connect a water supply to a master stream device
11. Deploy a fixed water supply
12. Deploy and control an elevated nozzle manually or remotely

Discussion Questions

1. What is the maximum lateral movement of the stream?
2. What is the sequence to start and stop the flow of water from the nozzle?
3. What are your limitations with water tower operations?
4. Do you wear a ladder belt when operating at the tip of a master stream?
5. What are some friction loss considerations when flowing an aerial master stream?

Application

1. Activity 3-5: Deploy and Operate an Elevated Master Stream

Instructor Notes

1. None

CTS Guide Reference: 8-5

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 deliver 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.

Skill Sheet

The Skill Sheet segment documents the skill sheet that tests the content contained within the topic. This segment is eliminated if the course does not have skill sheets.