



Tillered Apparatus Operations (2024)

Course Plan

Course Details

Certification:	Tillered Apparatus Driver/Operator (2024)
CTS Guide:	Fire Apparatus Driver/Operator (2024)
Description:	This course provides the knowledge and skills needed to operate a fire department aerial apparatus equipped with a tiller. Topics include practical driving exercises and operating, positioning, and stabilizing the apparatus from both the tractor and tiller positions.
Designed For:	Personnel who drive and operate a tillered 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 a tillered aerial apparatus (recommended)
Standard:	Complete all skills, activities, and tests Complete the summative test with a minimum score of 80%
Hours (Total):	40 hours (10.5 lecture / 28.5 application / 1 testing)
Maximum Class Size:	30
Instructor Level:	SFT Registered Instructor for both Tillered Apparatus Driver/Operator and Aerial Apparatus Driver/Operator
Instructor/Student Ratio:	1:30 (lecture) / 1:8 (application)
Restrictions:	Sufficient fire apparatus and space to accommodate classroom and skills training
SFT Designation:	CFSTES

Table of Contents

Course Details	1
Required Resources	3
Instructor Resources	3
Online Instructor Resources	3
Student Resources	3
Facilities, Equipment, and Personnel	3
Timetable	5
Timetable Key	5
Unit 1: Introduction	7
Topic 1-1: Orientation and Administration	7
Topic 1-2: Tillered Apparatus Driver/Operator Certification	8
Unit 2: Preventative Maintenance	10
Topic 2-1: Performing and Documenting Visual and Operational Checks	10
Unit 3: Operations	12
Topic 3-1: Performing Practical Driving Exercises	12
Topic 3-2: Operate a Tillered Apparatus	14
Topic 3-3: Position and Stabilize a Tillered Apparatus	16
How to Read a Course Plan	17

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
- Applicable state and local laws

Online Instructor Resources

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

- Tiller Apparatus Operations required activities
 - Activity 3-1(a): Serpentine
 - Activity 3-1(b): Cul-de-sac Turnaround
 - Activity 3-1(c): Station Parking
 - Activity 3-1(d): Diminishing Clearance
 - Activity 3-3: Position and Stabilize a Tiller Apparatus

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 equipped with a tiller to accommodate the students in the class
 - Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-3

- Skills Coaches who have already completed FADO 1C (Aerial) and 1D (Tiller) to support application activities (Based on class size, apparatus numbers, and student experience levels. Skills Coaches are in addition to and may not replace Registered Instructors)
- Spotters
- Adequate space to accommodate the required skills
- Tools and equipment for inspection and testing
- Tape measure
- Traffic cones
- Delineators
- Left front tire marker
- Optional straight line marker
- Vertical obstacle
- 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: Tillered Apparatus Driver/Operator Certification	0.5	0.0	
Unit 1 Totals	1.0	0.0	1.0
Unit 2: Preventative Maintenance			
Topic 2-1: Performing and Documenting Visual and Operation Checks	0.5	0.5	
Unit 2 Totals	0.5	0.5	1.0
Unit 3: Operations			
Topic 3-1: Performing Practical Driving Exercises	7.0	*	
Topic 3-2: Operating a Tillered Apparatus	1.0	1.0	
Topic 3-3: Positioning and Stabilizing a Tillered Apparatus	1.0	*	
Unit 2 Totals	9.0	28.0	37.0
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	10.5	29.5	40.0

* Individual application time determined by instructor for a total of 28 hours for Unit 3. Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-3.

Timetable Key

1. The Timetable documents the amount of time required to deliver the content included in the course plan.
2. 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: Tillered Apparatus Driver/Operator Certification

Terminal Learning Objective

At the end of this topic a student will be able to identify the requirements for Tillered Apparatus Driver/Operator 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 1D: Tillered 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)
 - Tillered 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 Operational Checks

Terminal Learning Objective

At the end of this topic a student, given a tillered apparatus, tools and equipment, maintenance and inspection forms, manufacturer specifications and requirements, and AHJ policies and procedures, will be able to perform and document the visual and operational checks on the system and components unique to a tillered apparatus so that the operational readiness of the tillered apparatus is verified.

Enabling Learning Objectives

1. Identify manufacturer specifications and requirements
2. Identify AHJ policies and procedures including documentation requirements
3. Identify vehicle systems and components
 - Battery(ies)
 - Braking system
 - Coolant system
 - Electrical system
 - Fuel
 - Hydraulic fluids
 - Oil
 - Tires
 - Steering systems (front and rear)
 - Belts
 - Tools, appliances, and equipment
 - Built-in safety features
4. Describe systems and components unique to a tillered apparatus
 - Electrical systems
 - Hydraulic systems
 - Emergency power unit (EPU)
 - Safety systems
 - Ladder (if applicable)
 - Waterway (if applicable)
 - 5th-wheel connection (if applicable)
 - Breathing air systems
 - Cable systems (if applicable)
 - Communication systems
 - Slides and rollers
 - Stabilizing systems
 - Tiller box (safety features and components)
5. Use hand tools and equipment
6. Inspect tillered 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 on a tillered apparatus?
2. What backup systems do tillers have if communication systems go down?
3. What powers the tillered power steering system?
4. What issues will take a tillered apparatus out of service?

Application

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

Instructor Notes

1. Bring materials for the Application.

CTS Guide Reference: CTS 9-1

Unit 3: Operations

Topic 3-1: Performing Practical Driving Exercises

Terminal Learning Objective

At the end of this topic a student, given an aerial apparatus equipped with a tiller, a qualified tillered apparatus driver/operator, a spotter for backing up, manufacturer's specifications and requirements, and AHJ policies and procedures, will be able to perform the practical driving exercises specified in 11.3.2 through 11.3.5 in NFPA 1010 (2024) from the tractor and the tiller position so that each exercise is performed without striking the apparatus or obstructions.

Enabling Learning Objectives

1. Describe tiller operator's responsibilities
 - Defensive driving
 - Following traffic laws
 - Rear spotting
 - Clear communication
2. Identify methods of communication with the apparatus driver/operator
 - Verbal
 - Electronic (beeps)
 - Radio/cell phone
3. Explain effects of general steering reactions on tiller control
 - From tractor position
 - From tiller box position
4. Explain effects of general steering reactions on tractor control
 - From tractor position
 - From tiller box position
5. Explain the effects on tiller control on:
 - General steering reactions
 - Night driving
 - Negotiating intersections
6. Describe manufacturer's driving limitations
7. Communicate with apparatus driver/operator
8. Avoid obstacles to operations
9. Operate passenger restraint devices
10. Maintain control of the tillered apparatus while accelerating, decelerating, and turning
11. Operate the tiller during nonemergency conditions
12. Operate under adverse environmental or driving surface conditions

Discussion Questions

1. What is your objective when steering as the apparatus driver/operator and as the tiller operator?
2. How does the responsibility of the tiller operator differ from the apparatus driver/operator?

3. How do the tiller operator's movements impact the driver/operator's control of the apparatus?
4. How many rotations of the tiller steering wheel to the left or right are required before reaching the stop?
5. Who is responsible for backing?
6. While backing, where should you position your hands on the steering wheel?
7. When should the two driver/operators communicate?

Application

1. Activity 3-1(a): Serpentine
2. Activity 3-1(b): Cul-de-sac Turnaround
3. Activity 3-1(c): Station Parking
4. Activity 3-1(d): Diminishing Clearance

Instructor Notes

1. All personnel will complete the activities from the tractor (aerial) and trailer (tiller) position.

CTS Guide Reference: CTS 10-1

Topic 3-2: Operate a Tillered Apparatus

Terminal Learning Objective

At the end of this topic a student, given an aerial apparatus equipped with a tiller and another driver/operator, will be able to operate an aerial apparatus equipped with a tiller from the tiller position and the tractor position over a predetermined route on a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations (NFPA 1010, Paragraph 11.3.1) so that the apparatus is operated in compliance with all applicable state and local laws and department policies and procedures, and the requirements of NFPA 1500, Section 4.2.

Enabling Learning Objectives

1. Describe principles of tiller operation
2. Describe methods of communication with the driver
3. Describe manufacturer operation limitations
4. Describe the capabilities and limitations of tiller aerial device related to:
 - Reach
 - Tip load
 - Angle of inclination
 - Angle from chassis axis
 - Manufacturer specifications for jackknifing
5. Identify effects of topography, ground, and weather conditions on safe deployment
6. Describe how to use a tiller aerial device
 - From tractor position
 - From tiller box position
7. Describe manufacturer's operation limitations
8. Determine a correct spotting position for the tractor during aerial operations
9. Operate the communication systems between the tiller operator's position and the driver's compartment
10. Maneuver tiller into correct position for spotting
 - Ventilation
 - Rescue
 - High point
 - Water tower
11. Operate aerial ladder

Discussion Questions

1. What should you consider when operating on a roadway?
2. What tasks are associated with the tiller position during aerial operations?
3. What tasks are associated with the aerial position during aerial operations?
4. How do you align the tractor and trailer when operating at night?

Application

1. Given tillered apparatus accident reports related to operations, divide students into small groups and have each group review an accident and develop recommendations for preventing a recurrence. Have each group present their findings.

Instructor Notes

1. None

CTS Guide Reference: CTS 10-2

Topic 3-3: Position and Stabilize a Tillered Apparatus

Terminal Learning Objective

At the end of this topic a student, given an aerial apparatus equipped with a tiller, another driver/operator, the apparatus operating instructions, an incident location, a situation description, and an assignment, will be able to position and stabilize an aerial apparatus equipped with a tiller from the tiller position and the tractor position so that the aerial device is positioned and stabilized to accomplish the assignment.

Enabling Learning Objectives

1. Explain principles of positioning and stabilizing an aerial apparatus
 - From the tiller position
 - From the tractor position
2. Determine a correct position for the tiller
3. Maneuver tiller into the correct position
 - From the tiller position
 - From the tractor position
4. Avoid obstacles to operations

Discussion Questions

1. When would you angle the trailer out?
2. When do you leave the tiller box after arriving on scene?
3. What responsibility does the tiller operator have for stabilizing the apparatus?

Application

1. Activity 3-3: Position and Stabilize a Tillered Apparatus

Instructor Notes

1. None

CTS Guide Reference: CTS 10-3

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.