

**CALIFORNIA
STATE FIRE**



TRAINING

Tillered Apparatus Operations

Course Plan

Course Details

- Certification:** Tillered Apparatus Driver/Operator (2017)
- CTS Guide:** Fire Apparatus Driver/Operator (2017)
- 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.)
- 1A: Fire Apparatus Driver/Operator (2008 or newer)
 - 1C: Aerial Apparatus Operations (2008 or newer)
- One of the following driver’s licenses: Class C fire fighter endorsed, Commercial A, or Commercial B
- Standard:** Complete all skills, activities, and tests
Complete the summative test with a minimum score of 80%
- Hours (Total):** 40 hours (11 lecture / 29 application)
- Maximum Class Size:** 30
- Instructor Level:** One primary instructor and sufficient assistant instructors to meet skills ratio requirements
- Instructor/Student Ratio:** 1:30 (lecture) / 1:10 (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 |
| Time Table | 5 |
| Time Table 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 | 9 |
| Topic 2-1: Performing and Documenting Visual and Operational Checks | 9 |
| Unit 3: Operations..... | 11 |
| Topic 3-1: Performing Practical Driving Exercises | 11 |
| Topic 3-2: Operate a Tillered Apparatus | 13 |
| Topic 3-3: Position and Stabilize a Tillered Apparatus | 14 |
| How to Read a Course Plan..... | 15 |

Required Resources

Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, 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/divisions/state-fire-training/cfstes-professional-certification/>:

- Tillered 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 Tillered Apparatus

Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, current edition)
- Personal protective equipment

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
- Qualified fire apparatus driver/operator
- Spotters
- 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)
- Adequate space to accommodate the required skills

Time Table

| 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 | TBD | 1.0 | 1.0 |
| Skills Practice (Lab / Sets and Reps) | | | |
| Determined by AHJ or educational institution | TBD | TBD | TBD |
| Course Totals | 11.0 | 29.0 | 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.

Time Table Key

1. The Time Table 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. = .25 / 30 min. = .50 / 45 min. = .75 / 60 min. = 1.0.
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 the prerequisites for certification
 - OSFM certified Fire Fighter 1
 - or**
 - Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer waives this certification prerequisite. (*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)
2. Identify the courses work required for certification
 - 1A: Fire Apparatus Driver/Operator (2008 or newer)
 - 1C: Aerial Apparatus Operations (2008 or newer)
 - 1D: Tillered Apparatus Operations (2008 or newer)
3. Identify the exams required for certification
 - No exams outside of class testing
4. Identify the task book requirements for certification
 - Tillered Apparatus Driver/Operator Certification Task Book (2017)
5. Identify the experience requirements for certification
 - A minimum of one year full-time paid experience in a California fire department with the primary responsibility of operating a tillered apparatus
 - A minimum of two years volunteer of part-time paid experience in a California fire department with the primary responsibility of operating a tillered apparatus
6. Identify the position requirements for certification
 - Appointed to the rank or position of Fire Apparatus Driver/Operator (performing in an acting capacity does not qualify)
7. Describe the certification task book process
8. 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 policies and procedures of the jurisdiction, 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 system
 - Belts
 - Tools, appliances, and equipment
 - Built-in safety features
4. Describe systems and components unique to a tillered apparatus
 - Electrical systems
 - Hydraulic systems
 - Safety systems
 - Ladder (if applicable)
 - Waterway (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 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 8-1

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 NFPA 1002 Paragraphs 4.3.2 through 4.3.5 from the tractor and the tiller position without striking the apparatus or obstructions.

Enabling Learning Objectives

1. Describe the capabilities and limitations of tiller aerial device related to:
 - Reach
 - Tip load
 - Angle of inclination
 - Angle from chassis axis
2. Identify the effects of topography, ground, and weather conditions on safe deployment
3. Describe how to use a tiller aerial device
 - From tractor position
 - From tiller box position
4. Describe the tiller operator's responsibility
5. Identify the methods of communication with the apparatus driver/operator
 - Verbal
 - Electronic (beeps)
6. Explain the effects of general steering reactions on tiller control
 - From tractor position
 - From tiller box position
7. Describe the manufacturer's operation limitations
8. Determine a correct position for the tiller
9. Maneuver the tiller into the correct position
10. Communicate with the apparatus driver/operator
11. Avoid obstacles

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 and tiller position.

CTS Guide Reference: CTS 9-1

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 1002 paragraph 4.3.1) while in compliance with all applicable state and local laws and policies and procedures of the jurisdiction.

Enabling Learning Objectives

1. Describe principles of tiller operation
2. Describe methods of communication with the driver
3. Explain the effects on tiller control on:
 - General steering reactions
 - Night driving
 - Negotiating intersections
4. Describe manufacturer operation limitations
5. Operate the communication systems between the tiller operator's position and the driver's compartment
6. Operate passenger restraint devices
7. Maintain control of the tillered apparatus while accelerating, decelerating, and turning
8. Operate the tiller during nonemergency conditions
9. Operate under adverse environmental or driving surface conditions

Discussion Questions

1. What should you consider when negotiating intersections?
2. What should you consider when operating on a roadway?
3. How do you align the tractor and trailer when operating at night?
4. How do you communicate to the apparatus driver/operator that you need to stop?

Application

1. Given tillered apparatus accident reports, 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 9-2

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, 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.

Enabling Learning Objectives

1. Explain the 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 the tiller into the correct position
 - From the tiller position
 - From the tractor position
4. Avoid obstacles

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 8-3

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.