

# FIRE APPARATUS DRIVER/OPERATOR 1A

Approved and Adopted by the  
Office of State Fire Marshal



Recommended for adoption by the Statewide  
Training and Education Advisory Committee  
and the  
State Board of Fire Services



## INSTRUCTOR GUIDE

January 2011



# **FIRE APPARATUS DRIVER/OPERATOR 1A**

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**EMERGENCY VEHICLE OPERATIONS**

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**I N S T R U C T O R   G U I D E**



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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### TABLE OF CONTENTS

State Fire Training .....	i
Mission Statement.....	i
California Fire Service Training and Education System .....	i
Acknowledgments .....	i
Student Profile .....	iii
Target Group.....	iii
Prerequisites .....	iii
Desired Attendance Time Frame .....	iii
Class Requirements and Space .....	iv
Equipment .....	iv
Driving Grounds And Equipment.....	iv
Materials.....	iv
Introduction to the Manual .....	vi
Appendix A – Glossary.....	vii
Appendix B – Instructor Tests .....	vii
Appendix C – Student Tests.....	vii
Course Outline.....	viii
Texts and References .....	ix
Calendar of Events .....	i
<b>INSTRUCTOR GUIDE</b>	
Unit 1: Responsibilities, Standards, And Laws .....	Topics 1-1 through 1-3
Unit 2: Inspection, Basic Maintenance, Documentation, and Troubleshooting .....	Topics 2-1 through 2-15
Unit 3: Driving Practices .....	Topics 3-1 through 3-8
Unit 4: Mandatory Driving Exercises.....	Topic 4-1
Unit 5: Optional Driving Exercises .....	Topic 5-1
Glossary .....	Appendix A
Instructor Tests (With Answers).....	Appendix B
Student Tests (Ready To Copy) .....	Appendix C

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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### State Fire Training

#### Mission Statement

The mission of State Fire Training is to enable the California fire service to safely protect life and property through education, training, and certification.

#### California Fire Service Training and Education System

The California Fire Service Training and Education System (CFSTES) was established to provide a single statewide focus for fire service training in California. CFSTES is a composite of all the elements that contribute to the development, delivery, and administration of training for the California fire service. The authority for the central coordination of this effort is vested in the Training Division of the California State Fire Marshal's Office with oversight provided by the State Board of Fire Services.

The role of CFSTES is one of facilitating, coordinating, and assisting in the development and implementation of standards and certification for the California fire service. CFSTES manages the California Fire Academy System by providing standardized curriculum and tests; accredited courses leading to certification; approved standardized training programs for local and regional delivery; administering the certification system; and publishing Certification Training Standards, Instructors Guides, Student Manuals, Student Supplements, and other related support materials.

This system is as successful and effective as the people involved in it are. It is a fire service system developed by the fire service, for the fire service... and we believe it is the best one in the country.

#### Acknowledgments

State Fire Training coordinated the development of the material contained in this guide. Before its publication, the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS) recommended this guide for adoption by the State Fire Marshal (SFM). This guide is appropriate for fire service personnel and for personnel in related occupations that are pursuing State Fire Training certification.

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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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Special acknowledgement and thanks are extended to the following members of CDF/State Fire Training Curriculum Development Division for their diligent efforts and contributions that made the final publication of this document possible.

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*"We gratefully acknowledge the hard work and accomplishments of those before us who built the solid foundation on which this program continues to grow."*



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### Student Profile

#### Target Group

Fire service emergency response personnel

#### Prerequisites

- Fire apparatus driving experience on a public way (two options)
  - California Class C driver's license ***and*** a signed verification of driving fire apparatus on a public way
    - ✦ Section 4.3.1 of the NFPA Standard for Fire Apparatus Driver/Operator Professional Qualifications, 2009 Edition
    - ✦ Signed by you and your Fire Chief
  - California driver's license
    - ✦ Class A, B, or C ***with*** the fire fighter endorsement
- Fire Fighter I training recommended

#### Desired Attendance Time Frame

None



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### Class Requirements and Space

The characteristics of the classroom and support facilities have a great impact on the learning environment and the instructor's success or failure. For this course, it is advisable for the instructor to adhere as closely as possible to the following guidelines.

#### Equipment

Writing board with markers/erasers

Appropriate audiovisual equipment

Appropriate audiovisual materials

#### Driving Grounds And Equipment

1. Fire apparatus
2. Adequate driving space
3. Tire pressure gauges
4. Wiping rags
5. Creepers
6. 48-inch pillars (minimum of 20)
7. 18-inch cones (minimum of 60)
8. Numbered lane change cards
9. 100-foot tape measure
10. Stopwatch
11. Clipboard

#### Materials

##### Unit 1

- Progress Chart
- Activity 1-3-1, "Legal Aspects Of Emergency And Nonemergency Driving"

##### Unit 2

- Activity 2-15-1, "Daily Apparatus And Equipment Check"

##### Unit 3

- Activity 3-2-1, "Principles Of Defensive Driving"



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### Unit 4

- Mandatory Driving Exercise 4-1-1, "Diminishing Clearance Exercise"
- Mandatory Driving Exercise 4-1-2, "Serpentine Exercise"
- Mandatory Driving Exercise 4-1-3, "Three-Point Turnaround Exercise"
- Mandatory Driving Exercise 4-1-4, "Station Apparatus Backing Exercise"
- Mandatory Driving Exercise 4-1-5, "Alley Dock Exercise"

### Unit 5

- Optional Driving Exercise 5-1-1, "Lane Change Exercise"
- Optional Driving Exercise 5-1-2, "Offset Alley Exercise"
- Optional Driving Exercise 5-1-3, "Dogleg Exercise"
- Optional Driving Exercise 5-1-4, "Parallel Parking Exercise"

### Written Tests

- Test 1
- Test 2
- Certification Exam



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### Introduction to the Manual

The **2011 Fire Apparatus Driver/Operator 1A** Instructor Guide has been updated to reflect the new California fire fighter's licensing law (AB #1648), the current California Vehicle Code (CVC) requirements, and the 2009 NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications. This course also requires three corresponding textbooks: the current edition of the California Commercial Driver Handbook published by the Department of Motor Vehicles, the second edition of IFSTA's Pumping Apparatus Driver/Operator Handbook, and the Fire Apparatus Driver/Operator 1A Student Supplement published by State Fire Training. All certification exam questions were developed using any one of the three textbooks.

During the revision process, the developers included the following:

- An increase in group and individual activities
- Endnotes detailing specific code sections as they relate to the lesson plan
- PowerPoint slides for all lesson plans
- Video clips for the driving exercises

This publication is intended to serve as an instructor guide and includes lesson plans, a slide index, student activities, and tests. For each topic identified in the course outline, a lesson plan has been developed that contains: a time frame, level of instruction, behavioral objective, materials needed, references, preparation statement, lesson content, and endnotes. Suggested application methods have been identified throughout the lessons for you to use during your presentation.

- **Time Frame:** The estimated duration required for in-class presentation.
- **Level Of Instruction:** Identifies the instructional level that the material was designed to fulfill. Obviously, you have the latitude to increase the level based on available time, local conditions, and the students' apperceptive base.
- **Behavioral Objective:** The behavioral objective is a statement of the student's performance desired at the end of instruction. You must ensure that enough information is given in the presentation and/or activities to enable the student to perform according to the goal.
- **Materials Needed:** This should be a complete list of everything you will need to present the lesson, including visual aids, tests, and so on.
- **References:** These are the specific references the curriculum development team used when developing the lesson plan. In addition, references may be listed as additional study aids for instructors to enhance the lesson -- books, manuals, bulletins, scripts, visual aid utilization plans, and the like. The corresponding pages in the student supplement are also listed here.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- **Preparation:** The motivational statement connects the student with the lesson plan topic through examples or illustrations relating to their occupation, injury, and even mortality. You will need to develop this statement to fit your target audience.
- **Lesson Content:** Includes information used in the four-step method of instruction.

### Cognitive Lesson Plans

PRESENTATION	APPLICATION
Everything you say or display Content Notes	Student Participation <ul style="list-style-type: none"> <li>• Questions</li> <li>• Activities</li> <li>• Audiovisual Cues</li> </ul>

### Psychomotor Lesson Plan

OPERATIONS	KEY POINTS
Specific actions to be performed by the students	The who, what, when, where, why, and how (the "tricks of the trade")
Begin with a verb, followed by a noun	Safety practices

### Appendix A – Glossary

- Glossary of terms used throughout the course.

### Appendix B – Instructor Tests

- Course tests with answer keys.

### Appendix C – Student Tests

- Test masters to copy for your students. Keep these in good condition to use for future classes. Collect these tests after they have been graded and discussed in class.
- **Do not let the students keep them since you will be using the same tests for your next class.**



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### Course Outline

**Course Objectives:** To provide the student with...

- a) Information on driver responsibilities, recognized standards, and related laws for fire apparatus.
- b) Information and techniques on basic inspections, documentation, maintenance, and troubleshooting fire apparatus.
- c) Information and techniques on driving and positioning fire apparatus.
- d) The opportunity to increase their driving skills during simulated driving conditions.

**Course Content**.....40:00

#### **Unit 1: Responsibilities, Standards, And Laws**

- 1-1 Orientation And Administration .....1:00
- 1-2 Fire Apparatus Driver/Operator Responsibilities.....0:45
- 1-3 Legal Aspects Of Emergency And Nonemergency Driving.....1:00

#### **Unit 2: Inspection, Basic Maintenance, Documentation, And Troubleshooting**

- 2-1 Introduction To Inspection, Basic Maintenance, And Troubleshooting .....0:30
- 2-2 Inspection And Basic Maintenance Of The Driver And Crew Areas, Apparatus Body, And Compartmentation .....0:15
- 2-3 Inspection And Basic Maintenance Of The Frame, Axles, Steering And Suspension Systems, Driveline, Wheels, And Tires .....0:15
- 2-4 Troubleshooting The Frame, Axles, Steering And Suspension Systems, Driveline, Wheels, And Tires .....0:30
- 2-5 Inspection And Basic Maintenance Of Engine Systems .....0:45
- 2-6 Troubleshooting Engine Systems .....0:30
- 2-7 Inspection And Basic Maintenance Of The Transmission And Clutch .....0:15
- 2-8 Troubleshooting The Transmission And Clutch .....0:15
- 2-9 Inspection And Basic Maintenance Of The Starting, Charging, And Other Electrical Systems .....0:30
- 2-10 Troubleshooting The Starting, Charging, And Other Electrical Systems .....2:00
- 2-11 Inspection And Basic Maintenance Of Brake Systems .....1:30
- 2-12 Troubleshooting Brake Systems .....1:00
- 2-13 Inspection And Basic Maintenance Of Auxiliary And Accessory Equipment.....0:15
- 2-14 Inspection Documentation And Reports .....0:15
- 2-15 Pretrip Inspection Procedures .....2:00



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### Unit 3: Driving Practices

3-1	Accident Statistics And Liability .....	0:30
3-2	Principles Of Defensive Driving .....	2:00
3-3	Driving Apparatus To Incidents.....	1:00
3-4	Principles Of Off-Road Driving.....	1:00
3-5	Principles Of Braking And Stopping.....	0:30
3-6	Principles Of Steering And Load Control .....	1:30
3-7	Driving During Adverse Weather Conditions .....	0:15
3-8	Positioning Apparatus.....	1:00

### Unit 4: Mandatory Driving Exercises

4-1	Introduction To The Mandatory Driving Exercises .....	0:30
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### Unit 5: Optional Driving Exercises

5-1	Introduction To The Optional Driving Exercises.....	0:15
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<b>Practice And Testing The Driving Exercises.....</b>	<b>14:00</b>
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<b>Unit Tests .....</b>	<b>3:00</b>
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<b>Certification Exam .....</b>	<b>1:00</b>
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### Texts and References

- Basic Fire Control Module 2A Automotive Battalion Student Supplement, CDF, 1999 Edition, Off Road Vehicle Operations Unit
- California Commercial Driver Handbook, DMV, 2008 Edition
- Chilton technical manuals
- Driver Awareness Instructor Course Manual, California Commission on Peace Officer Standards and Training, 1999 Edition
- Engineer Training Manual, Tiburon Fire Protection District, 2000 Edition, Section 53
- <http://www.bendix.com/troubleshooting/>
- Introduction to Fire Pump Operations, Delmar, 2005 Edition
- Motor Truck & Diesel Repair Manual, Bendix Commercial Vehicle Systems, 29th Edition
- NFPA 1001: Standard for Fire Fighter Professional Qualifications, 2008 Edition
- NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications, 2009 Edition
- NFPA 1451: Standard for a Fire Service Vehicle Operations Training Program, 2007 Edition
- NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2007 Edition



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments, 2007 Edition
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition
- NFPA Journal, July/August 2001 Edition
- NFPA Journal, November/December 2007 Edition
- Off Road and 4-Wheel Driver Operational Procedures Manual, Kern County Fire Department, 1999 Edition
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition
- Sacramento Regional Driver's Training Authority Student Manual, First Edition
- State of California Vehicle Code, DMV, 2007 Edition
- Title 49 CFR Transportation, U.S. Government Printing Office, October 2006 Edition
- University of Michigan Transportation Research Study of 1998, University of Michigan
- Webster's Unabridged Dictionary, Random House, Second Edition



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

### Calendar of Events

DAY	TOPIC	TITLE	TIME	ACTIVITY	EVALUATION	
Day 1	1-1	Orientation And Administration	1:00			
	1-2	Fire Apparatus Driver/Operator Responsibilities	0:45			
	1-3	Legal Aspects Of Emergency And Nonemergency Driving	1:00	1-3-1		
	2-1	Introduction To Inspection, Basic Maintenance, And Troubleshooting	0:30			
	2-2	Inspection And Basic Maintenance Of The Driver And Crew Areas, Apparatus Body, And Compartmentation	0:15			
	2-3	Inspection And Basic Maintenance Of The Frame, Axles, Steering And Suspension Systems, Driveline, Wheels, And Tires	0:15			
	2-4	Troubleshooting The Frame, Axles, Steering And Suspension, Driveline, Wheels, And Tires	0:30			
	2-5	Inspection And Basic Maintenance Of Engine Systems	0:45			
	2-6	Troubleshooting Engine Systems	0:30			
	2-7	Inspection And Basic Maintenance Of The Transmission And Clutch	0:15			
	2-8	Troubleshooting The Transmission/Clutch	0:15			
	2-9	Inspection And Basic Maintenance Of The Starting, Charging, And Other Electrical Systems	0:30			
	2-10	Troubleshooting The Starting, Charging, And Other Electrical Systems	1:30			
		<b>Day 1 Total</b>	<b>8:00</b>			
Day 2	2-10	Troubleshooting The Starting, Charging, And Other Electrical Systems	0:30			
	2-11	Inspection And Basic Maintenance Of Brake Systems	1:30			
	2-12	Troubleshooting Brake Systems	1:00			
	2-13	Inspection And Basic Maintenance Of Auxiliary And Accessory Equipment	0:15			
			1:00			<b>Test #1</b>
	2-14	Inspection Documentation And Reports	0:15			
	2-15	Pretrip Inspection Procedures	2:00	2-15-1		
	3-1	Accident Statistics And Liability	0:30			
	3-2	Principles Of Defensive Driving	1:00			
		<b>Day 2 Total</b>	<b>8:00</b>			



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

DAY	TOPIC	TITLE	TIME	ACTIVITY	EVALUATION	
Day 3	3-2	Principles Of Defensive Driving	1:00	3-2-1		
	3-3	Driving Apparatus To Incidents	1:00			
	3-4	Principles Of Off-Road Driving	1:00			
	3-5	Principles Of Braking And Stopping	0:30			
	3-6	Principles Of Steering And Load Control	1:30			
	3-7	Driving During Adverse Weather Conditions	0:15			
	3-8	Positioning Apparatus	1:00			
			1:00			<b>Test #2</b>
	4-1	Introduction To The Mandatory Driving Exercises	0:30			
	5-1	Introduction To The Optional Driving Exercises	0:15			
	<b>Day 3 Total</b>		<b>8:00</b>			
Day 4		Diminishing Clearance Exercise*	8:00	4-1-1		
		Serpentine Exercise*		4-1-2		
		Three-Point Turnaround Exercise*		4-1-3		
		Station Apparatus Backing Exercise*		4-1-4		
		Alley Dock Exercise*		4-1-5		
		Lane Change Exercise		5-1-1		
		Offset Alley Exercise		5-1-2		
		Dogleg Exercise		5-1-3		
		Parallel Parking Exercise		5-1-4		
	<b>Day 4 Total</b>			<b>8:00</b>		
Day 5		Practice Driving Exercises	7:00		<b>Performance Exams</b>	
		Graded Exercises				
		Certification Exam	1:00		<b>Certification Exam</b>	
	<b>Day 5 Total</b>		<b>8:00</b>			

\*Mandatory Driving Exercise



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 1-1: Orientation And Administration

**TIME FRAME:** 1:00

**LEVEL OF INSTRUCTION:** Level I

**AUTHORITY:** 2009 NFPA 1002: Chapters 1 and 4

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given an oral evaluation

**Behavior:** The student will confirm knowledge of the course objectives by completing an oral evaluation

**Standard:** To the instructor's satisfaction according to the information contained in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2011 Edition, Pages 1-4 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 1-10

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials
- Progress chart

**REFERENCES:**

- NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications, 2009 Edition, Chapters 1 and 4 and Appendix A
- NFPA 1451: Standard for a Fire Service Vehicle Operations Training Program, 2007 Edition
- NFPA 1500: Standard on Fire Department Occupational Safety and Health Program, 2007 Edition, Sections 5.2.2 and 5.3.1
- NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments, 2007 Edition, Sections 6-4 and 6-5
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 1-10



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***PREPARATION:***

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

**A**ttention (attract)

**B**egin

**C**uriosity (arouse)

**A**ssociation

**I**nterest (create)

**S**tudents

**D**esire (stimulate)

**E**xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>III. FACILITIES ORIENTATION</b></p> <ul style="list-style-type: none"><li>A. Classroom location(s)</li><li>B. Restrooms</li><li>C. Food locations</li><li>D. Smoking</li><li>E. Breaks</li><li>F. Telephones</li><li>G. Parking</li></ul> <p><b>IV. STUDENT REGISTRATION</b></p> <ul style="list-style-type: none"><li>A. Forms<ul style="list-style-type: none"><li>1. State Fire Training</li><li>2. College</li></ul></li></ul> <p><b>NOTE:</b> Provide step-by-step directions for completing the forms.</p> <ul style="list-style-type: none"><li>B. Resolve any tuition issues as needed</li></ul> <p><b>V. STUDENT EVALUATION</b></p> <ul style="list-style-type: none"><li>A. Activities<ul style="list-style-type: none"><li>1. Complete all activities</li></ul></li><li>B. Two written unit tests<ul style="list-style-type: none"><li>1. Each followed with group discussion</li><li>2. All tests must be completed and passed with a minimum score of 80%</li></ul></li></ul> <p><b>NOTE:</b> Tests must be returned to the instructor after review.</p> <ul style="list-style-type: none"><li>C. Driving exercises<ul style="list-style-type: none"><li>1. Manipulative skills tracking and accountability</li><li>2. Minimum score of 80% required to pass each mandatory manipulative performance test</li></ul></li><li>D. Progress chart<ul style="list-style-type: none"><li>1. Use student identification numbers<ul style="list-style-type: none"><li>a) No names</li></ul></li><li>2. Federal law prohibits publication of identifiable student grades</li></ul></li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>E. State certification exam</p> <ol style="list-style-type: none"><li>1. Not related to final course grade</li><li>2. Must pass the class first before taking the exam</li><li>3. 50 question multiple-choice exam</li><li>4. Minimum 70% required to pass the certification exam</li></ol> <p><b>VI. COURSE DESCRIPTION</b></p> <p>A. 40-hour class</p> <ol style="list-style-type: none"><li>1. Classroom information and activities</li><li>2. Reading assignments</li><li>3. Apparatus inspection</li><li>4. Hands-on driving exercises</li></ol> <p>B. Identify start and end times</p> <ol style="list-style-type: none"><li>1. Class will begin on time</li><li>2. Student attendance requirements<ol style="list-style-type: none"><li>a) Must attend the entire course</li><li>b) State Fire Training allows considerations for excused absences up to four hours</li></ol></li></ol> <p>C. Proper attire</p> <ol style="list-style-type: none"><li>1. Classroom<ol style="list-style-type: none"><li>a) Station wear or equivalent</li><li>b) Station boots or equivalent</li></ol></li><li>2. Field exercises<ol style="list-style-type: none"><li>a) Station wear or equivalent</li><li>b) Station boots or equivalent</li><li>c) Helmet</li><li>d) Gloves</li></ol></li></ol> <p>D. Required textbooks</p> <ol style="list-style-type: none"><li>1. <u>Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition</u></li></ol>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>2. <u>California Commercial Driver Handbook</u>, DMV, Current Edition</p> <p>3. Student supplement published by State Fire Training</p> <p><b>VII. COURSE OBJECTIVES</b></p> <p>A. Provide the students with</p> <ol style="list-style-type: none"> <li>1. Information on driver responsibilities, recognized standards, and related laws for fire apparatus</li> <li>2. Information and techniques on basic inspections, documentation, maintenance, and troubleshooting fire apparatus</li> <li>3. Information and techniques on driving and positioning fire apparatus</li> <li>4. The opportunity to increase their driving skills during simulated driving conditions</li> </ol> <p><b>VIII. HISTORICAL OVERVIEW</b></p> <p>A. Course development</p> <ol style="list-style-type: none"> <li>1. First as a career development guide               <ol style="list-style-type: none"> <li>a) Titled Driver/Operator I and II</li> </ol> </li> <li>2. 1988, two courses were developed               <ol style="list-style-type: none"> <li>a) Fire Apparatus Driver/Operator 1A                   <ol style="list-style-type: none"> <li>1) Emergency Vehicle Operations</li> </ol> </li> <li>b) Fire Apparatus Driver/Operator 1B                   <ol style="list-style-type: none"> <li>1) Pump Operations</li> </ol> </li> </ol> </li> <li>3. 2003, courses were updated</li> <li>4. 2008, courses were updated to meet the <u>Pumping Apparatus Driver/Operator Handbook</u>, IFSTA, Second Edition</li> <li>5. 2011, 1A course was updated to meet the new California fire fighter's licensing law (AB #1648)</li> </ol> <p>B. Experience has demonstrated that the following skills and senses are needed to be a successful fire apparatus driver/operator</p>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ol style="list-style-type: none"> <li>1. Reading               <ol style="list-style-type: none"> <li>a) Able to read and understand the written word</li> </ol> </li> <li>2. Writing               <ol style="list-style-type: none"> <li>a) Ability to write clearly and concisely</li> </ol> </li> <li>3. Mathematics               <ol style="list-style-type: none"> <li>a) Basic mathematical skills for Fire Apparatus Driver/Operator 1A</li> <li>b) Basic algebra skills necessary for hydraulics in Fire Apparatus Driver/Operator 1B</li> </ol> </li> <li>4. Physically fit               <ol style="list-style-type: none"> <li>a) Per department standards</li> </ol> </li> <li>5. Vision</li> </ol> <p><b>NOTE:</b> NFPA 1582: <u>Standard on Comprehensive Occupational Medical Program for Fire Departments</u>, 2007 Edition, Section 6.4</p> <ol style="list-style-type: none"> <li>a) Category A medical condition               <ol style="list-style-type: none"> <li>1) Far visual acuity less than 20/40 binocular, corrected with contact lenses or spectacles, or far visual acuity less than 20/100 binocular for wearers of hard contacts or spectacles, uncorrected</li> <li>2) Color perception                   <ul style="list-style-type: none"> <li>• Monochromatic vision resulting in inability to use imaging devices such as thermal imaging cameras</li> </ul> </li> <li>3) Monocular vision</li> <li>4) Any eye condition that results in the candidate not being able to safely perform one or more of the essential job tasks</li> </ol> </li> <li>b) Category B medical condition               <ol style="list-style-type: none"> <li>1) Diseases of the eye such as retinal detachment, progressive retinopathy, or optic neuritis</li> </ol> </li> </ol>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2) Ophthalmological procedures such as radial keratotomy, Lasik procedure, or repair of retinal detachment</li> <li>3) Peripheral vision in the horizontal meridian of less than 110 degrees in the better eye or any condition that significantly affects peripheral vision in <i>both</i> eyes</li> </ul> <p>6. Ears and hearing</p> <p><b>NOTE:</b> NFPA 1582: <u>Standard on Comprehensive Occupational Medical Program for Fire Departments</u>, 2007 Edition, Section 6.5</p> <ul style="list-style-type: none"> <li>a) Category A medical condition               <ul style="list-style-type: none"> <li>1) Chronic vertigo or impaired balance as demonstrated by the inability to tandem gait walk</li> <li>2) On audiometric testing, average hearing loss in the unaided better ear greater than 40 decibels (dB) at 500 Hz, 1000 Hz, 2000 Hz, and 3000 Hz when the audiometric device is calibrated to ANSI Z24.5, Audiometric Device Testing</li> <li>3) Any ear condition (or hearing impairment) that results in the candidate not being able to safely perform one or more of the essential job tasks</li> </ul> </li> <li>b) Category B medical condition               <ul style="list-style-type: none"> <li>1) Unequal hearing loss</li> <li>2) Average uncorrected hearing deficit at the test frequencies 500 Hz, 1000 Hz, 2000 Hz, and 3000 Hz greater than 40 dB in <i>either</i> ear</li> </ul> </li> </ul> <p>7. Mechanical ability</p> <ul style="list-style-type: none"> <li>a) To understand the operation and maintenance of apparatus</li> </ul> <p>8. Basic supervisory skills</p>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>9. Ability to remain calm</p> <p>10. Ability to avoid "tunnel vision"</p> <p>11. Ability to identify safety hazards</p> <p><b>IX. APPLICABLE STANDARDS</b></p> <p>A. <u>NFPA 1500: Standard on Fire Department Occupational Safety and Health Program</u>, NFPA, 2007 Edition</p> <p>1. Chapter 5: Training, Education, and Professional Development</p> <p>a) Section 5.2.2</p> <p>1) Must meet applicable requirements specified in <u>NFPA 1002</u></p> <p>b) Section 5.3.1</p> <p>1) Department shall adopt or develop training and education that meet the minimum requirements</p> <p>2) Department shall provide training, education, and professional development programs to support the minimum qualifications and certifications expected of its members</p> <p>3) Members shall practice assigned skill sets on a regular basis but not less than annually</p> <p>4) Department shall provide specific training to members when written policies, practices, procedures, or guidelines are changed and/or updated</p> <p>2. Chapter 6: Fire Apparatus, Equipment, and Driver/Operators</p> <p>a) Department shall consider safety and health as primary concerns in the specification, design, construction, acquisition, operation, maintenance, inspection, and repair of all fire department apparatus</p>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) Department shall specify restraint devices for fire apparatus, including those restraint devices for emergency medical service (EMS) members operating in the patient compartment of the ambulance</p> <p>B. <u>NFPA 1001: Standard for Fire Fighter Professional Qualifications</u>, NFPA, 2008 Edition</p> <ol style="list-style-type: none"> <li>1. Chapter 5: Fire Fighter I               <ol style="list-style-type: none"> <li>a) Section 5.1.1                   <ol style="list-style-type: none"> <li>1) General knowledge requirements</li> </ol> </li> <li>b) Section 5.1.2                   <ol style="list-style-type: none"> <li>1) General skill requirements</li> </ol> </li> </ol> </li> </ol> <p>C. <u>NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications</u>, NFPA, 2009 Edition</p> <ol style="list-style-type: none"> <li>1. Chapter 1: Administration</li> <li>2. Chapter 4: General Requirements</li> <li>3. Chapter 5: Apparatus Equipped with Fire Pump</li> <li>4. Appendix A: Explanatory Material</li> </ol> <p>D. <u>NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</u>, NFPA, 2007 Edition</p> <ol style="list-style-type: none"> <li>1. Chapter 1 Administration</li> <li>2. Chapter 4 General Requirements</li> <li>3. Chapter 5 Retirement of Fire Apparatus</li> <li>4. Chapter 6 Out-of-service Criteria</li> <li>5. Chapters 7-15 Inspection and Maintenance</li> <li>6. Chapter 16 Road Tests and Annual Weight Verification</li> <li>7. Chapters 17-23 Performance Testing</li> </ol> <p>E. <u>NFPA 1451: Standard for a Fire Service Vehicle Operations Training Program</u>, NFPA, 2007 Edition</p> <ol style="list-style-type: none"> <li>1. Entire standard applies</li> </ol>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>F. Other standards</p> <ul style="list-style-type: none"><li>1. Departmental</li></ul> <p><b>X. RELEVANCE OF STANDARDS</b></p> <p>A. Legal</p> <ul style="list-style-type: none"><li>1. Nationally recognized</li><li>2. Upheld in court<ul style="list-style-type: none"><li>a) Liability</li><li>b) Held personally accountable</li></ul></li><li>3. Negligence/liability<ul style="list-style-type: none"><li>a) Possible affects<ul style="list-style-type: none"><li>1) Driving record</li><li>2) Personal insurance</li><li>3) Career impact</li></ul></li></ul></li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

The professional fire apparatus driver/operator must recognize his or her role in the fire service and the responsibility that entails. The ability to remain calm, think clearly, decisively, and with intent are just part of the traits which are critical for this position.

## ***EVALUATION:***

The student will complete the oral evaluation at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2011 Edition, Pages 1-4 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 1-10. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

DRIVER/OPERATOR 1A PROGRESS CHART	BEGINNING DATE:												
	ENDING DATE:												
CLASS SIZE LIMITED TO 25 STUDENTS	MANDATORY					OPTIONAL							
	Activity 1-3-1	Activity 2-15-1	Activity 3-2-1	Exercise 4-1-1	Exercise 4-1-2	Exercise 4-1-3	Exercise 4-1-4	Exercise 4-1-5	Exercise 5-1-1	Exercise 5-1-2	Exercise 5-1-3	Exercise 5-1-4	
STUDENT IDENTIFICATION	Activity 1-3-1	Activity 2-15-1	Activity 3-2-1	Exercise 4-1-1	Exercise 4-1-2	Exercise 4-1-3	Exercise 4-1-4	Exercise 4-1-5	Exercise 5-1-1	Exercise 5-1-2	Exercise 5-1-3	Exercise 5-1-4	
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# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

DRIVER/OPERATOR 1A PROGRESS CHART	BEGINNING DATE:											
	ENDING DATE:											
CLASS SIZE LIMITED TO 25 STUDENTS	Test #1	Test #2	Attendance Day 1	Attendance Day 2	Attendance Day 3	Attendance Day 4	Attendance Day 5	LICENSE			PASS/FAIL	Cert Exam
								CDL with Fire Fighter Endorsement	Signed driving verification			
STUDENT IDENTIFICATION												
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# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 1-2: Fire Apparatus Driver/Operator Responsibilities

**TIME FRAME:** 0:45

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Chapter 1

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of fire apparatus driver/operator responsibilities by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 19-23, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 5-6, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 1-2, 9, 31-61, 64-65, 73-74, 76-88, 99-105, 151-161, and 418-425

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 19-23
- NFPA 1451: Standard for a Fire Service Vehicle Operations Training Program, 2007 Edition, Chapter 5
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition, Chapters 1-4
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 1-2, 9, 31-61, 64-65, 73-74, 76-88, 99-105, 151-161, and 418-425
- Title 49 CFR Transportation, U.S. Government Printing Office, October 2006 Edition, Parts 390 and 396

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

Attention (attract)

Begin

Curiosity (arouse)

Association



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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**Interest (create)**

**Students**

**Desire (stimulate)**

**Experience**

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. SAFETY</b></p> <p>A. Personnel/apparatus riders</p> <ol style="list-style-type: none"><li>1. Remain seated</li><li>2. Wear seatbelts</li> <li>3. Have a spotter<ol style="list-style-type: none"><li>a) A fire fighter who walks behind a backing apparatus to provide guidance to the driver/operator</li><li>b) Anytime backing up</li><li>c) May be needed front and/or rear</li></ol></li></ol> <p>B. Public</p> <ol style="list-style-type: none"><li>1. Use caution with general public around apparatus<ol style="list-style-type: none"><li>a) May be located in your "blind spot"</li></ol></li><li>2. Pedestrians</li><li>3. Cyclists</li></ol> <p>C. Driving (emergency and nonemergency)</p> <ol style="list-style-type: none"><li>1. Defensive driving techniques</li><li>2. Obey state, local, and departmental regulations</li></ol> <p>D. Operating apparatus</p> <ol style="list-style-type: none"><li>1. Scene considerations<ol style="list-style-type: none"><li>a) Apparatus positioning</li></ol></li></ol>	<p><b>SLIDE: 1-2-1</b></p> <p><b>SLIDE: 1-2-2</b></p> <p>The driver/operator should always utilize what when backing up?</p> <p><b>SLIDE: 1-2-3</b></p> <p><b>SLIDE: 1-2-4</b></p> <p><b>SLIDE: 1-2-5</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>1) Rescue considerations</p> <p>2) Building collapse</p> <p>3) Electrical hazards</p> <ul style="list-style-type: none"><li>• Generators and cords</li><li>• Downed wires</li><li>• Utility poles</li></ul> <p>b) Hoselines</p> <ol style="list-style-type: none"><li>1) Attack</li><li>2) Supply</li></ol> <p>c) Weather/topography</p> <ol style="list-style-type: none"><li>2) Upwind</li><li>3) Uphill</li><li>4) Paved/unpaved roads</li></ol> <p>2. Equipment</p> <ol style="list-style-type: none"><li>a) Doors left open</li><li>b) Ladder rack left down</li><li>c) Tools not secured or stored</li></ol> <p>E. Station</p> <ol style="list-style-type: none"><li>1. Apparatus bay doors</li><li>2. Compartment doors open</li></ol>	<p>What are two areas of concern when spotting apparatus at an emergency incident?</p> <p><b>SLIDE: 1-2-6</b></p> <p>As a driver/operator, what are some hazards that you should be aware of when departing the station?</p> <p><b>SLIDE: 1-2-7</b></p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>IV. APPARATUS MAINTENANCE</b></p> <ul style="list-style-type: none"><li>A. Regulated by Code of Federal Regulations<ul style="list-style-type: none"><li>1. Title 49<ul style="list-style-type: none"><li>a) Part 396</li></ul></li></ul></li><li>B. Daily<ul style="list-style-type: none"><li>1. Required by law<ul style="list-style-type: none"><li>a) Title 49 CFR, Part 396</li></ul></li><li>2. Per department SOPs</li><li>3. In accordance with the manufacturer's recommendations and specifications</li></ul></li><li>C. Weekly/monthly<ul style="list-style-type: none"><li>1. Per department SOPs</li><li>2. In accordance with the manufacturer's recommendations and specifications</li></ul></li><li>D. Written documentation<ul style="list-style-type: none"><li>1. Title 49 CFR, Part 396</li><li>2. Per department SOPs</li></ul></li></ul> <p><b>V. EQUIPMENT MAINTENANCE</b></p> <ul style="list-style-type: none"><li>A. Daily, weekly, and monthly<ul style="list-style-type: none"><li>1. Per department SOPs</li><li>2. In accordance with the manufacturer's recommendations and specifications</li></ul></li><li>B. Urgent (immediate) versus nonurgent (delayed)</li><li>C. Written documentation<ul style="list-style-type: none"><li>1. Per department SOPs</li></ul></li></ul>	<p><b>SLIDE: 1-2-13</b></p> <p>Who mandates apparatus maintenance?</p> <p><b>SLIDE: 1-2-14</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>VI. TRAINING</b></p> <p>A. On-going</p> <ol style="list-style-type: none"><li>1. <u>NFPA 1451: Standard for a Fire Service Vehicle Operations Training Program</u>, NFPA, 2007 Edition<ol style="list-style-type: none"><li>a) Chapter 5: Training and Education<ol style="list-style-type: none"><li>1) 5.2.1: On-going training must be provided</li><li>2) 5.2.3: Appropriate training and educations must take place when changes in procedures and/or technology occur</li></ol></li></ol></li><li>2. Department SOPs</li></ol> <p>B. Mentoring/instructing</p> <ol style="list-style-type: none"><li>1. Assist interested personnel</li></ol>	<p><b>SLIDE: 1-2-15</b></p> <p>On-going training is recommended under what NFPA standard?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

The importance of accepting the responsibility inherent with the position of fire apparatus driver/operator cannot be understated. Knowing all the elements of one's apparatus, driving regulations, and response district is part of the overall responsibility of the professional fire apparatus driver/operator.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 19-23, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 5-6, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 1-2, 9, 31-61, 64-65, 73-74, 76-88, 99-105, 151-161, and 418-425 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 1-3: Legal Aspects Of Emergency And Nonemergency Driving

**TIME FRAME:** 1:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Sections 4.3.1 and 4.3.6

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given an activity and written test

**Behavior:** The student will confirm a knowledge of California's driving regulations and laws relating to emergency and nonemergency driving by completing the activity and written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2011 Edition, Pages 7-17 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 9-10 and 63-64

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials
- Activity 1-3-1: Legal Aspects Of Emergency And Nonemergency Driving

**REFERENCES:**

- AB #1648, Chapter 360, January 2011
- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 1-18
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 9-10 and 63-64
- State of California 2001 Vehicle Code, DMV, 2007 Edition, Pages 4-6, 460-467, 583, 607-608, and 623-817
- Title 49 CFR Transportation, U.S. Government Printing Office, October 2006 Edition, Part 383

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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**A**ttention (attract)

**C**uriosity (arouse)

**I**nterest (create)

**D**esire (stimulate)

**B**egin

**A**ssociation

**S**tudents

**E**xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. LICENSING REQUIREMENTS</b></p> <p>A. Federal Department of Transportation (DOT)</p> <ul style="list-style-type: none"><li>1. Code of Federal Regulations (CFR)<ul style="list-style-type: none"><li>a) Set basic requirements for states' commercial drivers license programs</li><li>b) Title 49 CFR, Part 383.23<ul style="list-style-type: none"><li>1) Commercial drivers license standard</li></ul></li></ul></li></ul> <p>B. California</p> <ul style="list-style-type: none"><li>1. Assembly Bill 1648<ul style="list-style-type: none"><li>a) Effective January 1, 2011</li><li>b) Amends Sections 1808.1, 12804.9, and 15278 and adds Section 12804.11 to the Vehicle Code</li><li>c) Change the provisions regulating the operation of fire-fighting equipment<ul style="list-style-type: none"><li>1) Permit employed or volunteer fire fighters to operate fire-fighting equipment with a Class A, B, or C license and a <b><u>fire fighter endorsement</u></b> issued by the DMV</li></ul></li><li>d) Applying for the fire fighter endorsement<ul style="list-style-type: none"><li>1) Proof of current employment with a fire department as a fire fighter or registration as a volunteer fire fighter</li><li>2) Evidence of fire equipment operation training</li><li>3) Passing the written fire fighter examination developed by DMV with the cooperation of the OSFM</li><li>4) Submitting a report of medical examination on a DMV-approved form</li></ul></li></ul></li></ul>	<p>The basic requirements for individual state commercial driver license programs are found in which document?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>e) Repealed three sections of the Vehicle Code that affect fire fighters</p> <ol style="list-style-type: none"> <li>1) Section 12954: Driver's license fire fighters emergency exemption           <ul style="list-style-type: none"> <li>• Exempted fire fighters from the requirement to have in their immediate possession the appropriate driver's license when operating fire-fighting equipment during an emergency, or when returning from an emergency</li> </ul> </li> <li>2) Section 15250.6: Fire fighter equipment driver's license requirements</li> <li>3) Section 15250.7: Fire fighter equipment driver's license duplicate fee</li> </ol> <p>2. California Commercial Driver Handbook (CCDH)</p> <ol style="list-style-type: none"> <li>a) Guidelines and standards based upon Title 19 CFR</li> </ol> <p>C. Types of California driver's licenses</p> <ol style="list-style-type: none"> <li>1. Class A           <ol style="list-style-type: none"> <li>a) May drive any legal combination of vehicles               <ol style="list-style-type: none"> <li>1) Including vehicles under Class B and C</li> </ol> </li> </ol> </li> <li>2. Class B           <ol style="list-style-type: none"> <li>a) Limited to drive               <ol style="list-style-type: none"> <li>1) Any single vehicle with a GVWR of more than 26,000 pounds</li> <li>2) A 3-axle vehicle</li> <li>3) Any bus (except trailer bus) with endorsement</li> <li>4) Any farm labor vehicle with endorsement</li> <li>5) All vehicles under Class C</li> </ol> </li> </ol> </li> </ol>	<p>The Class A driver's license allows the holder to operate which type of vehicles?</p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>II. CALIFORNIA VEHICLE CODE (CVC)</b></p> <p>A. Legally binding and enforceable</p> <p>B. Code 3 authorization</p> <ol style="list-style-type: none"><li>1. Section 30<ol style="list-style-type: none"><li>a) Red lights and sirens</li><li>b) Restricted to authorized police, fire, and lifesaving services</li></ol></li><li>2. Section 165.2<ol style="list-style-type: none"><li>a) Definition of an authorized emergency vehicle</li></ol></li></ol> <p>C. Warning systems</p> <ol style="list-style-type: none"><li>1. Section 25252<ol style="list-style-type: none"><li>a) Emergency vehicles must have at least one burning red warning lamp in front</li><li>b) Visible for 1,000 feet to the front</li><li>c) Minimum allowable by law</li></ol></li><li>2. Section 25252.5(a)<ol style="list-style-type: none"><li>a) Flashing high beams on authorized emergency vehicles</li></ol></li><li>3. Section 25258<ol style="list-style-type: none"><li>a) Additional lights on authorized emergency vehicles</li><li>b) Flashing white light<ol style="list-style-type: none"><li>1) Opticom™</li></ol></li></ol></li></ol>	<p><b>ACTIVITY 1-3-1:</b> Complete the activity in the student supplement.</p> <p>What CVC section gives Code 3 authorization?</p> <p>What is the distance required by law, for a red warning lamp to be visible?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>4. Section 25259(a)               <ul style="list-style-type: none"> <li>a) Additional warning lights on authorized emergency vehicles</li> <li>b) Flashing amber lights</li> </ul> </li> <li>5. Section 25268               <ul style="list-style-type: none"> <li>a) Use of flashing warning amber lights</li> <li>b) Limits use of flashing amber</li> </ul> </li> <li>6. Section 25269               <ul style="list-style-type: none"> <li>a) Limits use of flashing or steady burning red light</li> </ul> </li> <li>7. Section 27000(a)               <ul style="list-style-type: none"> <li>a) Horns or warning devices</li> <li>b) Identifies who shall be equipped with a horn</li> </ul> </li> <li>8. Section 27001(a)               <ul style="list-style-type: none"> <li>a) Use of horns</li> <li>b) When reasonably necessary</li> </ul> </li> <li>9. Section 27002               <ul style="list-style-type: none"> <li>a) Sirens</li> <li>b) Identifies who shall legally use a siren</li> </ul> </li> <li>D. Civil liability               <ul style="list-style-type: none"> <li>1. Section 17001                   <ul style="list-style-type: none"> <li>a) Liability of a public entity</li> </ul> </li> <li>2. Section 17002                   <ul style="list-style-type: none"> <li>a) Extent of liability</li> </ul> </li> <li>3. Section 17004                   <ul style="list-style-type: none"> <li>a) Liability of public employees operating an authorized emergency vehicle</li> </ul> </li> <li>4. Section 17004.5                   <ul style="list-style-type: none"> <li>a) Liability of private fire departments</li> </ul> </li> </ul> </li> </ul> <p><b>NOTE:</b> Section 17001 is discussed in greater depth in Unit 4 – Topic 1.</p>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>E. Rules of the road</p> <ol style="list-style-type: none"> <li>1. Section 21055               <ol style="list-style-type: none"> <li>a) Exemption of authorized emergency vehicles</li> <li>b) While sounding siren</li> <li>c) Display a lighted red lamp</li> </ol> </li> <li>2. Section 21056               <ol style="list-style-type: none"> <li>a) Effect of exemption</li> </ol> </li> </ol> <p><b>NOTE:</b> Sections 21055 and 21056 are also discussed in greater depth in Unit 4 – Topic 1.</p> <ol style="list-style-type: none"> <li>3. Section 21706               <ol style="list-style-type: none"> <li>a) Following emergency vehicles</li> <li>b) No closer than 300 feet</li> </ol> </li> <li>4. Section 21707               <ol style="list-style-type: none"> <li>a) Fire areas</li> <li>b) No vehicles within the identified fire areas</li> </ol> </li> <li>5. Section 21708               <ol style="list-style-type: none"> <li>a) Fire hoses</li> <li>b) No driving over or across any fire hose unless provided with jumpers or other appliances to protect the hose</li> </ol> </li> <li>6. Section 22104               <ol style="list-style-type: none"> <li>a) No U-turns in front of the driveway entrance or approaches to a fire station</li> </ol> </li> </ol>	<p>What is the minimum distance between a vehicle and the emergency apparatus?</p> <p>Is there a law that addresses civilian vehicles within a fire area?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) Cannot use the driveway entrance or approaches to a fire station for turning a vehicle to proceed in the opposite direction</p> <p>7. Section 22454</p> <p>a) School bus</p> <p>    1) Meeting and passing</p> <p>b) All vehicles to stop under this law</p> <p>    1) Emergency vehicles are not exempt from this law</p> <p>F. Safety</p> <p>1. Section 26700(a)</p> <p>a) Every fire apparatus shall be equipped with an adequate windshield</p> <p>2. Section 27305</p> <p>a) Public fire vehicles are required to have seatbelts for all seats</p> <p><b>NOTE:</b> Individual cities and counties may have laws applicable to their specific region, locality, or department.</p>	<p>Is there any situation in which an emergency vehicle, while operating Code 3, is not exempt from passing other vehicles?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

As a fire apparatus driver/operator, in order to safely and legally perform your job, you must have a clear understanding of all laws and statutes, which are relevant to your position. By understanding and following the laws, your personal liability is greatly reduced.

## ***EVALUATION:***

The student will complete the activity and written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2011 Edition, Pages 7-17 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 9-10 and 63-64 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ACTIVITY 1-3-1

<b>TITLE:</b>	Legal Aspects Of Emergency And Nonemergency Driving
<b>TIME FRAME:</b>	0:45
<b>MATERIALS NEEDED:</b>	<ul style="list-style-type: none"><li>• <u>State of California Vehicle Code</u>, DMV, 2007 Edition (one copy for each group)</li><li>• Writing board/pad with markers/erasers</li></ul>
<b>INTRODUCTION:</b>	This activity provides the students the opportunity to research the laws and regulations governing emergency and nonemergency driving of fire apparatus using the California Vehicle Code.
<b>DIRECTIONS:</b>	<ol style="list-style-type: none"><li>1. Break the class into three groups.</li><li>2. For each topic listed, identify the applicable CVC section.</li><li>3. Using the writing board or pad, write the code section and a brief summary highlighting its important points.</li><li>4. You have 30 minutes to complete this activity.</li><li>5. Be prepared to discuss your answers with the class.</li></ol>
<b>INSTRUCTOR NOTE:</b>	The section and page numbers listed below apply to the 2007 Edition of the California Vehicle Code. It is imperative that you update these if using a newer edition of the code.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### GROUP 1

#### **Code 3 Authorization**

1. Red lights and sirens restriction

*Section 30, Page 4*

#### **Civil Liability**

2. Liability of a public entity

*Section 17001, Page 607*

#### **Warning Systems**

3. Red warning lamps

*Section 25252, Page 844*

4. Additional warning lights

*Section 25259, Page 846*

5. Use of flashing warning amber lights

*Section 25268, Page 848*

6. Use of horns

*Section 27001, Page 874*

#### **Rules Of The Road**

7. Exemption of authorized emergency vehicles

*Section 21055, Page 624*

### GROUP 2

#### **Code 3 Authorization**

1. Definition of an authorized emergency vehicle

*Section 165(b)(2), Page 6*

#### **Civil Liability**

2. Liability of public employees

*Section 17004, Page 607*

#### **Warning Systems**



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### 3. Flashing upper beams

*Section 25252.5, Page 844*

### 4. Limits use of flashing or steady burning red light

*Section 25269, Page 849*

### **Rules Of The Road**

### 5. Duty of drive with due regard

*Section 21056, Page 624*

### **Safety**

### 7. Windshields

*Section 26700, Page 869*

## **GROUP 3**

### **Civil Liability**

### 1. Liability of private fire departments

*Section 17004.5, Page 607*

### **Warning Systems**

### 2. Controlling traffic signals

*Section 25258, Page 846*

### 3. Horns

*Section 27000, Page 874*

### 4. Sirens

*Section 27002, Page 874*

### **Rules Of The Road**

### 5. Following emergency vehicles

*Section 21706, Page 673*

### 6. Vehicles within the identified fire areas

*Section 21707, Page 673*

### **Safety**

### 7. Seatbelts

*Section 27305, Page 882*



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-1: Introduction To Inspection, Basic Maintenance, And Troubleshooting

**TIME FRAME:** 0:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of basic inspection, maintenance, and troubleshooting procedures by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 19-22, 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 18, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 19-22, 115-126
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, NFPA, 2007 Edition, Chapters 4 and 6-8
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

Attention (attract)	Begin
Curiosity (arouse)	Association
Interest (create)	Students
Desire (stimulate)	Experience

Cite examples or use related illustrations of near-miss



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. INTRODUCTION</b></p> <p>A. All inspections and maintenance shall be conducted in accordance with the manufacturer's recommendations and specifications</p> <ol style="list-style-type: none"><li>1. Especially important for warranties</li></ol> <p>B. Troubleshooting</p> <ol style="list-style-type: none"><li>1. Corrective actions beyond the capabilities of the driver/operator must be referred to the department's fleet manager</li></ol> <p>C. Department standard operating procedures (SOPs)</p> <ol style="list-style-type: none"><li>1. May exceed manufacturer's recommendations and specifications</li><li>2. Should specify driver/operator's responsibilities and the conditions he or she is allowed to correct<ol style="list-style-type: none"><li>a) Should also state those situations that require the service of a qualified mechanic</li></ol></li><li>3. Address the frequency of inspections and maintenance</li><li>4. Address how inspection and maintenance is documented and transmitted to the proper person in the administration</li><li>5. Requirements for the inspection and maintenance of fire apparatus</li></ol>	<p><b>SLIDE: 2-2-1</b></p> <p><b>SLIDE: 2-2-2</b></p> <p>Why is it important to follow the manufacturer's recommendations and specifications?</p> <p><b>SLIDE: 2-2-3</b></p> <p><b>SLIDE: 2-2-4</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<b>II. FEDERAL, STATE, LOCAL LAWS, STANDARDS, AND RECOMMENDATIONS</b>	
A. These laws, standards, and recommendations are what govern inspections and maintenance	
B. Federal laws	<b>SLIDE: 2-2-5</b>
1. 49 CFR	
a) Part 390: Federal Motor Carrier Safety Regulations	
b) Part 396: Inspection, Repair, and Maintenance	<b>SLIDE: 2-2-6</b>
C. California laws	
1. <u>State of California 2007 Vehicle Code</u> , DMV	
2. <u>California Commercial Driver Handbook</u> , DMV, 2008 Edition	
a) Requires pretrip, en route, and posttrip inspections	<b>SLIDE: 2-2-7</b>
D. Local laws	
1. Pertaining to your jurisdiction	
a) Reflect special concerns of any given jurisdiction	<b>SLIDE: 2-2-8</b>
E. NFPA standards	
1. <u>NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</u> , NFPA, 2007 Edition	
2. <u>NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications</u> , 2009 Edition	
F. Recommendations	
1. <u>Pumping Apparatus Driver/Operator Handbook</u> , IFSTA, Second Edition	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2. Professional trade publications</li> </ul>	
<p><b>III. MAJOR APPARATUS SYSTEMS</b></p>	<p><b>SLIDE: 2-2-9</b></p>
<ul style="list-style-type: none"> <li>A. Can be grouped according to function</li> </ul>	
<ul style="list-style-type: none"> <li>B. Driver and crew areas, apparatus body, and compartmentation</li> </ul>	
<ul style="list-style-type: none"> <li>C. Vehicle gauges and instrumentation</li> </ul>	<p>Where might gauges be located on fire apparatus?</p>
<ul style="list-style-type: none"> <li>1. Dash gauges</li> </ul>	
<ul style="list-style-type: none"> <li>2. Pump panel gauges</li> </ul>	
<ul style="list-style-type: none"> <li>3. Computer monitors</li> </ul>	<p><b>SLIDE: 2-2-10</b></p>
<ul style="list-style-type: none"> <li>D. Frame, axles, steering and suspension systems, driveline, wheels and tires</li> </ul>	<p><b>SLIDE: 2-2-11</b></p>
<ul style="list-style-type: none"> <li>E. Engine systems</li> </ul>	
<ul style="list-style-type: none"> <li>1. Cooling</li> </ul>	
<ul style="list-style-type: none"> <li>2. Fuel</li> </ul>	
<ul style="list-style-type: none"> <li>3. Oil</li> </ul>	
<ul style="list-style-type: none"> <li>4. Air</li> </ul>	
<ul style="list-style-type: none"> <li>5. Exhaust</li> </ul>	
<ul style="list-style-type: none"> <li>6. Belts</li> </ul>	
<ul style="list-style-type: none"> <li>7. Ignition</li> </ul>	<p><b>SLIDE: 2-2-12</b></p>
<ul style="list-style-type: none"> <li>F. Transmission and clutch</li> </ul>	
<ul style="list-style-type: none"> <li>G. Battery and electrical systems</li> </ul>	
<ul style="list-style-type: none"> <li>H. Braking systems</li> </ul>	
<ul style="list-style-type: none"> <li>1. Air</li> </ul>	
<ul style="list-style-type: none"> <li>2. Hydraulic</li> </ul>	







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>VI. INSPECTION VERSUS TROUBLESHOOTING</b></p> <p>A. Inspection</p> <ol style="list-style-type: none"><li>1. Ensure the apparatus, pump, and related components are in a safe operating condition</li><li>2. Inspections typically include checking components for<ol style="list-style-type: none"><li>a) Operability, position, or status</li><li>b) Fluid levels, leaks</li><li>c) Condition, damage, wear, or corrosion</li></ol></li></ol> <p>B. Troubleshooting</p> <ol style="list-style-type: none"><li>1. Noninvasive activities that do not require the apparatus to be taken out-of-service in order to maintain proper operation</li><li>2. A constant monitoring that detects minor changes in apparatus performance</li><li>3. Identification of what mechanical repair is required to be immediate and which can be scheduled in the future</li></ol>	<p><b>SLIDE: 2-2-16</b></p> <p>Does troubleshooting require the apparatus to be put out-of-service?</p> <p><b>SLIDE: 2-2-17</b></p> <p>What does a troubleshooting inspection entail?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

A proper inspection and maintenance program should reflect the manufacturer's recommendations and specifications, and department policy. A variety of laws and standards dictate minimum requirements for safe operation. The properly prepared driver/operator understands automotive basics and develops a thorough plan of inspection and maintenance to ensure safe operation.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 19-22, 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 18, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-2: Inspection And Basic Maintenance Of the Driver And Crew Areas, Apparatus Body, And Compartmentation

**TIME FRAME:** 0:15

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of inspection and basic maintenance procedures for key components of the driver and crew areas, apparatus body, and compartmentation by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 19-20, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition, Chapters 4, 6, and 7
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

Attention (attract)

Begin

Curiosity (arouse)

Association

Interest (create)

Students



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### **Desire (stimulate)**

### **Experience**

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>2. Secures and protects the equipment in order for it to operate properly when needed</p> <p><b>II. INSPECTION</b></p> <p>A. Inspections of driver and crew areas, apparatus body, and compartmentation, often occur simultaneously during maintenance</p> <p>B. Up-close observation is a result of maintenance</p> <p>1. Defects are uncovered</p> <p>C. Conditions to look for with the equipment, components, hardware, and systems</p> <p>1. Missing</p> <p>2. Dirty</p> <p>3. Damaged</p> <p>4. Loose</p> <p>5. Leaking</p> <p>D. Apparatus damage</p> <p>1. Body damage</p> <p>a) Dents</p> <p>b) Scratches</p> <p>c) Missing or loose components</p> <p>2. Leaning to one side</p> <p>a) Causes</p>	<p><b>SLIDE: 2-2-13</b></p> <p>What benefit is gained from close observation?</p> <p>What conditions should the driver/operator look for?</p> <p><b>SLIDE: 2-2-14</b></p> <p>What would cause a fire apparatus to lean to one side?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>1) Major<ul style="list-style-type: none"><li>• Broken suspension</li></ul></li><li>2) Minor<ul style="list-style-type: none"><li>• Surface not level</li></ul></li></ul> <p><b>NOTE:</b> More information on the suspension is discussed in Unit 2 - Topic 3.</p> <ul style="list-style-type: none"><li>3. Running boards<ul style="list-style-type: none"><li>a) Dented</li><li>b) Missing or loose</li></ul></li><li>4. Lights and reflectors<ul style="list-style-type: none"><li>a) Cracked</li><li>b) Missing</li></ul></li><li>5. Doors<ul style="list-style-type: none"><li>a) Open and close properly</li></ul></li><li>6. Mirrors<ul style="list-style-type: none"><li>a) Secure</li><li>b) Clean</li></ul></li><li>7. Splash guards or mud flaps<ul style="list-style-type: none"><li>a) Missing or loose</li></ul></li></ul>	<p><b>SLIDE: 2-2-15</b></p>
<p><b>III. BASIC MAINTENANCE</b></p> <ul style="list-style-type: none"><li>A. Exterior washing<ul style="list-style-type: none"><li>1. New apparatus<ul style="list-style-type: none"><li>a) Paint and protective coating are new and unseasoned<ul style="list-style-type: none"><li>1) Need to cure about six months</li></ul></li><li>b) Wash frequently to harden the paint and avoid water spots</li></ul></li></ul></li></ul>	<p><b>SLIDE: 2-2-16</b></p> <p>Should new apparatus be treated differently?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>2. Use garden hose without a nozzle to apply water<ul style="list-style-type: none"><li>a) Set water pressure so the stream is no more than 1 foot<ul style="list-style-type: none"><li>1) Higher pressure can drive debris into the paint</li></ul></li><li>b) Never remove dust or grit by dry rubbing</li><li>c) Once a new apparatus's finish is properly cured (according to the owner's manual), garden hoses with nozzles may be used<ul style="list-style-type: none"><li>1) Or pressure washer</li></ul></li></ul></li><li>3. Wash with a good automotive shampoo<ul style="list-style-type: none"><li>a) Follow shampoo instructions</li></ul></li><li>4. Do not wash with extremely hot water or while the apparatus surface is hot<ul style="list-style-type: none"><li>a) Rinse loose dirt before applying shampoo and water<ul style="list-style-type: none"><li>1) Reduces the chance of scratching the surface when applying shampoo</li></ul></li><li>b) Try to wash mud, dirt, insects, soot, tar, grease, and road salts off the apparatus before they have a chance to dry</li><li>c) Never use gasoline or other solvents to remove grease or tar from painted surfaces<ul style="list-style-type: none"><li>1) Use only approved products to remove grease or tar from nonpainted surfaces</li></ul></li><li>d) Dry with a clean chamois rinsed frequently with clean water<ul style="list-style-type: none"><li>1) Failure to dry the apparatus completely will also encourage corrosion</li><li>2) Cotton towels are acceptable substitutes for a chamois</li><li>3) Rags or shop towels may scratch painted surfaces</li></ul></li></ul></li></ul>	<p style="text-align: right;"><b>SLIDE: 2-2-17</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>5. Waxes and polishes</p> <ul style="list-style-type: none"> <li>a) In accordance with the manufacturer's recommendations and specifications</li> <li>b) On many newer apparatus, the application of these products is no longer necessary               <ul style="list-style-type: none"> <li>1) May damage clear-coat protective-seal finishes that are applied over paints</li> </ul> </li> <li>c) Generally, do not apply waxes or polishes until the paint is at least six months old</li> <li>d) Wash and dry the apparatus before applying polish or wax</li> <li>e) Apply wax or polish with a soft cloth and buff with a soft cloth or mechanical buffer</li> </ul> <p>B. Glass care</p> <ul style="list-style-type: none"> <li>1. Do not use putty knives, razor blades, steel wool, or other metal objects to remove deposits from the glass</li> <li>2. Use warm soapy water or commercial glass cleaners in conjunction with paper towels or cloth rags</li> <li>3. Do not use dry towels or rags by themselves               <ul style="list-style-type: none"> <li>a) They may allow grit to scratch the surface of the glass</li> </ul> </li> <li>4. Windshield washer fluid               <ul style="list-style-type: none"> <li>a) Recommended that reservoir be refilled any time it is less than one-half full</li> <li>b) Commercially available</li> <li>c) Compatibility between brands</li> </ul> </li> </ul>	<p>When can wax be applied to newly painted surfaces?</p> <p><b>SLIDE: 2-2-18</b></p> <p><b>SLIDE: 2-2-19</b></p> <p><b>SLIDE: 2-2-20</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>1. Driving and crew areas, the apparatus body, and the compartmentation<ul style="list-style-type: none"><li>a) Cracked or broken windshield that obstructs the driver's/operator's view</li><li>b) Missing or broken rearview mirrors that obstruct the driver's/operator's view</li><li>c) Missing or broken windshield wipers</li><li>d) Missing or broken door latches</li><li>e) Missing or broken foot throttle</li></ul></li><li>2. Seat belt<ul style="list-style-type: none"><li>a) Is torn or has melted webbing, missing or broken buckles, or loose mountings, the following shall apply<ul style="list-style-type: none"><li>1) If it is at a seat other than the driver's seat, that seat shall be taken out of service</li><li>2) If it is at the driver's seat, the entire apparatus shall be taken out of service</li></ul></li></ul></li><li>3. System or components, a qualified technician shall conduct an out-of-service evaluation and make a written report, including recommendations to the AHJ<ul style="list-style-type: none"><li>a) Body mounting</li><li>b) Cab mounting</li><li>c) Steering wheel</li><li>d) Required cab instrumentation</li><li>e) Defrosters</li></ul></li><li>B. CCDH criteria<ul style="list-style-type: none"><li>1. None stated</li></ul></li></ul>	<p><b>SLIDE: 2-2-22</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Very simple items can indicate or hide a potential major problem. You must determine if the problem is new or if it has existed for some time and if this problem is something that will place the fire apparatus out-of-service.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 19-20, and, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-3: Inspection And Basic Maintenance Of The Frame, Axles, Steering/Suspension Systems, Driveline, Wheels, And Tires

**TIME FRAME:** 0:15

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of inspection and basic maintenance of the frame, axles, steering and suspension systems, driveline, wheels, and tires

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 21-23 and Appendix A, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition, Chapters 4, 6, and 7
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

Attention (attract)	Begin
Curiosity (arouse)	Association
Interest (create)	Students
Desire (stimulate)	Experience



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>a) No more than 10 degrees</p> <p>b) For a 20-inch wheel, this translates to about two inches in either direction</p> <p>c) Play that exceeds these parameters could indicate a serious steering problem that could result in the driver/operator losing control of the apparatus under otherwise reasonable driving conditions</p> <p>2. Power steering pump and lines</p> <p>a) Fluid level in reservoir</p> <p>1) Must be above refill mark</p> <p>2) Use approved power steering fluid</p> <ul style="list-style-type: none"> <li>• Information on the proper fluid will be included in the manufacturer's recommendations and specifications</li> </ul> <p>b) Mounting secure</p> <p>c) Condition of lines</p> <p>d) Possible damage from nearby components</p> <p>e) Leaks</p> <p>3. Steering box</p> <p>a) Leaks</p> <p>b) Mounting secure</p> <p>1) Missing nuts, bolts, and cotter keys</p> <p>4. Steering linkage</p> <p>a) Links, arms, or rods</p> <p>1) Worn</p> <p>2) Cracked</p>	<p><b>SLIDE: 2-3-10</b></p> <p>How would you find out the proper fluid to use?</p> <p><b>SLIDE: 2-3-11</b></p> <p><b>SLIDE: 2-3-12</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>3) Missing nuts, bolts, or cotter keys</li> <li>5. Springs<ul style="list-style-type: none"><li>a) Leaf<ul style="list-style-type: none"><li>1) Broken or missing leaves</li><li>2) Broken or missing hangers</li></ul></li><li>b) Coil<ul style="list-style-type: none"><li>1) Broken mounting brackets</li><li>2) Compressed or collapsed</li><li>3) Broken or distorted</li></ul></li></ul></li> <li>6. Shock absorbers<ul style="list-style-type: none"><li>a) Leaks</li><li>b) Damaged or missing</li></ul></li> <li>D. Drive shaft<ul style="list-style-type: none"><li>1. Damaged U-joints</li><li>2. Center support bearings with free play<ul style="list-style-type: none"><li>a) Could indicate worn out bearings</li></ul></li><li>3. Secure</li><li>4. Free of foreign objects</li></ul></li></ul>	<p><b>SLIDE: 2-3-13</b> <b>SLIDE: 2-3-14</b> <b>SLIDE: 2-3-15</b></p> <p><b>SLIDE: 2-3-16</b> <b>SLIDE: 2-3-17</b> <b>SLIDE: 2-3-18</b></p> <p><b>SLIDE: 2-3-19</b> <b>SLIDE: 2-3-20</b></p> <p>What could this indicate?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>E. Wheels and tires</p> <ol style="list-style-type: none"><li>1. Lugnuts<ol style="list-style-type: none"><li>a) Missing</li><li>b) Loose<ol style="list-style-type: none"><li>1) Check each lugnut by hand</li><li>2) Rust between lugnut and rim<ul style="list-style-type: none"><li>• Could indicate a loose lugnut</li></ul></li></ol></li></ol></li><li>2. Rims<ol style="list-style-type: none"><li>a) Missing studs</li><li>b) Cracked</li><li>c) Out-of-round</li></ol></li><li>3. Tires<ol style="list-style-type: none"><li>a) Inflated in accordance with the manufacturer's recommendations and specifications<ol style="list-style-type: none"><li>1) Found on molded numbers on tire sidewall</li><li>2) Too much or too little pressure<ul style="list-style-type: none"><li>• Damages the tire</li><li>• Causes poor road handling</li></ul></li></ol></li><li>b) Valve stem condition<ol style="list-style-type: none"><li>1) Damaged</li><li>2) Leaking air</li></ol></li><li>c) Sidewalls<ol style="list-style-type: none"><li>1) Not cut or damaged</li></ol></li></ol></li></ol>	<p><b>SLIDE: 2-3-21</b></p> <p><b>SLIDE: 2-3-22</b></p> <p><b>SLIDE: 2-3-23</b></p> <p><b>SLIDE: 2-3-24</b></p> <p><b>SLIDE: 2-3-25</b></p> <p>Where would we find these specifications?</p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>c) Bulges, other than bumps or repairs; repair bulges greater than 0.4 inches (10 mm), or bulges or knots associated with tread</p> <p>d) Sidewall separation</p> <p>B. CCDH criteria</p> <p>1. Leaf springs</p> <p>a) ¼ or more of the spring pack is missing, shifted, cracked, or has broken leaves</p> <p>1) The suspension system supports the apparatus and its load, and keeps the axles in place</p> <p>2) Any broken suspension part can be extremely dangerous</p> <ul style="list-style-type: none"><li>• Contact your department's fleet manager for a plan of action</li></ul> <p>2. Steering wheel having more than 10 degrees of movement in either direction without tire movement</p>	<p><b>SLIDE: 2-3-33</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

There are many components to the suspension, frame, steering, and driveline systems that require your knowledge to be complete and precise. Damaged steering components will not allow you to maintain proper control of the fire apparatus. A damaged drive shaft will not transfer power to the axles. Bad tires will cause you to lose control of the fire apparatus.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 21-23 and Appendix A, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-4: Troubleshooting The Frame, Axles, Steering And Suspension Systems, Driveline, Wheels, And Tires

**TIME FRAME:** 0:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of troubleshooting the frame, axles, steering and suspension systems, driveline, wheels, and tires by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 24-25

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 24-25

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>IV. NOISES</b></p> <p>A. Symptom: Growling or whining coming from the rear axle</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Bearing failure</li><li>b) Low oil level in rear axle</li></ol></li><li>2. Possible corrective action<ol style="list-style-type: none"><li>a) Check oil level<ol style="list-style-type: none"><li>1) Add oil if needed</li></ol></li><li>b) Do not drive any further than absolutely necessary<ol style="list-style-type: none"><li>1) Continuous operation could cause irreversible damage to components involved</li></ol></li><li>c) If problem persists, contact your department's fleet manager for a plan of action</li></ol></li></ol> <p>B. Symptom: Loud clang when placing the apparatus into gear from driveline</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Pinion bearing out-of-adjustment</li><li>b) Universal joint failure/excessive wear</li></ol></li><li>2. Possible corrective action<ol style="list-style-type: none"><li>a) Visually inspect the universal joint and driveline for obvious defects</li><li>b) Contact your department's fleet manager for a plan of action</li></ol></li></ol>	<p><b>SLIDE: 2-4-5</b></p> <p>What is a possible cause for this symptom?</p> <p><b>SLIDE: 2-4-6</b></p> <p><b>SLIDE: 2-4-7</b></p> <p>What is a possible corrective action for this symptom?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>C. Symptom: Clunking sound in the front end while turning left or right</p> <ol style="list-style-type: none"> <li>1. Possible cause               <ol style="list-style-type: none"> <li>a) Worn suspension parts                   <ol style="list-style-type: none"> <li>1) Oftentimes, as bushings wear out, the suspension will begin to shift from side-to-side in corners</li> <li>2) This can potentially cause handling problems at inopportune moments</li> </ol> </li> </ol> </li> <li>2. Possible corrective action               <ol style="list-style-type: none"> <li>a) Contact your department's fleet manager for a plan of action</li> </ol> </li> </ol>	<p><b>SLIDE: 2-4-8</b></p> <p>What is a possible cause for this symptom?</p>
<p><b>V. VIBRATIONS</b></p> <p>A. Symptom: Fine (mild) vibration at road speeds</p> <ol style="list-style-type: none"> <li>1. Any vibration indicates that something is worn out, out-of-balance, or broken</li> <li>2. Almost all vibrations will eventually cause some sort of component failure</li> <li>3. Possible cause               <ol style="list-style-type: none"> <li>a) Driveline out-of-balance</li> <li>b) Failure of universal joint</li> <li>c) Failure of carrier bearing</li> <li>d) Failure of input or output shaft bearings</li> </ol> </li> <li>4. Possible corrective action               <ol style="list-style-type: none"> <li>a) Catch early</li> <li>b) Any one of these conditions is reason to take apparatus out-of-service</li> <li>c) Contact your department's fleet manager for a plan of action</li> </ol> </li> </ol>	<p><b>SLIDE: 2-4-9</b></p> <p>What is a possible corrective action for this?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>B. Symptom: Coarse (hard) vibration</p> <ol style="list-style-type: none"> <li>1. Possible cause               <ol style="list-style-type: none"> <li>a) Probably progressed from a fine vibration</li> <li>b) Some kind of catastrophic failure of the drive train</li> <li>c) Wheel/tire out-of-balance</li> <li>d) Bent wheel</li> <li>e) Object between dual tires</li> </ol> </li> <li>2. Possible corrective action               <ol style="list-style-type: none"> <li>a) Remove object from between tires</li> <li>b) Do not move the apparatus until the problem has been identified and it is determined safe to do so</li> <li>c) Take out-of-service</li> <li>d) Contact your department's fleet manager for a plan of action</li> </ol> </li> </ol>	<p><b>SLIDE: 2-4-10</b></p> <p>What is a possible cause for this symptom?</p> <p><b>SLIDE: 2-4-11</b></p>
<p><b>VI. APPARATUS DOES NOT MOVE</b></p> <p>A. Symptom: Apparatus in gear, driveline turns but apparatus will not move</p> <ol style="list-style-type: none"> <li>1. Possible cause               <ol style="list-style-type: none"> <li>a) Pump not shifted from pump to road</li> <li>b) Broken axle</li> <li>c) Broken ring and pinion gear</li> <li>d) Two-speed rear differential stuck between high and low</li> </ol> </li> </ol>	<p><b>SLIDE: 2-4-12</b></p> <p>What is a possible cause for this symptom?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>2. Possible corrective action</p> <ul style="list-style-type: none"><li>a) Shift pump to road position</li><li>b) Check operator's manual<ul style="list-style-type: none"><li>1) May be something as simple as a blown fuse</li></ul></li><li>c) Take out-of-service</li><li>d) Contact your department's fleet manager for a plan of action</li></ul>	<p><b>SLIDE: 2-4-13</b></p>
<p><b>VII. APPARATUS LEANS</b></p> <p>A. Symptom: Apparatus leans to left or right</p> <ul style="list-style-type: none"><li>1. Fire apparatus spends most of its life sitting in an apparatus bay fully loaded<ul style="list-style-type: none"><li>a) Spring steel needs to be exercised in order to maintain its tension</li></ul></li><li>2. Possible cause<ul style="list-style-type: none"><li>a) Sagging spring or broken spring leaf on front or rear suspension</li></ul></li><li>3. Possible corrective action<ul style="list-style-type: none"><li>a) Sagging spring<ul style="list-style-type: none"><li>1) Contact your department's fleet manager for a plan of action</li></ul></li><li>b) Broken spring<ul style="list-style-type: none"><li>1) Take out-of-service</li><li>2) Contact your department's fleet manager for a plan of action</li></ul></li></ul></li></ul>	<p><b>SLIDE: 2-4-14</b></p> <p>What is a possible corrective action for this symptom?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Driver/operators must use basic apparatus troubleshooting skills to identify and prioritize maintenance problems in axles, steering and suspension systems, driveline, wheels, and tires. Every driver/operator must be familiar with the manufacturer's operational standards and criteria for maintenance of their department's apparatus.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 24-25 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-5: Inspection And Basic Maintenance Of Engine Systems

**TIME FRAME:** 0:45

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of inspection and basic maintenance of engine systems by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 26-30, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, NFPA, 2007 Edition, Chapters 4, 6, and 7
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

**A**ttention (attract)

**B**egin

**C**uriosity (arouse)

**A**ssociation

**I**nterest (create)

**S**tudents

**D**esire (stimulate)

**E**xperience

Cite examples or use related illustrations of near-miss



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.









# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>d) Injection pump</li> <li>e) Injectors</li> </ul> <p>9. Out-of-service criteria <u>NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</u>, 2007 Edition recommendations</p> <ul style="list-style-type: none"> <li>a) Any component with a Class 2 leakage</li> <li>b) Defective tank, mountings, or straps</li> </ul> <p>D. Oil system</p> <ul style="list-style-type: none"> <li>1. Dipstick level               <ul style="list-style-type: none"> <li>a) Safe operating range</li> <li>b) Proper parameters</li> </ul> </li> <li>2. Basic maintenance               <ul style="list-style-type: none"> <li>a) Add recommended oil if level is low                   <ul style="list-style-type: none"> <li>1) According to department SOPs</li> <li>2) In accordance with the manufacturer's recommendations and specifications</li> </ul> </li> <li>b) <u>Do not overfill</u></li> </ul> </li> <li>3. Out-of-service criteria <u>NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</u>, 2007 Edition recommendations               <ul style="list-style-type: none"> <li>a) Contaminated with coolant or fuel</li> <li>b) Any component that has a Class 3 leakage</li> </ul> </li> </ul>	<p><b>SLIDE: 2-5-16</b></p> <p><b>SLIDE: 2-5-17</b></p> <p>How would you find out the proper oil type to use?</p> <p><b>SLIDE: 2-5-18</b></p> <p><b>SLIDE: 2-5-19</b></p> <p><b>SLIDE: 2-5-20</b></p>











# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>3. Proper adjustment<ul style="list-style-type: none"><li>a) Single belts versus multiple belts</li><li>b) CCDH criteria<ul style="list-style-type: none"><li>1) Up to ¾-inch play at the center of belt</li></ul></li></ul></li><li>4. Basic maintenance<ul style="list-style-type: none"><li>a) Set belt tension in accordance with the manufacturer's recommendations and specifications</li></ul></li><li>5. Out-of-service criteria <u>NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition</u> recommendations<ul style="list-style-type: none"><li>a) None stated</li></ul></li></ul>	<p>According to the CCDH, what is the maximum amount of play for a belt?</p> <p><b>SLIDE: 2-5-39</b> <b>SLIDE: 2-5-40</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

There are a variety of systems that keep the engine cool, lubricated, and supplied with fuel and clean air. Some of these systems may seem minor, but they all play an important role in how your fire apparatus will perform. A basic knowledge of each of these individual systems and how to perform basic maintenance is necessary in order for you to carry out your role as a fire apparatus driver/operator.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 26-30, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-6: Troubleshooting Engine Systems

**TIME FRAME:** 0:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of troubleshooting engine systems by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 31-34 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 45-51

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 45-51

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>d) Possible corrective action</p> <ol style="list-style-type: none"><li>1) Remove the air intake from the carburetor and look down the throat of the carburetor<ul style="list-style-type: none"><li>• Simultaneously pump the throttle</li><li>• You should see fuel spray inside the carburetor</li><li>• If not, you have no fuel to the engine and your fuel pump is probably out</li></ul></li><li>2) Take out-of-service</li></ol> <p>B. Diesel engine</p> <ol style="list-style-type: none"><li>1. Relies on the fuel system being completely sealed from any contaminants<ol style="list-style-type: none"><li>a) Very sensitive to dirt and air pockets</li><li>b) Slightest air pocket can cause a drop in fuel pressure<ol style="list-style-type: none"><li>1) Causing the engine to misfire</li></ol></li><li>c) Also set up with every close tolerance between components<ol style="list-style-type: none"><li>1) Slightest bit of dirt can ruin a fuel pump or fuel injector</li></ol></li></ol></li><li>2. Symptom: Engine will not start<ol style="list-style-type: none"><li>a) Possible cause<ol style="list-style-type: none"><li>1) No fuel to the system</li></ol></li><li>b) Possible corrective action<ol style="list-style-type: none"><li>1) Ensure fuel tank is at least one-half full</li></ol></li></ol></li></ol>	<p><b>SLIDE: 2-6-4</b></p> <p><b>SLIDE: 2-6-5</b></p> <p>What is another possible cause for this symptom?</p> <p>What is your fuel level requirement?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2) Ensure fuel is reaching the clean side of the filter               <ul style="list-style-type: none"> <li>• Open the pet cock on top of the fuel filter</li> <li>• If fuel is not present at the filter, use the fuel primer (if equipped) to pump up the system</li> <li>• In accordance with manufacturer's recommendations and specifications</li> </ul> </li> <li>3) Take apparatus out-of-service if engine still will not start</li> </ul>	<p>What if the engine still will not start?</p> <p><b>SLIDE: 2-6-6</b></p> <p>What is another possible cause for this symptom?</p> <p><b>SLIDE: 2-6-7</b></p>
<p>c) Possible cause</p> <ul style="list-style-type: none"> <li>1) Air leak in the fuel system</li> </ul> <p>d) Possible corrective action</p> <ul style="list-style-type: none"> <li>1) Check all fuel lines for signs of leaking fuel               <ul style="list-style-type: none"> <li>• If fuel comes out, then air will go in</li> <li>• Tighten leaking fittings, if possible</li> <li>• Bleed the air in accordance with the manufacturer's recommendations and specification</li> </ul> </li> <li>2) Contact your department's fleet manager for a plan of action if the apparatus still will not start</li> </ul> <p><b>II. COOLANT LEVEL</b></p> <p>A. Leaks</p> <ul style="list-style-type: none"> <li>1. External coolant leaks on fire apparatus are generally easy to see               <ul style="list-style-type: none"> <li>a) Shows up on the clean apparatus bay floor</li> </ul> </li> </ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2. An internal leak may not be so obvious               <ul style="list-style-type: none"> <li>a) Water in the oil may separate, settle to the bottom of the oil reservoir, and go undetected</li> </ul> </li> <li>B. Symptom: Losing coolant               <ul style="list-style-type: none"> <li>1. Possible cause                   <ul style="list-style-type: none"> <li>a) External leak caused by damage or corrosion</li> </ul> </li> <li>2. Possible corrective action                   <ul style="list-style-type: none"> <li>a) Check the entire cooling system for external coolant leaks                       <ul style="list-style-type: none"> <li>1) May be able to fix the leaks by simply tightening a hose clamp or replacing a radiator cap</li> </ul> </li> </ul> </li> <li>3. Possible cause                   <ul style="list-style-type: none"> <li>a) Internal leaks caused by a failed head gasket, cylinder head, or piston sleeve</li> </ul> </li> <li>4. Possible corrective action                   <ul style="list-style-type: none"> <li>a) Check the motor oil                       <ul style="list-style-type: none"> <li>1) If it has a milky white appearance to it, you have coolant in the oil</li> </ul> </li> <li>b) Take out-of-service</li> </ul> </li> </ul> </li> </ul>	<p><b>SLIDE: 2-6-8</b></p> <p><b>SLIDE: 2-6-9</b></p> <p>What if the oil is milky white?</p>
<p><b>III. LUBRICATION SYSTEM</b></p> <ul style="list-style-type: none"> <li>A. Oil leaks on older apparatus are common               <ul style="list-style-type: none"> <li>1. Should be watched carefully</li> </ul> </li> <li>B. Symptom: Loud engine knock accompanied by a dramatic and sudden drop in oil pressure</li> </ul>	<p><b>SLIDE: 2-6-10</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>1. Possible cause</p> <ul style="list-style-type: none"> <li>a) External damage to the oil reservoir and loss of oil</li> <li>b) Broken connecting rod</li> <li>c) Catastrophic (complete) failure of oil pump</li> </ul> <p>2. Possible corrective action</p> <ul style="list-style-type: none"> <li>a) Shut down immediately</li> <li>b) Take out-of-service</li> </ul> <p>C. Symptom: Leaking oil, creating a puddle larger than two inches in diameter on the floor</p> <p>1. Possible cause</p> <ul style="list-style-type: none"> <li>a) Leaking gaskets</li> <li>b) Leaking oil lines</li> <li>c) Loose drain plug</li> <li>d) Loose oil filter</li> </ul> <p>2. Possible corrective action</p> <ul style="list-style-type: none"> <li>a) If the leak is found, attempt to tighten to stop the leak</li> <li>b) If the leak is coming from a source you cannot see or cannot repair, contact your department's fleet manager for a plan of action</li> </ul>	<p>What is a possible cause for this symptom?</p> <p>What is a possible corrective action for this symptom?</p> <p><b>SLIDE: 2-6-11</b></p>
<p><b>IV. AIR SYSTEM (INTAKE AND EXHAUST)</b></p> <p>A. Symptom: Sudden loss of power without increase in engine noise</p>	<p><b>SLIDE: 2-6-12</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>1. Possible cause</p> <ul style="list-style-type: none"><li>a) Failure of pressure tube from exhaust that drives the turbocharger</li></ul> <p>2. Possible corrective action</p> <ul style="list-style-type: none"><li>a) Attempt to reattach or repair the hose until you can get to a location where proper repairs can be made</li></ul> <p>B. Symptom: Gradual loss of power with heavy black smoke coming from exhaust</p> <p>1. Possible cause</p> <ul style="list-style-type: none"><li>a) Turbo failure</li></ul> <p>2. Possible corrective</p> <ul style="list-style-type: none"><li>a) Take out-of-service</li></ul> <p>3. Most common cause of turbo failure is due to improper shutdown procedures</p> <ul style="list-style-type: none"><li>a) Turns at 10,000 rpms</li><li>b) Relies on oil from the main engine to keep it lubricated</li><li>c) If the main engine is shutdown before the turbo stops turning, the turbo will not receive sufficient lubrication and may be destroyed</li></ul>	<p>What is a possible cause for this symptom?</p> <p><b>SLIDE: 2-6-13</b></p> <p>What is a possible corrective action for this symptom?</p> <p>What is the common cause of turbo failure?</p> <p><b>SLIDE: 2-6-14</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<b>V. EXHAUST SYSTEMS</b>	
<p>A. Symptom: Sudden increase in exhaust noise</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Damaged muffler or pipe</li><li>b) Damaged or worn out exhaust gaskets (donuts)</li></ol></li><li>2. Possible corrective action<ol style="list-style-type: none"><li>a) None of these problems would take the apparatus immediately out-of-service</li><li>b) Contact your department's fleet manager for a plan of action</li></ol></li></ol>	<p><b>SLIDE: 2-6-15</b></p> <p>What is a possible cause for this symptom?</p>
<p>B. Symptom: Gradual increase in exhaust noise starting as a slight ticking noise</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Failing exhaust manifold gasket at the cylinder head</li></ol></li><li>2. Possible corrective action<ol style="list-style-type: none"><li>a) Does not require apparatus to be taken out-of-service<ol style="list-style-type: none"><li>1) As the noise increases, it can become a serious problem</li><li>2) Problem should be addressed</li></ol></li><li>b) Contact your department's fleet manager for a plan of action</li></ol></li></ol>	<p><b>SLIDE: 2-6-16</b></p> <p>What's a possible cause?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

A basic troubleshooting review of fuel systems, cooling systems, lubrications systems, and air systems has been discussed. A good knowledge of these individual systems will assist the driver/operator in properly maintaining his or her apparatus.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 31-34 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 45-51 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-7: Inspection And Basic Maintenance Of The Transmission And Clutch

**TIME FRAME:** 0:15

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of inspection and basic maintenance of the transmission and clutch by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 35, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, NFPA, 2007 Edition, Chapters 4, 6, and 7
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

Attention (attract)	Begin
Curiosity (arouse)	Association
Interest (create)	Students
Desire (stimulate)	Experience



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. COMPONENTS</b></p> <ul style="list-style-type: none"><li>A. Transmission</li><li>B. Clutch and linkage</li><li>C. Lubricants and filters</li><li>D. Transmission controls and shift linkage</li><li>E. Indicators and gauges</li><li>F. Electronic diagnostic system</li><li>G. Power take-off units</li><li>H. Lock-up systems for pumps or other accessories</li><li>I. Transmission braking systems</li></ul> <p><b>II. INSPECTION AND BASIC MAINTENANCE</b></p> <ul style="list-style-type: none"><li>A. All basic maintenance needs to be done in accordance with the manufacturer's recommendations and specifications</li><li>B. Basic maintenance for these components is maintaining proper fluid levels with approved fluid or oil<ul style="list-style-type: none"><li>1. Information on approved fluids is listed in the manufacturer's recommendations and specifications</li></ul></li><li>C. Transmission<ul style="list-style-type: none"><li>1. Securely mounted</li><li>2. Structurally sound</li><li>3. Check for proper fluid level</li></ul></li></ul>	<p><b>SLIDE: 2-7-1</b></p> <p><b>SLIDE: 2-7-2</b></p> <p><b>SLIDE: 2-7-3</b></p> <p><b>SLIDE: 2-7-4</b></p> <p><b>SLIDE: 2-7-5</b></p> <p>Where would you find information about this?</p> <p><b>SLIDE: 2-7-6</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>4. Leaking</p> <p>5. Clean</p> <p>6. Smooth or hard shifting</p> <p>D. Clutch and linkage</p> <ol style="list-style-type: none"> <li>1. Missing, damaged, or loose components</li> <li>2. Clutch free play (free travel)               <ol style="list-style-type: none"> <li>a) The distance that the pedal must be pushed before the throw-out bearing actually contacts the clutch release fingers</li> <li>b) Insufficient free play                   <ol style="list-style-type: none"> <li>1) Shortens the life of the throw-out bearing</li> <li>2) Causes the clutch to slip, overheat, and wear out sooner than necessary</li> </ol> </li> <li>c) Excessive free play                   <ol style="list-style-type: none"> <li>1) May result in the clutch not releasing completely                       <ul style="list-style-type: none"> <li>• Which can cause harsh shifting, gear clash, and damage to gear teeth</li> </ul> </li> </ol> </li> </ol> </li> </ol> <p>E. Lubricants and filters</p> <ol style="list-style-type: none"> <li>1. Check level of all fluids               <ol style="list-style-type: none"> <li>a) If low, add appropriate fluid to the proper level</li> <li>b) Follow department SOPs</li> <li>c) In accordance with the manufacturer's recommendations and specifications</li> </ol> </li> <li>2. No contamination of fluids</li> <li>3. Burnt smell</li> <li>4. Fluid leaking from filters</li> </ol>	<p><b>SLIDE: 2-7-7</b></p> <p>Excessive free play may result in?</p> <p><b>SLIDE: 2-7-8</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>F. Transmission controls and shift linkage</p> <ol style="list-style-type: none"><li>1. Missing, damaged, or loose components</li><li>2. In accordance with the manufacturer's recommendations and specifications</li></ol>	<p><b>SLIDE: 2-7-9</b></p>
<p>G. Indicators and gauges</p> <ol style="list-style-type: none"><li>1. Working properly</li><li>2. In accordance with the manufacturer's recommendations and specifications</li></ol>	<p><b>SLIDE: 2-7-10</b></p>
<p>H. Electronic diagnostic system</p> <ol style="list-style-type: none"><li>1. Check for proper operation in accordance with the manufacturer's recommendations and specifications</li></ol>	<p><b>SLIDE: 2-7-11</b></p>
<p>I. Power take-off units</p> <ol style="list-style-type: none"><li>1. Operational tests</li><li>2. Mountings secure and not cracked</li><li>3. Check level of all fluids<ol style="list-style-type: none"><li>a) If low, add appropriate fluid to the proper level</li><li>b) Follow department SOPs</li><li>c) In accordance with the manufacturer's recommendations and specifications</li></ol></li></ol>	<p><b>SLIDE: 2-7-12</b></p>
<p>J. Lock-up systems for pumps or other accessories</p> <ol style="list-style-type: none"><li>1. Maintains the transmission in an appropriate gear to operate pumps and other accessories</li><li>2. Leaking</li><li>3. Operationally tested</li></ol>	<p><b>SLIDE: 2-7-13</b></p> <p>What is the function of a lock-up system?</p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

The transmission is fundamentally a gearbox that transmits the clockwise rotation of the engine into the proper gear to perform the movement of the fire apparatus. Regardless of whether the transmission is automatic or manual, each type performs the same operation. The difference being the automatic transmission is a hydraulic pump and the manual transmission is a set of gears and shafts. As with any machine, the various components need to be systematically and regularly checked.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 35, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-8: Troubleshooting The Transmission And Clutch

**TIME FRAME:** 0:15

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of troubleshooting the transmission and clutch by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 36-37

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 36-37

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. MANUAL TRANSMISSIONS</b></p> <p>A. Symptom: Transmission growls under a load</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Failure of one of the main bearings in the transmission<ol style="list-style-type: none"><li>1) May be caused by low oil levels in the transmission</li></ol></li></ol></li></ol> <p>B. Symptom: Transmission growls all of the time</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Clutch is out-of-adjustment causing the throw-out bearing to fail<ol style="list-style-type: none"><li>1) Clutch pedal needs to have some free play in it</li><li>2) Otherwise, the throw-out bearing will be running all of the time and burn out</li></ol></li></ol></li></ol> <p>C. Symptom: Transmission growls when you press on the clutch</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Throw-out bearing is failing</li></ol></li></ol> <p>D. Possible corrective action</p> <ol style="list-style-type: none"><li>1. If any of these signs are present, apparatus should be taken out-of-service until repairs can be made</li><li>2. Contact your department's fleet manager for a plan of action</li></ol>	<p><b>SLIDE: 2-8-1</b></p> <p><b>SLIDE: 2-8-2</b></p> <p><b>SLIDE: 2-8-3</b></p> <p>What is a possible cause for this symptom?</p> <p><b>SLIDE: 2-8-4</b></p> <p><b>SLIDE: 2-8-5</b></p> <p>What is a possible corrective action for these symptoms?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>II. AUTOMATIC TRANSMISSIONS</b></p> <p>A. Symptom: Transmission is leaking large amounts of fluid when in gear</p> <ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Too much fluid<ol style="list-style-type: none"><li>1) Overfilling a transmission with fluid can cause the transmission case to become overpressurized</li><li>2) This can cause the seals to be blown out, allowing fluid to leak</li></ol></li><li>2. Possible corrective action<ol style="list-style-type: none"><li>a) Shutdown immediately</li><li>b) Take out-of-service<ol style="list-style-type: none"><li>1) Until the level of fluid has been reduced to normal</li><li>2) Transmission has been inspected and tested by a qualified mechanic</li></ol></li></ol></li></ol><p>B. Symptom: Engine is running but the transmission will not engage</p><ol style="list-style-type: none"><li>1. Possible cause<ol style="list-style-type: none"><li>a) Auxiliary systems that override transmission control may be in use</li></ol></li><li>2. Possible corrective action<ol style="list-style-type: none"><li>a) Check all auxiliary systems to ensure they are in the lock-down position</li></ol></li><li>3. Possible cause<ol style="list-style-type: none"><li>a) Most likely low on fluid</li></ol></li></ol></li></ol>	<p><b>SLIDE: 2-8-6</b></p> <p>What is a possible cause for this symptom?</p> <p><b>SLIDE: 2-8-7</b></p> <p><b>SLIDE: 2-8-8</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>1) If the transmission is so low on fluid that the pump cannot pick it up, the vehicle will not move</p> <p>2) This generally will not damage the components unless it runs for an extended period without fluid</p> <p>3) If fluid is low but the pump still picks it up, there is risk of overheating the transmission</p> <p>4. Possible corrective action</p> <ul style="list-style-type: none"><li>a) Check for leaks</li><li>b) Add fluid if needed</li><li>c) If transmission still will not engage, contact your department's fleet manager for a plan of action</li></ul> <p>C. Symptom: Transmission will not shift up or down</p> <p>1. Possible cause</p> <ul style="list-style-type: none"><li>a) Low fluid level</li></ul> <p>2. Possible corrective action</p> <ul style="list-style-type: none"><li>a) Add fluid</li></ul> <p>3. Possible cause</p> <ul style="list-style-type: none"><li>a) Computer failure</li></ul> <p>4. Possible corrective action</p> <ul style="list-style-type: none"><li>a) Shutoff engine<ul style="list-style-type: none"><li>1) Disconnect, then reconnect batteries<ul style="list-style-type: none"><li>• This reboots the computer</li></ul></li><li>2) Try it again</li></ul></li><li>b) Contact your department's fleet manager for a plan of action if transmission still will not engage</li></ul>	<p><b>SLIDE: 2-8-9</b></p> <p>What is a possible cause for this symptom?</p> <p><b>SLIDE: 2-8-10</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

The transmission system is a vital component of the drive train. This lesson has given you a few tools to assist you in recognizing the symptoms of a failure in the transmission that may or may not put your apparatus out-of-service. Early recognition may avoid potentially costly repairs.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 36-37 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-9: Inspection And Basic Maintenance Of The Starting, Charging, And Other Electrical Systems

**TIME FRAME:** 0:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of inspection and basic maintenance of the charging, starting, and other electrical systems by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 38-40, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition, Chapters 4, 6, and 8
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. COMPONENTS</b></p> <p>A. Starting system</p> <ol style="list-style-type: none"><li>1. Batteries</li><li>2. Cables and connections</li><li>3. Cranking motor</li><li>4. Solenoid, relays, and switches</li><li>5. Interlock systems</li></ol> <p>B. Charging system</p> <ol style="list-style-type: none"><li>1. Alternator</li><li>2. Regulator</li><li>3. Associated wiring and cables</li><li>4. Rectifiers</li><li>5. Isolators</li><li>6. Alternator drive belts</li><li>7. Solenoids, relays, switches, instrumentation, and lighting</li></ol>	<p><b>SLIDE: 2-9-1</b></p> <p>What are the components of the starting system?</p> <p><b>SLIDE: 2-9-2</b></p> <p><b>SLIDE: 2-9-3</b></p> <p><b>SLIDE: 2-9-4</b></p> <p>What are the components of the charging system?</p> <p><b>SLIDE: 2-9-5</b></p> <p><b>SLIDE: 2-9-6</b></p> <p>What are the components of the ignition system?</p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>1) Light should turn off when switch depressed</p> <p>2) Light should turn on when switch is released</p> <p>H. Electrical accessories</p> <ol style="list-style-type: none"> <li>1. Heater and defroster</li> <li>2. Air conditioning system</li> <li>3. Windshield wipers and washers</li> <li>4. Instrumentation</li> </ol> <p>I. Warning devices</p> <ol style="list-style-type: none"> <li>1. Emergency warning lights</li> <li>2. Electric and electronic sirens</li> <li>3. Automotive traffic horn</li> <li>4. Air horns</li> <li>5. Backup alarm</li> <li>6. Traffic preemption</li> </ol> <p><b>II. INSPECTION AND BASIC MAINTENANCE</b></p> <p>A. General guidelines</p> <ol style="list-style-type: none"> <li>1. All components of the electrical system shall be maintained in a clean condition and free of corrosion</li> <li>2. All components shall be inspected for secure mounting, deformation and shall be operationally tested</li> </ol>	<p><b>SLIDE: 2-9-16</b></p> <p>How do you check compartment lights and switches?</p> <p><b>SLIDE: 2-9-17</b></p> <p><b>SLIDE: 2-9-18</b></p> <p><b>SLIDE: 2-9-19</b></p> <p><b>SLIDE: 2-9-20</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>III. OUT-OF-SERVICE CRITERIA</b></p> <p>A. <u>NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</u>, 2007 Edition recommendations</p> <ol style="list-style-type: none"><li>1. Legally required lighting (DOT lighting) or horn that is not operational</li><li>2. Ignition system that is not operational</li><li>3. Charging system that is not operational</li><li>4. Any failure of the warning light system that creates any position around the apparatus from which no warning light is visible</li><li>5. If there are deficiencies in the grounding and bonding system or an inoperative siren, a qualified technician shall conduct an out-of-service evaluation and make a written report, including recommendations to the AHJ</li></ol> <p>B. CCDH criteria</p> <ol style="list-style-type: none"><li>1. None stated</li></ol>	<p><b>SLIDE: 2-9-24</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

The importance of complete and accurate inspection and maintenance procedures for the electrical systems should be apparent. As fire apparatus become more electronically sophisticated, the need to keep pace increases. You cannot afford to lag behind the changes that seem to occur daily. The delicate nature of the starting, charging, and other electrical systems need professional, up-to-date attention by a proficient fire apparatus driver/operator.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 38-40, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-54 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-10: Troubleshooting The Starting, Charging, And Other Electrical Systems

**TIME FRAME:** 2:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of troubleshooting the starting, charging, and other electrical systems on fire apparatus by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver/ Operator 1A Student Supplement, SFT, 2008 Edition, Pages 41-46 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 48, 49, and 51

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 48, 49, and 51

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>2. Defines the relationship between current, voltage, and resistance<ul style="list-style-type: none"><li>a) If any two or these three electrical values are known, the third can be found</li></ul></li><li>3. Mathematical formula that shows how current, voltage, and resistance work together to produce electricity</li></ul> <p>F. Series circuit</p> <ul style="list-style-type: none"><li>1. Provides a single path for current flow from the electrical source through all the circuit's components and back to the source</li></ul> <p>G. Parallel circuit</p> <ul style="list-style-type: none"><li>1. Provides two or more paths for electricity to flow</li></ul>	<p><b>SLIDE: 2-10-7</b></p> <p><b>SLIDE: 2-10-8</b></p>
<p><b>II. TEST EQUIPMENT</b></p> <p><b>NOTE:</b> Remind students that all test equipment is different and that they need to follow manufacturer's recommendations for proper use.</p> <p>A. Jumper wires (not the same as jumper cables)</p> <ul style="list-style-type: none"><li>1. Simply a wire with an alligator clip on each end</li><li>2. <b><u>Warning! Never connect a jumper wire across the terminals of the battery</u></b><ul style="list-style-type: none"><li>a) Battery could explode causing serious injury</li></ul></li><li>3. Connecting one end of the jumper wire to positive battery post will provide an excellent 12-volt power supply for testing components</li><li>4. Can be used to check the load of components by bypassing switches, conductors, and connections in the circuit</li><li>5. Can also be used to provide the ground to test that portion of the circuit</li></ul>	<p><b>SLIDE: 2-10-9</b></p> <p><b>SLIDE: 2-10-10</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>B. Test lights</p> <ol style="list-style-type: none"><li>1. Used when you need to “look” for electrical power in the circuit</li><li>2. Handle is transparent and contains a light bulb<ol style="list-style-type: none"><li>a) A sharp probe extends from one end of the handle</li><li>b) A ground wire with a clamp extends from the other end</li></ol></li><li>3. The lamp should light after clamping the lead of the test light to ground and probing a live circuit</li><li>4. <b><u>Warning!</u></b> <u>It is not recommended that a test light be used to probe for power in a computer-controlled circuit</u><ol style="list-style-type: none"><li>a) The increased draw of the test light may damage the system components</li></ol></li></ol> <p>C. Self-powered continuity tester</p> <ol style="list-style-type: none"><li>1. Used to test circuits without power</li><li>2. Looks similar to a test light</li><li>3. Tester has a battery and lights when the circuit is complete between the probe and the lead</li><li>4. <b><u>Warning!</u></b> <u>Do not connect a self-powered test light to a circuit that is powered</u><ol style="list-style-type: none"><li>a) Doing so will damage the test light</li></ol></li></ol>	<p><b>SLIDE: 2-10-11</b> <b>SLIDE: 2-10-12</b> <b>SLIDE: 2-10-13</b></p> <p>Why use a test light?</p> <p><b>SLIDE: 2-10-14</b> <b>SLIDE: 2-10-15</b> <b>SLIDE: 2-10-16</b></p> <p><b>SLIDE: 2-10-17</b> <b>SLIDE: 2-10-18</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>D. Voltmeter</p> <ol style="list-style-type: none"> <li>1. One of the most used meters in the shop</li> <li>2. Used to read the pressure behind the flow of electrons</li> <li>3. Connected in parallel with a circuit               <ol style="list-style-type: none"> <li>a) Reads directly in volts</li> </ol> </li> </ol> <p>E. Ammeter</p> <ol style="list-style-type: none"> <li>1. Used to measure current draw</li> <li>2. Many styles require being connected in series with the current load to read the amount of current draw</li> <li>3. To make the series connection, disconnect the load and reconnect it with all of the current going through the ammeter               <ol style="list-style-type: none"> <li>a) Polarity must be followed</li> </ol> </li> <li>4. <b><u>Warning!</u></b> Do not connect the meter in parallel with the circuit               <ol style="list-style-type: none"> <li>a) This can cause damage to the test meter</li> </ol> </li> </ol>	<p><b>SLIDE: 2-10-19</b></p> <p><b>SLIDE: 2-10-20</b></p> <p>Why use an ammeter?</p> <p><b>SLIDE: 2-10-21</b></p>
<p><b>III. CIRCUIT DEFECTS</b></p> <p>A. Open</p> <ol style="list-style-type: none"> <li>1. A circuit in which there is a break in continuity</li> <li>2. Similar to turning off the switch, resulting in the system not operating</li> </ol> <p>B. Short</p> <ol style="list-style-type: none"> <li>1. A circuit that allows current to bypass part of the normal path</li> </ol>	<p><b>SLIDE: 2-10-22</b></p> <p><b>SLIDE: 2-10-23</b></p> <p>What is a short circuit?</p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>2) Make sure that the battery cables are disconnected before tightening</p> <p>c) Contact your department's fleet manager for a plan of action</p> <p>D. Alternator</p> <p>1. Maintains voltage (pressure) in the electrical system</p> <p>2. Symptom</p> <p>a) Low voltage (low pressure)</p> <p>1) Voltmeter is dropping below 12 volts and staying there</p> <p>2) May place your apparatus out-of-service when electronic systems begin to shut down if the voltage (pressure) drops below 11.5 volts</p> <p>b) Possible cause</p> <p>1) This problem can be caused by a variety of system failures</p> <p>c) <u>Possible corrective action</u></p> <p>1) Contact your department's fleet manager for a plan of action</p> <p>3. Symptom</p> <p>a) High voltage (over pressure)</p> <p>1) Modern day fire apparatus systems are becoming increasingly sensitive to high voltage problems</p>	<p><b>SLIDE: 2-10-32</b></p> <p>What function does an alternator fulfill?</p> <p><b>SLIDE: 2-10-33</b></p> <p>What could happen if the voltage drops too low?</p> <p><b>SLIDE: 2-10-34</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) Possible cause</p> <ol style="list-style-type: none"> <li>1) Voltmeter is raising above 16 volts and staying there               <ul style="list-style-type: none"> <li>• May cause the battery to overheat causing acid to boil, exploding the battery, and damaging sensitive components</li> </ul> </li> </ol> <p>c) <u>Possible corrective action</u></p> <ol style="list-style-type: none"> <li>1) Contact your department's fleet manager for a plan of action</li> </ol> <p>4. Symptom</p> <ol style="list-style-type: none"> <li>a) Growling sound coming from the alternator or squealing sound from the belts</li> </ol> <p>b) Possible cause</p> <ol style="list-style-type: none"> <li>1) Alternator may have bearing failure</li> </ol> <p>c) <u>Possible corrective action</u></p> <ol style="list-style-type: none"> <li>1) Take out-of-service</li> <li>2) Contact your department's fleet manager for a plan of action</li> </ol>	<p><b>SLIDE: 2-10-35</b></p> <p>What could cause this symptom?</p> <p><b>SLIDE: 2-10-36</b></p>
<p><b>V. LIGHTING CIRCUITS</b></p> <p>A. Symptom</p> <ol style="list-style-type: none"> <li>1. Head lights, tail lights, or marker lights do not light</li> <li>2. Possible cause           <ol style="list-style-type: none"> <li>a) Light bulb failure</li> <li>b) Broken wire</li> <li>c) Corroded connection</li> </ol> </li> </ol>	<p><b>SLIDE: 2-10-37</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>3. <u>Possible corrective action</u></p> <ul style="list-style-type: none"> <li>a) Change the bulb</li> <li>b) Check the circuit using a test light</li> <li>c) Clean the corroded connection</li> <li>d) Contact your department's fleet manager for a plan of action</li> </ul> <p>B. Symptom</p> <ul style="list-style-type: none"> <li>1. Turn signals or hazard flashers do not flash</li> <li>2. Possible cause               <ul style="list-style-type: none"> <li>a) Bad light bulb</li> <li>b) Bad flasher unit</li> <li>c) Failure in the lighting circuit</li> </ul> </li> <li>3. <u>Possible corrective action</u> <ul style="list-style-type: none"> <li>a) Replace light bulb</li> <li>b) Change flasher unit</li> <li>c) Test the circuit with a test light</li> <li>d) Contact your department's fleet manager for a plan of action</li> </ul> </li> </ul> <p>C. Symptom</p> <ul style="list-style-type: none"> <li>1. Brake lights do not light</li> <li>2. Possible cause               <ul style="list-style-type: none"> <li>a) Light bulb failure</li> <li>b) Switch failure</li> <li>c) Circuit failure</li> </ul> </li> <li>3. <u>Possible corrective action</u> <ul style="list-style-type: none"> <li>a) Change light bulb</li> </ul> </li> </ul>	<p><b>SLIDE: 2-10-38</b></p> <p><b>SLIDE: 2-10-39</b></p> <p>What might cause this symptom?</p> <p><b>SLIDE: 2-10-40</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>b) Test brake light switch using a test light</li><li>c) Test circuit using a test light</li><li>d) Contact your department's fleet manager for a plan of action</li></ul> <p>D. Symptom</p> <ul style="list-style-type: none"><li>1. Auxiliary systems and/or Code 3 systems not functioning properly</li><li>2. Possible cause<ul style="list-style-type: none"><li>a) Can be caused by a variety of system failures</li><li>b) Load manager operating</li><li>c) Opticom™ installed with door or brake termination switch</li></ul></li><li>3. <u>Possible corrective action</u><ul style="list-style-type: none"><li>a) Check the load manager</li><li>b) Close doors and/or release brake</li><li>c) Contact your department's fleet manager for a plan of action</li></ul></li></ul>	<p><b>SLIDE: 2-10-41</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Electrical systems on fire apparatus can be vast and complicated. Knowing the basics of trouble shooting electrical systems will get you out of most jams and allow you to complete your mission and get back to the station in a safe manner.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/ Operator 1A Student Supplement, SFT, 2008 Edition, Pages 41-46 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 48, 49, and 51 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-11: Inspection And Basic Maintenance Of Brake Systems

**TIME FRAME:** 1:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge the inspection and basic maintenance of brake systems by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 63-74, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 47-52, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 44

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2007 Edition, Pages 63-74
- NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, 2007 Edition, Chapters 4, 6, and 7
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 44

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

**A**ttention (attract)

**B**egin

**C**uriosity (arouse)

**A**ssociation

**I**nterest (create)

**S**tudents

**D**esire (stimulate)

**E**xperience

Cite examples or use related illustrations of near-miss



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>c) On apparatus equipped with air brakes, the air pressure should build to a sufficient level to allow apparatus operations within 60 seconds of starting</li><li>d) Need to be operationally tested daily<ul style="list-style-type: none"><li>1) DMV brake tests</li><li>2) Department SOPs</li><li>3) In accordance with the manufacturer's recommendations and specifications</li></ul></li></ul>	<p><b>SLIDE: 2-11-5</b></p>
<p>2. Air storage tanks</p> <ul style="list-style-type: none"><li>a) Used to hold compressed air<ul style="list-style-type: none"><li>1) Hold enough air to allow the brakes to be used several times, even if the compressor stops working</li></ul></li><li>b) Must be checked daily for condensation</li><li>c) Number and size varies among apparatus</li></ul>	<p><b>SLIDE: 2-11-6</b></p> <p>What is the purpose of the air dryer?</p> <p><b>SLIDE: 2-11-7</b></p>
<p>3. Air dryer</p> <ul style="list-style-type: none"><li>a) Collects and removes air system contaminants in solid, liquid, and vapor form</li><li>b) Provides clean, dry air to air reservoirs and air brake components</li><li>c) Normally in line between the air compressor and first air storage tank</li></ul>	<p><b>SLIDE: 2-11-8</b></p> <p><b>SLIDE: 2-11-9</b></p>
<p>4. Alcohol evaporator</p> <ul style="list-style-type: none"><li>a) Some air brake systems have an alcohol evaporator to put alcohol into the air system</li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>b) Helps to reduce the risk of ice in air brake storage tanks, valves, and other parts during cold weather               <ul style="list-style-type: none"> <li>1) Ice inside the system can cause brake failure</li> </ul> </li> <li>5. Treadle valve or master control valve               <ul style="list-style-type: none"> <li>a) Located at the brake pedal</li> <li>b) Controls entire brake system</li> <li>c) Overrides other components</li> </ul> </li> <li>6. Safety relief valve               <ul style="list-style-type: none"> <li>a) Installed in the first tank the air compressor pumps air into</li> <li>b) Protects the tank and the rest of the system from too much air pressure</li> <li>c) Usually set to open at 150 psi</li> </ul> </li> <li>7. Brake pedal               <ul style="list-style-type: none"> <li>a) Apply the brakes by pushing down on the brake pedal                   <ul style="list-style-type: none"> <li>1) Also called the foot valve or treadle valve</li> </ul> </li> <li>b) The harder the pedal is pushed down, the more air pressure is applied from the storage tanks into the brake chambers</li> </ul> </li> <li>8. Brake chamber               <ul style="list-style-type: none"> <li>a) Converts the energy of compressed air into mechanical force and motion                   <ul style="list-style-type: none"> <li>1) Actuates the brake camshaft, which in turn operates the foundation brake mechanism</li> <li>2) Forces the brake shoes/pads against the drum/disc</li> </ul> </li> </ul> </li> </ul>	<p><b>SLIDE: 2-11-10</b></p> <p><b>SLIDE: 2-11-11</b></p> <p><b>SLIDE: 2-11-12</b></p> <p><b>SLIDE: 2-11-13</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>9. Slack adjuster</p> <ul style="list-style-type: none"><li>a) The link between the brake chamber and the foundation brake camshaft<ul style="list-style-type: none"><li>1) Transforms and multiplies the force developed by the chamber into a torque</li><li>2) Applies the brake via the camshaft</li><li>3) Equipped with an adjusting mechanism, providing a means of adjusting for brake lining wear<ul style="list-style-type: none"><li>• Can be manual or automatic</li></ul></li></ul></li></ul> <p>10. Brakes</p> <ul style="list-style-type: none"><li>a) Brake drums and shoes<ul style="list-style-type: none"><li>1) Friction between the drums and shoes is what causes the wheel to stop</li></ul></li><li>b) Brake discs and pads<ul style="list-style-type: none"><li>1) Friction between the discs and pads is what causes the wheel to stop</li><li>2) Discs are normally used for front brakes because they can absorb more heat than drums</li></ul></li><li>c) Types<ul style="list-style-type: none"><li>1) S-cam brakes</li><li>2) Wedge brakes</li><li>3) Disc brakes</li></ul></li></ul> <p>11. One-way check valve</p> <ul style="list-style-type: none"><li>a) Allows air to flow in one direction only</li></ul>	<p><b>SLIDE: 2-11-14</b></p> <p>What is the common use for disc brakes on fire apparatus?</p> <p><b>SLIDE: 2-11-15</b></p> <p><b>SLIDE: 2-11-16</b></p> <p><b>SLIDE: 2-11-17</b></p> <p><b>SLIDE: 2-11-18</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) All air tanks on air-braked vehicles must have a check valve located between the air compressor and the first reservoir</p> <p>12. Air supply pressure gauge</p> <p>a) All air-braked vehicles have an air supply pressure gauge connected to the air tank</p> <p>b) If the apparatus has a dual air brake system, there will be a gauge for each half of the system</p> <p>1) Sometimes a single gauge with two needles</p> <p>c) Indicate how much pressure is in the air tanks</p> <p>1) Must be above 90 psi to operate the brakes safely</p>	<p><b>SLIDE: 2-11-19</b></p>
<p>13. Application pressure gauge</p> <p>a) Indicates how much air pressure you are applying to the brakes</p> <p>1) Some apparatus do not have this gauge</p> <p>14. Low air pressure warning</p> <p>a) Required with air brakes</p>	<p><b>SLIDE: 2-11-20</b></p>
<p>1) A visible <u>and</u> audible warning device that must come on when the air supply pressure drops below 60 psi, or</p> <p>2) When it reaches one-half of the compressor governor's cut-out pressure (older apparatus)</p> <p>3) Usually a red light and buzzer</p>	<p>At what psi is the low air pressure warning supposed to operate?</p> <p><b>SLIDE: 2-11-21</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>15. Air pressure protection valve</p> <ul style="list-style-type: none"><li>a) This valve prevents air horns from operating when the pressure in the air reservoir drops below 80 psi (552 kPa)</li></ul> <p>16. Stop light switch</p> <ul style="list-style-type: none"><li>a) Turns on the brake lights when applying the air brakes<ul style="list-style-type: none"><li>1) Drivers behind apparatus must be warned when driver/operator applies the brakes</li></ul></li><li>b) Air brake system does this with an electric switch that works by air pressure</li></ul> <p>17. Front brake limiting valve</p> <ul style="list-style-type: none"><li>a) Some apparatus made before 1975 have a front brake limiting valve and a control in the cab</li><li>b) Control is usually marked "normal" and "slippery"<ul style="list-style-type: none"><li>1) Normal position<ul style="list-style-type: none"><li>• Normal brake operation is unaltered</li></ul></li><li>2) Slippery position<ul style="list-style-type: none"><li>• The limiting valve cuts the normal air pressure to the front brakes by half</li></ul></li><li>3) Limiting valves are used to reduce the chance of the front wheels skidding on slippery surfaces</li><li>4) They also reduce the stopping power of the apparatus</li></ul></li></ul> <p>18. Spring brakes</p> <ul style="list-style-type: none"><li>a) Usually used to meet the emergency and parking brake requirements for all apparatus using air pressure to apply the service brakes</li></ul>	<p><b>SLIDE: 2-11-22</b></p> <p><b>SLIDE: 2-11-23</b></p> <p>Do spring brakes serve more than one purpose?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) When driving, powerful springs are held back by air pressure</p> <ol style="list-style-type: none"> <li>1) If the air pressure is removed, the springs put on the brakes               <ul style="list-style-type: none"> <li>• Actuated by a parking brake control in the cab</li> </ul> </li> <li>2) A significant leak in the air brake system could cause the springs to put on the brakes</li> <li>3) Spring brakes will come fully on when air pressure drops to a range of 20-45 psi</li> <li>4) The braking power of spring brakes depends on the brakes being properly adjustment</li> </ol> <p>c) Parking brake must be held on by mechanical force</p> <ol style="list-style-type: none"> <li>1) Because the air pressure can eventually leak away</li> <li>2) Always use a chock block with parking brake to secure apparatus</li> </ol> <p>19. Dual air brake systems</p> <ol style="list-style-type: none"> <li>a) Most new heavy-duty apparatus use dual air brake systems for safety</li> <li>b) A dual air brake system has two separate air brake systems that use a single set of brake controls               <ol style="list-style-type: none"> <li>1) Each system has its own air tanks, hoselines, etc.</li> </ol> </li> <li>c) The first system is the primary system               <ol style="list-style-type: none"> <li>1) Typically operates the regular brakes on the rear axle(s)</li> </ol> </li> </ol>	<p>At what pressure do the spring brakes apply?</p> <p><b>SLIDE: 2-11-24</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>d) Other system is the secondary system</p> <ol style="list-style-type: none"> <li>1) Operates the regular brakes on the front axle and possibly one rear axle</li> </ol> <p>20. Antilocking brake systems (ABS)</p> <ol style="list-style-type: none"> <li>a) Most newer apparatus, regardless of the brake system, are equipped with antilock braking systems</li> <li>b) Antilock brake systems reduce the possibility of the apparatus being thrown into a skid when the brakes are fully applied               <ol style="list-style-type: none"> <li>1) A skidding wheel has less traction than a nonskidding wheel</li> </ol> </li> <li>c) Components               <ol style="list-style-type: none"> <li>1) Speed sensors                   <ul style="list-style-type: none"> <li>• Senses when the wheel is about to lock up</li> <li>• Located at each wheel or, in some cases, in the differential (one controlling valve for more than one wheel)</li> </ul> </li> <li>2) Valves                   <ul style="list-style-type: none"> <li>• In the brake line of each brake controlled by the ABS</li> <li>• On some systems, the valve has three positions                       <ol style="list-style-type: none"> <li>1. Open – pressure passes through the brake</li> <li>2. Blocks – prevents pressure from rising further in that brake</li> <li>3. Release – releases pressure from the brake</li> </ol> </li> </ul> </li> </ol> </li> </ol>	<p><b>SLIDE: 2-11-25</b></p> <p>Why are antilock brake systems important?</p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2. Regulates the pressure of each wheel               <ul style="list-style-type: none"> <li>a) Ensures that pressure is applied to the front and rear brakes at the same time</li> </ul> </li> <li>3. Consists of a               <ul style="list-style-type: none"> <li>a) Metering valve</li> <li>b) Proportioning valve</li> <li>c) Brake warning light</li> </ul> </li> </ul>	<p><b>SLIDE: 2-11-33</b>  <b>SLIDE: 2-11-34</b>  <b>SLIDE: 2-11-35</b></p>
<ul style="list-style-type: none"> <li>D. Brake pedal</li> <li>E. Brake lines</li> <li>F. Wheel cylinders</li> </ul>	
<ul style="list-style-type: none"> <li>1. Contains fluid-activated pistons that push the brake shoes/pads against the drums/discs</li> <li>2. Contains an air bleeding screw used to remove air from the system</li> </ul>	<p>How do hydraulic brakes activate?</p>
<ul style="list-style-type: none"> <li>1. Contains fluid-activated pistons that push the brake shoes/pads against the drums/discs</li> <li>2. Contains an air bleeding screw used to remove air from the system</li> </ul>	<p><b>SLIDE: 2-11-36</b>  <b>SLIDE: 2-11-37</b></p>
<ul style="list-style-type: none"> <li>G. Emergency brakes               <ul style="list-style-type: none"> <li>1. Manually operated                   <ul style="list-style-type: none"> <li>a) By a cable</li> </ul> </li> <li>2. Not dependent on the hydraulic system</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>H. Brakes               <ul style="list-style-type: none"> <li>1. The operational principles of drum brakes/shoes, and the disc brakes/pads are the same as with air brakes</li> </ul> </li> </ul>	<p><b>SLIDE: 2-11-38</b>  <b>SLIDE: 2-11-39</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>4) When braking is desired, the exhaust valves open right as the piston reaches the top of the compression stroke</li> <li>5) The energy gathered in the compressed air is released               <ul style="list-style-type: none"> <li>• Compression stroke actually provides braking power</li> </ul> </li> <li>b) Exhaust brake               <ul style="list-style-type: none"> <li>1) Uses exhaust from engine                   <ul style="list-style-type: none"> <li>• To provide braking power</li> </ul> </li> <li>2) Works opposite of compression brake                   <ul style="list-style-type: none"> <li>• Holds compression in engine instead of releasing it</li> <li>• Accomplished by butterfly valve in exhaust system</li> <li>• Most favorable location to mount exhaust brake - to outlet side of turbo charger</li> </ul> </li> </ul> </li> <li>2. Automatic transmission retarder               <ul style="list-style-type: none"> <li>a) Works in conjunction with gear selection                   <ul style="list-style-type: none"> <li>1) To slow vehicle</li> </ul> </li> <li>b) Empty chamber usually mounted                   <ul style="list-style-type: none"> <li>1) On rear of transmission</li> <li>2) Stationary vanes                       <ul style="list-style-type: none"> <li>• AKA stators</li> <li>• Built into walls of chamber</li> </ul> </li> <li>3) Vanes or paddles                       <ul style="list-style-type: none"> <li>• On rotating driveline</li> </ul> </li> </ul> </li> <li>c) Transmission pump forces liquid into the chamber                   <ul style="list-style-type: none"> <li>1) Rotating paddles on driveline                       <ul style="list-style-type: none"> <li>• Forces fluid against stator vanes</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<p style="text-align: center;"><b>SLIDE: 2-11-44</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2) Chamber automatically empties               <ul style="list-style-type: none"> <li>• When not in use</li> </ul> </li> <li>d) Types               <ul style="list-style-type: none"> <li>1) Input shaft</li> <li>2) Output shaft                   <ul style="list-style-type: none"> <li>• 50% more efficient than input shaft</li> </ul> </li> </ul> </li> <li>3. Driveline               <ul style="list-style-type: none"> <li>a) Magnetic field that uses battery voltage to create the braking effect</li> </ul> </li> </ul> <p><b>V. INSPECTION AND BASIC MAINTENANCE</b></p> <p>A. Air brakes</p> <ul style="list-style-type: none"> <li>1. Air brake tests – DMV</li> </ul> <p><b>NOTE:</b> Review DMV brake tests if necessary.</p> <ul style="list-style-type: none"> <li>2. Air compressor and governor               <ul style="list-style-type: none"> <li>a) On apparatus equipped with air brakes, the air pressure should build to a sufficient level to allow apparatus operations within 60 seconds of starting</li> <li>b) Need to be operationally tested daily                   <ul style="list-style-type: none"> <li>1) DMV brake tests</li> <li>2) Department SOPs</li> <li>3) In accordance with the manufacturer's recommendations and specifications</li> </ul> </li> </ul> </li> <li>3. Air storage and drain tanks               <ul style="list-style-type: none"> <li>a) Proper mounting</li> <li>b) Loose</li> <li>c) Clean</li> <li>d) Check daily</li> </ul> </li> </ul>	<p><b>SLIDE: 2-11-45</b></p> <p>What are some of the tests required by the DMV?</p> <p><b>SLIDE: 2-11-46</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>4. Air dryer</p> <ul style="list-style-type: none"><li>a) Securely mounted</li><li>b) Connections intact</li></ul> <p>5. Alcohol evaporator</p> <ul style="list-style-type: none"><li>a) Securely mounted</li><li>b) Connections intact</li></ul> <p>6. Safety valve</p> <ul style="list-style-type: none"><li>a) If the safety valve releases air, something is wrong with the brake system</li></ul>	<p><b>SLIDE: 2-11-47</b></p>
<p>7. Slack adjusters</p> <ul style="list-style-type: none"><li>a) Look for<ul style="list-style-type: none"><li>1) Broken, loose, or missing parts</li><li>2) Proper angle between push rod and adjuster arm<ul style="list-style-type: none"><li>• A little over 90 degrees when brakes released and,</li><li>• Not less than 90 degrees when applied</li></ul></li></ul></li></ul>	<p><b>SLIDE: 2-11-48</b></p>
<p>8. Brake pedal</p> <ul style="list-style-type: none"><li>a) Pedal should be firm when applied</li><li>b) Pedal should not continue to travel to the floor when pressure is applied</li><li>c) Securely mounted</li><li>d) Operating properly</li></ul>	<p><b>SLIDE: 2-11-49</b></p>
<p>9. Brake drums and shoes</p> <ul style="list-style-type: none"><li>a) Excessive or uneven wear</li><li>b) Missing components</li><li>c) Cracks</li></ul>	<p><b>SLIDE: 2-11-50</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>d) Out of shape</li><li>e) Operational failure</li><li>f) Falls below required standards</li></ul> <p>10. Brake discs and pads</p> <ul style="list-style-type: none"><li>a) Same as drums and shoes</li></ul> <p>11. One-way check valve</p> <ul style="list-style-type: none"><li>a) Check for leaks</li><li>b) Securely mounted</li></ul> <p>12. Air supply pressure gauge</p> <ul style="list-style-type: none"><li>a) Must be above 90 psi to operate the brakes safely</li></ul> <p>13. Application pressure gauge</p> <ul style="list-style-type: none"><li>a) Proper operation</li></ul> <p>14. Low air pressure warning</p> <ul style="list-style-type: none"><li>a) A warning device that you can see must come on when the air supply pressure drops below 60 psi, or</li><li>b) One half the compressor governor cut-out pressure on older apparatus</li></ul> <p>15. Stop light switch</p> <ul style="list-style-type: none"><li>a) Ensure that it operates the brake warning lights</li></ul> <p>16. Front brake limiting valve</p> <ul style="list-style-type: none"><li>a) Leaks</li><li>b) Mounting</li></ul>	<p><b>SLIDE: 2-11-51</b></p> <p>What is the minimum pressure required to operate safely?</p> <p><b>SLIDE: 2-11-52</b></p> <p><b>SLIDE: 2-11-53</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>17. Spring brakes</p> <ul style="list-style-type: none"> <li>a) Missing components</li> <li>b) Leaks               <ul style="list-style-type: none"> <li>1) Leaks in the air brake system will generally cause the springs to apply the brakes</li> </ul> </li> </ul> <p>18. Dual air brake systems</p> <ul style="list-style-type: none"> <li>a) All inspections same as single</li> </ul> <p>19. Maintenance of the air brake system should be completed by a qualified technician</p> <ul style="list-style-type: none"> <li>a) This is due to the complexity of the system and safety issues</li> </ul> <p>B. Hydraulic brakes</p> <p>1. Hydraulic brake test</p> <ul style="list-style-type: none"> <li>a) Pump brake pedal three times and hold for five seconds</li> <li>b) Pedal should not move</li> <li>c) If it does, there is a leak</li> </ul> <p>2. Master cylinder</p> <ul style="list-style-type: none"> <li>a) Check fluid level               <ul style="list-style-type: none"> <li>1) Fill with proper fluid in accordance with the manufacturer's recommendations and specifications</li> </ul> </li> <li>b) Cover should not be leaking fluid</li> <li>c) Inspect for leaks               <ul style="list-style-type: none"> <li>1) Wear may cause cylinder to leak</li> <li>2) May result in brake failure</li> </ul> </li> </ul>	<p>Are inspections for dual systems the same as for single systems?</p> <p><b>SLIDE: 2-11-54</b></p> <p><b>SLIDE: 2-11-55</b></p> <p><b>SLIDE: 2-11-56</b></p> <p><b>SLIDE: 2-11-57</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>d) Loss of the vacuum power assist will cause a reduction of efficiency</p> <p>1) Caused by</p> <ul style="list-style-type: none"> <li>• Vacuum leak</li> <li>• Loss of engine power</li> </ul> <p>3. Brake pedal</p> <p>a) Pedal should be firm when applied</p> <p>b) Pedal should not continue to travel to the floor when pressure is applied</p> <p>c) Securely mounted</p> <p>d) Operating properly</p> <p>4. Brake drums and shoes</p> <p>a) Excessive or uneven wear</p> <p>b) Missing components</p> <p>c) Cracks</p> <p>d) Out of shape</p> <p>e) Operational failure</p> <p>f) Falls below required standards</p> <p>5. Brake discs and pads</p> <p>a) Same as drums and shoes</p> <p>6. Brake lines</p> <p>a) Physical damage</p> <p>b) Leaking fluid</p> <p>7. Wheel cylinders</p> <p>a) Leaking fluid</p> <p>1) Leaks or malfunctions can cause brake to partially or completely fail</p>	<p>What can cause a reduction of efficiency?</p> <p><b>SLIDE: 2-11-58</b></p> <p><b>SLIDE: 2-11-59</b></p> <p><b>SLIDE: 2-11-60</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) A sticking wheel cylinder can cause brake to drag</p> <p>8. Brake linings</p> <p>a) Same principles as linings for air brake systems</p> <p>9. Maintenance of the hydraulic brakes should be completed by a qualified technician</p> <p>a) This is due to the complexity of the system and safety issues</p> <p>C. Secondary brakes</p> <p>1. Inspections of the various secondary braking systems should include</p> <p>a) Proper mounting</p> <p>b) Loose or missing components</p> <p>c) Physical damage</p> <p>d) Leaks (if applicable)</p> <p>2. Most failures of secondary brake systems are discovered during operational tests</p> <p>3. Maintenance of the secondary braking system should be completed by a qualified technician</p> <p>a) This is due to the complexity of the system and safety issues</p> <p><b>VI. OUT-OF-SERVICE CRITERIA</b></p> <p>A. <u>NFPA 1911: Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus</u>, NFPA, 2007 Edition recommendations</p>	<p><b>SLIDE: 2-11-61</b></p> <p><b>SLIDE: 2-11-62</b></p> <p><b>SLIDE: 2-11-63</b></p> <p>When are defects in secondary braking systems found?</p> <p><b>SLIDE: 2-11-64</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>1. Air brakes</p> <ul style="list-style-type: none"><li>a) Service brakes that have an air pressure drop of more than 2 psi (13.8 kPa) in 1 minute for straight chassis or more than 3 psi (20.7 kPa) in 1 minute for combination chassis, with the engine stopped and the service brakes released</li><li>b) Leak-down rate (time) of the applied side of the air brake that is more than 3 psi (20.7 kPa) in 1 minute for straight chassis or more than 4 psi (27.6 kPa) in 1 minute for combination chassis, with the engine stopped and the service brakes applied</li><li>c) Brakes that are out of adjustment</li><li>d) Braking system components that are not operational</li><li>e) Service brake that does not meet test or DOT requirements</li><li>f) Parking (spring) brake operation that does not meet parking brake tests or standards</li><li>g) Air compressor that fails to build air pressure from 85 psi to 100 psi (586 kPa to 690 kPa) in 45 seconds, with engine at full RPM</li><li>h) Air compressor that fails to maintain 80 psi to 90 psi (552 kPa to 621 kPa) pressure in the system, with the service brakes applied and the engine at idle, or air compressor that fails to fill the air system to the air compressor governor cutout pressure with the service and parking brakes released</li><li>i) Friction surfaces, brake shoes, or disc brake pads that have grease or oil on them</li></ul>	<p><b>SLIDE: 2-11-65</b></p> <p>What are the out-of-service criteria for air loss in the applied brake test?</p> <p><b>SLIDE: 2-11-66</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>j) Brake linings or pads that are worn beyond the brake system manufacturer’s minimum specifications</li> <li>k) Rotors and drums that are worn beyond the brake system manufacturer’s minimum specifications</li> <li>l) Air gauge or audio low-air warning device that has failed</li> <li>m) If the antilock braking system (ABS) warning indicator indicates a problem, a qualified technician shall conduct an out-of-service evaluation and make a written report, including recommendations to the AHJ</li> <li>n) Service brakes that have a drop of more than 2 psi in one minute, with the engine stopped and the service brake released</li> </ul>	<p><b>SLIDE: 2-11-67</b></p>
<p>2. Hydraulic brakes</p> <ul style="list-style-type: none"> <li>a) Brake system components that have Class 2 leakage of brake fluid</li> <li>b) Friction surfaces, brake shoes, or disc brake pads that have grease or oil on them</li> <li>c) Braking system components that are not operational</li> <li>d) Braking operation that does not meet braking tests or standards</li> <li>e) Parking (service) brake operation that does not meet parking brake tests or standards</li> <li>f) Brake warning light that is activated or brake pedal that falls away or drifts toward the floor when brake pressure is applied</li> <li>g) Brake linings or pads that are worn beyond the brake system manufacturer’s minimum specifications</li> </ul>	<p><b>SLIDE: 2-11-68</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Making sure that apparatus brakes are in proper operating order is an extremely important part of the apparatus inspection process. Modern air, hydraulic, and secondary braking systems are complicated and each component has a specific, important function. You must know each type of braking system so that the apparatus may be tested, maintained, and driven in the appropriate manner.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 63-74, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 47-52, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 44 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-12: Troubleshooting Brake Systems

**TIME FRAME:** 1:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of troubleshooting the air brake system by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver Operator 1A Student Supplement, SFT, 2008 Edition, Pages 53-56

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- Chilton technical manuals
- Motor Truck & Diesel Repair Manual, Bendix Commercial Vehicle Systems, 29th Edition, Pages 521-586
- <http://www.bendix.com/troubleshooting/>

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>2) Contact your department's fleet manager for a plan of action</p> <p>f) Possible cause</p> <p>1) Reservoir volume reduced</p> <ul style="list-style-type: none"> <li>• System is partially filled with water, oil, or both</li> </ul> <p>g) <u>Possible corrective action</u></p> <p>1) Drain water from system</p> <p>h) Possible cause</p> <p>1) Brakes out of adjustment</p> <p>i) <u>Possible corrective action</u></p> <p>1) Contact your department's fleet manager for a plan of action</p> <p>2. Symptom: Passing excessive oil while draining tanks</p> <p>a) Possible cause</p> <p>1) Poorly filtered air</p> <p>b) <u>Possible corrective action</u></p> <p>1) Check for defective intake components</p> <p>c) Possible cause</p> <p>1) No air dryers in system</p> <p>d) <u>Possible corrective action</u></p> <p>1) Drain reservoirs daily</p>	<p><b>SLIDE: 2-12-6</b></p> <p>What may reduce the volume in the air reservoir?</p> <p><b>SLIDE: 2-12-7</b></p> <p><b>SLIDE: 2-12-8</b></p> <p><b>SLIDE: 2-12-9</b></p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) <u>Possible corrective action</u></p> <ul style="list-style-type: none"><li>1) Contact your department's fleet manager for a plan of action</li></ul> <p>3. Symptom: Brakes will not release completely</p> <p>a) Possible cause</p> <ul style="list-style-type: none"><li>1) Parking brakes on; will not release</li><li>2) Brakes improperly adjusted</li><li>3) Condition of brake components</li><li>4) Air lines pinched, improperly assembled into fittings, or misconnected</li><li>5) System contamination</li><li>6) Chamber/slack adjuster binding</li><li>7) Automatic slack adjuster malfunction<ul style="list-style-type: none"><li>• Over-adjusting</li></ul></li></ul> <p>b) <u>Possible corrective action</u></p> <ul style="list-style-type: none"><li>1) Contact your department's fleet manager for a plan of action</li></ul> <p>C. Manual slack adjusters</p> <p>1. Symptom: Adjustment backs off</p> <p>a) Possible cause</p> <ul style="list-style-type: none"><li>1) Component malfunction</li></ul> <p>b) <u>Possible corrective action</u></p> <ul style="list-style-type: none"><li>1) Contact your department's fleet manager for a plan of action</li></ul> <p>D. Automatic slack adjusters</p> <p>1. Automatic slack adjusters should only be looked at by a qualified technician</p>	<p><b>SLIDE: 2-12-16</b></p> <p><b>SLIDE: 2-12-17</b></p> <p><b>SLIDE: 2-12-18</b></p> <p><b>SLIDE: 2-12-19</b> <b>SLIDE: 2-12-20</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<b>IV. HYDRAULIC BRAKE SYSTEMS</b>	
A. Troubleshooting  1. The majority of problems occur with hydraulic brake systems are caused by <ol style="list-style-type: none"><li>Defects or improper adjustments that allow hydraulic fluid to leak from the system</li><li>Defects or improper adjustments that allow air to enter the system<ol style="list-style-type: none"><li>Air can also be introduced during repair and replacement of brake components</li></ol></li></ol>	What causes problems with hydraulic brake systems?  <b>SLIDE: 2-12-23</b>
B. Symptom: Brake pedal feels soft and spongy <ol style="list-style-type: none"><li>Possible cause<ol style="list-style-type: none"><li>Low amount of fluid in the system</li></ol></li><li><u>Possible corrective action</u><ol style="list-style-type: none"><li>Add fluid to the reservoir</li></ol></li><li>Possible cause<ol style="list-style-type: none"><li>Air in the system</li></ol></li><li><u>Possible corrective action</u><ol style="list-style-type: none"><li>Have the air removed from the system by a qualified technician</li></ol></li></ol>	<b>SLIDE: 2-12-24</b>  <b>SLIDE: 2-12-25</b>
C. Symptom: Pedal drifts toward or falls to the floorboard <ol style="list-style-type: none"><li>Possible cause<ol style="list-style-type: none"><li>Low amount of fluid in the system</li></ol></li><li><u>Possible corrective action</u><ol style="list-style-type: none"><li>Add fluid to the reservoir</li></ol></li></ol>	





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

You have been given some basic information on how to troubleshoot possible problems with the air brake system since it is important for you to know how to identify a potential problem. However, it is imperative that a qualified technician should conduct all repairs. Before any action is taken, contact your department's fleet manager to determine a plan of action.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver Operator 1A Student Supplement, SFT, 2008 Edition, Pages 53-56 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-13: Inspection And Basic Maintenance Of Auxiliary And Accessory Equipment

**TIME FRAME:** 0:15

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of inspection and basic maintenance of auxiliary and accessory equipment by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 57-58, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2007 Edition, Pages 107-117
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51

**PREPARATION:** Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

Attention (attract)	Begin
Curiosity (arouse)	Association
Interest (create)	Students
Desire (stimulate)	Experience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. OVERVIEW</b></p> <p>A. Fire apparatus are designed to perform work</p> <p>B. All equipment assigned to or attached to a vehicle are to be considered part of the apparatus</p> <p style="padding-left: 40px;">1. Driver/operator responsibilities extend to auxiliary and accessory equipment</p> <p><b>II. AUXILIARY EQUIPMENT</b></p> <p>A. Permanently attached equipment, engines, etc that are not essential to the driving of commercial apparatus</p> <p>B. May include, but not be limited to</p> <p style="padding-left: 40px;">1. Generators</p> <p style="padding-left: 40px;">2. Pumps</p> <p style="padding-left: 40px;">3. Power units</p> <p style="padding-left: 40px;">4. Hydraulic or pneumatic equipment</p> <p>C. Auxiliary equipment inspections should be conducted with the same thoroughness as all other vehicle inspections</p>	<p><b>SLIDE: 2-13-1</b></p> <p><b>SLIDE: 2-13-2</b></p> <p>Is the driver/operator responsible for the auxiliary and accessory equipment?</p> <p><b>SLIDE: 2-13-3</b></p> <p><b>SLIDE: 2-13-4</b></p> <p><b>SLIDE: 2-13-5</b></p> <p><b>SLIDE: 2-13-6</b></p> <p><b>SLIDE: 2-13-7</b></p> <p><b>SLIDE: 2-13-8</b></p> <p><b>SLIDE: 2-13-9</b></p> <p><b>SLIDE: 2-13-10</b></p> <p><b>SLIDE: 2-13-11</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ol style="list-style-type: none"> <li>1. In accordance with the manufacturer's specifications and recommendations</li> <li>2. Inspection should include               <ol style="list-style-type: none"> <li>a) Security of mounting</li> <li>b) All necessary fluids</li> <li>c) Proper components</li> <li>d) Cleanliness</li> </ol> </li> <li>3. Can be incorporated into apparatus inspections</li> <li>4. Basic maintenance of all auxiliary equipment should be conducted in accordance with the manufacturer's specifications and recommendations</li> </ol>	<p><b>SLIDE: 2-13-12</b></p>
<p><b>III. ACCESSORY EQUIPMENT</b></p> <ol style="list-style-type: none"> <li>A. Equipment assigned to and/or carried on apparatus</li> <li>B. Not permanently attached</li> <li>C. May include, but not be limited to           <ol style="list-style-type: none"> <li>1. Portable power equipment</li> <li>2. Forcible entry tools</li> <li>3. Apparatus portable equipment               <ol style="list-style-type: none"> <li>a) Jacks</li> <li>b) Spare tire(s)</li> </ol> </li> </ol> </li> <li>D. Accessory equipment inspections should be conducted with the same thoroughness as all other vehicle inspections</li> </ol>	<p>What are some examples of accessory equipment?</p> <p><b>SLIDE: 2-13-13</b>  <b>SLIDE: 2-13-14</b>  <b>SLIDE: 2-13-15</b>  <b>SLIDE: 2-13-16</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ol style="list-style-type: none"><li>1. In accordance with the manufacturer's specifications and recommendations</li><li>2. Inspection should include<ol style="list-style-type: none"><li>a) Security of mounting</li><li>b) All necessary fluids</li><li>c) Proper components</li><li>d) Operational tests</li><li>e) Cleanliness</li></ol></li><li>3. Can be incorporated into apparatus inspections</li><li>4. Basic maintenance of all accessory equipment should be conducted in accordance with the manufacturer's specifications and recommendations</li></ol>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### ***SUMMARY:***

A properly designed apparatus inspection and basic maintenance program includes all associated equipment. Inspection and maintenance procedures should be based on the manufacturer's specifications and recommendations, all applicable laws, recommendations, and SOPs. The emergency scene is not the place to discover deficiencies.

### ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

### ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2007 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 57-58, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-14: Inspection Documentation And Reports

**TIME FRAME:** 0:15

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2003 NFPA 1002: Sections 4.2.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of the inspection documentation and reports by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, 59 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-33 and 513-532

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- dictionary.com
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-33 and 513-532

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

**A**ttention (attract)

**B**egin

**C**uriosity (arouse)

**A**ssociation

**I**nterest (create)

**S**tudents

**D**esire (stimulate)

**E**xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. DEFINITIONS</b></p> <p>A. Document (dictionary.com)</p> <ol style="list-style-type: none"><li>1. A written or printed paper furnishing information or evidence, as a passport, deed, bill of sale, or bill of lading; a legal or official paper</li></ol> <p>B. Report (dictionary.com)</p> <ol style="list-style-type: none"><li>1. An account or statement describing in detail an event, situation, or the like, usually as the result of observation, inquiry, etc.</li></ol> <p><b>II. OVERVIEW</b></p> <p>A. Apparatus inspection and maintenance records serve many functions</p> <ol style="list-style-type: none"><li>1. Warranty claims<ol style="list-style-type: none"><li>a) These records may be needed to document that the necessary maintenance was performed</li></ol></li><li>2. Events of an accident/crash<ol style="list-style-type: none"><li>a) Maintenance records are likely to be scrutinized by the accident investigators</li></ol></li><li>3. Proper documentation of recurrent repairs<ol style="list-style-type: none"><li>a) Assists in deciding whether to purchase new apparatus in lieu of continued repairs on an older unit</li></ol></li></ol>	<p><b>SLIDE: 2-14-1</b></p> <p><b>SLIDE: 2-14-2</b></p> <p><b>SLIDE: 2-14-3</b></p> <p><b>SLIDE: 2-14-4</b></p> <p>Why is it important to keep apparatus inspections and maintenance records?</p> <p><b>SLIDE: 2-14-5</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>B. Abide by the department's SOP on how maintenance and inspection results are documented and submitted to the proper person</p> <ol style="list-style-type: none"> <li>1. All driver/operators must be trained to use their department's recordkeeping system</li> <li>2. Written forms or computer programs may be used to record the information</li> </ol> <p>C. Fire departments should maintain an effective filing system that allows the information from these reports to be reviewed, stored, and retrieved when required</p> <p><b>III. TYPES OF DOCUMENTATION</b></p> <p>A. Apparatus documents</p> <ol style="list-style-type: none"> <li>1. Movement records/logs</li> <li>2. Inspections               <ol style="list-style-type: none"> <li>a) Pretrip</li> <li>b) Periodic                   <ol style="list-style-type: none"> <li>1) Daily, weekly, monthly, quarterly, semiannual, annual</li> </ol> </li> <li>c) Posttrip                   <ol style="list-style-type: none"> <li>1) Ensuring the apparatus and equipment is ready for the next response</li> </ol> </li> </ol> </li> <li>3. Maintenance and repairs performed</li> <li>4. Inventories</li> <li>5. Equipment records               <ol style="list-style-type: none"> <li>a) Inspections</li> <li>b) Inventories</li> </ol> </li> <li>6. Test records</li> <li>7. Accident records</li> </ol>	<p><b>SLIDE: 2-14-6</b></p> <p>What is the reason for a posttrip inspection?</p> <p><b>SLIDE: 2-14-7</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>B. Manufacturer's operation manuals<ul style="list-style-type: none"><li>1. References for inspection practices</li><li>2. Often manufacturer or equipment specific</li></ul></li><li>C. Training manuals<ul style="list-style-type: none"><li>1. Procedures and practices for the driver/operator</li></ul></li><li>D. Department maintenance SOPs<ul style="list-style-type: none"><li>1. Should address<ul style="list-style-type: none"><li>a) Who should perform certain maintenance functions</li><li>b) When maintenance and inspection should be performed</li><li>c) How detected problems should be corrected or reported</li><li>d) What items driver/operators are responsible for checking and which conditions they are allowed to correct on their own</li><li>e) How the process should be documented and submitted to the proper person</li></ul></li></ul></li><li>E. Government or private industry publications<ul style="list-style-type: none"><li>1. Laws and ordinances</li><li>2. Standards and common practices</li></ul></li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Documentation of fire apparatus and equipment maintenance is a key component for the driver/operator. It is mandatory that all equipment be fully operational for every response. If records are not accurately maintained, then equipment and job performances will suffer. Moreover, as far as the law is concerned, if it is not written down then it did not happen.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 59 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-33 and 513-532 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 2-15: Pretrip Inspection Procedures

**TIME FRAME:** 2:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 49 CFR Part 390 and the State Fire Marshal

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given an activity

**Behavior:** The student will confirm a knowledge of pretrip inspection procedures by completing the activity

**Standard:** With a minimum 100% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 60-65, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51 and 513-532

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials
- Activity 2-15-1: Daily Apparatus And Equipment Check

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51 and 513-532

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2. Exhaust system               <ul style="list-style-type: none"> <li>a) Missing, broken, or loose components</li> </ul> </li> <li>3. Drive shaft               <ul style="list-style-type: none"> <li>a) Missing, broken, or loose components</li> </ul> </li> <li>4. Mud flaps</li> <li>5. Fuel system               <ul style="list-style-type: none"> <li>a) Tank and straps</li> <li>b) Hoses and lines</li> <li>c) Leaks</li> </ul> </li> <li>6. Springs</li> <li>7. Shocks</li> <li>8. Air ride system               <ul style="list-style-type: none"> <li>a) Missing, broken, or loose components</li> </ul> </li> <li>9. Steering               <ul style="list-style-type: none"> <li>a) Steering box</li> <li>b) Steering pump</li> <li>c) Hoses and lines</li> <li>d) Linkage</li> </ul> </li> </ul> <p><b>III. BRAKES</b></p> <ul style="list-style-type: none"> <li>A. The following tests need to be completed with apparatus on level ground with the wheels chocked               <ul style="list-style-type: none"> <li>1. Test air leakage rate                   <ul style="list-style-type: none"> <li>a) With a fully charged air system (typically 125 psi), turn off the engine, release the service brake and let the system settle (air gauge needle stops moving)                       <ul style="list-style-type: none"> <li>1) Time the air pressure drop</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<p>Review: How would you find out what type of fluid is used in the power steering reservoir?</p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>C. Check air compressor governor cut-in pressure</p> <ol style="list-style-type: none"> <li>1. Start with the air pressure above the governor cut-in level (no lower than 85 psi)</li> <li>2. With the engine idling, slowly pump the brake pedal to reduce the air tank pressure</li> <li>3. Watch the air gauge between pumps to identify when the compressor cuts in (needle starts to rise)</li> </ol> <p>D. Test low pressure warning signal</p> <ol style="list-style-type: none"> <li>1. May be performed with engine on or off</li> <li>2. To perform the test with the engine off, turn the electrical power on so there is enough air pressure to keep the low air pressure warning signal from coming on</li> <li>3. Slowly pump the brake pedal to reduce air tank pressure</li> <li>4. The low air pressure warning signal will must come on before the pressure drops to less than 60 psi in the air tank (or tank with the lowest air pressure, in dual air systems)</li> </ol> <p>E. Check rate of air pressure buildup</p> <ol style="list-style-type: none"> <li>1. With the engine at operating rpms, the pressure should build from 85 to 100 psi within 45 seconds in dual air systems</li> <li>2. If the vehicle has larger than minimum air tanks, the buildup time can be longer and still be safe               <ol style="list-style-type: none"> <li>a) Check the manufacturer's specifications and recommendations</li> </ol> </li> </ol> <p>F. Test service brakes</p> <ol style="list-style-type: none"> <li>1. Remove chock blocks</li> <li>2. Wait for normal air pressure, release the parking brake, move the vehicle forward slowly (about 5 mph), apply the brakes firmly using the brake pedal</li> </ol>	<p>According to the CCDH, when should the low air pressure warning signal sound?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>3. Any pulling to one side, unusual feel, or delayed stopping action should be checked</p> <p>G. Test parking brake</p> <ol style="list-style-type: none"><li>1. Fasten seat belt</li><li>2. Set the parking brake and try to move the vehicle or allow the vehicle to move forward slowly and apply the brake</li><li>3. The parking brake should not allow any movement</li></ol> <p><b>IV. ENGINE COMPARTMENT</b></p> <p>A. Visible signs of a problem</p> <ol style="list-style-type: none"><li>1. Leaks</li><li>2. Damage</li><li>3. Missing</li></ol> <p>B. Check fluid levels</p> <ol style="list-style-type: none"><li>1. Engine oil level</li><li>2. Coolant level</li><li>3. Power steering fluid level</li><li>4. Transmission fluid level</li><li>5. Windshield washer fluid</li></ol> <p>C. Drive belts</p> <ol style="list-style-type: none"><li>1. Condition<ol style="list-style-type: none"><li>a) Cracks</li><li>b) Frays</li><li>c) Excessive wear</li></ol></li><li>2. Missing</li><li>3. Adjustment<ol style="list-style-type: none"><li>a) Up to <math>\frac{3}{4}</math>-inch play at center</li></ol></li></ol>	<p>What is the maximum amount of movement in a belt as per the CCDH?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>D. Hoses and lines               <ul style="list-style-type: none"> <li>1. Radiator</li> <li>2. Air</li> <li>3. Fuel</li> <li>4. Oil</li> </ul> </li> <li>E. Air filter               <ul style="list-style-type: none"> <li>1. Air filter restriction gauge</li> </ul> </li> <li>F. Battery               <ul style="list-style-type: none"> <li>1. Electrolyte level</li> <li>2. Clean</li> <li>3. Terminals tight</li> </ul> </li> <li>G. Other/miscellaneous</li> <li><b>V. CAB AREA - PRESTART</b> <ul style="list-style-type: none"> <li>A. Battery switch</li> <li>B. Key/ignition switch</li> <li>C. Seats</li> <li>D. Seatbelts</li> <li>E. Windshield wipers and blades</li> <li>F. Mirrors</li> <li>G. Glass</li> <li>H. Gauges</li> <li>I. Load manager</li> <li>J. Floor area clean</li> <li>K. Maps and books</li> <li>L. Fuel tank level</li> <li>M. Dome and map lights</li> </ul> </li> <li><b>VI. CAB AREA - POSTSTART</b> <ul style="list-style-type: none"> <li>A. Gauges</li> <li>B. Heater and defroster</li> <li>C. Horn</li> </ul> </li> </ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>D. Emergency lights and sirens</li><li>E. Emergency radios</li><li>F. Computer (mobile data terminal)</li><li>G. Headlights</li><li>H. Flashers and turn signals</li></ul> <p><b>VII. FIRE EQUIPMENT AND ACCESSORIES</b></p> <ul style="list-style-type: none"><li>A. This course does not cover how to check fire equipment that is carried on an apparatus<ul style="list-style-type: none"><li>1. This is determined by each piece of equipment's manufacturer's specifications and recommendations or departments SOPs</li></ul></li></ul>	<p><b>ACTIVITY 2-15-1:</b> Complete the activity in the student supplement.</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

By law, standardized daily departmental pretrip inspections are necessary to ensure all fire apparatus are ready to respond. This standardized daily checkout procedure helps reinforce apparatus readiness and your knowledge. Apparatus logbooks must be kept up-to-date and accurate so you can take the appropriate actions if deficiencies are found.

## ***EVALUATION:***

The student will complete the activity at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 115-126, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 60-65, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 31-51 and 513-532 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ACTIVITY 2-15-1

**Title:** Daily Apparatus And Equipment Check

**TIME FRAME:** 1:00

**MATERIALS NEEDED:**

- Fire apparatus
- Daily apparatus and equipment checklist
- Tire pressure gauge
- Wiping rags
- Creeper
- Clipboard
- Pen or pencil

**introduction:** This activity provides the students the opportunity to complete a required daily inspection that complies with all applicable laws and standards.

**DIRECTIONS:**

1. Divide the class into manageable groups.
2. Have each group perform a complete inspection on the apparatus.
3. Document the inspection on the check sheet.
4. Each team has 30 minutes to complete this activity.
5. Be prepared to discuss the inspection results with the class.

**Instructor note:** The instructor must demonstrate a complete inspection in detail before the students perform this activity.  
The attached forms are sample checklists that may be used. You can substitute your department's checklist or the students may use their department's checklist.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

GROUP: \_\_\_\_\_ APPARATUS: \_\_\_\_\_ DATE: \_\_\_\_\_

## DAILY APPARATUS AND EQUIPMENT CHECK

	OK	REPAIRS MADE	REPAIRS NEEDED
<b>VISUAL CHECK</b>			
Cleanliness			
Leaning to One Side			
Body Damage			
Puddles or Leaks			

<b>BRAKES, TIRES, AND UNDERCARRIAGE</b>	OK	REPAIRS MADE	REPAIRS NEEDED
Brake Linings and Pads			
Brake Drums and Rotors			
Brake Chambers			
Air Lines, Hose, Fittings			
Slack Adjusters			
Tire Pressure			
Tread			
Rims			
Lug Nuts			
Axle Seals			
Frame			
Exhaust System			
Drive Shaft			
Mud Flaps			
Fuel Tanks			
Fuel Lines and Fittings			
Springs			
Shocks			
Air Ride System			
Steering Box			
Steering Lines			
Steering Linkage			

<b>BRAKE CHECK</b>	OK	REPAIRS MADE	REPAIRS NEEDED
Air Leakage Rate Test			
Air Compressor Governor			
Cut-Out Pressure			
Cut-In Pressure			
Parking Brake Test			
Low Air Pressure Warning			
Air Pressure Buildup Rate			
Service Brake Test			

	OK	REPAIRS MADE	REPAIRS NEEDED
<b>ENGINE COMPARTMENT</b>			
Leaks			
Damaged Components			
Missing Components			
Engine Oil Level			
Coolant Level			
Power Steering Level			
Transmission Fluid Level			
Windshield Washer Level			
Drive Belts			
Radiator Hoses			
Air Hoses			
Fuel Lines			
Oil Lines			
Air Filter			
Battery			
Battery Terminals			

<b>CAB AREA – PRESTART</b>	OK	REPAIRS MADE	REPAIRS NEEDED
Battery Switch			
Key/Ignition Switch			
Seats			
Seatbelts			
Windshield Wipers/Blades			
Mirrors			
Glass			
Gauges			
Load Manager			
Floor Area Clean			
Maps and Books			
Fuel Tank Level			
Dome and Map Lights			

<b>CAB AREA - POSTSTART</b>	OK	REPAIRS MADE	REPAIRS NEEDED
Gauges			
Heater and Defroster			
Horn			
Emergency Lights, Sirens			
Radio, Portable Radio			
Computer/MDT			
Headlights			
Parking Lights			
Backup Lights			
Backup Alarm			
Flashers/Turn Signals			



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

GROUP: \_\_\_\_\_ APPARATUS: \_\_\_\_\_ DATE: \_\_\_\_\_

### A P P A R A T U S O P E R A T O R S D A I L Y C H E C K L I S T

Check off each item as completed and indicate any fluids that are added. Log and record all fluids added and all maintenance problems in apparatus logbook with date, mileage, and your initials. Follow proper channels for needed repairs. Send all completed forms to the shop on the last day of every month. Also, complete a form after all significant class and daily when on a strike team.

<p><b>I FLUID LEVELS</b></p> <p>___ Radiator _____</p> <p>___ Engine Oil _____</p> <p>___ Transmission Fluid _____</p> <p>___ Hot and running in neutral _____</p> <p>___ Fuel _____</p> <p>___ Water Tank _____</p> <p>___ Assigned Equipment _____</p> <p>___ Generators, Blowers, etc. _____</p> <p>___ Priming Oil _____</p> <p>___ Power Steering Fluid _____</p>	<p style="text-align: center;"><b>QUANTITY ADDED</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p><b>IV EQUIPMENT</b></p> <p>___ Knox Box Key _____</p> <p>___ Portable Radios _____</p> <p><b>V BODY AND RUNNING GEAR</b></p> <p>___ Any New Body Damage Not Logged _____</p> <p>___ Tires (nails, glass, air, etc.) _____</p> <p>___ Belts and Hoses (condition and tension) _____</p> <p>___ Undercarriage (location of leaks and fluid color) _____</p> <p>___ Valve Operation (open and close) lube as necessary _____</p> <p>___ After Steam Cleaning, Lube All Effected Moving Parts _____</p>
<p><b>II ELECTRICAL SYSTEMS</b></p> <p>___ Warning Lights _____</p> <p>___ Head and Parking Lights _____</p> <p>___ Turn Signals and Brake Lights _____</p> <p>___ Portable Radio Chargers _____</p> <p>___ Siren and Public Addresses _____</p> <p>___ Horns and Warning Buzzers (air and electric) _____</p> <p>___ Gauges (cab and panel) _____</p> <p>___ Cab and Compartment Lights _____</p>		<p><b>VI REMARKS</b></p> <p>Battery Readings _____</p> <p>Brake Piston Travel _____</p> <p>Amount of Water Discharge from Air Tanks _____</p> <p>Operation of Relief and Change Over Valves _____</p> <p>Oil Needed, Lubrication, etc. _____</p> <p>Engine Miles _____</p> <p>Road Miles _____</p> <p>Tire Pressure _____</p> <p>Other _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><b>III AIR SYSTEMS</b></p> <p>___ Air Pressure _____</p> <p>___ Parking Brakes (set and release) _____</p> <p>___ Air Leaks in Brake System _____</p> <p>___ Full pressure, engine off, foot brakes applied _____</p> <p>___ Air Line and Hose _____</p>		

**WEEKLY**

Monday	Check batteries. Inspect cables. Dip fuel tanks and check for water.
Tuesday	Check brake piston travel, tire pressure, lug nuts, and axle nuts.
Wednesday	Clean and inspect undercarriage. Clean engine compartment. Tighten all loose screws, nuts, and bolts.
Thursday	Check batteries. Clean compartments. Bleed air tanks.
Friday	Clean, flush, and operate relief and change over valves. Wax and touch up.
Saturday	Run and clean all mechanical equipment, electrical equipment, and ground ladders. Lube and discharge rods and valves.
Sunday	Make-up day. Bleed air tanks. Operate aerial ladders. Check ground jacks

**MONTHLY**

1 <sup>st</sup> Monday	Remove and clean battery cables. Check hydraulic fluids.
1 <sup>st</sup> Tuesday	Inventory first aid kit. Date and record findings. Check intake valves and all screens.
1 <sup>st</sup> Wednesday	Pressure check all spare oxygen cylinders. Date sign tag.
1 <sup>st</sup> Thursday	Clean communicator rings. Grease fifth wheel. Grease locks.
1 <sup>st</sup> Friday	Inventory toolbox. Date and sign record.
1 <sup>st</sup> Saturday	Check and clean any special equipment. Rotate all ground ladders.
1 <sup>st</sup> Sunday	Inspect extinguisher. Date and sign both tags/records. Tighten driveline bolts.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

GROUP: \_\_\_\_\_ APPARATUS: \_\_\_\_\_ DATE: \_\_\_\_\_

## D A I L Y V E H I C L E I N S P E C T I O N R E P O R T

### ENGINE COMPARTMENT

- |                          |                          |                            |
|--------------------------|--------------------------|----------------------------|
| OK                       | DEF                      |                            |
| <input type="checkbox"/> | <input type="checkbox"/> | Fluid Leaks Under Vehicle* |
| <input type="checkbox"/> | <input type="checkbox"/> | Oil Fluid Level            |
| <input type="checkbox"/> | <input type="checkbox"/> | Transmission Fluid Level   |
| <input type="checkbox"/> | <input type="checkbox"/> | Power Steering Fluid       |
| <input type="checkbox"/> | <input type="checkbox"/> | Coolant Level/Filter       |
| <input type="checkbox"/> | <input type="checkbox"/> | Battery Condition          |
| <input type="checkbox"/> | <input type="checkbox"/> | Exhaust System             |
| <input type="checkbox"/> | <input type="checkbox"/> | Belts and Hoses            |
| <input type="checkbox"/> | <input type="checkbox"/> | Other _____                |

- |                          |                          |                                |
|--------------------------|--------------------------|--------------------------------|
| OK                       | DEF                      |                                |
| <input type="checkbox"/> | <input type="checkbox"/> | Glass/Windshield               |
| <input type="checkbox"/> | <input type="checkbox"/> | Windshield Wipers              |
| <input type="checkbox"/> | <input type="checkbox"/> | Seat Belts                     |
| <input type="checkbox"/> | <input type="checkbox"/> | Warning Devices                |
| <input type="checkbox"/> | <input type="checkbox"/> | Gauges and Horns               |
| <input type="checkbox"/> | <input type="checkbox"/> | Fuel Gauge/Level (3/4 minimum) |
| <input type="checkbox"/> | <input type="checkbox"/> | Mirrors                        |
| <input type="checkbox"/> | <input type="checkbox"/> | Radios (UHF and VHF)           |
| <input type="checkbox"/> | <input type="checkbox"/> | Master Key Ring                |

### BRAKE SYSTEM TESTS

- |                          |                          |                                    |
|--------------------------|--------------------------|------------------------------------|
| OK                       | DEF                      |                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Low Air Warning Signal (Test 1)    |
|                          |                          | Air Compressor Governor (Test 2)   |
| <input type="checkbox"/> | <input type="checkbox"/> | Cut In >85 psi                     |
| <input type="checkbox"/> | <input type="checkbox"/> | Cut Out > 110-120 psi              |
|                          |                          | Static Air Pressure Loss (Test 3)  |
| <input type="checkbox"/> | <input type="checkbox"/> | Single – Maximum Loss 2 psi/min.   |
|                          |                          | Applied Air Pressure Loss (Test 4) |
| <input type="checkbox"/> | <input type="checkbox"/> | Maximum Loss 3 psi/min.            |
| <input type="checkbox"/> | <input type="checkbox"/> | Service Brake (Test 5)             |
| <input type="checkbox"/> | <input type="checkbox"/> | Parking Brake (Test 6)             |

Tuesday

- |                          |                          |                                 |
|--------------------------|--------------------------|---------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Battery Water Level             |
| <input type="checkbox"/> | <input type="checkbox"/> | Rotate Portable Radio Batteries |
| <input type="checkbox"/> | <input type="checkbox"/> | Check/Discharge Mag-lites       |

Saturday

- |                          |                          |                         |
|--------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Battery Water Level     |
| <input type="checkbox"/> | <input type="checkbox"/> | Bleeder Valves          |
| <input type="checkbox"/> | <input type="checkbox"/> | Decontaminate Equipment |

\*Remarks

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### OUTSIDE APPARATUS

- |                          |                          |                                      |
|--------------------------|--------------------------|--------------------------------------|
| OK                       | DEF                      |                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | Tire Pressure Front _____ Rear _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | Wheels, Rims, and Lug Nuts           |
| <input type="checkbox"/> | <input type="checkbox"/> | Steering Mechanism                   |
| <input type="checkbox"/> | <input type="checkbox"/> | Springs and Shock Absorbers          |
| <input type="checkbox"/> | <input type="checkbox"/> | Tilt Cab Pump Reservoir              |
| <input type="checkbox"/> | <input type="checkbox"/> | Operator Panel Lights                |
| <input type="checkbox"/> | <input type="checkbox"/> | Primer Tank Oil                      |
| <input type="checkbox"/> | <input type="checkbox"/> | Activate Priming Pump                |
| <input type="checkbox"/> | <input type="checkbox"/> | Fuel Tank Mounting and Filters       |
| <input type="checkbox"/> | <input type="checkbox"/> | Head Lamps High/Low                  |
| <input type="checkbox"/> | <input type="checkbox"/> | Running Lights/Reflectors            |
| <input type="checkbox"/> | <input type="checkbox"/> | Turn Signals                         |
| <input type="checkbox"/> | <input type="checkbox"/> | Brake Lights/Backup Lights           |
| <input type="checkbox"/> | <input type="checkbox"/> | Emergency Lighting                   |
| <input type="checkbox"/> | <input type="checkbox"/> | Door/Compartment Latches             |
| <input type="checkbox"/> | <input type="checkbox"/> | Covers                               |
| <input type="checkbox"/> | <input type="checkbox"/> | Equipment Secure                     |
| <input type="checkbox"/> | <input type="checkbox"/> | Body Damage*                         |
| <input type="checkbox"/> | <input type="checkbox"/> | Fifth Wheel Assembly                 |

F-G 2s Made

Overall Condition of Apparatus

- |                          |                |
|--------------------------|----------------|
| <input type="checkbox"/> | Satisfactory   |
| <input type="checkbox"/> | Unsatisfactory |



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

---

### AIR SYSTEM TEST

#### TEST 1: Low Air Warning Signal and Emergency Brake Test

- 1) With engine OFF, ignition ON
- 2) Chock wheels
- 3) Release all brakes
- 4) Pump brake pedal to activate low pressure warning signal at 60 psi\*\*
- 5) Confirm parking brakes are still released
- 6) Continue pumping brake pedal until parking brake control knob pops out (approximately 30 psi)

\*\*When performing Step 4, applying the brake pedal will be accompanied by the sound of air escaping from the spring brake relay valve. This is due to the operation of the spring brake control valve being operated by the treadle valve.

#### TEST 2: Air Compressor Governor Test

- 1) With engine running, build pressure to 110-125 psi (should hear air dryer release air, indicating compressor has shut-off)
- 2) Pump brake pedal to reduce pressure to 85 psi (air compressor should build pressure to 100 psi within 45 seconds)
- 3) Build pressure to 110-125 psi

#### TEST 3: Static Air Pressure Loss Test

- 1) Chock wheels
- 2) Release all brakes
- 3) Shut-off engine with air pressure at 110-125 psi
- 4) Time air pressure reading for one minute (maximum drop 2 psi for single vehicle)

#### TEST 4: Applied Air Pressure Test

- 1) With engine off, chock wheels
- 2) Release parking brake
- 3) Apply steady pressure to brake pedal for one minute (after initial drop, maximum drop 3 psi)

#### TEST 5: Service Brake Test

- 1) Start apparatus
- 2) Place in gear and move apparatus
- 3) Apply brake pedal (apparatus should stop)

#### TEST 6: Parking Brake Test

- 1) Set parking brake
- 2) Place in gear
- 3) Try to move apparatus (should not move)



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

GROUP: \_\_\_\_\_ APPARATUS: \_\_\_\_\_ DATE: \_\_\_\_\_

D A I L Y A P P A R A T U S C H E C K O U T S H E E T								
	S	M	T	W	T	F	S	COMMENTS
<b>ENGINE COMPARTMENT</b>								
Fluid levels								
▪ radiator								
▪ engine oil								
▪ power steering								
▪ automatic transmission								
▪ priming oil								
Belts and hoses								
▪ radiator hoses								
▪ all belts								
<b>ELECTRICAL SYSTEMS</b>								
Warning lights, four-way lights								
Headlights (low and high beam)								
Turn signal indicators								
Gauges (all)								
Brake lights								
Backup lights								
Code 3 lights (light bar, strobes)								
Pump panel								
Miscellaneous lights								
<b>AIR SYSTEMS</b>								
Brakes								
▪ air pressure (static and applied)								
▪ low pressure warning light								
▪ air governor (cut-out and cut-in)								
▪ air lines and hoses								
<b>PUMP CHECKOUT</b>								
Valve operation (open and closed)								
Transfer valve (pressure and volume)								
Relief valve								
Water level gauge								
Water tank (leaks)								
<b>EQUIPMENT</b>								
All assigned equipment								
<b>BODY</b>								
Tires (including rims)								
Exterior paint and gold leaf								

**WEEKLY**

- Monday Start and run all equipment
- Tuesday Check tires, lug nuts, and axle nuts
- Wednesday Check all batteries
- Thursday Bleed air tanks
- Friday Flush, clean, and operate relief and change-over valves
- Saturday Wash, clean, and inspect apparatus
- Sunday Check and weight all extinguishers

**MONTHLY**

- 1<sup>st</sup> Saturday Check undercarriage and transmission for grease
- 1<sup>st</sup> Sunday Check radio batteries
- 1<sup>st</sup> Monday Clean and inspect all ground ladders
- 1<sup>st</sup> Tuesday Perform any missed or needed maintenance
- 25<sup>th</sup> Complete apparatus reports



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-1: Accident Statistics And Liability

**TIME FRAME:** 0:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of accident statistics and liability by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 66-67 and Pumping Apparatus Driver/Apparatus Handbook, IFSTA, Second Edition, Pages 60-61

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- State of California 2001 Vehicle Code, DMV, 2007 Edition, Divisions 9 and 11
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 60-61
- National Fire Data Center, FEMA/USFA

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>NOTE:</b> Review <u>Pumping Apparatus Driver/Operator Handbook</u>, IFSTA, Second Edition, Pages 60-61, Tables 4.1 through 4.4.</p> <p><b>I. STATISTICS</b></p> <p>A. Fire fighter deaths and injuries from apparatus accidents</p> <ol style="list-style-type: none"><li>1. 16,202 apparatus accidents in 2006</li><li>2. 1,250 apparatus occupants of apparatus injured each year<ol style="list-style-type: none"><li>a) 15 killed</li></ol></li><li>3. Rollovers were the leading cause</li></ol>	<p><b>SLIDE: 3-1-1</b></p>  <p><b>SLIDE: 3-1-2</b></p>  <p>Do you know how many apparatus accidents occur each year?</p>
<p><b>NOTE:</b> Data from the National Fire Data Center, FEMA/USFA.</p> <p>B. Civilian deaths</p> <ol style="list-style-type: none"><li>1. 21 civilians are killed each year from collisions with apparatus</li><li>2. 642 civilians are injured each year</li></ol> <p><b>NOTE:</b> Statistics for civilian deaths and collisions are included in the University of Michigan Transportation Research Study of 1998.</p>	<p><b>SLIDE: 3-1-3</b></p> <p><b>SLIDE: 3-1-4</b></p>
<p>C. Collisions</p> <ol style="list-style-type: none"><li>1. 20% of apparatus collisions result in rollovers</li><li>2. 47% of apparatus collisions occur at intersections</li></ol>	<p><b>SLIDE: 3-1-5</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>II. 2001 CVC - LIABILITY OF ACCIDENTS</b></p> <p>A. Section 17001 - Liability of a public entity</p> <ol style="list-style-type: none"><li>1. A public entity is liable for death and injury to person or property proximately caused by a negligent or wrongful act or omission in the operation of any motor vehicle by an employee of the public entity acting within the scope of his employment</li></ol> <p>B. Section 17302 - Damage from weight or size</p> <ol style="list-style-type: none"><li>1. The driver, or the owner and driver, jointly, as the case may be, are also liable for all damages that any highway or bridge sustains as the result of any operation, driving, or moving of any vehicle that exceeds any of the limitations imposed by Division 15 (commencing with Section 35000), Chapter 1 (commencing with Section 29000) of Division 13, Section 21461 with respect to a sign erected under Section 35655, and Sections 21712 and 23114 even though the vehicle is exempted from the limitations by Section 35001, 35104, 35105, 35106, 35108, 35250, 35400, 35414, or 36615</li></ol> <p>C. Section 21056 - Effect of exemption</p> <ol style="list-style-type: none"><li>1. Section 21055 does not relieve the driver of a vehicle from the duty to drive with due regard for the safety of all persons using the highway, nor protect him from the consequences of an arbitrary exercise of the privileges granted in that section</li></ol>	<p>What does the CVC state as to liability when apparatus are being operated?</p> <p><b>SLIDE: 3-1-6</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>III. COST OF ACCIDENTS</b></p> <p>A. Judgment is based upon the injured person's loss of ability to make a living</p> <ol style="list-style-type: none"><li>1. Example<ol style="list-style-type: none"><li>a) If killed at the age of 35 and the average person works until 65 years of age, he or she could have worked an additional 30 years</li><li>b) If the job paid \$35,000 a year, that is multiplied times the 30 years totaling \$1,050,000 (plus inflation factor, medical bills, anguish, etc.)<ol style="list-style-type: none"><li>1) This could easily surpass \$5.7 million</li></ol></li></ol></li><li>2. "Deep pocket" syndrome<ol style="list-style-type: none"><li>a) The courts have held that government or big business have deep pockets and are capable of paying large sums for judgments</li></ol></li></ol>	<p>What could the monetary cost be for injuries or death suffered in collisions?</p> <p><b>SLIDE: 3-1-7</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

The responsibility and liability extends not only to the agency, but also to the driver/operator. All driver/operators must realize their responsibility while operating fire apparatus. There is a level of trust and expectation on the part of the agency and the public for the driver/operator to act with "due regard" for all others using the roadway.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 66-67 and Pumping Apparatus Driver/Apparatus Handbook, IFSTA, Second Edition, Pages 60-61 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-2: Principles Of Defensive Driving

**TIME FRAME:** 2:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.3.6

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given an activity and written test

**Behavior:** The student will confirm a knowledge of the principles of defensive driving by completing the activity and written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 24-27, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 68-70, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 76-83

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials
- Activity Sheet 3-2-1: Principles Of Defensive Driving

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 24-27
- NFPA 1451: Standard for a Fire Service Vehicle Operations Training Program, 2007 Edition
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 76-83

**PREPARATION:**

As a defensive driver/operator, you drive to prevent accidents despite the conditions around you. Be prepared by expecting the unexpected; anticipate the unpredictable reactions of other drivers and pedestrians. Operate apparatus at a speed that allows you to safely maneuver under any situation that may occur.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>B. Recognizes that he or she has no control over the unpredictable actions of other drivers or pedestrians, nor over weather or road conditions</li> <li>C. Will give up the right-of-way and will make whatever concessions to avoid a collision</li> </ul>	
<p><b>IV. FACTORS CONTRIBUTING TO ACCIDENTS</b></p>	
<ul style="list-style-type: none"> <li>A. Improper backing               <ul style="list-style-type: none"> <li>1. Most preventable accident</li> <li>2. Significant portion of overall damage costs</li> <li>3. At scene of incidents                   <ul style="list-style-type: none"> <li>a) When positioning apparatus</li> <li>b) When leaving scene</li> <li>c) Consider driving around the block</li> </ul> </li> <li>4. Parking lots</li> <li>5. Into fire stations</li> </ul> </li> </ul>	<p>What is the most preventable accident?</p> <p><b>SLIDE: 3-2-6</b></p>
<ul style="list-style-type: none"> <li>B. Reckless driving by the public               <ul style="list-style-type: none"> <li>1. Failure to obey posted traffic regulations or directions</li> <li>2. Failure to yield to emergency vehicles</li> <li>3. Excessive speed</li> <li>4. Unpredictable behavior created by a panic reaction to emergency vehicles</li> <li>5. Inattentiveness</li> </ul> </li> </ul>	<p><b>SLIDE: 3-2-7</b></p>
<ul style="list-style-type: none"> <li>C. Excessive speed by apparatus driver/operator               <ul style="list-style-type: none"> <li>1. Urgency of incident often leads to speeds faster than should reasonably be used</li> </ul> </li> </ul>	<p><b>SLIDE: 3-2-8</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>2. May lead to the following types of collisions</p> <ul style="list-style-type: none"><li>a) Loss of control on curves or adverse road conditions<ul style="list-style-type: none"><li>1) Apparatus leaves road surface</li><li>2) Rollovers</li><li>3) Apparatus strikes other vehicle or object</li></ul></li><li>b) Unable to stop apparatus prior to collision</li></ul> <p>3. Apparatus do not handle or respond like an automobile</p> <ul style="list-style-type: none"><li>a) Braking systems different</li><li>b) Apparatus are top heavy</li></ul> <p>D. Lack of driving skills and experience</p> <p>1. May be attributed to several factors</p> <ul style="list-style-type: none"><li>a) Insufficient training</li><li>b) Unfamiliarity with apparatus</li><li>c) Overconfidence in driving ability</li><li>d) Inability to recognize dangerous situations</li><li>e) False sense of security because of good driving record</li><li>f) Misunderstanding apparatus capabilities</li></ul> <p>E. Poor apparatus design or maintenance</p> <p>1. Typically more serious with "home built" than with manufactured apparatus</p> <ul style="list-style-type: none"><li>a) "Home built" apparatus can be<ul style="list-style-type: none"><li>1) Overweight/underbraked</li><li>2) Have high center of gravity</li></ul></li></ul>	<p><b>SLIDE: 3-2-9</b></p> <p>Can you name a factor that contributes to lack of driving skills?</p> <p><b>SLIDE: 3-2-10</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>2) Manufacturer's operations instructions</li> <li>3) Prefire plans</li> <li>4) Educational materials               <ul style="list-style-type: none"> <li>• Training evaluations</li> <li>• Policy and procedure changes</li> </ul> </li> <li>5) Writing</li> <li>6) Mathematics               <ul style="list-style-type: none"> <li>• Simple addition, subtraction, multiplication, and division</li> <li>• Hydraulics</li> </ul> </li> <li>4. Physical fitness               <ul style="list-style-type: none"> <li>a) General physical condition                   <ul style="list-style-type: none"> <li>1) Minimum physical requirements                       <ul style="list-style-type: none"> <li>• DMV standards</li> <li>• Department policies and procedures</li> </ul> </li> </ul> </li> <li>b) Strenuous activities                   <ul style="list-style-type: none"> <li>1) Connecting hose</li> <li>2) Laying hose by hand</li> <li>3) Deploying portable water tanks</li> </ul> </li> <li>c) Bending and lifting of heavy, awkward equipment                   <ul style="list-style-type: none"> <li>1) Proper lifting techniques</li> </ul> </li> </ul> </li> <li>5. Visual acuity               <ul style="list-style-type: none"> <li>a) Keep your eyes moving</li> <li>b) Visual lead time                   <ul style="list-style-type: none"> <li>1) Scanning far enough ahead for speed being driven, to assure appropriate and safe action if needed</li> </ul> </li> </ul> </li> </ul>	<p>How would you define visual lead time?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>2) Match speed you are traveling with distance ahead of vehicle you are surveying</p> <ul style="list-style-type: none"> <li>• If a vehicle is 100 feet in front of an apparatus, based on the speed of the apparatus, it would take 200 feet to stop or perform an evasive maneuver or a collision will likely occur</li> </ul> <p>6. Hearing</p> <p>a) Must be able to distinguish between your siren and sirens of other vehicles</p> <p>b) Must be able to focus on particular sounds</p> <p>1) Radio instructions for placing apparatus</p> <ul style="list-style-type: none"> <li>• Failure to do so could result in less effective or unsafe positioning</li> </ul> <p>7. Techniques</p> <p>a) Never assume</p> <p>b) Expect the unexpected</p> <p>c) Anticipation</p> <p>d) Aim high in steering</p> <p>e) Get the big picture</p> <p>1) In town</p> <ul style="list-style-type: none"> <li>• Look 1 block ahead</li> </ul> <p>2) Open road/highway speeds</p> <ul style="list-style-type: none"> <li>• Look ¼ mile ahead</li> </ul> <p>f) Leave yourself an "out"</p> <p>g) Make sure others can "see" and "hear" you</p> <p>h) Manage your space</p> <p>1) Maintain safety cushion around apparatus</p>	<p>How far ahead should you look while driving?</p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Safe operation of your apparatus will allow you to anticipate and avoid situations that might result in a serious accident or injuries to you, your crew, and the public. By developing good driving skills, proper attitude, and understanding "due regard" when driving, you will become the efficient and effective driver/operator that is expected of you.

## ***EVALUATION:***

The student will complete the activity and written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 24-27, Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 68-70, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 76-83 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## INDIVIDUAL ACTIVITY 3-2-1

<b>TITLE:</b>	Principles Of Defensive Driving
<b>TIME FRAME:</b>	0:15
<b>MATERIALS NEEDED:</b>	<ul style="list-style-type: none"><li>• Notes</li><li>• Pen or pencil</li></ul>
<b>INTRODUCTION:</b>	This activity provides the students the opportunity to review the material covered in the principles of defensive driving.
<b>DIRECTIONS:</b>	<ol style="list-style-type: none"><li>1. Using information from your notes, answer the following questions.</li><li>2. You have 5 minutes to complete this activity.</li><li>3. Be prepared to discuss your answers with the class.</li></ol>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### PRINCIPLES OF DEFENSIVE DRIVING

1. What are the most important aspects of safe driving?

***Defensive driving skills***

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*Pumping Apparatus Driver/Operators Handbook, IFSTA, Second Edition, Page 76*

2. List four of the six components of defensive driving?

(1) ***Anticipating other drivers' actions***

---

(2) ***Estimating visual lead time***

---

(3) ***Knowing braking and reaction times***

---

(4) ***Combating skids***

---

(5) ***Knowing evasive tactics***

---

(6) ***Knowledge of weight transfer***

---

*Pumping Apparatus Driver/Operators Handbook, IFSTA, Second Edition, Page 76*

3. Where do most collisions involving an emergency vehicle occur?

***Intersection***

---

*Pumping Apparatus Driver/Operators Handbook, IFSTA, Second Edition, Page 77*

4. List two of the five control factors.

(1) ***Aim high in steering***

---

(2) ***Get the big picture***

---

(3) ***Keep you eyes moving***

---

(4) ***Leave yourself an "out"***

---

(5) ***Make sure others can see and hear you***

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*Pumping Apparatus Driver/Operators Handbook, IFSTA, Second Edition, Page 77*

5. To get the "big picture" in town at lower speeds you should be seeing ahead \_\_\_\_\_ block and at highway speeds about \_\_\_\_\_ mile.

(a) ***one***

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(b) ***1/4***

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*California Commercial Driver Handbook, DMV, 2008 Edition, Page 24*



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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6. If you must stop on or by a one-way or divided highway, what three locations should you place your warning devices?

(1) **10 feet**

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(2) **100 feet**

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(3) **200 feet toward the approaching traffic**

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*California Commercial Driver Handbook, DMV, 2008 Edition, Page 27*

7. What is the first thing to consider when passing a vehicle, pedestrian, or cyclist?

**Assume they don't see you**

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*California Commercial Driver Handbook, DMV, 2008 Edition, Page 26*

8. Which is greater, total stopping distance or total braking distance?

**Stopping distance**

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*Pumping Apparatus Driver/Operators Handbook, IFSTA, Second Edition, Page 79*

9. What four special situations require more than regular mirror checks?

(1) **Lane changes**

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(2) **Turns**

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(3) **Merges**

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(4) **Right maneuvers**

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*California Commercial Driver Handbook, DMV, 2008 Edition, Page 25*

10. Define the "Law of Inertia."

**Objects in motion tend to remain in motion**

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**Objects at rest tend to remain at rest unless acted upon by an outside force**

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*Pumping Apparatus Driver/Operators Handbook, IFSTA, Second Edition, Page 81*



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-3: Driving Apparatus To Incidents

**TIME FRAME:** 1:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.3

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of driving apparatus to incidents by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Section 2 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 59-89

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Section 2
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 59-89
- State of California Vehicle Code, DMV, 2007 Edition

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

**A**ttention (attract)

**B**egin

**C**uriosity (arouse)

**A**ssociation

**I**nterest (create)

**S**tudents

**D**esire (stimulate)

**E**xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.







# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>b) Over reliance on lights leads to accidents               <ul style="list-style-type: none"> <li>1) Studies have shown that lights mounted low are more effective than roof-mounted</li> </ul> </li> <li>3. Sirens               <ul style="list-style-type: none"> <li>a) Operate through a wide spectrum</li> <li>b) Sound waves produced by a siren are directional                   <ul style="list-style-type: none"> <li>1) Apparatus moving at 40 mph can project 300 feet in front</li> <li>2) Apparatus moving at 60 mph can project 12 feet</li> </ul> </li> <li>c) Mechanical siren                   <ul style="list-style-type: none"> <li>1) Full up, then down</li> </ul> </li> <li>d) Electrical siren                   <ul style="list-style-type: none"> <li>1) May use different tones to gain attention of others</li> </ul> </li> <li>e) CVC Section 21055 requires the driver/operator to sound the siren as may be reasonably necessary</li> </ul> </li> <li>4. Air horns               <ul style="list-style-type: none"> <li>a) Very good "attention getters"</li> <li>b) Cannot drowned out the sound of the siren</li> <li>c) Is not a legal emergency vehicle warning device</li> </ul> </li> <li>5. You are not considered as a responding emergency vehicle if you are not using red lights and siren               <ul style="list-style-type: none"> <li>a) Do not come up from behind someone and sound an air horn</li> <li>b) Due regard implies a level of responsibility not to scare other drivers</li> </ul> </li> </ul>	<p>Is an air horn a legal emergency warning device?</p> <p><b>SLIDE: 3-3-8</b></p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>c) If traffic cannot be cleared, <u>and</u> the opposing lane cannot be used</p> <ol style="list-style-type: none"><li>1) Do not "force" vehicles into the intersection</li><li>2) Forcing vehicles into the intersection is extremely dangerous</li><li>3) If you force a vehicle into the intersection and it gets hit, you are responsible</li><li>4) Consider shutting down the lights and siren and wait for the signal light to change to green</li><li>5) Response time lost by using due caution is very small</li></ol> <p>d) Right turn procedure with traffic, against a red signal light</p> <ol style="list-style-type: none"><li>1) Move to the left lane<ul style="list-style-type: none"><li>• Clear lane-by-lane</li><li>• Make eye-to-eye contact</li><li>• Proceed through intersection</li></ul></li><li>2) Right turn alternative<ul style="list-style-type: none"><li>• Shut down the lights and siren</li><li>• Move to the right turn lane</li><li>• Proceed as a normal right turn</li></ul></li></ol> <p>e) Left turn procedure with traffic, against a red signal light</p> <ol style="list-style-type: none"><li>1) Move to the left lane</li><li>2) Stop</li><li>3) Proceed when safe</li></ol>	<p>What are some possible results if you "force" another vehicle into an intersection?</p> <p><b>SLIDE: 3-3-13</b></p> <p><b>SLIDE: 3-3-14</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>4) Clear lane-by-lane</li> <li>5) Make eye-to-eye contact</li> <li>f) Cancelled or reduced to Code 2               <ul style="list-style-type: none"> <li>1) If already committed to the intersection, consider continuing Code 3 through the intersection</li> <li>2) Shutting down while already committed may confuse other drivers</li> </ul> </li> <li>D. Use of left lane or center of roadway               <ul style="list-style-type: none"> <li>1. Pass on the left</li> <li>2. Divided roads                   <ul style="list-style-type: none"> <li>a) Travel next to divider</li> </ul> </li> </ul> </li> <li>E. Freeway driving               <ul style="list-style-type: none"> <li>1. Entering                   <ul style="list-style-type: none"> <li>a) Turn off red lights and sirens</li> </ul> </li> <li>2. Move to left lane or #1 lane</li> <li>3. Proceed with flow of traffic</li> <li>4. Do not scare other drivers</li> <li>5. Exiting                   <ul style="list-style-type: none"> <li>a) Move to exit lane</li> <li>b) Turn on lights and siren</li> <li>c) Do not scare other drivers</li> </ul> </li> </ul> </li> <li>F. Apparatus blind spots               <ul style="list-style-type: none"> <li>1. Mirrors</li> <li>2. A-post</li> <li>3. Use other personnel on apparatus as spotters</li> </ul> </li> <li>G. Speed               <ul style="list-style-type: none"> <li>1. Maintain control of the apparatus at all times</li> </ul> </li> </ul>	<p><b>SLIDE: 3-3-15</b></p> <p>What areas are deemed to be blind spots?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>2. Excessive speed is reason for most response accidents<ul style="list-style-type: none"><li>a) Use basic speed law<ul style="list-style-type: none"><li>1) Never drive faster than is safe for the present conditions</li></ul></li></ul></li><li>H. Citizens' reaction<ul style="list-style-type: none"><li>1. Predictable<ul style="list-style-type: none"><li>a) They will pull to the right and stop</li><li>b) You cannot pass on the right</li></ul></li><li>2. Unpredictable<ul style="list-style-type: none"><li>a) You should avoid sudden moves<ul style="list-style-type: none"><li>1) Your sudden moves can confuse and cause panic to others</li></ul></li><li>b) Try to get eye-to-eye contact</li></ul></li><li>3. Warning devices may be blanketed<ul style="list-style-type: none"><li>a) Driver/operator assumes all motorists are<ul style="list-style-type: none"><li>1) Partially deaf</li><li>2) Inattentive to their driving</li><li>3) Have their windows up and radio on</li><li>4) Driving newer cars with sound proofing</li></ul></li><li>b) Weather conditions<ul style="list-style-type: none"><li>1) Rain</li><li>2) Hail</li></ul></li></ul></li><li>I. When responding from same location (2 or more units) tandem or caravan<ul style="list-style-type: none"><li>1. Maintain 300-500 feet separation</li><li>2. Do not pass other emergency vehicles unless signaled to do so and it is safe</li></ul></li></ul></li></ul>	<p>What does the basic speed law say?</p> <p><b>SLIDE: 3-3-16</b></p> <p><b>SLIDE: 3-3-17</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>J. When responding from other locations (2 or more units)</p> <ol style="list-style-type: none"><li>1. Let other units know when you are approaching an intersection that they might be using at the same time</li></ol> <p>K. Traffic control devices</p> <ol style="list-style-type: none"><li>1. Proper direction selected</li><li>2. Apparatus responding from opposing direction</li></ol>	<p>What should you do if several apparatus are responding to the same location?</p> <p><b>SLIDE: 3-3-18</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

A fire apparatus driver/operator has the responsibility to safely drive the apparatus to an incident. You have the responsibility of driving with due regard to ensure that your crew and the public are safe by responding with the proper warning devices, roadway operations, speed, and attention to other drivers.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Section 2 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 59-89 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-4: Principles Of Off-road Driving

**TIME FRAME:** 1:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 1.4.13

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of the principles of off-road driving by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 72 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 115-120

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- Basic Fire Control Module 2A Automotive Battalion Student Supplement, CDF, 1999 Edition, Off Road Vehicle Operations Unit
- Engineer Training Manual, Tiburon Fire Protection District, 2000 Edition, Section 53
- Off Road and 4-Wheel Driver Operational Procedures Manual, Kern County Fire Department, 1999 Edition, Off Road Section
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 115-120

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

Attention (attract)

Curiosity (arouse)

Interest (create)

Desire (stimulate)

Begin

Association

Students

Experience



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. OFF-ROAD DEFINED</b></p> <ul style="list-style-type: none"><li>A. Unpaved or unimproved roads, trails, paths, or dozer breaks</li><li>B. Maintained or not</li><li>C. Even and uneven terrain</li><li>D. Flat and high-angle elevations</li></ul> <p><b>II. INDICATIONS THAT LEAD TO OFF-ROAD OPERATIONS</b></p> <ul style="list-style-type: none"><li>A. Wildland fires<ul style="list-style-type: none"><li>1. Apparatus required at fire scene</li><li>2. Remote locations</li><li>3. Best or only access</li></ul></li><li>B. Structure fires<ul style="list-style-type: none"><li>1. Undeveloped locations</li><li>2. Exposure protection</li></ul></li><li>C. Rescue<ul style="list-style-type: none"><li>1. Remote locations</li><li>2. Undeveloped locations</li></ul></li><li>D. Public service<ul style="list-style-type: none"><li>1. Assisting public in nonemergency situations</li></ul></li><li>E. Area familiarization<ul style="list-style-type: none"><li>1. Topographical layout of area</li></ul></li><li>F. General indicators<ul style="list-style-type: none"><li>1. Advantages realized must justify risks taken</li></ul></li></ul>	<p><b>SLIDE: 3-4-1</b> What is "off-road?"</p> <p><b>SLIDE: 3-4-2</b></p> <p><b>SLIDE: 3-4-3</b></p> <p><b>SLIDE: 3-4-4</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ol style="list-style-type: none"><li>1. Limited access</li><li>2. Limited maneuverability</li><li>3. Must drive slower</li></ol> <p>D. Safety hazards</p> <ol style="list-style-type: none"><li>1. Escape routes</li><li>2. Visibility<ol style="list-style-type: none"><li>a) Dust</li><li>b) Smoke</li><li>c) Terrain</li><li>d) Trees, foliage, rocks, berms</li></ol></li><li>3. Proximity to fire</li><li>4. Retardant drops</li><li>5. Old bridges</li></ol> <p>E. Apparatus limitations</p> <ol style="list-style-type: none"><li>1. Type I engine<ol style="list-style-type: none"><li>a) Designed for paved roads</li><li>b) May be used on dirt roads</li><li>c) Weight</li><li>d) Low ground clearance<ol style="list-style-type: none"><li>1) Angle of approach<ul style="list-style-type: none"><li>• Angle between the ground and line running from the two front tires to lowest hanging component directly ahead, usually front bumper</li></ul></li></ol></li></ol></li></ol>	<p>What could cause a slower response time?</p> <p><b>SLIDE: 3-4-8</b></p> <p>What limitations does a Type I engine have for off-road use?</p> <p><b>SLIDE: 3-4-9</b></p> <p><b>SLIDE: 3-4-10</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>• Allows the driver/operator to judge the ability of the apparatus to negotiate obstacles</li></ul> <p>2) Breakover angle</p> <ul style="list-style-type: none"><li>• Ability of apparatus to maneuver over objects without making contact with underside of apparatus</li></ul> <p>3) Angle of departure</p> <ul style="list-style-type: none"><li>• Angle between the ground and line running from the two rear tires to the lowest hanging component directly behind it, usually the rear bumper or tail board</li></ul> <p>e) Inability to pump and roll</p> <p>2. Type II engine</p> <ul style="list-style-type: none"><li>a) Similar to Type I</li><li>b) Some designs allow for better clearance</li><li>c) Some designs can pump and roll</li><li>d) Ground clearance<ul style="list-style-type: none"><li>1) Angle of approach</li><li>2) Breakover angle</li><li>3) Angle of departure</li></ul></li></ul> <p>3. Type III engine</p> <ul style="list-style-type: none"><li>a) Designed for off-road</li><li>b) Some are four-wheel drive</li><li>c) Can pump and roll</li><li>d) Consider center of gravity<ul style="list-style-type: none"><li>1) Some are higher than normal</li></ul></li></ul>	<p><b>SLIDE: 3-4-11</b></p> <p><b>SLIDE: 3-4-12</b></p> <p><b>SLIDE: 3-4-13</b></p> <p><b>SLIDE: 3-4-14</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>e) Less water than Types I and II</li><li>f) Ground clearance<ul style="list-style-type: none"><li>1) Angle of approach</li><li>2) Breakover angle</li><li>3) Angle of departure</li></ul></li><li>4. Type IV engine<ul style="list-style-type: none"><li>a) Similar to Type III</li><li>b) Less water and hose</li><li>c) Increased mobility</li><li>d) Ground clearance<ul style="list-style-type: none"><li>1) Angle of approach</li><li>2) Breakover angle</li><li>3) Angle of departure</li></ul></li></ul></li><li>5. Excessive wear on components<ul style="list-style-type: none"><li>a) Brakes</li><li>b) Tires</li><li>c) Shocks and springs</li><li>d) Transmission</li><li>e) Cooling system<ul style="list-style-type: none"><li>1) Moving slowly</li><li>2) Debris</li><li>3) Dirt</li><li>4) Long idle times</li></ul></li></ul></li></ul>	<p><b>SLIDE: 3-4-15</b></p> <p>What components can experience excessive wear?</p> <p><b>SLIDE: 3-4-16</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>4) Power steering</li><li>5) Transmission</li><li>b) Belt or belts condition</li><li>c) Loose or leaking items</li><li>d) Radiator obstructions</li><li>e) Overall engine condition</li><li>4. Tires and lug nuts<ul style="list-style-type: none"><li>a) Tires<ul style="list-style-type: none"><li>1) Thump tires for proper inflation</li><li>2) Tire wear</li><li>3) Sidewalls for cuts or damage</li><li>4) Rocks between rear duals</li></ul></li><li>b) Lug nuts<ul style="list-style-type: none"><li>1) Damage</li><li>2) Missing</li><li>3) Loose</li></ul></li></ul></li><li>5. Undercarriage<ul style="list-style-type: none"><li>a) Muffler and exhaust pipes</li><li>b) Shock absorbers</li><li>c) Steering linkage</li><li>d) Springs</li><li>e) Spring hangers</li><li>f) Drivelines</li><li>g) Skid plates</li><li>h) Frame</li></ul></li><li>6. Lights and safety devices<ul style="list-style-type: none"><li>a) Headlights</li><li>b) Taillights</li><li>c) Clearance lights</li><li>d) Turn signals</li></ul></li></ul>	







# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ol style="list-style-type: none"><li>1. Hard surface with loose materials<ol style="list-style-type: none"><li>a) Maintain smooth and steady speed</li><li>b) Increased braking distances</li></ol></li><li>2. Soft sand, mud, or loose dirt<ol style="list-style-type: none"><li>a) Small area<ol style="list-style-type: none"><li>1) Travel through quickly</li></ol></li><li>b) Large area<ol style="list-style-type: none"><li>1) Maintain steady speed</li><li>2) Avoid tire spinning</li><li>3) Avoid stopping</li><li>4) Avoid chattering with tires</li><li>5) Accelerate and decelerate slowly</li><li>6) Use some water if needed</li></ol></li></ol></li><li>3. Gullies and ruts<ol style="list-style-type: none"><li>a) Go at an angle</li><li>b) Slow speed</li><li>c) Clearance of bumpers</li><li>d) Could take control of steering</li></ol></li><li>4. Crossing water<ol style="list-style-type: none"><li>a) Scout<ol style="list-style-type: none"><li>1) Water depth</li><li>2) Soil condition</li><li>3) Approach and departure angles</li></ol></li><li>b) Condition before crossing</li><li>c) Maintain slight pressure on brake</li></ol></li></ol>	<p>What type of surface conditions might a driver/operator find when driving without a road?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>1) Keeps water from entering in between brake pad and drum</p> <p>2) Check brakes after crossing</p> <p>B. Slopes</p> <p>1. Determine angle of slope</p> <ul style="list-style-type: none"><li>a) Topographic maps</li><li>b) Estimation by eye</li><li>c) Other apparatus</li><li>d) Safe maximum limit is 40%</li><ul style="list-style-type: none"><li>1) If exceeded, should drive straight up or down incline</li></ul></ul> <p>2. Driving on a slope</p> <ul style="list-style-type: none"><li>a) Downhill<ul style="list-style-type: none"><li>1) Use proper gear<ul style="list-style-type: none"><li>• Normally a lower gear</li></ul></li><li>2) Avoid locking brakes</li><li>3) Attempt to drive straight down<ul style="list-style-type: none"><li>• Avoid side-hilling</li></ul></li><li>4) Use spotter, if needed</li><li>5) Sound horn where needed</li><li>6) Use engine compression</li><li>7) Be in four-wheel drive before descending</li></ul></li></ul>	<p>Why would you apply slight pressure on the brakes while crossing water?</p> <p><b>SLIDE: 3-4-22</b></p> <p><b>SLIDE: 3-4-23</b></p> <p><b>SLIDE: 3-4-24</b></p> <p><b>SLIDE: 3-4-25</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) Uphill</p> <ol style="list-style-type: none"><li>1) Keep rpms in safe range<ul style="list-style-type: none"><li>• Maintain around 2,000 rpm</li><li>• Refer to owner's manual</li></ul></li><li>2) Use proper gear</li><li>3) Attempt to drive straight up</li></ol> <p>4) Evaluate condition of slope for</p> <ul style="list-style-type: none"><li>• Rocks</li><li>• Ruts</li><li>• Wet areas</li><li>• Air drops</li><li>• Green grass</li></ul> <p>5) Use caution at top of hills</p> <ul style="list-style-type: none"><li>• Poor visibility</li><li>• Use spotter</li><li>• Sound horn</li></ul> <p>c) Sidehill</p> <ol style="list-style-type: none"><li>1) Avoid driving on sidehill, if possible</li><li>2) Travel slowly</li><li>3) If apparatus begins to slide, steer downhill</li></ol> <p>3. Stopping or parking on slopes</p> <p>a) Temporary stopping</p> <ol style="list-style-type: none"><li>1) Automatic transmission<ul style="list-style-type: none"><li>• Hold brake with left foot</li></ul></li></ol>	<p>What are some conditions that you should evaluate when driving on a slope?</p> <p><b>SLIDE: 3-4-26</b></p> <p><b>SLIDE: 3-4-27</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>• Apply parking brake if needed</li><li>• Accelerate slowly with right foot</li><li>• Release brake when apparatus begins moving</li></ul> <p>2) Standard transmission</p> <ul style="list-style-type: none"><li>• Set parking brake</li><li>• Release clutch pedal as you accelerate slowly while releasing the parking brake</li><li>• Do not slip clutch or stall engine</li></ul> <p>b) Stopping when engine dies</p> <ol style="list-style-type: none"><li>1) Brake with left foot</li><li>2) Set parking brake</li><li>3) Start engine</li><li>4) After engine starts<ul style="list-style-type: none"><li>• Continue as indicated above</li></ul></li><li>5) If engine will not start<ul style="list-style-type: none"><li>• Remain behind steering wheel unless you are alone</li><li>• Other personnel disembarks apparatus to safe area</li><li>• Apply parking brake</li><li>• Place transmission in park or first gear</li><li>• Set chock blocks</li><li>• Call for assistance</li></ul></li></ol>	<p>What steps would you take if the engine dies while on a slope?</p> <p><b>SLIDE: 3-4-28</b></p>









# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>I. Keep roads clear if possible</li><li>J. Drive with headlights on</li><li>K. Wear seatbelts</li><li>L. Use chock blocks when needed</li><li>M. Awareness of apparatus fuel, oil pressure, and coolant temperature at all times</li><li>N. Think safety at all times</li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Operating an apparatus off-road, and/or in 4-wheel drive, you must be aware of the conditions you might encounter. The ability to operate on various and hazardous road conditions, changing environmental conditions, and equipment limitations will assist you in a safe and effective operation.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 72 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 115-120 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-5: Principles Of Braking And Stopping

**TIME FRAME:** 0:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.3

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of the principles of braking and stopping by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 28, 31, and 73 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 77-82

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2007 Edition, Pages 28, 31, and 73
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 77-82
- Sacramento Regional Driver's Training Authority Student Manual, First Edition, Pages 55, 62, 69-71, and 93-94

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. BRAKING</b></p> <p>A. Should be planned</p> <ol style="list-style-type: none"> <li>1. Before a curve or turn               <ol style="list-style-type: none"> <li>a) Approach zone</li> <li>b) Straight line braking</li> </ol> </li> <li>2. Before driving downhill               <ol style="list-style-type: none"> <li>a) Using correct gear before starting down the grade</li> </ol> </li> <li>3. Before the need to stop               <ol style="list-style-type: none"> <li>a) Intersection</li> <li>b) Incident</li> </ol> </li> <li>4. Secondary braking devices should also be used in conjunction with primary braking systems               <ol style="list-style-type: none"> <li>a) Engine or exhaust brake</li> <li>b) Transmission retarder</li> </ol> </li> </ol> <p>B. Antilock brake system</p> <ol style="list-style-type: none"> <li>1. Allows driver/operator to steer while braking               <ol style="list-style-type: none"> <li>a) Even aggressive (panic) braking</li> </ol> </li> <li>2. Prevents wheels from skidding on wet or slippery roads while braking</li> </ol> <p>C. No antilock brake system</p> <ol style="list-style-type: none"> <li>1. Does not allow the driver/operator to steer during emergency braking               <ol style="list-style-type: none"> <li>a) Apparatus will skid during emergency braking</li> <li>b) Stab brake the brakes during emergency braking to prevent skidding</li> </ol> </li> </ol>	<p><b>SLIDE: 3-5-1</b></p> <p><b>SLIDE: 3-5-2</b></p> <p><b>SLIDE: 3-5-3</b></p> <p>What is "brake fade?"</p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>4. Decide</p> <ul style="list-style-type: none"><li>a) What must I do?<ul style="list-style-type: none"><li>1) Brake?</li><li>2) Steer?</li></ul></li></ul> <p>C. Reaction distance (physical action)</p> <ul style="list-style-type: none"><li>1. The distance traveled from the time your brain tells your foot to move from the accelerator until your foot is actually pushing the brake pedal<ul style="list-style-type: none"><li>a) Reaction time for the average driver is <math>\frac{3}{4}</math> second</li><li>b) This accounts for an additional 60 feet traveled at 55 mph</li></ul></li><li>2. Execute<ul style="list-style-type: none"><li>a) Do it - action taken by driver/operator</li></ul></li><li>3. Apparatus traveling at 30 mph<ul style="list-style-type: none"><li>a) Perception distance takes 33 feet</li><li>b) Reaction distance takes 33 feet</li><li>c) Combined distance equals 66 feet</li></ul></li><li>4. Professional drivers<ul style="list-style-type: none"><li>a) Most people think professional drivers have fast perception and reaction skills<ul style="list-style-type: none"><li>1) This is false</li><li>2) Professional drivers are trained to anticipate</li></ul></li></ul></li><li>5. Perception times and reaction times<ul style="list-style-type: none"><li>a) <math>\frac{3}{4}</math> second + <math>\frac{3}{4}</math> second = <math>1\frac{1}{2}</math> seconds the apparatus travels before the driver acts</li></ul></li></ul>	<p><b>SLIDE: 3-5-6</b></p> <p>When traveling at 30 mph, how far will the apparatus travel before the driver reacts to stop?</p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>3. Not all apparatus have ABS               <ul style="list-style-type: none"> <li>a) That is why it is important to know this technique</li> </ul> </li> <li>C. Straight line braking               <ul style="list-style-type: none"> <li>1. Applying the brakes while traveling in a straight line</li> <li>2. Applied before curves (approach zone)</li> </ul> </li> <li>D. Trail braking               <ul style="list-style-type: none"> <li>1. Slowly releasing the pressure on the brakes while turning</li> <li>2. Applied after straight line braking                   <ul style="list-style-type: none"> <li>a) Between entry point and apex of curve (entry zone)</li> </ul> </li> <li>3. Transfers weight to the front tires                   <ul style="list-style-type: none"> <li>a) Provides maximum traction and turning capability</li> </ul> </li> <li>4. Too much pressure on the brakes can cause oversteer</li> <li>5. Should be completed when the apparatus gets to the apex</li> </ul> </li> <li>E. Downgrade braking               <ul style="list-style-type: none"> <li>1. Apply brakes until the apparatus has slowed down                   <ul style="list-style-type: none"> <li>a) Short application                       <ul style="list-style-type: none"> <li>1) Just hard enough to feel a definite slowdown</li> </ul> </li> </ul> </li> <li>2. Reduces speed approximately 5 mph below your "safe" speed                   <ul style="list-style-type: none"> <li>a) Safe for the driving conditions</li> </ul> </li> </ul> </li> </ul>	<p><b>SLIDE: 3-5-11</b></p> <p><b>SLIDE: 3-5-12</b></p> <p><b>SLIDE: 3-5-13</b></p> <p>What is a "safe" speed?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>3. When the apparatus speed has increased to a "safe" speed, apply brakes again<ul style="list-style-type: none"><li>a) Short application</li></ul></li><li>4. Example<ul style="list-style-type: none"><li>a) If safe speed is 40 mph, slow the apparatus to 35 mph, let-up on the brakes until the apparatus reaches 40 mph, then brake again</li></ul></li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

You govern your choice of speed according to a basic speed rule that can be stated in a very straightforward way, "Never exceed a speed that is reasonable and proper for existing conditions, even where law permits."

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2007 Edition, Pages 28, 31, and 73, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 77-82 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-6: Principles Of Steering And Load Control

**TIME FRAME:** 1:30

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.3

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of the principles of steering and load control by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 22, 45, and 46, in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 74-77, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 81-82

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 22, 45, and 46
- dictionary.com
- Driver Awareness Instructor Course Manual, California Commission on Peace Officer Standards and Training, 1999 Edition, Pages 67-70 and 122-125
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 81-82
- Sacramento Regional Driver's Training Authority Student Manual, First Edition, Pages 29, 52-58, 66-68, and 72-76

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

**A**ttention (attract)

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**B**egin

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**S**tudents

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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. PHYSICAL FORCES THAT AFFECT CONTROL</b></p> <p><b>A. Momentum</b></p> <ol style="list-style-type: none"><li>1. Vehicle's mass (weight) times its velocity (speed)</li><li>2. The more momentum the apparatus has, the more energy or effort required to stop</li></ol> <p><b>B. Inertia</b></p> <ol style="list-style-type: none"><li>1. Force that makes the apparatus retain its speed in the same direction</li><li>2. As momentum increases, it is harder to overcome the effects of inertia</li></ol> <p><b>C. Centrifugal force</b></p> <ol style="list-style-type: none"><li>1. Tends to push an apparatus traveling around a curve away from the center of the curve or turn</li><li>2. Influenced by speed and radius of the curve</li><li>3. Higher speed, the greater the centrifugal force</li></ol> <p><b>D. Friction</b></p> <ol style="list-style-type: none"><li>1. Friction is the resistance to slipping</li><li>2. Occurs whenever two surfaces contact each other</li><li>3. Two areas of friction that are most important for apparatus control<ol style="list-style-type: none"><li>a) Tires and road surface<ol style="list-style-type: none"><li>1) Affects the amount of friction between the road and the tires</li></ol></li><li>b) Brake pad/shoe and disk/drum<ol style="list-style-type: none"><li>1) Condition of the brakes affects the amount of friction between these</li></ol></li></ol></li></ol>	<p><b>SLIDE: 3-6-1</b></p> <p><b>SLIDE: 3-6-2</b></p> <p>What is "inertia?"</p> <p><b>SLIDE: 3-6-3</b></p> <p><b>SLIDE: 3-6-4</b></p> <p><b>SLIDE: 3-6-5</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>II. WEIGHT TRANSFER</b></p> <ul style="list-style-type: none"><li>A. The shift of weight is called weight transfer</li><li>B. Effective use of weight transfer is critical for safe handling of an emergency apparatus</li><li>C. Weight transfer that affects apparatus handling<ul style="list-style-type: none"><li>1. Lateral weight transfer caused from turning the apparatus right or left</li><li>2. Weight transfer to the front of the apparatus caused by braking (straight line, trail braking)</li><li>3. Weight transfer to the rear of the apparatus caused from acceleration</li></ul></li></ul> <p><b>III. TIRE CONTACT PATCHES</b></p> <ul style="list-style-type: none"><li>A. Tire contact patches are the area of tire contact (footprint) on a road surface</li><li>B. Weight transfer will change the size of the tire contact patches</li><li>C. The size of the tire contact patches will affect the amount of friction between the tires and the road</li><li>D. Amount of friction between the tires and the road will affect the amount of apparatus control in curves<ul style="list-style-type: none"><li>1. Braking will create larger front tire contact patches</li><li>2. Accelerating will cause larger rear tire contact patches</li><li>3. Right turn will create larger tire contact patches on the left</li><li>4. Left turn will create larger tire contact patches on the right side</li></ul></li></ul>	<p>What is weight transfer? <b>SLIDE: 3-6-6</b></p> <p><b>SLIDE: 3-6-7</b></p> <p><b>SLIDE: 3-6-8</b></p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>I. Hydroplaning</p> <ol style="list-style-type: none"><li>1. Term used when an apparatus is skimming along the surface of a wet road</li><li>2. Normal contact patch of the tire tread and the road begins to separate</li><li>3. A serious condition because the driver/operator cannot control the apparatus</li><li>4. Three factors contribute to the hydroplaning effect<ol style="list-style-type: none"><li>a) Water depth<ol style="list-style-type: none"><li>1) Normally a ¼" of water is enough to cause hydroplaning</li></ol></li><li>b) Tire condition<ol style="list-style-type: none"><li>1) Tread depth</li><li>2) Air pressure</li><li>3) Design</li><li>4) Width</li></ol></li><li>c) Apparatus speed<ol style="list-style-type: none"><li>1) The faster the tires are rotating, the more likely that the apparatus will skim the surface of the water</li><li>2) Total hydroplaning on 1" of water may be expected at about 58 mph</li><li>3) Partial hydroplaning can occur at significantly slower speeds</li></ol></li></ol></li></ol>	<p>What is "hydroplaning?" <b>SLIDE: 3-6-15</b></p> <p><b>SLIDE: 3-6-16</b></p> <p><b>SLIDE: 3-6-17</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>C. Roadway position</p> <ol style="list-style-type: none"> <li>1. Position of the apparatus on the roadway to best facilitate the negotiation of a turn or curve at a safe rate of speed</li> <li>2. The use of the available roadway to its fullest advantage with the least amount of steering</li> <li>3. Roadway position could also be referred to as the "driving line" through a turn</li> </ol>	<p>What is meant by "roadway position?"</p> <p><b>SLIDE: 3-6-21</b></p>
<p><b>VI. TYPICAL TURN CLASSIFICATIONS</b></p>	<p><b>SLIDE: 3-6-22</b></p>
<p>A. Constant radius (90° turn)</p> <ol style="list-style-type: none"> <li>1. Most efficient driving line is one with a constant radius</li> <li>2. This turn would become a full circle if permitted to continue a full 360°</li> <li>3. Driving advantages               <ol style="list-style-type: none"> <li>a) Minimize weight transfer</li> <li>b) Minimize steering input</li> <li>c) Smooth apparatus control</li> <li>d) Greatest attainable safe speed through the turn</li> </ol> </li> </ol>	<p><b>SLIDE: 3-6-23</b></p>
<p>B. Decreasing radius</p> <ol style="list-style-type: none"> <li>1. This is a continually tightening turn</li> <li>2. Driving speed will be decreased in proportion to the tightening of the turn</li> <li>3. Negotiate the turn by taking the line of least resistance to the apparatus' travel</li> </ol>	<p>What is a decreasing radius turn?</p> <p><b>SLIDE: 3-6-24</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>C. Increasing radius</p> <ol style="list-style-type: none"><li>1. This turn gradually straightens</li><li>2. Apparatus speed will be slower at the entry point<ol style="list-style-type: none"><li>a) Can be increased upon exiting</li></ol></li></ol> <p>D. 180° turn</p> <ol style="list-style-type: none"><li>1. The configuration of this turn corresponds to driving through one half of a circle</li><li>2. Entry should start from the extreme outside edge of the available roadway<ol style="list-style-type: none"><li>a) Driving line will be maintained to the approach of the apex</li><li>b) Although not any faster speed-wise than an "inside" or "outside" driving line, this route provides a degree of safety for maneuvering in the case of a slide</li></ol></li><li>3. The apex area is relatively close to the exit of the turn, not geometrically located</li><li>4. Exit point will be on the outside of the roadway, beyond the apex area</li></ol> <p>E. Multiple turn situation</p> <ol style="list-style-type: none"><li>1. Multiple turns create a situation where apparatus control problems are likely to occur</li><li>2. Correct roadway position through multiple turns is a path that will reduce the amount of directional change from one turn to another<ol style="list-style-type: none"><li>a) Lessens side-to-side weight transfer</li></ol></li></ol>	<p><b>SLIDE: 3-6-25</b> <b>SLIDE: 3-6-26</b></p> <p><b>SLIDE: 3-6-27</b> <b>SLIDE: 3-6-28</b></p> <p>Why is the entry at the outside edge safer?</p> <p><b>SLIDE: 3-6-29</b> <b>SLIDE: 3-6-30</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>b) Provides tires improved traction</li><li>c) Allows greater control</li><li>3. In order to drive the correct roadway position, the driver/operator will have to equalize turning motions from one turn to another while maintaining a consistent speed<ul style="list-style-type: none"><li>a) These two ingredients create centrifugal force</li></ul></li><li>4. Correct road position will vary as to the configuration of the turns<ul style="list-style-type: none"><li>a) The driving line selected should provide for optimum efficiency and control at the exit of the final turn</li></ul></li></ul>	<p><b>SLIDE: 3-6-31</b></p> <p><b>SLIDE: 3-6-32</b></p>
<p><b>VII. CONTROL CONSIDERATIONS</b></p> <ul style="list-style-type: none"><li>A. To establish proper roadway position through a turn, the driver/operator must scan the curve during the approach</li><li>B. The path of travel should bring the apparatus to the apex or low side just prior to the exit of the turn</li><li>C. The apparatus should be held as close as possible to the apex to allow adequate distance when exiting the turn</li><li>D. Apparatus stress and weight transfer may be reduced by allowing the apparatus to smoothly drift out to the high side (outside) upon leaving the turn</li><li>E. Driving zones<ul style="list-style-type: none"><li>1. Zone 1, approach zone<ul style="list-style-type: none"><li>a) This area consists of the approach up to the entry point of the curve</li><li>b) Also the speed adjustment area</li></ul></li></ul></li></ul>	<p>What are the three driving zones in a curve?</p> <p><b>SLIDE: 3-6-33</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>2. Zone 2, entry zone<ul style="list-style-type: none"><li>a) This area consists of the first portion of the turning arc between the entry point and the apex</li></ul></li><li>3. Zone 3, exit zone<ul style="list-style-type: none"><li>a) This area consists of the turning arc from the apex to the exit point</li></ul></li></ul>	<p><b>SLIDE: 3-6-34</b></p>
<b>VIII. STEERING CONTROL</b>	
<ul style="list-style-type: none"><li>A. Hand position<ul style="list-style-type: none"><li>1. Recommend 9-3 o'clock position<ul style="list-style-type: none"><li>a) Allows for greater turning and balanced steering</li></ul></li><li>2. Two hands on steering wheel<ul style="list-style-type: none"><li>a) With standard transmission, shift gear then return hand to the steering wheel</li><li>b) Do not rest hand on gear shift</li></ul></li><li>3. Thumbs resting on steering wheel<ul style="list-style-type: none"><li>a) Not around steering wheel<ul style="list-style-type: none"><li>1) Could cause injury if the apparatus were to hit a bump or pot hole</li></ul></li></ul></li></ul></li></ul>	<p><b>SLIDE: 3-6-35</b></p> <p>Why do you not place your thumbs around the steering wheel?</p> <p><b>SLIDE: 3-6-36</b></p>
<ul style="list-style-type: none"><li>B. Turning<ul style="list-style-type: none"><li>1. Keep both hands on the wheel</li><li>2. Turn wheel to make the turn</li><li>3. Tight turns may require hand-over-hand or hand-shuffle<ul style="list-style-type: none"><li>a) Hand-over-hand method<ul style="list-style-type: none"><li>1) Movements made slowly</li></ul></li></ul></li></ul></li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>b) Best method when making an evasive maneuver hand-shuffle method</p> <ol style="list-style-type: none"><li>1) Prepare before reaching turn</li><li>2) Note degree of curve</li><li>3) Hold steering wheel firmly</li><li>4) Maintain control<ul style="list-style-type: none"><li>• Hands do not leave the wheel</li></ul></li></ol> <p>C. Turning in curves</p> <ol style="list-style-type: none"><li>1. Turning arc<ol style="list-style-type: none"><li>a) The driving line or line of travel that the apparatus travels through a curve</li></ol></li><li>2. Understeer<ol style="list-style-type: none"><li>a) Occurs when traveling too fast into a turn, resulting in a loss of friction</li><li>b) Apparatus tends to travel in a straight line and not turn</li><li>c) Tire contact patches of the front tires are too small for the speed of the apparatus</li><li>d) Not enough friction between the front tires and the road surface</li><li>e) Not enough weight has been transferred to the front tires</li></ol></li><li>3. Oversteer<ol style="list-style-type: none"><li>a) Occurs when too much braking is applied<ol style="list-style-type: none"><li>1) Transfers too much weight to the front of the apparatus</li></ol></li></ol></li></ol>	<p>What is a "turning arc?" <b>SLIDE: 3-6-37</b></p> <p><b>SLIDE: 3-6-38</b> What is "understeer?"</p> <p><b>SLIDE: 3-6-39</b></p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>E. Front wheels returning to straight position</p> <ol style="list-style-type: none"><li>1. Without power steering<ol style="list-style-type: none"><li>a) Tend to straighten</li><li>b) Because of caster</li></ol></li><li>2. With power steering<ol style="list-style-type: none"><li>a) Designed to retain position</li></ol></li></ol>	<p><b>SLIDE: 3-6-44</b></p>
<p>F. Steering while stopped</p> <ol style="list-style-type: none"><li>1. Do not turn the steering wheel while stopped<ol style="list-style-type: none"><li>a) Causes stress on steering components and grinds tires</li></ol></li></ol>	<p><b>SLIDE: 3-6-45</b></p> <p>Why not turn the steering wheel while stopped?</p> <p><b>SLIDE: 3-6-46</b></p>
<p>G. Maneuvering in close quarters</p> <ol style="list-style-type: none"><li>1. Turning around before stopping<ol style="list-style-type: none"><li>a) Turn wheels in direction they will travel</li></ol></li></ol>	<p><b>SLIDE: 3-6-47</b></p>
<p>H. Axle location</p> <ol style="list-style-type: none"><li>1. When turning, the rear wheels do not follow the same path of the front</li><li>2. Cheating/cutting a shorter circumference</li><li>3. Longer the wheelbase, the sharper the turn, more the rear wheels will cheat</li><li>4. Understand cheating to avoid hitting<ol style="list-style-type: none"><li>a) Curbs</li><li>b) Buildings</li><li>c) Cars</li></ol></li></ol>	<p><b>SLIDE: 3-6-48</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>I. Rear end swing               <ul style="list-style-type: none"> <li>1. Extended part of apparatus behind rear wheels                   <ul style="list-style-type: none"> <li>a) Outward opposite direction of turn</li> </ul> </li> </ul> </li> <li>J. Front end swing</li> <li>K. Know your apparatus               <ul style="list-style-type: none"> <li>1. High points</li> <li>2. Low points</li> </ul> </li> </ul> <p><b>IX. TIRE FAILURE</b></p> <ul style="list-style-type: none"> <li>A. Recognize tire failure               <ul style="list-style-type: none"> <li>1. Hear a loud "bang"                   <ul style="list-style-type: none"> <li>a) Blowout</li> <li>b) Could take a few seconds for the apparatus to react</li> <li>c) May think it is another vehicle because of the delay</li> </ul> </li> <li>2. Feel of tire failure                   <ul style="list-style-type: none"> <li>a) Thumps or vibrates heavily                       <ul style="list-style-type: none"> <li>1) May be a sign that a tire has gone flat</li> <li>2) May be the only sign of a rear failure with dual wheels</li> </ul> </li> <li>b) Steering feels "heavy"                       <ul style="list-style-type: none"> <li>1) Front tire has failed</li> </ul> </li> <li>c) Apparatus "fish tails"                       <ul style="list-style-type: none"> <li>1) Rear tire has failed</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<p><b>SLIDE: 3-6-49</b></p> <p>How does the apparatus feel after a tire failure?</p> <p>What corrective actions should you take during a tire failure?</p> <p><b>SLIDE: 3-6-50</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>B. Corrective action</p> <ol style="list-style-type: none"> <li>1. Hold steering wheel firmly               <ol style="list-style-type: none"> <li>a) Both hands on the wheel</li> <li>b) Front tire failure can cause wheel to twist in the driver/operator's hand</li> </ol> </li> <li>2. Stay off the brakes               <ol style="list-style-type: none"> <li>a) Hard braking                   <ol style="list-style-type: none"> <li>1) Can cause a loss of control</li> <li>2) Transfers weight quickly                       <ul style="list-style-type: none"> <li>• Compounds handling problem</li> </ul> </li> </ol> </li> </ol> </li> <li>3. Pull off the road and stop               <ol style="list-style-type: none"> <li>a) After controlling the vehicle</li> </ol> </li> <li>4. Follow SOPs</li> </ol> <p><b>X. SKID CONTROL</b></p> <p>A. Release the brakes, allowing the wheels to rotate freely</p> <ol style="list-style-type: none"> <li>1. Threshold braking</li> </ol> <p>B. Turn apparatus toward the skid or direction you want to travel</p> <p>C. Do not release the clutch until apparatus is under control</p> <ol style="list-style-type: none"> <li>1. Reduces weight transfer to the rear</li> <li>2. Will upset the balance of the apparatus</li> </ol> <p>D. Understeer correction</p> <ol style="list-style-type: none"> <li>1. Release accelerator to transfer weight to the front tires</li> <li>2. Lightly apply brakes to transfer weight to front tires</li> </ol>	<p><b>SLIDE: 3-6-51</b></p> <p>Which direction do you steer the vehicle during a skid?</p> <p><b>SLIDE: 3-6-52</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>3. Too much braking<ul style="list-style-type: none"><li>a) Apparatus continues to skid</li><li>b) Loss of steering ability</li><li>c) Apparatus may go into an oversteer skid</li></ul></li> <li>E. Oversteer correction<ul style="list-style-type: none"><li>1. Release the brakes<ul style="list-style-type: none"><li>a) Allows the weight to transfer to the rear tires</li></ul></li><li>2. Continue to steer in direction desired</li></ul></li> <li>F. Power oversteer correction<ul style="list-style-type: none"><li>1. Release the accelerator<ul style="list-style-type: none"><li>a) Allows rear tires to gain traction</li></ul></li><li>2. Do not step on the brake pedal</li><li>3. Continue to steer in direction desired</li></ul></li></ul>	<p><b>SLIDE: 3-6-53</b></p> <p>Why should you release the brakes during an oversteer situation?</p> <p><b>SLIDE: 3-6-54</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

You must understand the principles of physical forces, weight transfer, and how the driver/operator's input during driving situations affects the balance and control of the apparatus. Once you can confidently apply these principles to your driving, your skill in controlling the apparatus while driving through turns and skids will greatly improve.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 22, 45, and 46, in Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 74-77, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 81-82 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-7: Driving During Adverse Weather Conditions

**TIME FRAME:** 0:15

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 4.3

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of driving during adverse weather conditions by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 29, 35-38 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 84

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- California Commercial Driver Handbook, DMV, 2008 Edition, Pages 29, 35-38
- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 84

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

**A**ttention (attract)

**B**egin

**C**uriosity (arouse)

**A**ssociation

**I**nterest (create)

**S**tudents

**D**esire (stimulate)

**E**xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. ADVERSE WEATHER CONDITIONS</b></p> <p>A. Factors to consider</p> <ol style="list-style-type: none"><li>1. Rain</li><li>2. Snow</li><li>3. Ice</li><li>4. Mud</li><li>5. Fog</li><li>6. Dust</li></ol> <p>B. Must recognize these conditions and adjust speed accordingly</p> <ol style="list-style-type: none"><li>1. Crown of roads</li><li>2. Sharpness of curves</li><li>3. Condition of road surfaces</li><li>4. Decreased visibility<ol style="list-style-type: none"><li>a) Frosted and ice covered windows</li><li>b) Heavy rain conditions</li><li>c) Decrease speed gradually</li><li>d) Keep off low or soft shoulders</li></ol></li></ol> <p>C. Recognize areas that become slippery first</p> <ol style="list-style-type: none"><li>1. Bridge surfaces</li><li>2. Northern slopes</li><li>3. Shaded spots</li><li>4. Areas where snow blows across road</li></ol>	<p><b>SLIDE: 3-7-1</b></p> <p>What factors of adverse weather conditions should you consider?</p> <p><b>SLIDE: 3-7-2</b></p> <p><b>SLIDE: 3-7-3</b></p> <p><b>SLIDE: 3-7-4</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>3) Hub throws the chains underneath the rolling tires</li><li>4) They tend to lose effectiveness in snow greater than 8 inches deep</li></ul> <p>D. Lights</p> <ul style="list-style-type: none"><li>1. Headlights<ul style="list-style-type: none"><li>a) Use low beams<ul style="list-style-type: none"><li>1) High beams will be reflected back and cause glare</li></ul></li></ul></li><li>2. Fog lights<ul style="list-style-type: none"><li>a) Always use in conjunction with low beam headlights</li><li>b) Never use alone</li></ul></li><li>3. Turn off emergency lights<ul style="list-style-type: none"><li>a) In nonemergency situations and are off to the side of the road<ul style="list-style-type: none"><li>1) To avoid being hit by other vehicles</li></ul></li></ul></li></ul> <p><b>NOTE:</b> Refer to department SOPs for additional information.</p>	<p>Why should you use low beams?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

You must understand the potential effects that adverse weather conditions have on driving. By understanding the effects that adverse weather has on driving conditions, you can make allowances to afford a larger margin of safety to avoid possible accidents.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read the California Commercial Driver Handbook, DMV, 2008 Edition, Pages 29, 35-38, and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 84 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**TOPIC:** 3-8: Positioning Apparatus

**TIME FRAME:** 1:00

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Section 5.2

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given a written test

**Behavior:** The student will confirm a knowledge of positioning apparatus by completing the written test

**Standard:** With a minimum 80% accuracy according to the information contained in Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 99-131

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials

**REFERENCES:**

- Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 99-131

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>I. POSITIONING APPARATUS AT INCIDENTS</b></p> <ul style="list-style-type: none"><li>A. Fire attack</li><li>B. Wildland incidents</li><li>C. Support</li><li>D. Special situations</li></ul> <p><b>II. FIRE ATTACK</b></p> <ul style="list-style-type: none"><li>A. Multiple factors must be considered</li><li>B. Begins with size-up<ul style="list-style-type: none"><li>1. Nothing showing<ul style="list-style-type: none"><li>a) Park near main entrance</li><li>b) Be prepared to support fire attack operations<ul style="list-style-type: none"><li>1) Connect to water supply</li><li>2) Connect to sprinkler/standpipes</li><li>3) Pull attack hoselines</li></ul></li></ul></li><li>2. Smoke showing<ul style="list-style-type: none"><li>a) Park upwind out of smoke<ul style="list-style-type: none"><li>1) Best tactical position</li></ul></li></ul></li><li>3. Fire involvement<ul style="list-style-type: none"><li>a) Park away from heat and smoke<ul style="list-style-type: none"><li>1) Best tactical position</li></ul></li></ul></li></ul></li><li>C. Department SOPs<ul style="list-style-type: none"><li>1. Follow based on situation</li></ul></li></ul>	<p><b>SLIDE: 3-8-1</b></p> <p>What type of incident requires special considerations when positioning your apparatus?</p> <p><b>SLIDE: 3-8-2</b></p> <p><b>SLIDE: 3-8-3</b></p> <p><b>SLIDE: 3-8-4</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>2. Allow for safety</li><li>3. Allow for next-in apparatus to position effectively</li><li>D. Rescue situations<ul style="list-style-type: none"><li>1. Primary objective</li><li>2. Consider need for ground ladder position</li><li>3. Position of aerial ladder if needed</li></ul></li><li>E. Water supply<ul style="list-style-type: none"><li>1. Can incident be handled with tank water?</li><li>2. Does a supply hoseline need to be used?<ul style="list-style-type: none"><li>a) Lay supply hoseline to side of street</li></ul></li><li>3. Is there a need to use a fire department connection (FDC)?</li><li>4. Will aerial/ladder support be needed?</li></ul></li><li>F. Method of attack<ul style="list-style-type: none"><li>1. Whether or not these methods can be used, depends on the position of the apparatus<ul style="list-style-type: none"><li>a) Handline use<ul style="list-style-type: none"><li>1) Position so that nozzle can reach seat of fire</li></ul></li><li>b) Master streams<ul style="list-style-type: none"><li>1) Position so that hoseline can effectively supply them</li></ul></li><li>c) Turret or deck guns<ul style="list-style-type: none"><li>1) Position so that fire stream can reach intended target</li></ul></li></ul></li></ul></li><li>G. Exposures<ul style="list-style-type: none"><li>1. Where are your exposures in relation to the fire?</li><li>2. What are your exposures?</li><li>3. Do not make the apparatus an exposure</li></ul></li></ul>	<p><b>SLIDE: 3-8-5</b></p> <p><b>SLIDE: 3-8-6</b></p> <p><b>SLIDE: 3-8-7</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>H. Wind direction</p> <ol style="list-style-type: none"><li>1. Park upwind if possible<ol style="list-style-type: none"><li>a) Keep out of smoke</li><li>b) Negates need for driver/operator to wear SCBA</li><li>c) Reduces possibility of apparatus becoming an exposure if fire conditions worsen</li><li>d) If hazardous materials involved it will lessen chances of contamination of apparatus and personnel</li></ol></li></ol> <p>I. Terrain</p> <ol style="list-style-type: none"><li>1. Best on paved surface</li><li>2. Uphill if possible<ol style="list-style-type: none"><li>a) Except on wildland incidents</li></ol></li></ol> <p>J. Relocation potential</p> <ol style="list-style-type: none"><li>1. Always leave yourself an out</li></ol> <p>K. Structural collapse zone considerations</p> <ol style="list-style-type: none"><li>1. Equal to height of building</li><li>2. Position apparatus at corners<ol style="list-style-type: none"><li>a) If not being used by aerial/ladder apparatus</li></ol></li><li>3. Indicators of possible unstableness in building<ol style="list-style-type: none"><li>a) Bulging walls</li></ol></li></ol>	<p><b>SLIDE: 3-8-8</b></p> <p>What should you consider regarding wind direction?</p> <p><b>SLIDE: 3-8-9</b></p> <p><b>SLIDE: 3-8-10</b></p> <p>What should the distance be between the apparatus and the building in a collapse zone?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>b) Large cracks in exterior</li><li>c) Falling bricks, blocks, or mortar</li><li>d) Interior collapses</li><li>e) Falling debris<ul style="list-style-type: none"><li>1) Large pieces of glass</li></ul></li><li>4. Pre-incident planning can identify old or poorly maintained buildings<ul style="list-style-type: none"><li>a) Ornamental stars at intervals on exterior walls</li><li>b) Large bolts with washers on exterior walls</li></ul></li><li>L. Utilities<ul style="list-style-type: none"><li>1. Overhead electrical lines<ul style="list-style-type: none"><li>a) Identified</li><li>b) Illuminated if at night</li><li>c) Down electrical lines<ul style="list-style-type: none"><li>1) Assume they are live/hot</li></ul></li></ul></li><li>2. Gas lines<ul style="list-style-type: none"><li>a) If leaking, stay out of gas cloud</li></ul></li></ul></li></ul>	<p><b>SLIDE: 3-8-11</b></p> <p><b>SLIDE: 3-8-12</b></p>
<h3>III. WILDLAND INCIDENTS</h3> <ul style="list-style-type: none"><li>A. Can be dynamic<ul style="list-style-type: none"><li>1. Potential to relocate several time during the incident</li><li>2. Must be more flexible</li></ul></li><li>B. Structure protection factors<ul style="list-style-type: none"><li>1. Back in from last known turnaround<ul style="list-style-type: none"><li>a) Ensures easy exit from area</li></ul></li></ul></li></ul>	<p><b>SLIDE: 3-8-13</b></p> <p>Why should you back the apparatus into a driveway?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>2. Note any landmarks</li><li>3. Park off the roadway to allow for other apparatus or evacuating private vehicles</li><li>4. Avoid flammable vegetation<ul style="list-style-type: none"><li>a) Park in the burn if possible</li></ul></li><li>5. Position on leeward side of structure to protect apparatus from heat and embers</li><li>6. Position near structure to keep hoselines short<ul style="list-style-type: none"><li>a) But not too close</li></ul></li><li>7. Keep apparatus doors and windows closed</li><li>8. Identify and avoid potential hazards<ul style="list-style-type: none"><li>a) Power lines</li><li>b) Trees or snags</li><li>c) LPG tanks or other pressure vessels</li><li>d) Exposures that might burn</li></ul></li></ul> <p>C. Making a wildland fire attack</p> <ul style="list-style-type: none"><li>1. Wildland fire attack will incorporate a variety of positions</li><li>2. Driver/operator must be constantly aware of fire's current location and direction of travel</li><li>3. Smoke, high brush, and dense vegetation often limit vision</li><li>4. Safety is the top priority for crew and apparatus<ul style="list-style-type: none"><li>a) Reduce speed appropriately</li><li>b) Use spotters to help avoid obstacles<ul style="list-style-type: none"><li>1) Logs</li><li>2) Stumps and stobs</li><li>3) Rocks</li></ul></li></ul></li></ul>	<p><b>SLIDE: 3-8-14</b></p> <p>What is the highest priority during a wildland fire attack?</p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>4) Low hanging limbs</li><li>5) Ditches</li><li>6) Gullies</li><li>7) Unstable ground</li><li>8) Other apparatus in area<ul style="list-style-type: none"><li>• Engines</li><li>• Dozers</li><li>• Hand crew</li><li>• Aircraft</li></ul></li><li>c) Spotters should stay in view of the driver/operator at all times and be equipped with<ul style="list-style-type: none"><li>1) Handlights</li><li>2) Highly visible PPE</li><li>3) Radios</li></ul></li><li>5. Slipping, sliding, and overturning hazards can be present<ul style="list-style-type: none"><li>a) Steep hillsides</li><li>b) Loose or unstable ground</li><li>c) Sand, mud, or soft ground</li><li>d) Rocks</li><li>e) Shoulders of railroad beds</li></ul></li><li>6. Weight limitations<ul style="list-style-type: none"><li>a) Can be hazardous crossing bridges if bridge will not support weight of apparatus</li></ul></li><li>7. Keep hoselines as short as possible<ul style="list-style-type: none"><li>a) To reduce the chance of being tangled around objects</li></ul></li></ul>	<p><b>SLIDE: 3-8-15</b></p> <p>Why should you keep hoselines short?</p>









# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>1) Staging officer's apparatus' emergency lights should be left on to easily identify his or her location</li><li>d) Additional apparatus reports to staging officer</li><li>e) Staging officer communicates resources to IC</li><li>f) IC will communicate needs to staging officer<ul style="list-style-type: none"><li>1) Staging officer will then notify staged apparatus to respond</li></ul></li><li>g) Staging area<ul style="list-style-type: none"><li>1) Should be free of nonemergency traffic</li></ul></li><li>h) Apparatus in staging should turn off emergency lights when parked</li></ul> <p>B. Highways and freeways</p> <ul style="list-style-type: none"><li>1. Use warning devices in accordance with state law and department SOPs<ul style="list-style-type: none"><li>a) Keep warning lights to a minimum<ul style="list-style-type: none"><li>1) Prevent blinding or distracting other drivers</li></ul></li></ul></li><li>2. Follow law enforcement direction if they are on-scene and it is best for incident operations</li><li>3. Identify fluid spills from vehicles<ul style="list-style-type: none"><li>a) Position accordingly</li></ul></li><li>4. Angle apparatus across lanes<ul style="list-style-type: none"><li>a) Use as a barrier to protect personnel</li></ul></li></ul> <p><b>NOTE:</b> See Figure 5.73 on page 127 in <u>Pumping Apparatus Driver/Operator Handbook</u>, IFSTA, Second Edition.</p> <ul style="list-style-type: none"><li>5. Turn front wheels away from where fire fighters are working</li><li>6. Allow plenty of working space between fire fighters and apparatus</li><li>7. Consider positioning additional apparatus 150-200 feet behind initial apparatus position</li></ul>	<p><b>SLIDE: 3-8-22</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>8. Use extreme caution when personnel are exiting and entering the apparatus</p> <p style="padding-left: 20px;">a) Use same caution when deploying handlines and other equipment</p> <p>C. Hazardous materials</p> <p>1. Do not drive directly into scene without first attempting to identify the material</p> <p>2. Determine wind speed and direction</p> <p style="padding-left: 20px;">a) Ensures you are not downwind of the incident</p> <p>3. Use routes that will allow the apparatus to approach from uphill or upwind side</p> <p>4. Position apparatus to accommodate isolation and denial of entry if possible</p> <p>5. Identify hot, warm, and cold zones</p> <p style="padding-left: 20px;">a) Communicate to additional apparatus responding</p> <p>6. Avoid positioning in same location if incident is a bomb threat or potential terrorism</p> <p style="padding-left: 20px;">a) Devices could be located in these areas</p> <p>D. Near railroads</p> <p>1. Always treat railroad tracks as potential active lines</p> <p>2. Never position the apparatus across railroad tracks</p> <p>3. Position apparatus far enough away so that it will not be struck by a passing train</p> <p>4. Position apparatus on same side of tracks as incident</p> <p>5. If hose needs to be laid across tracks</p> <p style="padding-left: 20px;">a) Try and confirm train traffic has been halted</p>	<p><b>SLIDE: 3-8-23</b></p> <p>Why is wind direction important to consider during Haz Mat?</p> <p><b>SLIDE: 3-8-24</b></p>





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>a) Roll up windows</li><li>b) Lock cab and compartment doors</li><li>C. In staging<ul style="list-style-type: none"><li>1. Stay with apparatus at all times</li><li>2. Stay alert for possible problems<ul style="list-style-type: none"><li>a) Riot situations</li><li>b) Suspicious individuals or groups</li></ul></li></ul></li><li>D. Other<ul style="list-style-type: none"><li>1. Inspections<ul style="list-style-type: none"><li>a) Park in safe area<ul style="list-style-type: none"><li>1) Well lit if at night</li><li>2) Highly visible areas</li></ul></li><li>b) Lock apparatus</li></ul></li><li>2. Repairs/maintenance<ul style="list-style-type: none"><li>a) If outside shop area, lock apparatus</li><li>b) Roll up windows</li><li>c) In well lit areas if possible</li></ul></li><li>3. Drills<ul style="list-style-type: none"><li>a) Keep apparatus in view</li><li>b) Lock apparatus</li></ul></li><li>4. Public service venues<ul style="list-style-type: none"><li>a) Try to leave one person with apparatus</li><li>b) If unable to leave one person<ul style="list-style-type: none"><li>1) Park in safe area<ul style="list-style-type: none"><li>• Well lit if at night</li><li>• Highly visible areas</li></ul></li><li>2) Lock apparatus</li></ul></li></ul></li></ul></li></ul>	<p>What should you do if you must leave your apparatus?</p> <p><b>SLIDE: 3-8-28</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Whether you are involved in fire attack, wildland, EMS, hazardous materials, or rescue incidents, apparatus positioning is vital to the overall success of an incident. Water supply, structure and exposure locations, wind direction, terrain, and potential hazards are factors that can determine where the most optimal apparatus position should be. Knowing and using all of this information will help ensure a safe and efficient incident operation.

## ***EVALUATION:***

The student will complete the written test at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 99-131 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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<b>TOPIC:</b>	4-1: Introduction To The Mandatory Driving Exercises
<b>TIME FRAME:</b>	0:30 (Introduction only)
<b>LEVEL OF INSTRUCTION:</b>	Level II
<b>AUTHORITY:</b>	2009 NFPA 1002: Appendix A
<b>BEHAVIORAL OBJECTIVE:</b>	
<b>Condition:</b>	Given an activity
<b>Behavior:</b>	The student will demonstrate the ability to negotiate a fire apparatus through the mandatory driving exercises
<b>Standard:</b>	With a minimum 80% accuracy according to the information contained in <u>Fire Apparatus Driver/Operator 1A Student Supplement</u> , SFT, 2008 Edition, Pages 80-92 and <u>Pumping Apparatus Driver/Operator Handbook</u> , IFSTA, Second Edition, Pages 90-92
<b>MATERIALS NEEDED:</b>	<ul style="list-style-type: none"><li>• Writing board/pad with markers/erasers</li><li>• Appropriate audiovisual equipment</li><li>• Appropriate audiovisual materials</li><li>• Mandatory Driving Exercise 4-1-1: Diminishing Clearance Exercise</li><li>• Mandatory Driving Exercise 4-1-2: Serpentine Exercise</li><li>• Mandatory Driving Exercise 4-1-3: Three-Point Turnaround Exercise</li><li>• Mandatory Driving Exercise 4-1-4: Station Apparatus Backing Exercise</li><li>• Mandatory Driving Exercise 4-1-5: Alley Dock Exercise</li></ul>
<b>REFERENCES:</b>	<ul style="list-style-type: none"><li>• <u>Fire Apparatus Driver/Operator 1A Student Supplement</u>, SFT, 2008 Edition, Pages 80-92</li><li>• <u>Pumping Apparatus Driver/Operator Handbook</u>, IFSTA, Second Edition, Pages 90-92</li><li>• <u>NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications</u>, 2003 Edition, Appendix A</li></ul>
<b>PREPARATION:</b>	Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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**A**ttention (attract)

**C**uriosity (arouse)

**I**nterest (create)

**D**esire (stimulate)

**B**egin

**A**ssociation

**S**tudents

**E**xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p>4. Wait for the end measurement to be taken</p> <p>5. When instructed, back the apparatus through the lane without touching the side markers</p> <p>6. Bring the apparatus to a complete stop</p> <p style="padding-left: 20px;">a) After clearing entry markers</p> <p>D. Scoring criteria</p> <ol style="list-style-type: none"> <li>1. 100 points possible</li> <li>2. 5 points subtracted each time the apparatus touches a side marker</li> <li>3. 5 points subtracted each time the apparatus stops while in the diminishing alley</li> <li>4. 10 points subtracted if apparatus stops 6-12 inches before the end marker or 20 points subtracted if apparatus stops more &gt;12-18 inches before the end marker. The student fails if the apparatus stops &gt;18 inches from the end marker</li> <li style="padding-left: 20px;">a) Distance is measure from the end marker to the front bumper.</li> <li>5. The student fails if the apparatus touches the end marker</li> <li>6. The student fails if a speed of 15-20 mph is not maintained during the exercise</li> <li>7. The student fails if he or she does not maintain control of the apparatus during the exercise</li> <li>8. Passing score is 80%</li> </ol> <p><b>III. SERPENTINE EXERCISE</b></p> <p>A. Overview</p> <ol style="list-style-type: none"> <li>1. Simulates maneuvering around parked and stopped vehicles and tight corners</li> <li>2. The driver/operator maneuvers the apparatus forward and backward in one continuous motion without touching any of the course markers</li> </ol>	<p><b>SLIDE: 4-1-5</b></p> <p><b>SLIDE: 4-1-6</b></p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>5. The student fails if he or she exceeds three directional changes as outlined in the diagram</li> <li>6. The student fails if he or she does not maintain control of the apparatus during the exercise</li> <li>7. Passing score is 80%</li> </ul>	<p><b>SLIDE: 4-1-11</b></p> <p><b>SLIDE: 4-1-12</b></p>
<p><b>V. STATION APPARATUS BACKING EXERCISE</b></p> <p>A. Overview</p> <ul style="list-style-type: none"> <li>1. Move the apparatus backward within a restricted area and into a fire station without striking the walls</li> <li>2. Bring the apparatus to a smooth stop               <ul style="list-style-type: none"> <li>a) Close to a rear wall</li> </ul> </li> </ul> <p>B. Course description</p> <ul style="list-style-type: none"> <li>1. Simulated street 30 feet wide</li> <li>2. Apron off the street is 20 feet deep and 24 feet wide</li> <li>3. Engine bay off the apron is 12 feet wide x apparatus length plus 10 feet for depth</li> </ul> <p>C. Apparatus operation</p> <ul style="list-style-type: none"> <li>1. Drive down the simulated street in a straight line               <ul style="list-style-type: none"> <li>a) Past the apron located on your left</li> </ul> </li> <li>2. Bring the apparatus to a complete stop               <ul style="list-style-type: none"> <li>a) After passing the apron opening</li> </ul> </li> <li>3. Back the apparatus into the designated bay</li> <li>4. Bring the apparatus to a complete stop               <ul style="list-style-type: none"> <li>a) After the front bumper clears the first two 48-inch markers</li> </ul> </li> <li>5. Drive the apparatus forward               <ul style="list-style-type: none"> <li>a) Making a right turn</li> </ul> </li> </ul>	<p><b>SLIDE: 4-1-13</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>6. Bring the apparatus to a complete stop<ul style="list-style-type: none"><li>a) After finishing the turn</li></ul></li><li>7. Back the apparatus into the designated bay</li><li>8. Bring the apparatus to a complete stop<ul style="list-style-type: none"><li>a) After the front bumper clears the first two 48-inch markers</li></ul></li><li>D. Scoring criteria<ul style="list-style-type: none"><li>1. 100 points possible</li><li>2. 5 points subtracted each time the apparatus stops within the alley before reaching the end</li><li>3. The student fails if the apparatus touches a marker</li><li>4. The student fails if he or she does not maintain control of the apparatus during the exercise</li><li>5. Passing score is 80%</li></ul></li></ul>	<p><b>SLIDE: 4-1-14</b></p> <p><b>SLIDE: 4-1-15</b></p>
<h3>VI. ALLEY DOCK EXERCISE</h3> <ul style="list-style-type: none"><li>A. Overview<ul style="list-style-type: none"><li>1. Move the apparatus backward within a restricted area and into an alley, dock, or fire station without striking the walls</li><li>2. Bring the apparatus to a smooth stop<ul style="list-style-type: none"><li>a) Close to a rear wall</li></ul></li></ul></li><li>B. Course description<ul style="list-style-type: none"><li>1. Restricted area is 40 feet wide</li><li>2. Alley dock is 12 feet x 20 feet</li><li>3. Rear center marker indicates the end of the alley dock</li></ul></li><li>C. Apparatus operation<ul style="list-style-type: none"><li>1. Drive past the alley dock area<ul style="list-style-type: none"><li>a) Located on the driver's left side</li></ul></li></ul></li></ul>	<p><b>SLIDE: 4-1-16</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ol style="list-style-type: none"> <li>2. Bring the apparatus to a complete stop               <ol style="list-style-type: none"> <li>a) After passing the alley dock area</li> </ol> </li> <li>3. Back the apparatus into the alley dock area               <ol style="list-style-type: none"> <li>a) Hard left turn</li> </ol> </li> <li>4. Bring the apparatus to a complete stop               <ol style="list-style-type: none"> <li>a) Within 18 inches of the center marker</li> </ol> </li> <li>5. Set the parking brake</li> <li>6. When instructed, drive forward               <ol style="list-style-type: none"> <li>a) Out of the alley dock area</li> </ol> </li> <li>7. Repeat the exercise from opposite direction</li> </ol> <p><b>NOTE:</b> This exercise should be practiced while backing from both sides of the alley dock area. The student will be tested while backing only from the left side.</p> <p>D. Scoring criteria</p> <ol style="list-style-type: none"> <li>1. 100 points possible</li> <li>2. 5 points subtracted each time the apparatus touches a marker in the restricted area</li> <li>3. 10 points subtracted if apparatus stops 6-12 inches before the end marker</li> <li>4. Or 20 points subtracted if apparatus stops more &gt;12-18 inches before the end marker</li> <li>5. The student fails if the apparatus stops &gt;18 inches from the end marker               <ol style="list-style-type: none"> <li>a) Distance is measure from the end marker to the front bumper.</li> </ol> </li> <li>6. The student fails if the apparatus touches the end marker</li> <li>7. The student fails if the apparatus touches a side marker</li> <li>8. The student fails if the apparatus breaks the plane denoted by the markers</li> <li>9. The student fails if he or she does not maintain control of the apparatus during the exercise</li> <li>10. Passing score is 80%</li> </ol>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

PRESENTATION	APPLICATION
<p><b>VII. SAFETY CONSIDERATIONS</b></p> <ul style="list-style-type: none"><li>A. Check your apparatus before operating<ul style="list-style-type: none"><li>1. Ensure everything is in proper operating condition</li></ul></li><li>B. Check the condition of the surface where the exercise will take place<ul style="list-style-type: none"><li>1. Cracks</li><li>2. Holes</li><li>3. Fluid spills<ul style="list-style-type: none"><li>a) Oil</li><li>b) Water</li><li>c) Fuel</li></ul></li><li>4. Ice</li><li>5. Foreign objects<ul style="list-style-type: none"><li>a) Nails</li><li>b) Glass</li></ul></li></ul></li><li>C. Wear appropriate PPE<ul style="list-style-type: none"><li>1. As required by testing department/college SOPs</li></ul></li><li>D. Review and follow all instructions with your evaluator before beginning any exercise</li><li>E. Operate the apparatus with due regard at all times<ul style="list-style-type: none"><li>1. Maintain control at all times</li></ul></li><li>F. Use spotters for safety<ul style="list-style-type: none"><li>1. Cannot be used as backers</li></ul></li><li>G. Check your apparatus after completing the exercise<ul style="list-style-type: none"><li>1. Advise staff of any problems found</li></ul></li></ul>	<p><b>SLIDE: 4-1-17</b></p> <p><b>SLIDE: 4-1-18</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Although no driver/operator can prepare for every driving situation that can occur in the field, understanding apparatus dynamics and how they affect apparatus control on the roadway is imperative. Just as important is the opportunity to apply the knowledge of apparatus dynamics in a controlled environment to develop the skills necessary to drive safely and efficiently.

## ***EVALUATION:***

The student will complete the mandatory driving exercises at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 80-92 and Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 90-92 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## MANDATORY DRIVING EXERCISE 4-1-1

**EXERCISE:**

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Diminishing Clearance Exercise

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This exercise measures the students' ability to steer the apparatus in a straight line, to judge distances from wheel to object, and to stop at a designated finish line. The speed at which the apparatus is driven is fast enough to require the students to exercise quick judgment.

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**TIME FRAME:**

None

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**AUTHORITY:**

2009 NFPA 1002: Section A.4.3.5

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**MATERIALS NEEDED:**

- Fire apparatus
  - 8,250 square foot area
  - 48-inch pillars (9)
  - Stopwatch
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. Student should accelerate to the course speed of 15-20 mph in the approach area.
  2. To ensure this speed is maintained, it should take the student no more than 3 seconds to travel the 75-foot lane.
  3. Provide adequate space to perform the exercise without risk of collision.
- 

**STUDENT DIRECTIONS:**

1. Accelerate to the course speed in the approach area.
  2. Maneuver the apparatus through the lane without touching the side markers.
  3. At the designated end marker, stop the apparatus with the front bumper short of the end marker.
  4. Wait for the end measurement to be taken.
  5. When instructed, back the apparatus through the lane without touching the side markers.
  6. Stop the apparatus after clearing entry markers.
-

# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

## SCORING:

100 points possible

80% passing

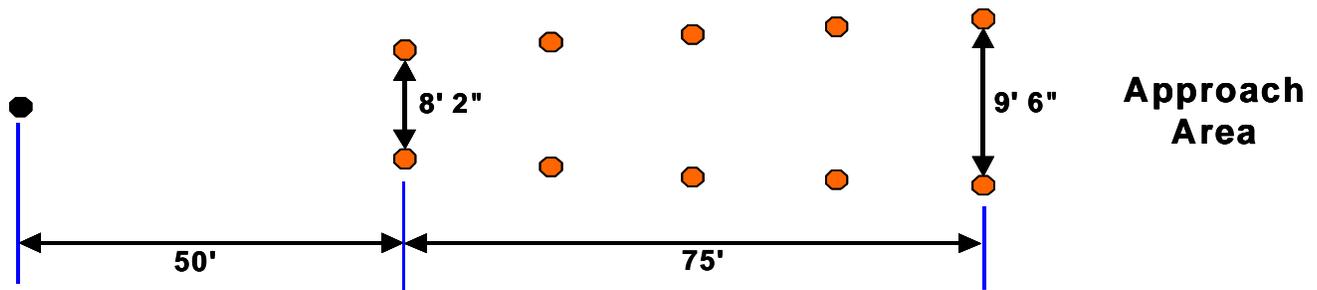
1. **5 points** subtracted each time the apparatus touches a side marker.
2. **5 points** subtracted each time the apparatus stops before reaching the end marker.
3. **10 points** subtracted if apparatus stops 6-12 inches before the end marker or **20 points** subtracted if apparatus stops more >12-18 inches before the end marker. The student **fails** if the apparatus stops >18 inches from the end marker.

Distance is measure from the end marker to the front bumper.

4. The student **fails** if the apparatus touches the end marker.
5. The student **fails** if a speed of 15-20 mph is not maintained during the exercise.
6. The student **fails** if he or she does not maintain control of the apparatus during the exercise.

## SITE PREPARATION:

- Markers are set up as shown.
- Unless indicated, marker spacing shall be of equal distance.
- Two rows of side markers form a lane 75-feet long.
- Beginning width of 9 inches wider than the apparatus.
- Lane diminishes to a clearance width of 1 inch.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## MANDATORY DRIVING EXERCISE 4-1-2

**EXERCISE:**

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Serpentine Exercise

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This exercise simulates maneuvering around parked and stopped vehicles and tight corners. The students maneuver the apparatus forward and backward in one continuous motion without touching any of the course markers.

---

**TIME FRAME:**

None

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**AUTHORITY:**

2009 NFPA 1002: Section A.4.3.3

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**MATERIALS NEEDED:**

- Fire apparatus
  - 8,000 square foot area
  - 48-inch pillars (3)
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. For the purposes of this exercise, apparatus length is measured from the front bumper to the end of the tailboard.
  2. For the purposes of this exercise, apparatus width is 8 feet.
  3. Provide adequate space to perform the exercise without risk of collision.
- 

**STUDENT DIRECTIONS:**

1. Drive the apparatus along the left side of the markers in a straight line.
  2. Stop just beyond the last marker.
  3. Back the apparatus between the markers by passing to the left of Marker #1, to the right of Marker #2, and to the left of Marker #3.
  4. Stop the apparatus.
  5. Drive the apparatus forward between the markers by passing to the right of Marker #3, to the left of Marker #2, and to the right of Marker # 1.
-

# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**SCORING:**

---

**100 points possible**

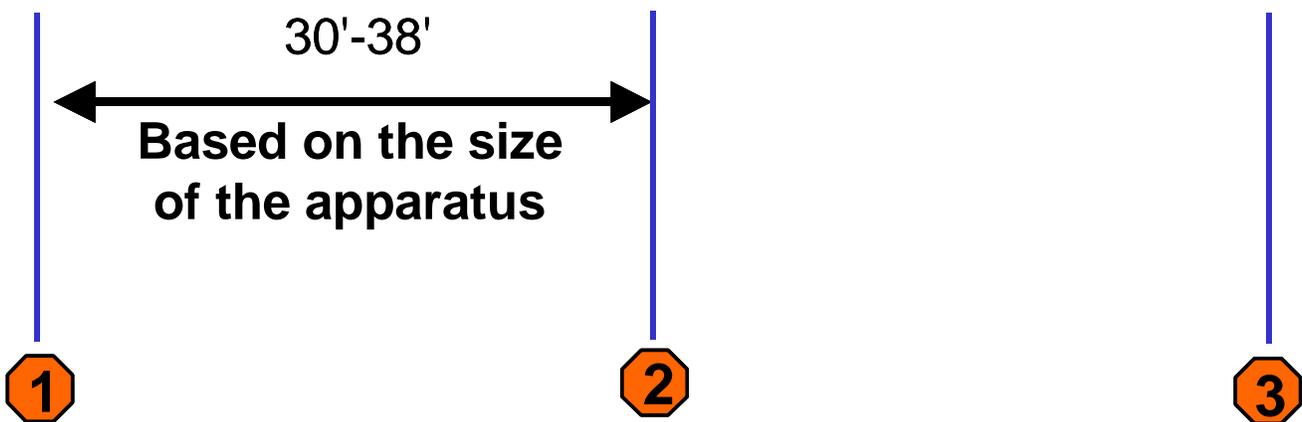
**80% passing**

---

1. **5 points** subtracted for each marker passed on the wrong side.
  2. **5 points** subtracted each time the apparatus stops during the exercise.
  3. The student **fails** if the apparatus touches a marker.
  4. The student **fails** the performance exam if he or she does not maintain control of the apparatus during the exercise.
- 

**SITE PREPARATION:**

- Markers are set up as shown.
  - Place three markers in a straight line, equal distance apart.
  - Ensure adequate space is available on both sides of the markers for the apparatus to move freely.
- 





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## MANDATORY DRIVING EXERCISE 4-1-3

**EXERCISE:**

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Three-Point Turnaround Exercise

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This exercise tests the students' ability to turn the apparatus around within a confined space without striking obstacles.

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**TIME FRAME:**

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None

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**AUTHORITY:**

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2009 NFPA 1002: Section A.4.3.4

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**MATERIALS NEEDED:**

- Fire apparatus
  - 5,000 square foot area
  - 18-inch cones (16)
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. The turn is accomplished within a 50'x100' area. Provide adequate space to perform the exercise without risk of collision.
- 

**STUDENT DIRECTIONS:**

1. Drive forward through the 12-foot opening in the center of one of the 50-foot legs.
  2. Turn the apparatus either direction (left or right).
  3. Bring the apparatus to a complete stop without touching a marker or extending beyond the course boundaries.
  4. Back the apparatus far enough to accommodate the turn to proceed out without touching a marker or extending beyond the course boundaries.
  5. Make the turn.
  6. Proceed to the exit point.
  7. Bring the apparatus to a complete stop after clearing the exit point.
-

# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## SCORING:

100 points possible

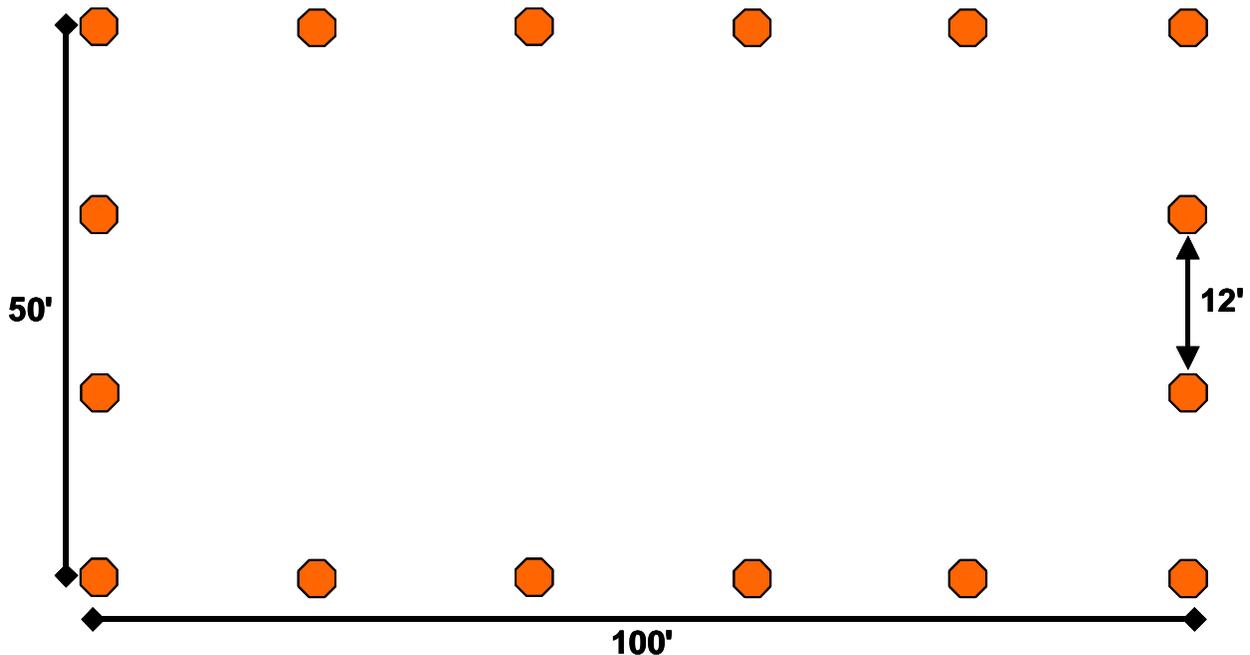
80% passing

---

1. **10 points** subtracted if the wheels are turned when the apparatus is stopped.
  2. The student **fails** if the apparatus touches a marker.
  3. The student **fails** if the apparatus travels outside the exercise boundaries.
  4. The student **fails** if he or she exceeds three directional changes as outlined in the diagram.
  5. The student **fails** if he or she does not maintain control of the apparatus during the exercise.
- 

## SITE PREPARATION:

- Markers are set up as shown.
  - Align markers in straight lines, equal distance apart.
  - Size of exercise is 50'x100'.
  - Width of approach gate is 12 feet.
- 





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## **MANDATORY DRIVING EXERCISE 4-1-4**

Exercise 4-1-5, the Alley Dock, may be substituted for this exercise.

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**EXERCISE:**

Station Apparatus Backing Exercise

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This exercise tests the students' ability to move the apparatus backward within a restricted area and into a fire station without striking the walls and to bring the apparatus to a smooth stop close to a rear wall.

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**TIME FRAME:**

None

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**AUTHORITY:**

2009 NFPA 1002: Section A.4.3.2(b)

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**MATERIALS NEEDED:**

- Fire apparatus
  - 5,000 square foot area
  - 48-inch pillars (4)
  - 18-inch cones (14)
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. Provide adequate space to perform the exercise without risk of collision.
- 

**STUDENT DIRECTIONS:**

1. Drive down the simulated street in a straight line, past the driveway apron located on your left.
  2. Bring the apparatus to a complete stop after passing the driveway apron opening.
  3. Back the apparatus into the designated bay.
  4. Bring the apparatus to a complete stop after the front bumper clears the first two 48-inch pillars.
  5. Drive the apparatus forward, making a right turn.
  6. Bring the apparatus to a complete stop after finishing the turn.
  7. Back the apparatus into the designated bay.
  8. Bring the apparatus to a complete stop after the front bumper clears the first two 48-inch pillars.
-

# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

## SCORING:

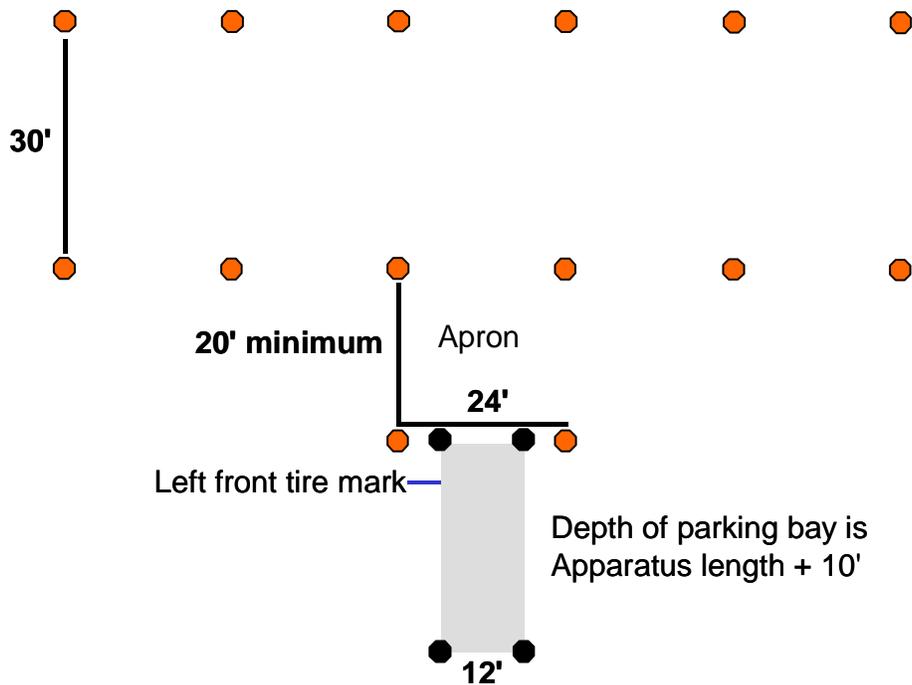
100 points possible

80% passing

1. **5 points** subtracted each time the apparatus stops within the alley before reaching the end.
2. The student **fails** if the apparatus touches a marker.
3. The student **fails** if he or she does not maintain control of the apparatus during the exercise.

## SITE PREPARATION:

- Markers are set up as shown.
- Unless indicated, marker spacing shall be of equal distance.
- The boundary lines for the restricted area should be 30 feet wide, similar to curb-to-curb distance
- Along one side and perpendicular is another simulated area 20' x 24' and again reduced to 12 feet x vehicle length plus 10 feet.
- Each simulated area shall be centered end from end of next largest area.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## MANDATORY DRIVING EXERCISE 4-1-5

Exercise 4-1-4, Station Apparatus Backing, may be substituted for this exercise.

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**EXERCISE:**

Alley Dock Exercise

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This exercise tests the students' ability to move the apparatus backward within a restricted area and into an alley, dock, or fire station without striking the walls and to bring the apparatus to a smooth stop close to a rear wall.

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**TIME FRAME:**

None

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**AUTHORITY:**

2009 NFPA 1002: Section A.4.3.2(a)

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**MATERIALS NEEDED:**

- Fire apparatus
  - 6,000 square foot area (60x100)
  - 48-inch pillars (5)
  - 18-inch cones (12)
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. Provide adequate space to perform the exercise without risk of collision.
- 

**STUDENT DIRECTIONS:**

1. Drive past the alley dock area located on the your left.
  2. Bring the apparatus to a complete stop after passing the alley dock area.
  3. Back the apparatus into the alley dock area, making a hard left turn.
  4. Bring the apparatus to a complete stop within 18 inches of the center marker.
  5. Set the parking brake.
  6. When instructed, drive forward out of the alley dock area.
- 

**SCORING:**

**100 points possible**

**80% passing**

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1. **5 points** subtracted each time the apparatus stops within the alley before reaching the end marker.
  2. **10 points** subtracted if apparatus stops 6-12 inches before the end marker or **20 points** subtracted if apparatus stops more >12-18 inches before the end marker.
-

**EXERCISE:**

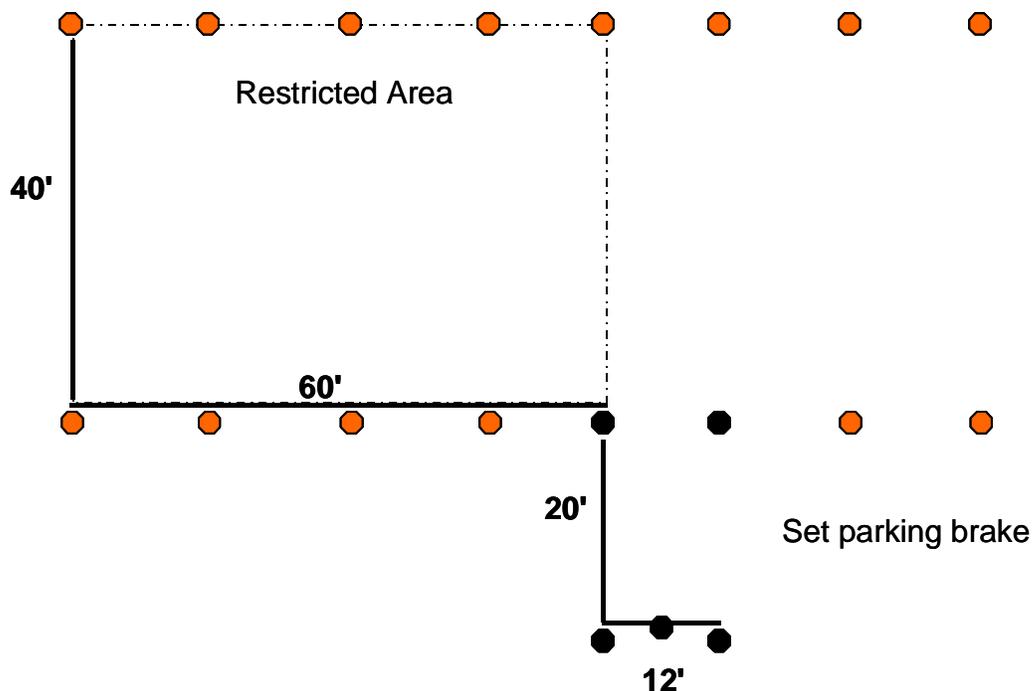
Alley Dock Exercise

The student **fails** if the apparatus stops >18 inches from the end marker. Distance is measured from the end marker to the front bumper.

3. The student **fails** if the apparatus touches the end marker.
4. The student **fails** if the apparatus touches a side marker.
5. The student **fails** if he or she breaks the plane denoted by the markers.
6. The student **fails** if he or she does not maintain control of the apparatus during the exercise.

**SITE PREPARATION:**

- Markers are set up as shown.
- Markers shall be aligned in straight lines.
- Unless indicated, marker spacing shall be of equal distance.
- The boundary lines for the restricted area should be 40-feet wide, similar to curb-to-curb distance.
- Along one side and perpendicular is another simulated area 12' x 20'.
- Smaller simulated area is 60 feet from the end of the opposite approach.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

## MANDATORY DRIVING EXERCISES SCORING SHEET

STUDENT: \_\_\_\_\_ DATE: \_\_\_\_\_

4-1-1: DIMINISHING CLEARANCE EXERCISE		Penalty points subtracted from 100 possible points.		
	Rated Component	Frequency	Value	100
1.	Apparatus touches a side marker		5	
2.	Apparatus stops before reaching the end marker		5	
3.	Apparatus stops 0-6 inches before the end marker	<input type="checkbox"/> 0-6	0	
	OR Apparatus stops >6-12 inches before the end marker	<input type="checkbox"/> >6-12	10	
	OR Apparatus stops >12-18 inches before the end marker	<input type="checkbox"/> >12-18	20	
	OR Apparatus stops >18 inches before the end marker	<input type="checkbox"/> >18		Failure
4.	Apparatus touches the end marker	<input type="checkbox"/> Yes		Failure
5.	Speed is not maintained (>3 seconds in lane)	<input type="checkbox"/> Yes		Failure
6.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		Failure

TOTAL POINTS: \_\_\_\_\_

PASSING SCORE: 80

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

PASS/FAIL:  Pass  
 Fail  
 Retest

### 4-1-1 NOTES:

4-1-2: SERPENTINE EXERCISE		Penalty points subtracted from 100 possible points.		
	Rated Component	Frequency	Value	100
1.	Apparatus passes a marker on the wrong side		5	
2.	Apparatus stops during the exercise		5	
3.	Apparatus touches a marker	<input type="checkbox"/> Yes		Failure
4.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		Failure

TOTAL POINTS: \_\_\_\_\_

PASSING SCORE: 80

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

PASS/FAIL:  Pass  
 Fail  
 Retest

### 4-1-2 NOTES:



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

STUDENT: \_\_\_\_\_

DATE: \_\_\_\_\_

<b>4-1-3: THREE-POINT TURNAROUND EXERCISE</b>		Penalty points subtracted from 100 possible points.		
	<b>Rated Component</b>	<b>Frequency</b>	<b>Value</b>	<b>100</b>
1.	Wheels turned while the apparatus is stopped		10	
2.	Apparatus touches a marker	<input type="checkbox"/> Yes		Failure
3.	Apparatus travels outside the exercise boundaries	<input type="checkbox"/> Yes		Failure
4.	Driver/operator exceeds three directional changes	<input type="checkbox"/> Yes		Failure
5.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		Failure

**TOTAL POINTS:** \_\_\_\_\_

**PASSING SCORE:** 80

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Pass

PASS/FAIL:  Fail

Retest

**4-1-3 NOTES:**

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<b>4-1-4: STATION APPARATUS BACKING EXERCISE</b>		Penalty points subtracted from 100 possible points.		
	<b>Rated Component</b>	<b>Frequency</b>	<b>Value</b>	<b>100</b>
1.	Apparatus stops within the alley before reaching the end		5	
2.	Apparatus touches a marker	<input type="checkbox"/> Yes		Failure
3.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		Failure

**TOTAL POINTS:** \_\_\_\_\_

**PASSING SCORE:** 80

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Pass

PASS/FAIL:  Fail

Retest

**4-1-4 NOTES:**

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# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

STUDENT: \_\_\_\_\_

DATE: \_\_\_\_\_

<b>4-1-5: ALLEY DOCK EXERCISE</b>		Penalty points subtracted from 100 possible points.		
	<b>Rated Component</b>	<b>Frequency</b>	<b>Value</b>	<b>100</b>
1.	Apparatus stops within the alley before reaching the end marker		5	
2.	Apparatus stops 0-6 inches before the end marker	<input type="checkbox"/> 0-6	0	
	<b>OR</b> Apparatus stops >6-12 inches before the end marker	<input type="checkbox"/> >6-12	10	
	<b>OR</b> Apparatus stops >12-18 inches before the end marker	<input type="checkbox"/> >12-18	20	
	<b>OR</b> Apparatus stops >18 inches before the end marker	<input type="checkbox"/> >18		Failure
3.	Apparatus touches the end marker	<input type="checkbox"/> Yes		Failure
4.	Apparatus touches a side marker	<input type="checkbox"/> Yes		Failure
5.	Apparatus breaks the plane denoted by the markers	<input type="checkbox"/> Yes		Failure
6.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		Failure

**TOTAL POINTS:** \_\_\_\_\_

**PASSING SCORE:** 80

Pass

PASS/FAIL:  Fail

Retest

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

**4-1-5 NOTES:**



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

---

**TOPIC:** 5-1: Introduction To The Optional Driving Exercises

**TIME FRAME:** 0:15 (Introduction only)

**LEVEL OF INSTRUCTION:** Level II

**AUTHORITY:** 2009 NFPA 1002: Appendix A

**BEHAVIORAL OBJECTIVE:**

**Condition:** Given an activity

**Behavior:** The student will demonstrate the ability to negotiate a fire apparatus through the mandatory driving exercises

**Standard:** With a minimum 80% accuracy according to the information contained in the Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 93-102

**MATERIALS NEEDED:**

- Writing board/pad with markers/erasers
- Appropriate audiovisual equipment
- Appropriate audiovisual materials
- Optional Driving Exercise 5-1-1: Lane Change Exercise
- Optional Driving Exercise 5-1-2: Offset Alley Exercise
- Optional Driving Exercise 5-1-3: Dogleg Exercise
- Optional Driving Exercise 5-1-4: Parallel Parking Exercise

**REFERENCES:**

- Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 93-102

**PREPARATION:**

Each instructor must develop a motivational statement on why the student should learn the upcoming material. The purpose is to establish relevancy of the lesson to the audience. The ACID BASE acronym can be used to help develop student motivation.

<b>A</b> ttention (attract)	<b>B</b> egin
<b>C</b> uriosity (arouse)	<b>A</b> ssociation
<b>I</b> nterest (create)	<b>S</b> tudents
<b>D</b> esire (stimulate)	<b>E</b> xperience

Cite examples or use related illustrations of near-miss incidents, injuries, or fatalities. Write this section "from the heart." Be creative! Have fun with it or be serious, but remember the goal is to stimulate student motivation.





# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>2) Six on the outside of the curve</li><li>3) Evenly spaced</li><li>b) Widens to 12 feet wide at the last two markers</li></ul> <p>C. Apparatus operation</p> <ul style="list-style-type: none"><li>1. Time begins when the instructor signals to proceed through the entry gate</li><li>2. Time ends when the front bumper of the apparatus passes the exit gate</li><li>3. Lane assignments will be displayed just before the apparatus enters the first lane</li><li>4. Maneuver the apparatus through the assigned lanes</li><li>5. Time allow to drive from entry gate to exit gate is 25 seconds</li><li>6. Proceed through the exit curve until the apparatus clears the last set of markers</li><li>7. Bring the apparatus to a complete stop</li></ul> <p>D. Scoring criteria</p> <ul style="list-style-type: none"><li>1. 100 points possible</li><li>2. 5 points subtracted for each marker touched by the apparatus</li><li>3. The student fails if the apparatus stops or fails to maintain a constant forward motion within the course</li><li>4. The student fails if he or she does not take the lane marked by the evaluator</li><li>5. The student fails if time exceeds 25 seconds</li><li>6. The student fails if he or she does not maintain control of the apparatus during the exercise</li><li>7. Passing score is 80%</li></ul>	<p><b>SLIDE: 5-1-5</b></p>







# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"> <li>5. Diminishing lane               <ul style="list-style-type: none"> <li>a) 50 feet long</li> </ul> </li> <li>6. Last set of markers in diminishing lane               <ul style="list-style-type: none"> <li>a) 8 feet-6 inches wide</li> </ul> </li> <li>7. Center marker at end of diminishing lane</li> <li>C. Apparatus operation               <ul style="list-style-type: none"> <li>1. Maintain a constant speed throughout the exercise</li> <li>2. Drive through the entry gate</li> <li>3. Drive through first direction gate</li> <li>4. Turn in the changing space</li> <li>5. Align apparatus to enter next direction gate</li> <li>6. Proceed through all direction gates in the same manner</li> <li>7. Enter the diminishing gate</li> <li>8. Bring the apparatus to a complete stop                   <ul style="list-style-type: none"> <li>a) Before touching the center marker</li> </ul> </li> <li>9. Back the apparatus through the course following the same path                   <ul style="list-style-type: none"> <li>a) Maintaining a constant speed</li> </ul> </li> <li>10. Bring the apparatus to a complete stop after the front bumper passes the entry/exit gate</li> <li>11. Minimum time to complete this exercise is 0:50 seconds</li> <li>12. Maximum time to complete this exercise: 1:15</li> </ul> </li> <li>D. Scoring criteria               <ul style="list-style-type: none"> <li>1. 100 points possible</li> <li>2. 5 points subtracted for each marker touched by the apparatus</li> <li>3. The student fails if he or she completes the course in less than 0:50 seconds</li> <li>4. The student fails he or she completes the exercise in more than 1:15 minutes</li> </ul> </li> </ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>5. The student fails if he or she does not maintain control of the apparatus during the exercise</li><li>6. Passing score is 80%</li></ul>	<p><b>SLIDE: 5-1-11</b></p> <p><b>SLIDE: 5-1-12</b></p>
<p><b>V. PARALLEL PARKING EXERCISE</b></p> <p>A. Overview</p> <ul style="list-style-type: none"><li>1. Simulates aligning an apparatus for hydrant hookups or elevating device operations</li><li>2. Parallel park within 18 inches of the curb</li><li>3. Align the apparatus with the curb without hitting the curb or markers and with a minimum loss of apparatus motion</li></ul> <p>B. Course description</p> <ul style="list-style-type: none"><li>1. Four markers<ul style="list-style-type: none"><li>a) 9 feet wide</li><li>b) Distance equals apparatus length plus width</li></ul></li><li>2. Two markers next to an actual curb<ul style="list-style-type: none"><li>a) Or use a line to simulate a curb</li></ul></li></ul> <p>C. Apparatus operation</p> <ul style="list-style-type: none"><li>1. Drive the apparatus along the left side of the designated parking area</li><li>2. Bring the apparatus to a complete stop after the rear bumper passes the last markers</li><li>3. Back the apparatus between the markers<ul style="list-style-type: none"><li>a) Turning as needed</li></ul></li><li>4. Bring the apparatus to a complete stop before touching the markers or exceeding the parking area boundaries</li><li>5. Drive the apparatus forward to straighten, if needed</li><li>6. Bring the apparatus to a complete stop</li></ul>	<p><b>SLIDE: 5-1-13</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>7. Set the parking brake</li><li>8. Apparatus must be within 18 inches of the curb</li></ul> <p>D. Scoring criteria</p> <ul style="list-style-type: none"><li>1. 100 points possible</li><li>2. 5 points subtracted if apparatus tire brushes the curb</li><li>3. The student fails if the apparatus touches a marker</li><li>4. The student fails if the rear wheels roll up and onto the curb</li><li>5. The student fails if the front or rear wheels are &gt;18 inches from the curb when the parking brake is set</li><li>6. The student fails if he or she exceeds two directional changes as outlined in the diagram</li><li>7. The student fails if he or she does not maintain control of the apparatus during the exercise</li><li>8. Passing score is 80%</li></ul> <p><b>VI. SAFETY CONSIDERATIONS</b></p> <ul style="list-style-type: none"><li>A. Check your apparatus before operating<ul style="list-style-type: none"><li>1. Ensure everything is in proper operating condition</li></ul></li><li>B. Check the condition of the surface where the exercise will take place<ul style="list-style-type: none"><li>1. Cracks</li><li>2. Holes</li><li>3. Fluid spills<ul style="list-style-type: none"><li>a) Oil</li><li>b) Water</li><li>c) Fuel</li></ul></li><li>4. Ice</li></ul></li></ul>	<p><b>SLIDE: 5-1-14</b></p> <p><b>SLIDE: 5-1-15</b></p>



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>5. Foreign objects<ul style="list-style-type: none"><li>a) Nails</li><li>b) Glass</li></ul></li><li>C. Wear appropriate PPE<ul style="list-style-type: none"><li>1. As required by testing department/college SOPs</li></ul></li><li>D. Review and follow all instructions with your evaluator before beginning any exercise</li><li>E. Operate the apparatus with due regard at all times<ul style="list-style-type: none"><li>1. Maintain control at all times</li></ul></li><li>F. Use spotters for safety<ul style="list-style-type: none"><li>1. Cannot be used as backers</li></ul></li><li>G. Check your apparatus after completing the exercise<ul style="list-style-type: none"><li>1. Advise staff of any problems found</li></ul></li></ul>	



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## ***SUMMARY:***

Although no driver/operator can prepare for every driving situation that can occur in the field, understanding apparatus dynamics and how they affect apparatus control on the roadway is imperative. Just as important is the opportunity to apply the knowledge of apparatus dynamics in a controlled environment to develop the skills necessary to drive safely and efficiently.

## ***EVALUATION:***

The student will complete the optional driving exercises at a time determined by the instructor.

## ***ASSIGNMENT:***

Review your notes and read Fire Apparatus Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 93-102 in order to prepare yourself for the upcoming test. Study for our next session.



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

---

## OPTIONAL DRIVING EXERCISE 5-1-1

**EXERCISE:**

---

Lane Change Exercise

---

This exercise tests the students' ability to change lanes and judge distances from wheel to object while moving at a constant speed.

---

**TIME FRAME:**

25 seconds maximum

---

**AUTHORITY:**

SBFS

---

**MATERIALS NEEDED:**

- Fire apparatus
  - 1 assistant instructor
  - 36,000 square foot area
  - 48-inch pillars (4)
  - 18-inch cones (59)
  - 8½"x11" numbered cards (8)
    - "1" (2)
    - "2" (2)
    - "3" (2)
    - "4" (1)
    - "5" (1)
  - 8½"x11" "STOP" card (1)
  - Stopwatch
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. Time begins when the instructor signals the student to proceed through the entry gate (48-inch pillars).
  2. Time ends when the front bumper of the apparatus passes the exit gate (48-inch pillars).
  3. Display the lane assignment cards just before the apparatus enters the first lane.
  4. Student adjusts accordingly to take the assigned lanes.
-



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

---

**EXERCISE:**

---

Lane Change Exercise

---

**STUDENT DIRECTIONS:**

1. Time begins when the instructor signals you to proceed through the entry gate.
  2. Time ends when the front bumper of the apparatus passes the exit gate.
  3. Lane assignments will be displayed just before the apparatus enters the first lane.
  4. Maneuver the apparatus through the assigned lanes.
  5. You have 25 seconds from entry gate to exit gate.
  6. Proceed through the exit curve until the apparatus clears the last set of markers.
  7. Bring the apparatus to a complete stop.
- 

**SCORING:**

**100 points possible**

**80% passing**

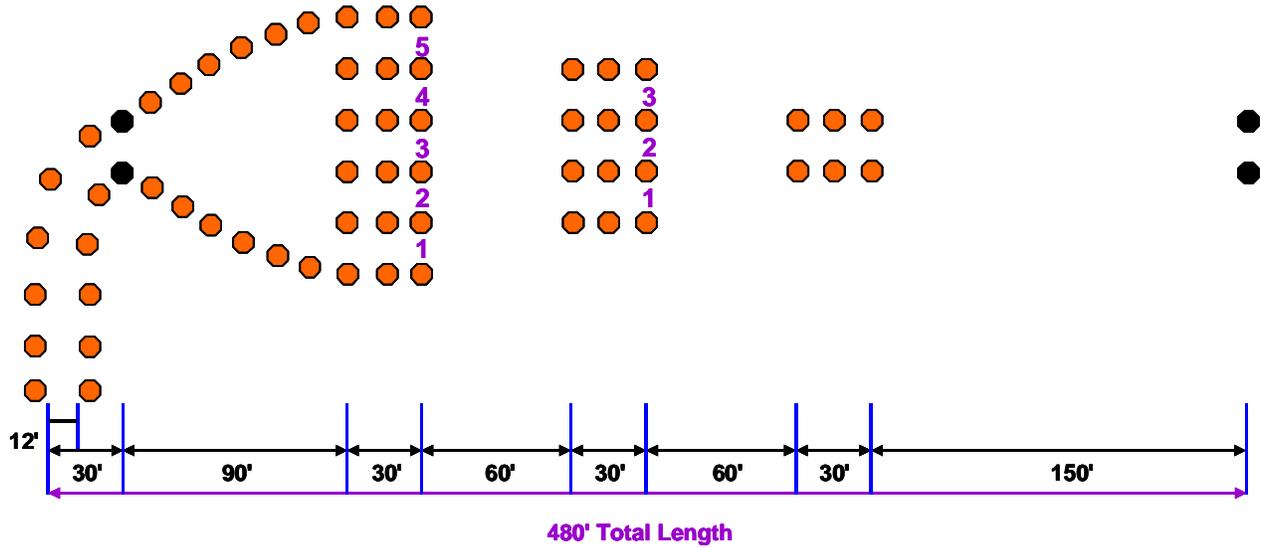
---

1. **5 points** subtracted for each marker touched by the apparatus.
  2. The student **fails** if the apparatus stops or fails to maintain a constant forward motion within the course.
  3. The student **fails** if he or she does not take the lane marked by the evaluator.
  4. The student **fails** if time exceeds 25 seconds.
  5. The student **fails** if he or she does not maintain control of the apparatus during the exercise.
- 

**SITE PREPARATION:**

- Markers are set up as shown, with each set of lanes being 30-feet long and each lane 10-feet wide.
  - Measure the markers base to base.
  - The distance from one set of lane markers to the next is 60 feet. This area is called the change space.
  - The entry and exit gates are in line with the first lane, #2 lane of the first set, and #3 lane of the second set.
  - Exit curve width is 12 feet, starting at the first set of markers after the exit gate.
-

## LANE CHANGE EXERCISE



All gates are 10 feet wide



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## OPTIONAL DRIVING EXERCISE 5-1-2

**EXERCISE:**

---

Offset Alley Exercise (Forward And Backward)

---

This exercise simulates responding to an emergency and making a lane change through a narrow passageway without striking any nearby vehicles. It tests the students' ability to maneuver the apparatus at a constant speed within a confined space. To do this, the driver/operator must accurately judge the distance between the apparatus and the barriers.

---

**TIME FRAME:**

None

---

**AUTHORITY:**

SBFS

---

**MATERIALS NEEDED:**

- Fire apparatus
  - 100 square foot area
  - 48-inch pillars (4)
  - 18-inch cones (12)
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. For this exercise, apparatus length is measured from the front bumper to the end of the tailboard.
  2. Provide adequate space to perform the exercise without risk of collision.
- 

**STUDENT DIRECTIONS:**

1. Maintain a constant speed throughout the exercise.
  2. Drive through the entry gate.
  3. Turn the apparatus into the offset lane.
  4. Exit the offset lane.
  5. Enter the exit lane.
  6. Bring the apparatus to a complete stop after rear bumper clears the exit gate.
  7. Back the apparatus following the same path, maintaining a constant speed.
  8. Bring the apparatus to a complete stop after front bumper clears the entry gate.
-

# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

**SCORING:**

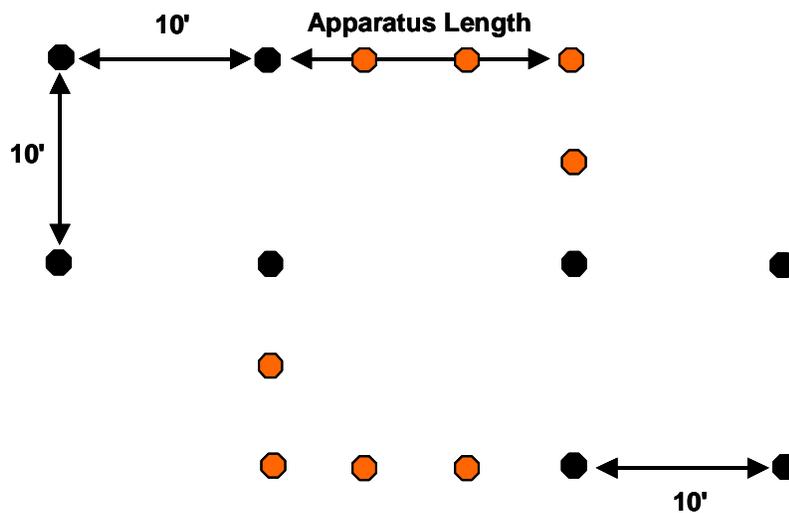
**100 points possible**

**80% passing**

1. **10 points** subtracted for each marker touched by the apparatus.
2. **10 points** subtracted each time the apparatus stops before reaching the end markers.
3. The student **fails** if he or she continues the exercise without realigning the apparatus after touching a marker.
4. The student **fails** if he or she does not maintain control of the apparatus during the exercise.

**SITE PREPARATION:**

- Place two sets of markers in line and one apparatus length apart to form an alley.
- These alleys are arranged with course markers and are 10 feet wide.
- The 10 foot alley from which the driver/operator must exit is arranged 10 feet out of line to the opposite 10 foot alley into which the apparatus must be maneuvered.
- No set speed should be established for this exercise, but the driver/operator should not stop or back the apparatus during the maneuver.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## OPTIONAL DRIVING EXERCISE 5-1-3

**EXERCISE:**

---

Dogleg Exercise

---

This measures the students' ability to maneuver apparatus within a confined space. Judging distance between apparatus and objects while driving at a constant speed in both forward and reverse.

---

**TIME FRAME:**

Minimum: 0:50

Maximum: 1:15

---

**AUTHORITY:**

SBFS

---

**MATERIALS NEEDED:**

- Fire apparatus
  - 1 assistant instructor
  - 8,400 square foot area
  - 48-inch pillars (17)
  - 18-inch cones (46)
  - Stopwatch
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. Time begins when the front bumper of the apparatus passes the entry/exit gate (48-inch pillars).
  2. Time ends when the front bumper of the apparatus passes the entry/exit gate (48-inch pillars).
- 

**STUDENT DIRECTIONS:**

1. Maintain a constant speed throughout the exercise.
  2. Drive through the entry gate.
  3. Drive through first direction gate.
  4. Turn in the changing space.
  5. Align apparatus to enter next direction gate.
  6. Proceed through all direction gates in the same manner.
  7. Enter the diminishing gate.
  8. Bring the apparatus to a complete stop.
  9. Before touching the center marker.
  10. Back the apparatus through the course following the same path.
-

# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

### EXERCISE:

Dogleg Exercise

11. Maintaining a constant speed.
12. Bring the apparatus to a complete stop after the front bumper passes the entry/exit gate.
13. Minimum time to complete this exercise is 0:50.
14. Maximum time to complete this exercise is 1:15.

### SCORING:

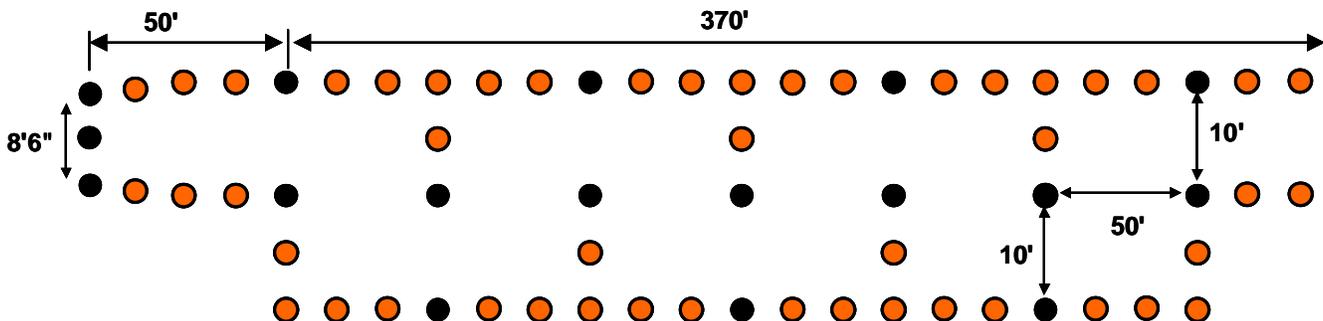
100 points possible

80% passing

1. **5 points** subtracted for each marker touched by the apparatus.
2. The student **fails** if he or she completes the course in less than 0:50 seconds.
3. The student **fails** if he or she completes the exercise in more than 1:15 minutes.
4. The student **fails** if he or she does not maintain control of the apparatus during the exercise.

### SITE PREPARATION:

- Markers are set up as shown, with each gate being 10-foot wide.
- Opposing gates are spaced at 50-foot intervals.
- Perimeter markers are spaced evenly throughout.
- Marker spacing is measured from base to base.





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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## OPTIONAL DRIVING EXERCISE 5-1-4

**EXERCISE:**

---

Parallel Parking Exercise

---

In this exercise, students are required to parallel park within 18 inches of the curb. This exercise tests the students' ability to align the apparatus with the curb without hitting the curb or markers and with a minimum loss of apparatus motion. This exercise simulates aligning an apparatus for hydrant hookups or elevating device operations.

---

**TIME FRAME:**

None

---

**AUTHORITY:**

SBFS

---

**MATERIALS NEEDED:**

- Fire apparatus
  - 1 assistant instructor
  - 1,800 square foot area
  - 48-inch pillars (4)
  - 100-foot tape measure
- 

**INSTRUCTOR DIRECTIONS:**

1. For pumper-sized vehicles, the driver/operator must get the truck into the designated space.
  2. For tractor-trailer units, the trailer must be spotted and jackknifed in the designated space.
- 

**STUDENT DIRECTIONS:**

1. Drive the apparatus along the left side of the designated parking area.
  2. Bring the apparatus to a complete stop after the rear bumper passes the last markers.
  3. Back the apparatus between the markers, turning as needed.
  4. Bring the apparatus to a complete stop before touching the markers or exceeding the parking area boundaries.
  5. Drive the apparatus forward to straighten, if needed.
  6. Bring the apparatus to a complete stop.
  7. Set the parking brake.
  8. Apparatus must be within 18 inches of the curb.
-

# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

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**EXERCISE:**

Parallel Parking Exercise

---

**SCORING:**

**100 points possible**

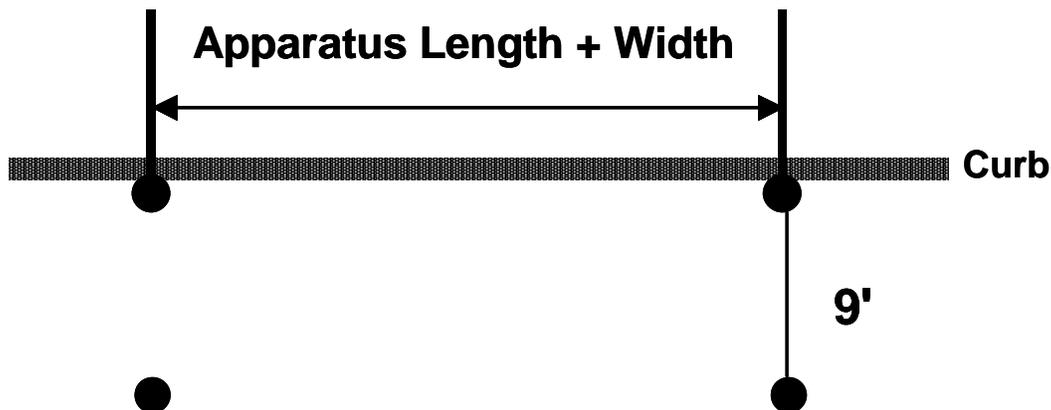
**80% passing**

---

1. **5 points** subtracted if apparatus tire brushes the curb.
  2. The student **fails** if the apparatus touches a marker.
  3. The student **fails** if the rear wheels roll up and onto the curb.
  4. The student **fails** if the front or rear wheels are >18 inches from the curb when the parking brake is set.
  5. The student **fails** if he or she exceeds two directional changes as outlined in the diagram.
  6. The student **fails** if he or she does not maintain control of the apparatus during the exercise.
- 

**SITE PREPARATION:**

- Site must be free of all obstacles.
  - Measure the markers from base to base.
- 





# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

## OPTIONAL DRIVING EXERCISES

These exercises are for skill development only and are not part of the testing process.

STUDENT: \_\_\_\_\_ DATE: \_\_\_\_\_

5-1-1: LANE CHANGE EXERCISE		Penalty points subtracted from 100 possible points.		
	Rated Component	Frequency	Value	100
1.	Apparatus touches a marker		5	
2.	Apparatus stops or fails to maintain a constant forward motion		25	
3.	Failure to take the lane marked by the proctors	<input type="checkbox"/> Yes	25	
4.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		

**TOTAL POINTS:** \_\_\_\_\_

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

### 5-1-1 NOTES:

\_\_\_\_\_  
\_\_\_\_\_

5-1-2: OFFSET ALLEY EXERCISE		Penalty points subtracted from 100 possible points.		
	Rated Component	Frequency	Value	100
1.	Apparatus touches a marker		10	
2.	Failure to realign the apparatus after touching a marker		25	
3.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		

**TOTAL POINTS:** \_\_\_\_\_

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

### 5-1-2 NOTES:

\_\_\_\_\_  
\_\_\_\_\_



# FIRE APPARATUS DRIVER/OPERATOR 1A

Emergency Vehicle Operations

STUDENT: \_\_\_\_\_ DATE: \_\_\_\_\_

<b>5-1-3: DOGLEG EXERCISE</b>		Penalty points subtracted from 100 possible points.		
	<b>Rated Component</b>	<b>Frequency</b>	<b>Value</b>	<b>100</b>
1.	Apparatus touches a marker		5	
2.	Driver/operator completes the course in less than 0:50	<input type="checkbox"/> Yes		
3.	Driver/operator completes the course in more than 1:15	<input type="checkbox"/> Yes		
4.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		

**TOTAL POINTS:** \_\_\_\_\_

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

### 5-1-3 NOTES:

\_\_\_\_\_  
\_\_\_\_\_

<b>5-1-4: PARALLEL PARKING EXERCISE</b>		Penalty points subtracted from 100 possible points.		
	<b>Rated Component</b>	<b>Frequency</b>	<b>Value</b>	<b>100</b>
1.	Apparatus touches a marker		10	
2.	Rear wheels cross over or touch the curb	<input type="checkbox"/> Yes	25	
3.	Wheels are more than 18 inches from the curb at the end of the exercise	<input type="checkbox"/> Yes	25	
4.	Driver/operator exceeds two directional changes	<input type="checkbox"/> Yes		
5.	Driver/operator fails to maintain control of the apparatus	<input type="checkbox"/> Yes		

**TOTAL POINTS:** \_\_\_\_\_

Scorer's Name: \_\_\_\_\_

Signature: \_\_\_\_\_

### 5-1-4 NOTES:

\_\_\_\_\_  
\_\_\_\_\_



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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### APPENDIX A: GLOSSARY

- Adjust** .....To maintain or regulate, within prescribed limits, by setting the operating characteristics to specified parameters.
- AHJ** .....Authority Having Jurisdiction. The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.
- Alignment** .....To adjust components to bring about optimum or desired performance.
- Camber Angle** .....The angle of the wheel, measured in degrees, when viewed from the front of the apparatus.
- CCDH** .....California Commercial Driver Handbook
- CFR** .....Code of Federal Regulations. A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government.
- Combination Fire Apparatus** .....A vehicle consisting of a pulling tractor and trailer.
- Component** .....A constituent part of a mechanical or electrical device.
- Decibel** .....A unit used to express relative difference in power or intensity, usually between two acoustic or electric signals, equal to ten times the common logarithm of the ratio of the two levels.
- Defect** .....A discontinuity in a part or a failure to function that interferes with the service or reliability for which the part was intended.
- Defective** .....Having a defect, or faulty.
- Deformation** .....Abnormal wear, defects, cracks or fractures, warpage, and deviations from the original condition that would affect safe and correct operation.
- Documentation** .....The process of gathering, classifying, and storing information.
- DOT** .....Department of Transportation. The department of the U.S. government that coordinates and institutes national transportation programs.
- Driveline** .....See power train.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- Failure**.....A cessation of proper functioning or performance.
- Frame**.....The basic structural system that transfers the weight of the fire apparatus to the suspension system.
- High Voltage**.....Voltage that is above the normal 12 or 24 volts.
- Inspect**.....To determine the condition or operation of a component(s) by comparing its physical, mechanical, and/ or electrical characteristics with established standards, recommendations, and requirements through examination by sight, sound, or feel.
- Interlock**.....A device or arrangement by means of which the functioning of one part is controlled by the functioning of another.
- Leakage**.....The escape of a fluid from its intended containment, generally at a connection. The three classes of leakage are defined.
- Leakage, Class 1**.....Seepage of fluid, as indicated by wetness or discoloration, not great enough to form drops.
- Leakage, Class 2**.....Leakage of fluid great enough to form drops, but not enough to cause drops to fall from the item being inspected.
- Leakage, Class 3**.....Leakage of fluid great enough to cause drops to fall from the item being inspected.
- Liability**.....The state of being responsible for ones actions. This could be civil or criminal, financial, moral, or legal.
- Low Voltage**.....Voltage that is usually 12 or 24 volts.
- Manufacturer's Recommendation (Specification)**.....Any requirement or suggestion a fire apparatus builder or component producer makes concerning care and maintenance of its product(s).
- Modification**.....An alteration or adjustment to any component that is a deviation from the original specifications or design of the fire apparatus.
- Operational Test**.....A test to determine the operational readiness of a component on a fire apparatus by observing the actual operation of the component.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- Operator Alert Device** .....Any device, whether visual, audible, or both, installed in the driving compartment or at an operator's panel, to alert the operator to either a pending failure, an occurring failure, or a situation that requires his or her immediate attention.
- Optical Source** .....Any single, independently mounted, light-emitting component in a lighting system.
- Overhaul** .....To inspect, identify deficiencies, and make necessary repairs to return a component to operational condition.
- Power Train** .....The parts of a fire apparatus that transmit power from the engine to the wheels, including the transmission, split shaft power takeoff, midship pump transmission, drive shaft(s), clutch, differential(s), and axles.
- Powered Equipment Rack** .....A power-operated device that is intended to provide storage of hard suction hoses, ground ladders, or other equipment, generally in a location above apparatus compartments.
- Preventive Maintenance** .....The act or work of keeping something in proper condition by performing necessary preventive actions, in a routine manner, to prevent failure or breakdown.
- Primary Ignition System** .....The low voltage components of the ignition system including solenoids, relays, and valves that will allow the engine to start. On a gasoline driven engine, it begins with the battery and ends at the coil.
- Proper** .....As recommended by the manufacturer.
- Qualified Person** .....A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems relating to a particular subject matter, work, or project.
- Repair** .....To restore to sound condition after failure or damage.
- Replace** .....To remove an unserviceable item and install a serviceable counterpart in its place.
- Secondary Ignition System** .....The high voltage components of an ignition system. This system is most often associated with gasoline-powered engines. It starts at the ignition coil and ends at the spark plug.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- Severe Service** .....Those conditions that apply to the rigorous, harsh, and unique applications of fire apparatus, including but not limited to local operating and driving conditions, frequency of use, and manufacturer's severe service (duty) parameters.
- Shall** .....Indicates a mandatory requirement.
- Shoreline** .....A 120-volt electrical cord that attaches to the fire apparatus to maintain a full charge in the battery, run temperature control systems, maintain air pressure, and other vital systems.
- Should** .....Indicates a recommendation or that which is advised but not required.
- Single Fire Apparatus** .....A vehicle on a single chassis frame.
- SOP** .....Standard Operating Procedure. A method of performing a task that is developed by a department.
- Steering Axle**.....Any axle designed such that the wheels have the ability to turn the vehicle.
- Systems**.....A regularly interacting or interdependent group of components forming a unified whole.
- Test**.....To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.
- Title 49** .....A portion of the CFR that deals with transportation. The CFR is divided into 50 titles, which represent broad areas subject to Federal regulation.
- Toe Angle** .....The difference in the distance between the front of the tires and the back of the tires.
- Troubleshooter** .....An expert in discovering and eliminating the cause of trouble in mechanical equipment.
- Troubleshooting** .....To act or be employed as a troubleshooter.
- Tunnel Vision**.....Vision in which the visual field is severely constricted, as from within a tunnel looking out.



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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# Instructor Answer Key

# Test 1

Each answer space is worth five points. You have 30 minutes to complete the entire test.

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INSTRUCTIONS: This is a true-false test. If the statement is true, draw a circle around the "T." If the statement is false, draw a circle around the "F."

EXAMPLE:  T F The Incident Command System was developed by the fire service.

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- ♦T F 1. Spring brakes are used to meet emergency and parking brake requirements.  
*California Commercial Driver Handbook, DMV, 2008 Edition, Page 67*
- T ♦F 2. The safety relief valve activates the spring brakes when the pressure drops to a range of 20-45 psi.  
*California Commercial Driver Handbook, DMV, 2008 Edition, Pages 64*
- ♦T F 3. An air compressor that fails to maintain 80-90 psi in the system with the service brakes applied and the engine at idle is to be placed out-of-service.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 50*
- ♦T F 4. Fire apparatus that have defective defrosters are to be placed out-of-service.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 20*
- T ♦F 5. According to the NFPA, a fire apparatus that has one torn passenger's seat belt should be placed out-of-service.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 20*
- ♦T F 6. An air pressure protection valve prevents the air horns from operating when the air pressure in the reservoir drops below 80 psi.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 45*
- T ♦F 7. The minimum tread depth for a nonsteering tire is 4/32".  
*California Commercial Driver Handbook, DMV, 2008 Edition, Page 36*



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- ▶T F 8. Apparatus batteries that are corroded should be cleaned with a mixture of baking soda and water.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 49*
- T ▶F 9. A fire apparatus cooling system with a Class 1 leak should be placed out-of-service.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 28*
- T ▶F 10. The load monitor is intended to prevent an overload of the apparatus suspension system.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 44*
- ▶T F 11. The process of automatically shutting down less important electrical systems so that other systems may continue to function is called load shedding.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 44*
- ▶T F 12. The maximum amount of free play in an apparatus steering wheel is 20 degrees of total play.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 44*
- T ▶F 13. According to the CCDH, a fire apparatus with a missing or broken leaf spring should be placed out-of-service.  
*California Commercial Driver Handbook, DMV, 2008 Edition, Page 58*
- T ▶F 14. A Class 2 Leakage is defined as seepage of fluid that is indicated by wetness or discoloration not great enough to form drops.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 104*
- ▶T F 15. It is important to keep apparatus and maintenance records to assist in deciding to purchase new apparatus or continue repairs on an older unit.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 32*
- ▶T F 16. Department SOPs should indicate items that a driver/operator can repair on their own.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 31*
- T ▶F 17. In the event of a collision, maintenance records are not likely to be scrutinized by accident investigators.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 32*
- ▶T F 18. Fire departments typically do a pretrip inspection at the beginning of each shift.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 31*



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- T    ♦F    19. The minimum licensing requirements to drive fire apparatus in the State of California is a "Class B" driver license.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 7*
- ♦T    F    20. On an authorized emergency vehicle, the flashing of the headlamps shall consist of upper-beam flashing, and not the flashing of any other light beam.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 8*
- T    ♦F    21. Every authorized emergency vehicle shall be equipped with one steady burning red lamp visible from at least 1,200 feet to the front.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 8*
- ♦T    F    22. Before leaving the fire station, the driver/operator should ensure that all members on the apparatus are seated, with their seat belts on and secured.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 5*
- T    ♦F    23. When placing an apparatus at an incident, ground integrity is of little concern to the driver/operator.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Pages 6*
- ♦T    F    24. Low tire pressure can cause poor road-handling characteristics.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 37*
- T    ♦F    25. Oil leaks on older apparatus are common and the driver/operator should not be concerned with the leaks.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 33*
- ♦T    F    26. A gradual increase in exhaust noise starting with a slight ticking noise could be caused by a failing exhaust manifold gasket.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 34*
- T    ♦F    27. In an alternating current (AC) circuit, voltage and current remain constant.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 42*
- ♦T    F    28. Current can be defined as the rate of flow of electron flow and is measured in amperes.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 41*
- ♦T    F    29. On an air brake system, automatic slack adjusters should only be worked on by a certified air brake technician.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 55*



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- ▶T F 30. Fire apparatus equipped with a hydraulic braking system and a Class 2 leakage shall be considered when developing out-of-service criteria.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 50*
- ▶T F 31. Growling or whining coming from the rear axle could be caused by low oil or bearing failure.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 24*
- ▶T F 32. The overfilling of an automatic transmission with fluid may cause the transmission case to become overpressurized.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 36*
- ▶T F 33. If an automatic transmission is low on fluid, there is a risk of overheating.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 37*
- ▶T F 34. The first component of an electrical system is the batteries.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 45*
- ▶T F 35. Voltage is the difference between negative and positive charges.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 41*

QUIZ SCORING	
Each question blank is worth five points	
Total Possible	175
80% Minimum	140
Score	
Pass or Fail?	



# *Instructor Answer Key*

# Test 2

Each answer space is worth five points. You have 30 minutes to complete the entire test.

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INSTRUCTIONS: This is a true-false test. If the statement is true, draw a circle around the "T." If the statement is false, draw a circle around the "F."

EXAMPLE: (T) F The Incident Command System was developed by the fire service.

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- ▶T F 1. According to the NFPA Journal, in the year 2000, 87.5% of all fire fighters killed were not wearing seat belts while riding in apparatus.  
*Driver/Operator 1A Student Supplement, SFT, 2008 Edition, Page 67*
- T ▶F 2. Some of the concepts involved with defensive driving include visual lead times, reaction times, and response times.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 76*
- T ▶F 3. The preemption device that controls traffic signals uses a radio signal.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 88*
- T ▶F 4. A large percentage of collisions occur in front of driveways.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 77*
- T ▶F 5. When proceeding through intersections avoid eye contact with other drivers because it is distracting.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 77*
- ▶T F 6. Defensive driving techniques include "leaving yourself an out" and "getting the big picture."  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 78*
- ▶T F 7. When anticipating another driver's actions, expect the unexpected.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 78*
- ▶T F 8. There are times when the use of audible warning devices is inappropriate.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 85*



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- ▶T F 9. Always travel in the innermost lane on multilane roads.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 83*
- ▶T F 10. Spotters should precede wildland engines when driving through smoke.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 117*
- T ▶F 11. Apparatus should never be driven into unburned fuels higher than the bumper or running board.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 119*
- T ▶F 12. The total stopping distance is the sum of the driver/operator reaction distance, vehicle braking distance, and tire to road surface time.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 79*
- ▶T F 13. The use of brakes on a long and/or steep downgrade is only a supplement to the braking effect of the engine.  
*California Commercial Driver Handbook, DMV, 2008 Edition, Page 39*
- ▶T F 14. The braking distance is the distance the vehicle travels from the time the brakes are applied until the apparatus comes to a complete stop.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 79*
- T ▶F 15. When the apparatus goes into a skid, it is recommended that you turn the front wheels in the opposite direction of the skid.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 81-82*
- ▶T F 16. The weight transfer experienced by an apparatus when steering action is too abrupt can contribute to skidding or rollover.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 81*
- T ▶F 17. Because the stopping distance is greatly increased on slippery road surfaces, it is sometimes a good policy to try the brakes in traffic before you need to stop.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 84*
- ▶T F 18. Snow tires or tire chains will reduce the stopping distance and increase traction on hills in snow or ice.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 66*
- ▶T F 19. When arriving at a location where no fire is evident, stop the apparatus at the front entrance.  
*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Pages 99-100*



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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- ♦ F 20. Level II staging is used where numerous emergency vehicles will be responding to an incident.

*Pumping Apparatus Driver/Operator Handbook, IFSTA, Second Edition, Page 124*

QUIZ SCORING	
Each question blank is worth five points	
Total Possible	100
80% Minimum	80
Score	
Pass or Fail?	



# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

# Test 1

Each answer space is worth five points. You have 30 minutes to complete the entire test.

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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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## Emergency Vehicle Operations

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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

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# FIRE APPARATUS DRIVER/OPERATOR 1A

## Emergency Vehicle Operations

---

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Each question blank is worth five points	
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Score	
Pass or Fail?	