FIRE COMMAND 1A

Approved by the Statewide Training and Education Advisory Committee

RETIRED CURRICULUM

Adopted by the State Board of Fire Services

INSTRUCTOR GUIDE

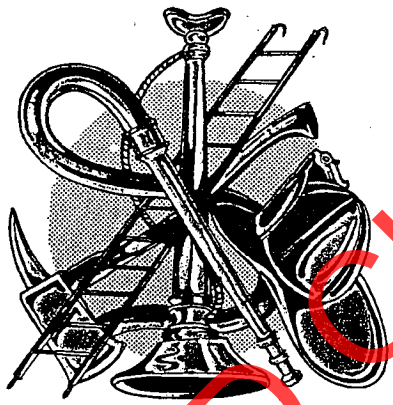
1995 Edition

California Department of Forestry and Fire Protection State Fire

FIRE COMMAND 1A

Command Principles for Company Officers

Instructor Guide



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C F S T E S

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 Career Development Guides, Instructors Guides, Student Manuals and other related support materials.

This system is as successful and effective as the people involved in it. 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.

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ACKNOWLEDGEMENTS

The development of the material contained in this guide was coordinated by the Training Division of the California State Fire Marshal's Office and approved by the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS). This curriculum is appropriate for fire service personnel and for personnel in related occupations who are pursuing one or more of the certification programs.

RONNY J. COLEMAN, Chief
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Special acknowledgement and thanks are extended to the following members and associates of State Fire Training for their diligent efforts and contributions that made the final publication of this document possible.

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The material contained in this document was compiled and organized through the cooperative effort of numerous professionals within, and associated with, the California fire service. Chief Coleman was the originator of this manual. His book, "Management of Fire Service Operations," was the basis from which this material was originally drawn.

We gratefully acknowledge the following individuals who served as the rewrite team and whose expertise, talent, and dedication made this manual possible.

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INTRODUCTION

The April 1995 edition of the Fire Command 1A instructor guide was developed under a new type of system -- a "living" system. Unlike past curriculum, this instructor guide will become a viable document within the system. Here's how it will work.

Each Fire Command instructor will have the ability to critique this document on a continual basis. At the conclusion of each course taught, the instructor should comment on the material presented. A Fire Command 1A Team will review each instructor's comments and suggestions annually. The Team will communicate among themselves on a regular basis and meet on a calendar basis for the sole purpose of revising and editing the Fire Command 1A curriculum.

At the conclusion of each Team meeting, revisions will be submitted to State Fire Training for publication and distribution to each registered Fire Command 1A instructor. Pages are numbered for easy replacement in both the instructor guide and student manual. This system allows newer information and concepts to continually replace older, outdated material and the curriculum will evolve as technology grows and changes. Fire Command 1A will not become obsolete as time passes.

At this time, the April 1995 edition does not include the written quizzes or a grading system for the Fire Command 1A course. It is the instructor's responsibility to develop these evaluation tools to determine whether a student successfully completed the course and is eligible to take the certification exam. These materials, once developed, should be submitted to the Team for review and possible inclusion as permanent evaluation tools for the course.

The Team is seeking suggestions continually; all input will be considered. Instructors wishing to submit multiple choice test questions with suggested answers for the test bank can do so and will be much appreciated.

Dennis Childress, Team Leader
Orange County Fire Authority

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FIRE COMMAND 1A

Command Principles for Company Officers

COURSE OBJECTIVES: To...

a) Provide fire service personnel an introduction to human resource management.

b) Provide fire service personnel with an overview of the organizational structure used within the fire service, including duties and responsibilities.

c) Introduce fire service personnel to communication skills appropriate for reporting on conditions and managing resources at an emergency scene.

d) Provide fire service personnel information on how to compile a prefire plan, and how to utilize that information when responding to an emergency incident.

e) Provide fire service personnel the opportunity to size-up emergency situations; and identify the strategies, tactics and methods necessary to manage given scenarios.

f) Provide fire service personnel an overview of the common causes of fire fighter deaths and injuries, and appropriate safety measures to protect personnel.

COURSE CONTENT: 40:00 HOURS

1.	Orientation and Administration	1:30
2.	The Learning Process	0:15
3.	Fire Command Overview	0:30
4.	Fire Chemistry	0:30
5.	Fire Phases	0:45
6.	Effects of Time	0:30
7.	Fire Behavior within Structures	0:30
8.	Extinguishing Agents	0:30
9.	Water Application	0:45
10.	Protection Systems	1:00
11.	Building Construction	0:45

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12.	Occupancy Types	0:15
13.	Prefire Planning	0:30
14.	Fire Data	0:15
15.	Local Resources	0:15
16.	State and Federal Resources	0:15
17.	Fireground Safety	0:30
18.	Size-up	1:00
19.	Strategy, Tactics and Methods	0:30
20.	Report on Conditions	0:15
21.	Role of the First-In Officer	0:45
22.	Company Operations	0:15
23.	Determining Resources Requirements	0:30
24.	Apparatus Placement	0:30
25.	Initial Fire Attack	0:30
26.	Management Overview	0:30
27.	The Fire Service	0:30
28.	The Company Officer	0:30
29.	Pressure of Command	0:45
30.	Performance Standards	1:15
31.	Levels of Emergency	0:15
32.	Decision Making	1:00
33.	Communications	0:30
34.	Management by Objectives (MBO)	0:30
35.	Divisions of Fire Fighting	0:45
36.	Command/Control Components	0:45
	Simulation Overview	1:00
	Skull Session Exercises	3:00
	Simulator Use	12:00
	Daily Reviews	2:00
	Final Exam	1:00

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FIRE COMMAND 1A

Command Principles for Company Officers
Instructor Guide

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Introduction To Command

1. Orientation and Administration
2. The Learning Process
3. Fire Command Overview

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TOPIC: **Orientation and Administration**

TIME FRAME: 1:30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: None

Behavior: None

Standard: None

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES: Command 1A Instructor Guide, Chapter 1

PREPARATION: The objective of Command 1A is to provide students with an introduction to the principles of command in the fire service.

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PRESENTATION | APPLICATION

Orientation and Administration

Page: SM 1.1

I. Administration and Registration

A. Course Goals

1. To provide students with the following:

a) An introduction to human resource management

b) An overview of the organizational structure used within the fire service, including duties and responsibilities

c) A review of communication skills appropriate for reporting on conditions and managing resources at an emergency scene

d) Information on how to compile a pre-fire plan, and how to utilize that information when responding to an emergency incident

e) An opportunity to size-up emergency situations; and identify the strategies, tactics and methods necessary to manage given scenarios

f) An overview of the common causes of firefighter deaths and injuries, and appropriate safety measures to protect personnel

Instructor Note: More detailed information on the Command 1A curriculum is provided in Information Sheet #1.1 on page 1.2 in the student manuals. A copy is included at the end of this lesson plan.

B. Administrative

1. Course length: 40 hours

a) Minimum attendance: 36 hours

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PRESENTATION	APPLICATION
2. Start time and end time	
3. Homework and reading assignments	
4. Final Exam	
a) 50 questions	
b) 70% passing score	
C. Registration	
	Instructor Note: Circulate registration forms.
1. CSFM roster	
2. College applications (as appropriate)	
3. Other rosters (as appropriate)	
D. Fee Schedule	
1. Registration fee	
2. Certification fee	
E. Student manuals	
	Instructor Note: Pass out student manuals.
II. Other Announcements	
A. Parking	
B. Breaks	
1. Restrooms	
2. Refreshments	
3. Eating, drinking and smoking policies	
4. Public phone location	
5. Emergency message phone number	
6. Off limit areas	

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PRESENTATION	APPLICATION
III. Introductions A. Students B. Instructor(s) 1. Instructor phone number (optional)	

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SUMMARY:

None

EVALUATION:

None

ASSIGNMENT:

None

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INFORMATION SHEET #1.1

NFPA 1021, Standard for Fire Officer Professional Qualifications

The Fire Command 1A curriculum encompasses a great number of subjects, skills and goals geared towards structural firefighting. This curriculum addresses, either partially or in full, the following requirements from NFPA 1021, Standard for Fire Officer Professional Qualifications, 1992 edition. It includes requirements at Fire Officer Level I (sections 2-2 through 2.13), Fire Officer Level II (sections 3-2 through 3-13), and Fire Officer Level III (sections 4-2 through 4.13).

Standard	Description
2-2	**Human Resource Management**
2-2.2	Differentiate between the types of verbal orders or commands that an officer would use in each of the following situations: (a) During an emergency operation (b) While working in the station (c) During a training session.
2-2.6	Demonstrate the ability to plan, assign, coordinate activities, and establish priorities at the unit level, given the job requirements of subordinate positions.
2-4	**Organizational Structure**
2-4.1	Identify the authority and responsibility of each component of the fire department. Given a table of organization for the fire department, include lines of authority and the duties and responsibilities of each rank in both line and staff functions.
2-4.2	Identify the duties and command responsibilities of fire ground officers using the incident management procedures adopted by the authority having jurisdiction at each of the following resource levels: (a) A single unit response (b) A multi unit response (c) A major incident involving multiple units responding at various times.
2-8	**Communication Skills.** Complete a narrative report detailing both an emergency and a nonemergency incident.
2-10	**Planning.** Prepare an pre-incident plan that identifies hazards for each of the following occupancies: (a) Assembly

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(b) Educational

(c) Residential

2-11 Inspection, Investigation, and Public Education

2-11.2 Demonstrate methods used to identify and preserve evidence and secure a fire scene.

2-12 Emergency Service Delivery

2-12.1 Identify the factors that must be considered during a size-up to determine procedures for control of an emergency situation, given an incident.

2-12.2 Given an interior fire situation:

(a) Describe how the fire may extend within the building.

(b) Describe how to control the spread of fire within the building.

2-12.3 Given an exterior fire situation:

(a) Evaluate the situation

(b) Describe how to control the spread of the fire to keep it from extending to adjacent buildings.

2-12.4 Identify the attack procedures required to control, confine, and extinguish fires in each of the following situations, if typical, within the authority having jurisdiction:

(a) Structures

(b) Flammable liquids

(c) Flammable gases

(d) Hazardous materials

(e) Exterior wildland

2-13 Safety

2-13.1 Identify the most common causes of personal injury to the firefighter.

3-7 Government Structure

3-7.1 Identify the functions of other bureaus, agencies and divisions of government and the need for interagency and intergovernmental cooperation.

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3-10 Planning

3-10.1 Prepare a pre-fire plan for a given target hazard using forms, symbols, and maps prescribed by the authority having jurisdiction. Include elements describing the utilization of personnel, equipment and extinguishing agents.

3-10.2 Prepare an operational plan that identifies the required resources and safety considerations for the safe and successful control of an incident involving any of the following materials:

(a) Flammable liquids

(b) Flammable gases

(c) Poisons

(d) Explosives

(e) Radioactive materials

(f) Flammable solids

(g) Reactives

(h) Corrosives.

3-11 Inspection, Investigation, and Public Education

3-11.4 Given water system reference materials:

(a) Describe the water supply facilities as they apply to fire department operations

(b) Identify the procedure for mapping auxiliary water supplies to supplement the normal system

(c) Differentiate between sewer and drainage lines.

3-12 Emergency Service Delivery

3-12.1 Determine the resources required for control and demonstrate the assignment and placement of these resources for any of the following:

(a) Flammable liquids

(b) Flammable gases

(c) Poisons

(d) Explosives

(e) Radioactive materials

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(f) Flammable solids

(g) Reactives

(h) Corrosives.

4-11 Inspection, Investigation, and Public Education

4-11.4 Evaluate and identify the construction features that might contribute to the spread of fire, heat and smoke throughout the building or from one building to another, given fire inspection reports for each of the following occupancies:

(a) Public assembly

(b) Educational

1. Residential

2. Nonresidential

(c) Institutional

(d) Residential

(e) Stores and offices

(f) Basic industry

(g) Manufacturing

(h) Storage

(i) Special properties

4-12 Emergency Service Delivery

4-12.1 Analyze an emergency incident requiring multiple company operations to determine the resources required for control and demonstrate the assignment and placement of the resources.

4-12.2 Describe the principles of delegation of authority at an emergency incident.

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TOPIC: **The Learning Process**

TIME FRAME: 0:15 hours

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the two components that make up the learning process, describe how knowledge and experience can be transferred, and identify how learning can be positively reinforced.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 2.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 2
Coleman, *Management of Fire Service Operations*

PREPARATION:

Good fireground commanders are all around us. We often watch them and wonder what their secret is. The truth is that there is no secret. These skills are learned though experience and education. That learning process must be understood in order to benefit others.

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PRESENTATION | APPLICATION

The Learning Process

Page: SM 2.1

I. Knowledge and Experience

A. Learning process consists of a conscious effort to raise:

1. Base of knowledge
2. Level of experience

Question:
What is the difference between knowledge and experience?

B. Knowledge

1. That which is known
   a) An inventory of facts
2. Acquired though:
   a) Formal classes
   b) Reading or self study
   c) Listening to others who share their knowledge

C. Experience

1. Events or circumstances one has lived through
2. Gained by exposing oneself to:
   a) Situations
   b) Environments
   c) Problems
   d) Circumstances
3. Longevity is not always an accurate indicator of one's level of experience
   a) One year's experience repeated 20 times is but one year of experience

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PRESENTATION	APPLICATION
D. Knowledge and experience can be transferred	**Question:** How can knowledge and experience be transferred?
1. Increase knowledge by studying or listening to someone else's experiences	
2. Enhance experience by applying knowledge to an appropriate situation	
E. You must be able to draw on knowledge and experience	
1. Examples:	
a) A fire prevention inspection	
1) Credibility and confidence comes from:	
• Knowledge of the codes	
• Experience of actual fires	
b) "One in a lifetime" situations such as an aircraft crash	
1) Not many fire officers have experience commanding an aircraft crash	**Question:** How can fire officers effectively manage such an incident when they've never been in that situation before?
2) Draw on training:	
• Crash rescue	
• Aircraft construction	
• Class B fuels	
• Extrication techniques	

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PRESENTATION | APPLICATION

3) Draw on experience with:

- Class B fires
- Application of foam
- Extrication
- Rescue
- First aid
- Mass casualty drills

2. A good fire officer utilizes both knowledge and experience as a foundation for making decisions

II. A Synergistic Balance

A. The best choice for fire officer is a person who has a good balance of experience and education

Question:
Why is a good balance of education and experience important?

1. An officer with good education, but not much field experience, may be "book smart"

   a) Perform well on written tests is no guarantee about making command decisions at a fire

2. Officers with field experience, but little education, may be less confident because decisions are based more on intuition than training

Instructor Note:
Refer students to Figure 2.1, "The Synergistic Balance," on page 2.2 in their student manuals.

Page: SM 2.3

III. Reinforcement

A. Experience and knowledge must build on one another

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PRESENTATION

B. The key factor is positive reinforcement

1. Don't repeat behavior that brings negative results
2. Learn from your mistakes and move one
3. Learn from the mistakes of others
4. Most important, repeat successful behaviors
   a) Like any professional who practices to improve performance

APPLICATION

Question:
What is the key factor in learning to apply education and experience?

Instructor Note:
Refer students to the Review Questions on page 2.4 in their student manuals.

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SUMMARY:

The learning process is a combination of both knowledge and experience. Both go hand in hand, particularly on the fireground when we're often faced with new situations that require us to make the right decisions very quickly. The best fire officer is one who has a good balance of experience and education. Education can be acquired through formal training. But, experience comes from practice.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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TOPIC: **Fire Command Overview**

TIME FRAME: :30

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will define fire command, identify the primary function of command, and identify the five general activities of command. The student will also cite two "givens" of human behavior that affect the way people perform in command positions.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 3.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 3
Fried, Emanuel, *Fireground Tactics*
Layman, Lloyd, *Firefighting Tactics*

PREPARATION:

To many firefighters, serving in a command position at a working fire is the high point of their career. Yet, others are reluctant to assume command at emergency scenes. Regardless of an officer's personal feelings, the command function is a basic responsibility of all line officers. This command function is made up of both specific activities and a human element. This chapter will provide an overview of both.

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PRESENTATION | APPLICATION

Fire Command Overview

Page: SM 3.1

I. Why Command?

Question:
What are some reasons why people may choose to advance to command positions?

A. Reasons why people choose command

1. It's exciting to be:

   a) In charge of a major incident

   b) Part of management

2. It's challenging

   a) Need to be more knowledgeable

   b) More responsibility

   c) More time and dedication

   d) Many people thrive on the challenge

3. Opportunity to use "people" skills

4. Opportunity to help others develop

Question:
What are some reasons why people may *not* choose command positions?

B. Command is not for everyone

1. Some people are not suited to it

2. Others may not be ready

   a) Need additional training (or knowledge)

   b) Need additional experience

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PRESENTATION	APPLICATION
C. How each person handles the responsibility is important	
1. It can add stress to someone's life	
2. Officers will sometimes experience fear of failure	
a) For some that's just part of the challenge	
b) Others may be held back by fear of failure	
1) They avoid taking risks	
c) Sometimes this fear also holds back others	
D. Sometimes the new relationship with others is a difficult adjustment	**Question:** What are some of the "relationship problems" that new officers may experience?
1. The new officer may no longer be perceived as "one of the guys"	
a) He or she is now a supervisor	
1) Giving orders	
2) Evaluating performance	
3) Looking out for "management" first	
2. Some are still perceived as "one of the guys" - not a new officer	**Instructor Note:** Refer students to Activity Sheet #3.1 on page 3.4 in their student manuals. It contains questions designed to help student reflect on the advantages and disadvantages of command. (A copy of this activity sheet is included at the end of this lesson plan.)

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PRESENTATION | APPLICATION

E. Questions to ponder:

1. What do you find attractive about command?
2. Which aspects are the most fulfilling to you?
3. What strengths can you bring to the department as a fire officer?
4. What are some of your fears or concerns?
5. How might they impact your performance as a fire officer?
6. What can you do to overcome those fears and concerns, and turn them into strengths instead?

Page: SM 3.2

II. Command Activities

A. Primary function is systematic management of resources to reduce the impact of an emergency

Question:
What general activities must take place at every emergency?

B. The fire officer must engage in five general activities at every emergency:

1. Collect and analyze facts
2. Identify and assess probabilities
3. Determine resource capabilities
4. Make decisions
5. Implement a plan

C. This is "Size-Up"

D. These basic activities do not change with the type of emergency or the rank of the officer in charge

Instructor Note:
These activities will be covered in more detail later in the course.

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PRESENTATION | APPLICATION

III. The Human Element of Command

A. Command involves human behavior

B. There are two "givens" in command:

Question:
What are the two "givens" in the human element of command?

1. No two individuals are likely to handle an emergency in the same manner

   a) Each person's perception will be a little bit different

   b) Each may size up the situation differently

   c) They have different training and experience

   d) They may prioritize things differently, even when guided by SOPs

   e) Rarely is there "one right answer"

2. No such thing as the "perfect" fireground officer

   a) At one time or another all commanders will:

      1) Get excited or flustered

      2) Make mistakes or judgment errors

      3) Forget things

      4) Doubt their abilities

   b) They will often look back and think of things they could have done differently or better

C. Acceptance of these two facts will better prepare any officer for command

Instructor Note:
Refer students to the review questions on page 3.3 in their student manuals.

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SUMMARY:

There are a number of reasons why a person may choose a command position, or choose not to advance to a command position. Nevertheless, when a person is in charge of an emergency scene, there are both specific command activities that must be accomplished and a human element that impacts the decision making process. Acceptance of these two facts will better equip any officer to handle the responsibilities of command.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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ACTIVITY SHEET #3.1

Why Command?

This activity sheet is designed to help you reflect on what you consider to be the advantages and disadvantages of command. An honest evaluation of your feelings can assist you to become a better fire officer.

1. What is it that you find attractive about command?

2. Which aspects are the most fulfilling to you?

3. What strengths can you bring to the department as a fire officer?

4. What are some of your fears or concerns?

5. How might these fears and concerns impact your performance as a fire officer?

6. What can you do to overcome these fears and concerns, and turn them into strengths instead?

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Fire Behavior

4. Fire Chemistry
5. Fire Phases
6. Effects of Time
7. Fire Behavior withing Structures

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TOPIC: **Fire Chemistry**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will define combustion, identify the four components of the fire tetrahedron and their relationship to the combustion process, describe the three methods of heat transfer, identify the major causes of fire spread, distinguish between an oxidizing agent and a reducing agent, and identify the four classes of fire.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 4.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 4
NFPA *Fire Protection Handbook*, 17th edition
NFPA *Fire Protection Guide to Hazardous Materials*, 11th edition
NFPA *Fire Terms*
NFPA *Incident Command*
IFSTA *Fire Essentials*
Edwards, *Fire Chemistry 1*

PREPARATION:

Fire has always been both a friend and foe to mankind. Controlled, it comforts our lives and propels our industries. Uncontrolled, it causes havoc; destroying lives and property. The basic duties of the fireground commander are to control unwanted fire. A thorough knowledge of fire chemistry is essential.

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PRESENTATION | APPLICATION

Fire Chemistry

Page: SM 4.1

I. Fire Defined

Question:
What is fire?

A. Fire defined

1. Rapid oxidation producing heat, light and products of combustion

B. Fire Triangle

Question:
What are the 3 elements of the fire triangle?

1. Fuel
2. Oxygen
3. Heat

C. Fire Tetrahedron

1. Fire is further propagated by products of combustion

Question:
What are the 4 elements of the fire tetrahedron?

2. Four elements:
   a) Reducing agent
      1) Fuel
   b) Oxidizing agent
      1) Oxygen, or
      2) Oxidizers
   c) Temperature

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PRESENTATION | APPLICATION

d) Chemical chain reaction

1) Fuel vapors + heat = free radical fuel fragments

2) Free radical fuel fragments + oxygen = hydroxyl free radicals + heat

3) Hydroxyl free radicals are free to burn again

Instructor Note:
Each of these four elements are explained in more detail throughout the lesson plan.

II. Heat (Temperature)

A. Energy associated with molecular movement

B. Measured in degrees

1. Fahrenheit

2. Celsius

3. Btu (British Thermal Unit)

a) Heat of combustion

b) One Btu is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit at sea level

Page: SM 4.2

C. Four sources of heat

Question:
What are the four sources of heat?

Instructor Note:
Refer students to Table 4.1 on page 4.2 in their student manuals.

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
1. Chemical	
a) Combustion	
b) Spontaneous ignition	
2. Electrical	
a) Over current conditions	
b) Arcing	
3. Mechanical	
a) Compression	
b) Friction	
4. Nuclear	
a) Fission	
b) Fusion	
D. Heat transfer	
1. Three methods	**Question:** What are the three methods of heat transfer?
a) Conduction	
b) Radiation	
c) Convection	
2. Conduction	
a) Heat transferred through a medium	
1) Usually by direct contact	
2) Transferred from atom to atom	
b) Examples:	
1) Uninsulated handle of a frying pan becoming hot during cooking	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2) Heat transferred along steel structural members in a fire	
c) Speed and efficiency depends on:	
1) Type of material	
2) Intensity of the heat	
3) Duration of exposure	
d) Usually the least significant heat transfer method at structure fires	
3. Radiation	
a) Transfer of heat via electro-magnetic waves	
b) Does not require a medium	
c) Moves in all directions	
d) Examples:	
1) Sun heating the earth	
2) Fire spread to adjacent exposure buildings	
e) Can pass through opaque objects or materials	
1) Including glass and water	
f) Space between heat source and receptive materials may not be heated equally	
g) Significant factor in fire spread	
4. Convection	
a) Transfer of heat via liquid or gaseous medium	
b) Examples:	
1) Boiler uses water to heat the radiator within a building	
2) Heat in a fire rises, using smoke and gas	
c) Can cause fire to break out several floors above the point of origin	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

d) If heated smoke and gases can no longer travel up they will travel horizontally, then bank downwards

e) Most significant cause of fire spread within a structure

5. Preventing the transfer of heat is one of the primary functions of fire suppression

III. Fuel

A. A substance that will produce heat during combustion

B. Also known as reducing agents

1. Substances capable of reducing an oxidizer and losing electrons in the process

C. Three physical forms

1. Solid

2. Liquid

3. Gas

Question:
What must happen to a fuel before it can burn?

D. Fuel must first be vaporized before it can be ignited

1. Solids and liquids do not burn

a) They give off flammable gases which burn

b) Fuel for a flammable or combustible liquid is vapor

2. Generally easier to ignite gas than solids or liquids

a) Doesn't need to be vaporized first

E. Fire classified by type of fuel involved

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Instructor Note: Refer students to Table 4.2 on page 4.3 in their student manuals.
1. A - Ordinary Combustibles	
2. B - Flammable Liquids and Gases	
3. C - Energized Electrical Equipment	
4. D - Combustible Metals	
F. All fuels have an ignition temperature	
	Question: What is ignition temperature?
1. Minimum temperature that is required to cause self sustained combustion	
a) Independent of a heat source	
2. Ignition temperatures vary between different fuels	
	Instructor Note: Refer students to Table 4.3 on page 4.3 in their student manuals for approximate ignition temperatures of some common fuels.
3. They are approximations based on lab testing	
a) Every fire is different	
b) The same fuel may ignite at different temperatures in different situations	
	Question: What are some of the factors that influence when a fuel ignites?

RETIRED CURRICULUM

PRESENTATION | APPLICATION

4. Factors that influence when a fuel ignites:

   a) Moisture content of the fuel

   b) Relative humidity in the atmosphere

   c) Fuel configuration (horizontal or vertical)

   d) Shape of the fuel

   e) Intensity and duration of heat exposure

   f) Amount of fuel surface exposed

   g) Ratio of fuel surface to mass of fuel

Page: SM 4.4

IV. Oxygen (Oxidizing Agent)

A. All matter will oxidize when exposed to air

1. Oxidation process

B. Normal oxidation

1. Slow combination of a material with oxygen

   a) Liberating products of combustion and heat energy

2. Slow process because little or no heat is added

3. Examples:

   a) Rusting of metal

   b) Yellowing of paper

C. Rapid oxidation - combustion

1. Oxidation process is accelerated by adding heat

D. Oxygen is not a flammable gas

1. Supports and assists combustion

2. Available concentration of oxygen directly affects the combustion process

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Instructor Note:
Refer students to Table 4.4 on page 4.4 in their student manuals.

E. Effects of Oxygen Concentration on Combustion

1. 21%
   a) Intensifies combustion process
   b) Not often encountered on the fireground
2. 16% - 21%
   a) Open burning with flame production
3. 10% - 15%
   a) Smoldering with minimal flame production
   b) Inefficient combustion
   c) Produces dense, toxic smoke
   d) Caused by lack of ventilation or extreme density of fuel
4. 0% - 9%
   a) Combustion will not occur

F. Effects of oxygen depletion on human health

Instructor Note:
Refer students to Table 4.5 on page 4.5 in their student manuals.

1. 21%
   a) No effects
   b) Normal condition
2. 19.5%
   a) OHSA limit requiring supplemental oxygen

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. 17%

   a) Some impairment of muscular coordination

   b) Increase in respiratory rate to compensate for lower oxygen concentration

4. 12%

   a) Dizziness

   b) Headache

   c) Fatigue

5. 9%

   a) Unconsciousness

6. 6%

   a) Death within a few minutes from respiratory failure and concurrent heart failure

G. Notes about this data:

1. Does not account for individual differences in breathing rate or length of time exposed

2. Symptoms reflect reduced oxygen levels only

3. If the atmosphere is contaminated with toxic gases other symptoms may develop

H. Important when considering smothering a fire by excluding oxygen

Question:
At what point does OSHA require using SCBA?

1. OSHA requires SCBA in atmospheres containing less than 19.5% oxygen

I. Oxidizers intensify a fire by releasing oxygen or heat or both

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PRESENTATION | APPLICATION

1. Oxidizers broken down by NFPA into four classes

   a) Class I (slight increase in burning rate)

   b) Class IV (capable of undergoing explosive reactions)

Instructor Note:
Refer students to Table 4.6 on page 4.5 in their student manuals.

Page: SM 4.6

V. The Chemical Chain Reaction

A. Self sustaining series of chemical activity

B. Products of the reaction contribute directly to the continuance of the reaction

Question:
How does the chemical chain reaction work?

C. The process

1. A reducing agent is exposed to an oxidizing agent in the presence of sufficient heat

2. Molecular structures of both are altered

   a) Electrons are lost and received

3. Chemical changes produce electrons known as free radicals

4. Molecular change also produces heat

   a) Exothermic reaction

5. Heat generated causes more free radicals to be produced

6. This, in turn, causes more heat again

D. In theory, once this reaction is begun, it will continue as long as sufficient heat, fuel and oxygen are available

RETIRED CURRICULUM

PRESENTATION	APPLICATION
VI. The Combustion Process A. Process consists of the following steps: 1. Heat increases oxidation 2. Fuel undergoes chemical and physical changes as it oxidizes 3. Fuel produces vapors 4. Molecular change occurs between vapors and oxygen 5. This change produces heat, which will increase oxidation 6. Flame production occurs when the fuel's ignition temperature is reached 7. Heat and light are produced B. There are many other variables and factors involved 1. This is a simplified explanation C. However, there are two key points 1. Combustion is a dynamic chemical process 2. The four components of the tetrahedron must be present in sufficient quantities and a proper ratio in order to sustain combustion	Instructor Note: Refer students to the Review Questions on page 4.7 in their student manuals.

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SUMMARY:

Fire is defined as a rapid oxidation producing heat, light and products of combustion. For many years it was depicted using the fire triangle with three necessary elements; fuel, heat and oxygen. An additional theory, the fire tetrahedron, was later introduced to explain the fact that fire is actually further propagated by products produced in the combustion process. It consists of a reducing agent (fuel), temperature (heat), oxidizing agent (oxygen) and a chemical chain reaction. This chapter provided an overview of each.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

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TOPIC: **Fire Phases**

TIME FRAME: :45

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the three phases of fire behavior, describe the conditions present during each phase, define backdraft and flashover, and identify those conditions which indicate potential backdraft conditions.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 5.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 5
Coleman, *Management of Fire Service Operations*
IFSTA, *Essentials of Fire Fighting*

PREPARATION:

A fire generally goes through 3 predictable phases; incipient, free burning and smoldering. However, it's important to note that numerous variables can affect a fire's behavior. A fire may or may not go through each of the phases. The duration of each phase can vary drastically. And, it cannot be guaranteed that all fires will begin or end with a particular phase. These phases are a generalization of what is likely to occur.

It's important for the fire officer to understand these three phases of fire, how to recognize them and the hazards associated with each in order to make appropriate strategic and tactical decisions.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Fire Phases

Page: SM 5.1

I. Incipient Phase

Question:
What characteristics are present in the incipient stage of a fire?

A. Generally first stage of a fire

B. Room temperature raised only slightly

1. 100°F to 110°F

C. Oxygen content close to normal

1. 20%

D. Smoke is present above fire

1. Impairs visibility slightly

E. Minor amounts of gases produced

1. Water vapor
2. Carbon dioxide
3. Carbon monoxide
4. Sulfur dioxide
5. Other gases depending on the fuel

F. Temperature at base of fire is approximately 100°F

G. Convected heat begins to form thermal column

1. Heat and smoke rise

H. Radiated heat pre-heats fuels

I. Fire grows as more fuel is consumed

J. Atmosphere becomes progressively hostile

1. Increased heat

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PRESENTATION | APPLICATION

2. Increased toxicity

3. Decreased visibility

II. Free Burning Phase

Question:
What characteristics are present in the free burning stage of a fire?

A. Temperature significantly higher

1. As high as 1300°F in upper areas

B. Oxygen level between 16% and 20%

C. Visibility reduced

D. Production of gases continues at increasing rate

1. Gases collect at upper levels

E. Convected heat forms definite thermal column

1. Heat and smoke rise vertically above fire

2. Then spread horizontally

3. Cooler, fresher air is pushed down and out

F. Radiated heat pre-heats other fuels

G. Fuels with low ignition temps (300°F - 500°F) ignite

H. Convected heat begins to affect objects that extend to uninvolved portions of the structure

1. Beams

2. Pipes

3. Walls

I. Fire behavior depends on availability of oxygen

1. Fire grows as oxygen enters building

2. Intensified when fire vents itself

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. If insufficient oxygen, fire enters smoldering phase

Page: SM 5.2

III Smoldering Phase

Question:
What characteristics are present in the smoldering phase of a fire?

A. Temperature may drop to approximately 1000°F

1. Throughout most of the room

2. No longer concentrated in upper areas alone

B. Oxygen level between 11% and 15%

C. Heavy smoke

1. Drastically reduces visibility

D. Significant concentrations of gases due to incomplete combustion

1. Toxicity extremely high

E. Convected heat affects fuels in entire area

F. Less radiant heat because of reduced flame production

G. Heat present will increase pressure in structure

H. Reduced oxygen level is critical

1. Combustion will cease

2. Heat and pressure will gradually dissipate

Question:
What is the most serious consequence of the smoldering phase?

3. Most serious consequence is threat of backdraft

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PRESENTATION | APPLICATION

Instructor Note:
Backdraft is discussed later in this lesson plan.

I. Firefighters don't often encounter fires in the smoldering stage

1. They often encounter fires that have vented themselves after smoldering phase

a) Heat may cause a window to fail, introducing new oxygen

b) Pressure inside may also cause an air exchange through cracks or other openings

2. Once the fire has vented, combustion will increase significantly

a) Generally results in fire entering (or re-entering) free burning phase

IV. Backdraft

Question:
What is a backdraft?

A. Rapid combustion of heated gases and suspended fuel particles when oxygen is introduced into a fire structure that has a low concentration of oxygen from inadequate ventilation

B. Risks:

1. Extensive property damage

2. Genuine threat to firefighters

Question:
What causes backdraft?

C. The process

1. Encountered where fire has been smoldering for a prolonged period in a relatively confined area

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Room or building is vented suddenly a) Pressure build-up causes a window or other opening to fail, or b) Someone inadvertently opens a door or window, unaware of the consequences 3. Pressure and heated gases rush from fire area 4. Fresh oxygen enters a) Oxygen levels return to near normal 5. Suspended fuels and flammable gases that have accumulated within the fire area ignite a) Ignition often occurs with a near-explosive force	
D. Firefighters have been killed or injured by backdrafts	**Question:** What are the signs of potential backdraft?
E. Signs of potential backdraft 1. Darkened smoke 2. Stained windows 3. Little or no flame present 4. Dark smoke issuing from cracks or other openings 5. A closed, tight structure 6. Smoke exiting in "puffs" rather than "billowing"	**Question:** What is the proper method of controlling a potential backdraft?
F. Controlling a potential backdraft 1. Carefully vent structure	

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PRESENTATION | APPLICATION

2. Preferred method is to vent vertically

   a) As high as possible

   b) With a coordinated suppression effort

3. Horizontal venting is recommended only when vertical venting is not practical or not safe

   a) Must be done with extreme caution

Page: SM 5.3

V. Flashover

A. More common than backdraft

1. But, less information is actually known about it

Question:
What is flashover?

B. All fuel surfaces within fire area are heated to their ignition temperature and ignite

1. Originally thought to be caused by release of flammable gases during combustion

2. Now believed to be attributed to overall build up of heat caused by the fire

C. Size of fire area and amount of available fuel load will impact the development of flashover

1. Flashover will occur sooner in smaller areas containing a high fuel load

2. Opposite is true for a large area with little fuel loading

3. Tests of an ordinary dwelling with plaster finish and a light fuel load indicate that approximately 30 minutes of burning is required prior to flashover

   a) May occur a lot quicker under other conditions

RETIRED CURRICULUM

PRESENTATION	APPLICATION
D. Flashover significantly increases: 1. Area of fire involvement 2. Rate of combustion	
E. Usually requires a dramatic increase in suppression efforts	
F. Usually occurs during incipient or free burning phases 1. Can be connecting process between the two	
G. May happen: 1. Before firefighters arrive 2. After firefighting efforts have begun	
	Question: What are some indications of impending flashover?
H. Indications 1. Sudden smoke build up in uninvolved room 2. Accompanied by fire breaking through a wall or other opening	
I. At height of flashover, firefighters will see smoke and flames rolling across ceiling	
J. Very dangerous situation 1. Heat at ceiling level can reach 750°F to 1000°F	
	Question: How quickly can flame spread in a flashover?
2. Flame spread can exceed 6 feet per second	
	Instructor Note: Refer students to the Review Questions on page 5.4 in their student manuals.

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SUMMARY:

Fire generally goes through three predictable phases: incipient, free burning and smoldering. However, all fires are different. They may not go through all three phases. The duration of each phase may vary drastically depending on conditions. Understanding these phases and the characteristics of each will help the fire officer make more appropriate decisions regarding tactics and strategies.

Two other conditions that all firefighters must be alert to are backdraft and flashover. These do not occur at every fire. However, either condition can result in death or injury to firefighters if they don't take adequate safety precautions.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **The Effects of Time**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will describe the standard time-temperature curve, identify the critical period of a fire's development, and define the factors that make up total reflex time.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 6.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 6
Coleman, *Management of Fire Service Operations*
NFPA *Fire Protection Handbook*, 17th Edition

PREPARATION:

The length of time it takes before a fire is discovered and reported, and the time it takes before firefighters are on-scene and can begin their extinguishment efforts, are critical factors in the development of a fire. The more time that passes, the more damage done. This is a major reason why we place such a heavy emphasis on early detection and warning systems, fire prevention practices and public fire safety education.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

The Effects of Time

Page: SM 6.1

I. Standard Time-Temperature Curve

A. Fire will generate heat rapidly once ignition occurs

Question:
What temperatures can be expected in the first 5 - 10 minutes of a fire?

1. Temperatures can reach:

a) 1000°F in 5 minutes

b) 1300°F in 10 minutes

B. This is generally the most critical period in the fire's development

1. Threat to property dramatically increases

2. Fire rapidly moves from incipient to free burning

3. Flashover may occur

4. Amount of fuel involved will increase rapidly

Question:
What is the range of ignition temperatures for most ordinary combustibles?

a) Ignition temperature of most ordinary combustibles ranges from 400°F to 1400°F

C. As fire grows, so does need for suppression activities and resources

D. Normal ambient atmosphere becomes poisoned and super-heated

E. The Standard Time-Temperature Curve

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Instructor Note: Refer students to the illustration of the Standard Time-Temperature Curve (Figure 6.1 on page 6.1 in their student manuals).
1. Developed as a standard for testing and rating a material's fire resistance qualities 2. Represents time required for "typical" class A structure fire to reach specific temperature levels 3. Based on tests conducted by National Bureau of Standards	
	Page: SM 6.2
II. Fire Department Reflex Time	
A. Firefighters seldom have opportunity to control a fire's initial rapid growth	
	Question: What is reflex time?
B. Reflex time is total time elapsed from fire's beginning until extinguishment	
	Question: What are some of the factors involved in fire department reflex time?
C. Reflex Time Factors: 1. Detection 2. Notification 3. Receipt of alarm 4. Dispatch 5. Clearing stations 6. Response time 7. Arrival and size-up	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
8. Conducting fireground evolutions	
9. Control and extinguishment	
D. Detection	
1. Often most critical factor in fire's development	
2. Most fatal fires occur in residential occupancies, at night when people are asleep	
a) No smoke detector or dead battery	
b) Significant delay before fire is discovered	
c) Occupants may have inhaled fatal levels of smoke and toxic fire gases	
d) Fire is no longer easily controlled	
3. Automatic detection and notification systems provide protection when a building is unoccupied	
a) When residents aren't home	
b) When a business is closed	
c) These fires may not be detected until:	
1) They've vented	
2) Fully involved	
E. Fire Department Notification	
1. How long does it take for occupants to notify fire department?	
2. Notification may be delayed by:	
a) Difficulty finding a phone	
b) People who panic during call	
c) In some facilities, people have to call an internal number	
1) They report emergencies to site operator who calls appropriate response agency	

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PRESENTATION | APPLICATION

d) Site ERTs may investigate before calling fire department

3. Case Study: MGM Grand Hotel in Las Vegas (November 21, 1980)

a) 85 people died

b) Over 600 were injured

c) Approximately 6 minute delay between discovery and notification

d) Hotel employee tried to extinguish the fire during those 6 minutes

1) It wasn't left to grow unattended

e) Immediate notification may have prevented the deaths and injuries

Page: SM 6.3

F. Receipt of Alarm

1. It takes time for alarm to be "received"

2. Dispatcher must ask questions for proper dispatch

a) Type of emergency

b) Type of fire

1) Structure

2) Wildland

3) Auto

c) Other hazards or problems that may require additional resources

1) Burn victims

2) Hazardous materials

3) Down power lines

d) Address and cross street

RETIRED CURRICULUM

PRESENTATION	APPLICATION
3. Other delays a) Difficulty getting information from a child b) Language barriers G. Dispatching Units 1. Dispatcher must determine which units to send a) Computer aided dispatch systems 1) Automatically select nearest available units 2) May also select units based on resources required b) "Run cards" 1) Manual tracking of units available 2. Two dispatchers reduce dispatch time a) One taking information b) One dispatching H. Clearing the Stations 1. How long does it take to clear station? 2. Many variables a) Time of day 1) Generally takes more time at night when firefighters are asleep b) What's going on when the alarm comes in 1) Someone in the shower 2) Drills/training 3. Longer delays in communities that depend on volunteers who must respond to the station	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
I. Response Time 1. Factors that affect response time a) Distance from station to fire scene b) Traffic conditions c) Road construction d) Route of travel chosen e) Information received from caller 1) Example: wrong direction of travel on freeway	
J. Arrival and Size-Up Time 1. Time needed to properly position apparatus and size-up the fire: a) Essential to protecting lives of firefighters b) Can make a difference in tactics and strategy	
	Page: SM 6.4
K. Conducting Fireground Evolutions 1. All fireground evolutions take time a) Donning SCBA b) Pulling hose line c) Throwing ladder d) Priming pump e) Charging line 2. Training and practice builds proficiency 3. Additional delays occur if something goes wrong a) Equipment malfunctions b) Mistakes c) Someone gets hurt	

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PRESENTATION	APPLICATION
L. Control and Extinguishment 1. Fire may still be growing even after control and extinguishment has begun 2. "Reflex time" incorporates total time to bring fire under control	**Instructor Note:** Refer students to the Review Questions on page 6.5 in their student manuals. **Instructor Note:** Refer students to Activity Sheet #6.1 on page 6.6 in their student manuals. (A copy is included at the end of this lesson plan.) Have students indicate what they think are the minimum, maximum and average times for each of the factors listed.

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SUMMARY:

Time is a critical factor in the development of a fire. It doesn't take long for fire to generate a lot of heat, smoke and toxic fire gases. When reflex time is compared to the time-temperature curve, it's easy to see that any delay can have a significant impact on our ability to save lives and property. Effective control really only occurs if the fire is in its incipient stages. Adequate size up and resource management must be accomplished early to keep the fire from escalating out of control.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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ACTIVITY SHEET #6.1

Reflex Time

Based on your experience in your own fire department, indicate below what you think are the minimum, maximum and average times for each of the factors listed.

Factor	Minimum	Maximum	Average
Detection of the fire			
Fire department notification			
Receipt of the alarm			
Dispatching units			
Clearing the stations			
Response time			
Arrival and size-up time			
Subtotal			
Conducting fireground evolutions			
Control and extinguishment			
Total			

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TOPIC: **Fire Behavior Within Structures**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the basic fire behavior within a structure, the main method by which heat will spread, and three factors which may effect a fire's development within a structure. The student will also define the "rule of thumb" regarding fire spread and identify the natural order of heat movement within a structure.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 7.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 7
Clark, *Fire Fighting Principles and Practices*
NFPA Fire Almanac

PREPARATION:

Structure fires represent the vast majority of fires that most departments respond to. This is where most of the civilian deaths and injuries take place. Structure fires present a significant hazard to firefighters as well. It's essential, both for safety and for limiting fire damage, that the fire officer understand the basics of fire behavior within structures and the factors that can influence this behavior.

PRESENTATION | APPLICATION

Fire Behavior within Structures

Page: SM 7.1

I. Basic Fire Behavior within Structures

A. Introduction

1. Numerous variables affect how a fire behaves

a) Some are covered in other chapters

b) The following is applicable to most structure fires

B. Complete and Incomplete Combustion

Question:
What is complete combustion?

1. Complete combustion

a) Results in:

1) Carbon dioxide

2) Water vapor

3) Heat energy

b) Greatest concern is chemical chain reaction

1) Sufficient heat will break down carbon dioxide and water into:

- Carbon
- Oxygen
- Free radical - hydroxyl group (HO)

2) These recombine with other molecules and free radicals to again form carbon dioxide, water vapor and heat energy

RETIRED CURRICULUM

PRESENTATION	APPLICATION
3) Self-perpetuating process that will only stop when: • One side of fire triangle is removed • An extinguishing agent is applied to interrupt the chemical chain reaction 4) Referred to as "secondary pyrolysis"	
	Question: What is incomplete combustion?
2. Incomplete Combustion a) Insufficient oxygen or heat distribution	
	Question: What are some of the products of incomplete combustion?
b) Results in products such as: 1) Hydrogen cyanide 2) Sulfur dioxide 3) Carbon monoxide 4) Smoke c) Smoke consists of: 1) Toxic gases 2) Carbon particles 3) Unburned fuel vapors d) Each fuel generates a different kind of smoke with different effects e) Many tactical problems associated with smoke 1) Reduction in visibility 2) Flammable gases in the atmosphere	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
3) Smoke kills most our nation's fire victims	
4) Smoke necessitates wearing SCBA	
f) Ventilation is a priority to clear smoke	
C. Convection	
1. Most significant cause of heat transfer	**Question:** How does convection contribute to a fire's growth?
a) Smoke and heated gases rise	
b) Then travel horizontally	
c) Then begin banking downward	**Question:** What is this downward movement called?
1) "Mushrooming"	
2. It can cause fire to break out in distant areas	
a) Flashover	
b) This is especially a problem in:	
1) Long hallways	
2) Center core construction (high rise)	
c) Heat can travel through unprotected vertical openings	
d) This is why it's so important to:	
1) Check for extension	
2) Identify the need for vertical or positive pressure ventilation as soon as possible	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. Structural members are *usually* not impacted by convection until later in the fire

   a) Except with pre-fabricated roof assemblies (trusses) that are exposed to heat

      1) They fail at a faster rate than conventional roofs because of metal nail plates

Page: SM 7.2

II. Fire Progress within a Structure

A. 3 major factors affect a fire's progress:

1. Fuel
2. Air movement
3. Construction features

B. Fuel

Question:
What are some ways in which fuel impacts a fire's growth?

1. Fuel type

   a) Each behaves differently when burning

   b) Each requires different extinguishing methods

   c) Many fires contain multiple types of fuels

      1) More difficult to predict fire behavior

2. Burning characteristics of different fuels will vary

   a) Heat of combustion

      1) Amount of heat the burning material contributes to the fire

   b) Smoke index

      1) Amount of smoke the burning material releases

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PRESENTATION | APPLICATION

c) Flame spread

1) Speed at which the combustible material will become involved once fire occurs

d) Any negative reactions the material may have to the fire or extinguishing agents

3. Fuel division (exposed surface area)

4. Fuel arrangement

a) Closer fuels will ignite faster

b) Densely packed fuels are slower to ignite

c) Fuels stacked vertically will burn faster

5. Fuel load (or fire load)

a) The amount of fuel within the structure

b) Measure of the maximum heat that would be released if all combustibles burned

c) In a typical building, the fuel load includes:

1) Combustible contents

2) Interior finish

3) Floor finish

4) Structural elements

d) Commonly expressed in terms of pounds per square feet

1) For average fire load in building or area

e) As the fuel loading increases, so does the potential for a larger fire

Page: SM 7.3

C. Air Movement

1. Availability of oxygen

2. HVAC systems alter normal convection currents

RETIRED CURRICULUM

PRESENTATION	APPLICATION
D. Construction Features	**Question:** How can construction features affect fire behavior?
1. Construction features can add to the fuel load	
a) Therefore there are strict requirements:	
1) Materials used in construction	
2) Exposed structural members	
3) Interior finishings	
2. Other requirements to restrict spread of fire and smoke:	
a) Limiting building size	
b) Compartmentalization	
c) Automatic sprinklers	
d) Fixed extinguishing systems	
III. The Path of Least Resistance	
A. A fire will follow the path of least resistance	
B. Fire will travel:	
1. Towards adequate, suitable fuel	
2. With the prevailing air flow	
3. Away from construction barriers	
4. Away from areas where hose streams are applied	
C. A fire officer should be able to predict fire behavior	**Instructor Note:** Refer students to the Review Questions on page 7.4 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

It's essential, both for safety and for limiting fire damage, that the fire officer understand the basics of fire behavior within structures. Unless the structure is totally involved upon arrival, the fire officer should be able to anticipate fire behavior based on some fairly predictable factors. He or she must understand the impact of complete and incomplete combustion, and the process of convection; and must understand how fuel, air movement and construction features contribute to a fire's growth.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

Fire Control Concepts

8. Extinguishing Agents
9. Water Application
10. Protection Systems

RETIRED CURRICULUM

TOPIC: **Extinguishing Agents**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the six major categories of extinguishing agents and give examples of each. The student will also identify which classes of fire these extinguishing agents are effective on and which types of fires they cannot be used on safely.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 8.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 8
NFPA, *Fire Protection Handbook*, 17th edition

PREPARATION:

Although water is the most commonly used extinguishing agent in the fire service, there are many other options. The fire officer must understand the different agents available, what types of fires they may be used on, and the circumstances under which they can be hazardous.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Extinguishing Agents

Page: SM 8.1

I. Four Classes of Fire

A. Different classes need different extinguishing agents

B. Four classes

1. A - Ordinary Combustibles
2. B - Flammable Liquids
3. C - Energized Electrical Equipment
4. D - Combustible Metals

Instructor Note
Refer students to Figure 8.1 which shows the different classes of fire and the symbols associated with each.

Page: SM 8.2

II. Water

A. Introduction

1. Most common extinguishing agent in fire service

Question:
How does water function to extinguish a fire?

2. Able to absorb large quantities of heat

a) Cools the fire

b) More surface area = more cooling

1) Fog stream

- Often more effective than straight stream
- Causes less water damage

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. High expansion ratio

   a) Varies with temperature

Instructor Note:
Refer students to Table 8.1 on page 8.2 in their student manuals.

Question:
What is the expansion ratio of water?

   b) Expansion of 1 cubic foot of water:

      1) 212°F (100°C) 1,700:1

      2) 500°F (260°C) 2,400:1

      3) 1,200°F (649°C) 4,200:1

   c) Steam occupies more space than water

      1) Displaces hot gases, smoke and other products of combustion

      2) May help smother fire in a relatively confined space

B. Types of Fires Water Can Be Used On

Question:
What types of fires can water be used on?

1. Class A

   a) Water is most effective on Class A fires

   b) Cools burning material

2. Class B

   a) Water may or may not be appropriate

   b) Small fires

      1) Water on a frying pan can spread fire

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2) More effective techniques:	
• Lid	
• Dry chem extinguisher	
c) Larger fires	
1) May require water	
• No other extinguishing agent is available in sufficient quantities	
d) Type of liquid determines how to use water	
	Question: How does water behave on floaters?
1) Floaters	
• Example: gasoline	
• Will not mix with water	
• Specific gravity less than 1	
• Water alone will not be effective	
• Water with foam will work	
	Question: How does foam make water work better?
• Foam "modifies" density of water	
• Floats on surface	
• Creates film that seals surface	
• Prevents further vapor production	
	Question: How does water behave on sinkers?
2) Sinkers	
• Specific gravity greater than 1	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
• Water effectively smothers fire • Water floats on surface • Requires no "modification" to seal surface and prevent vapor production	
	Question: How does water behave on polar liquids?
3) Polar (miscible) liquids • Example: alcohol • Mixes with water • Water decreases overall vapor content • Eliminates vapor production • Large amounts of water required • Must contain runoff • Foam can help reduce water required	
	Question: What are the hazards associated with using water on Class C and Class D fires?
3. Class C a) Hazardous b) Water conducts electricity c) Once de-energized, fire is Class A or Class B 4. Class D a) Water not recommended b) Many burning metals are water reactive 1) Produce toxic gases and excessive heat c) Special extinguishing agents required	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 8.3

C. Water Additives

Question:
What kind of water additives can be used? How do they function?

1. Wetting agents
   a) Reduce surface tension
   b) Water penetrates more effectively
2. Water thickeners
   a) Increase viscosity
   b) Water blankets fire better
   c) Does not run off surfaces as quickly
3. Flow agents
   a) Reduce friction loss
   b) Deliver higher pressure to nozzle

D. Water Reactive Chemicals

1. Many chemicals are water reactive
2. Reactions can be violent and explosive

Instructor Note:
Refer students to Table 8.2 on page 8.3 in their student manuals for examples of water reactive chemicals.

3. Examples
   a) Alkalies (Caustics)
      1) Caustic soda (sodium hydroxide or lye)
      2) Caustic potash (potassium hydroxide)

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) Carbides

1) Calcium carbide

2) Lithium carbide

3) Potassium carbide

4) Barium carbide

c) Hydrides

1) Sodium hydride

2) Lithium hydride

3) Lithium aluminum hydride

d) Oxides

1) Sodium oxide

2) Calcium oxide (quicklime or unslaked lime)

e) Alkali Metals

1) Lithium

2) Sodium

3) Potassium

f) Alkaline Earths

1) Magnesium

2) Beryllium

3) Calcium

Page: SM 8.4

III. Foam

A. Most common use is flammable and combustible liquid fires

Question:
How does foam work?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
B. Impacts all three sides of fire triangle 1. Oxygen a) Smothers and acts as flame barrier 1) Light density 2) High water content 3) Blanketing tendencies 4) Resistance to rapid breakdown 2. Fuel a) Suppresses release of vapors b) Reduces available fuel 3. Temperature a) Minimal cooling properties 4. Does not inhibit chemical chain reaction C. Many departments using foams on Class A fires 1. Including structure and wildland fires 2. Solutions with low surface tensions: a) Easily penetrate combustible fuels b) Reduce water needed c) Minimize possibility of reignition	
	Question: What are some of the limitations and disadvantages of foam?
D. Limitations and Disadvantages of Foam 1. Sometimes foam is not effective or not safe 2. Cannot safely be used on a) Water-reactive chemicals	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
b) Energized electrical fires	
3. Must be compatible with burning fuel	
4. Less effective on fuels with high vapor pressures	
5. Designed for horizontal surface fires	
a) Cannot blanket fuels flowing vertically	
1) Fuel leaking from elevated tank or pipeline	
b) Some foams are capable of "following" a flowing fuel fire	
	Question: What is the greatest hazard with foam?
6. Greatest hazard is disturbance of foam blanket	
a) Blanket may be disturbed by:	
1) Strong hose stream	
2) Personnel walking through foamed area	
b) Fire can easily reignite	
c) Uneven topography can affect density of foam blanket	
d) Important precautions:	
1) Maintain intact foam barrier at all times	
2) Keep personnel out of the area	
7. No perfect "all purpose" foam	
a) Each designed for different types of fuels	
8. Don't mix foams	
a) Many are not compatible	
b) May cause foams to be ineffective	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
E. Protein Foam	
1. Chemically broken-down natural protein solids	
2. Commonly used at 3 or 6 percent	
	Question: What are the advantages of protein foam?
3. Advantages:	
a) Excellent elasticity	
b) Excellent water retention capabilities	
c) High strength	
d) High stability	
e) High heat resistance	
f) Good resistance to burnback	
g) Non-toxic	
h) Biodegradable after dilution	
i) Works well within 20°F to 120°F	
4. Not well suited for:	
a) Polar solvents	
b) Extremely cold temperatures	
c) Subsurface injection	
F. Fluoroprotein Foam	
1. Protein foams fortified with fluorinated solvents	
2. Commonly used at 3 or 6 percent	
	Question: What are the advantages of fluoroprotein foam?

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. Advantages:

   a) "Fuel shedding" property allows foam to separate from flammable liquids

   b) More effective where foam becomes coated with fuel

      1) Subsurface injection for tank fire fighting

      2) Deep petroleum or hydrocarbon fuel fires

   c) Superior vapor securing and burnback resistance characteristics

   d) Non-toxic

   e) Biodegradable after dilution

   f) Works well at 20°F to 120°F

Page: SM 8.5

G. High Expansion Foam

1. Synthetic hydrocarbon surfactants that foam copiously with a small input of turbulent action

2. Generally used at 2%

3. In volume, it can prevent air from reaching fire

Question:
How does high expansion foam work?

4. Heat converts water in the foam to steam

   a) Absorbs heat

   b) Displaces oxygen

5. Foam not converted penetrates Class A materials

   a) Due to relatively low surface tension

6. When accumulated in depth, it can provide insulating barrier for exposure protection

RETIRED CURRICULUM

PRESENTATION	APPLICATION
7. When generated from gases of combustion it becomes toxic	
a) SCBA required	
H. Synthetic (AFFF) Foam	
1. Aqueous film-forming foam (AFFF)	
2. Synthetically produced materials	
	Question: How does AFFF work?
3. Dual action	
a) First action forms blanket of strong foam	
1) Spreads over surface of burning liquid	
2) Smothers fire	
3) Retards vapor production	
b) Second action forms film or aqueous solution between foam and surface of liquid	
1) Smothers fire	
2) Prevents vaporization	
	Question: What are the advantages of AFFF?
4. Advantages	
a) Self-healing	
1) Re-seals open areas caused by agitation	
2) Dependable and versatile	
b) Often used on spills to prevent ignition	
c) Will penetrate deep Class A and Class B fuels	
d) Compatible with dry chem	
e) No special application devices needed	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
f) Non-toxic	
g) Biodegradable	
h) Work well at 35°F to 120°F	
i) Available for proportioning at 1%, 3% and 6%	
I. "Alcohol-Type" Concentrates (ATC)	
1. Developed for fuels that rapidly break down ordinary foams	
a) Water soluble fuels	
b) Polar solvents	
c) Hydrocarbons	
2. Proprietary compositions of several types	
a) Protein or fluoroprotein base	
b) AFFF concentrate base	
3. Exhibit AFFF characteristics on hydrocarbons	**Question:** How does ATC foam work?
4. Produce floating gel-like mass for foam build-up on water miscible fuels	
5. Normal temperature range 35 to 120°F	
J. Class A	
1. Fairly new	
2. Designed for Class A and B fires	
a) Used primarily on Class A or wildland	
3. Characteristics differ from other foams:	
a) Applied as water or compressed air driven	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) Formed as air bubbles surrounded by water (like other foams) but:

1) Other foams formulated to maintain bubble structure as long as possible

2) Class A designed to drain the water from its bubble structure in order to wet fuels

Question:
What are the characteristics of Class A foam?

4. Characteristics:

a) Surfactant allows spread and penetration by reducing surface tension

b) Increased ability to absorb heat

1) High surface area to mass ratio of water

c) Reflects radiated heat to keep fuels cooler

d) Holds water on vertical surfaces

1) Allows water to penetrate fuels

e) Removes oily substances from fuels to allow water penetration

f) High visibility helps identify areas already covered

g) 5 gallons will treat 500 - 2500 gallons of water

h) Relatively inexpensive

5. Increasingly used for wildland fires

Page: SM 8.6

IV. Carbon Dioxide (CO_2)

Question:
What types of fire is CO_2 used for?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
A. Used for:	
1. Flammable liquids and gases	
2. Energized electrical equipment	
	Question: How does CO_2 work?
B. Extinguishing properties	
1. Functions primarily by smothering	
a) Inert gas	
2. Minimal cooling effect	
a) Discharges at -110°F	
C. Stored as liquefied gas	
1. Applied in a gaseous state	
D. Leaves no residue	
1. Reduces clean up	
E. Used in:	
1. Portable extinguishers	
2. Fixed systems	
F. Limitations and Hazards	
	Question: What are the limitations associated with CO_2?
1. Limited effectiveness on:	
a) Ordinary combustibles	
1) Can't penetrate deep seated fires	
b) Fuels that contain their own oxygen supply	
1) Example: cellulose nitrate	

RETIRED CURRICULUM

PRESENTATION

APPLICATION

2. Some materials decompose carbon dioxide, often causing a violent reaction:

   a) Reactive metals

      1) Sodium

      2) Potassium

      3) Magnesium

      4) Titanium

      5) Zirconium

   b) Metal hydrides

Question:
What are the health hazards of CO_2?

3. Mildly toxic

4. Displaces oxygen

   a) Can cause oxygen-deficient atmospheres

5. High concentrations are dangerous

   a) 9% will cause loss of consciousness in a few minutes

   b) Higher concentrations can render a person helpless almost immediately

   c) Highest concentrations near floor

      1) 1.5% times heavier than air

6. Very cold when discharged

   a) Can cause frostbite

   b) Avoid contact with nozzle horn

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 8.7

V. Halogenated Agents

A. Hydrocarbons with one or more hydrogen atoms replaced by halogen atom(s):

1. Fluorine
2. Chlorine
3. Bromine
4. Iodine

B. Used in:

1. Portable extinguishers
   a) 1211 (Bromochlorodifluoromethane)
2. Fixed systems
   a) 1301 (Bromotrifluoromethane)

C. Gas or liquid which rapidly vaporizes

1. Leaves no corrosive or abrasive residue
2. Preferred near electrical and electronic equipment

D. Probably interrupts chemical chain reaction

Question:
What types of fires can halon be used on?

E. Application

1. Class C fires
   a) Does not conduct electricity
2. Class B fires
   a) Very effective
   b) About 2.5 times more effective than CO_2

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. Class A fires

   a) Less predictable results

   b) Depends on type and configuration of fuel

      1) Most plastics behave as flammable liquids

         - Can be extinguished rapidly with relatively low concentrations

      2) Limited capacity to penetrate deep seated fire in ordinary combustibles

         - Smaller extinguishers not rated for Class A

F. Hazards

1. Toxicity of Halon 1301 and 1211 has been studied extensively

Instructor Note:
Table 8.4 (page 8.8 in the student manual) shows the effects on humans at various concentrations, and the permitted exposure times listed in the NFPA Fire Protection Handbook (17th edition).

2. Effects partly attributed to oxygen displacement

   a) Disappear quickly after exposure stopped

Question:
What are the effects of exposure to halon?

3. Effects and Permitted Exposure Limits

   a) 1301

      1) Up to 7% for 15 minutes

         - Little noticeable effect

RETIRED CURRICULUM

PRESENTATION

2) 7-10% for 1 minute

- Dizziness and tingling of extremities, indicating mild anesthesia

3) 10-15% for 30 seconds

- Dizziness pronounced
- Physical and mental dexterity reduced
- Subjects feel like they may lose consciousness

4) Above 15

- Prevent exposure

b) 1211

1) Up to 4% for 5 minutes

- Little noticeable effect (2-3%)
- Dizziness and tingling of extremities, indicating mild anesthesia (3-4%)

2) 4-5% for 1 minute

- Dizziness pronounced
- Physical and mental dexterity reduced
- Subjects feel like they may lose consciousness

3) Above 5%

- Prevent exposure

4. Health effects under normal circumstances are minimal

APPLICATION

Question:
How is halon affected by heat?

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PRESENTATION

5. Under fire conditions

a) Can be broken down to toxic by-products by:

1) Flame

2) Surface temperatures above 900°F

b) Halon 1301 decomposes to:

1) Hydrogen fluoride

2) Hydrogen bromide

3) Bromide

c) Halon 1211 decomposes to:

1) Hydrogen fluoride

2) Hydrogen bromide

3) Bromide

4) Hydrogen chloride

5) Chlorine

d) Decomposition products have good warning properties

1) Characteristically sharp, acrid odors even in minute concentrations

2) Create noxious, irritating atmosphere

e) Brief exposures have no lasting health effects

f) SCBA recommended

APPLICATION

Instructor Note: Table 8.5 (page 8.8 in the student manual) shows the main decomposition products of halon in the presence of available hydrogen (either from water vapor or the combustion process itself).

RETIRED CURRICULUM

PRESENTATION | APPLICATION

6. Destructive effects on ozone layer

   a) Numerous experiments are being conducted to find an adequate replacement

   b) No immediate solutions

Page: SM 8.9

VI. Dry Chemicals

A. Powder mixture containing one of the following:

1. Sodium bicarbonate
2. Potassium bicarbonate
3. Potassium chloride
4. Urea-potassium bicarbonate
5. Monoammonium phosphate

B. Various additives improve:

1. Storage
2. Flow
3. Water repellent characteristics

C. Applied by:

1. Portable extinguishers
2. Hose lines
3. Fixed systems

D. Application

Question:
What types of fires can dry chem be used on?

1. Effective on Class B and Class C fires

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Class A	
a) Some dry chemicals need supplemental water spray to get beneath fuel surface	
b) Multipurpose dry chem designed to be more effective on Class A	
1) Seldom needs water	
E. Multipurpose (ABC) dry chem is the most common	
	Question: How does dry chem function?
F. How it functions	
1. Primarily inhibits chemical chain reaction	
2. Helps somewhat to smother fire	
3. Multipurpose dry chem leaves a sticky residue (metaphosphoric acid) on burning material	
a) Seals glowing material from oxygen	
b) Extinguishes fire	
c) Prevents reignition	
G. Limitations and Hazards	
	Question: What are the limitations and hazards associated with dry chem?
1. Health hazards	
a) Non-toxic	
b) Irritating to respiratory system	
c) SCBA recommended	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

2. Don't mix dry chemicals indiscriminately

   a) Mixing multipurpose dry chem, which is acidic, with an alkaline dry chem (most others) will result in an undesirable reaction which releases carbon dioxide gas together with formation of caking

      1) Extinguisher shells have been known to explode because of this

3. Dry chem not recommended around delicate electrical equipment

   a) Insulating properties may render equipment inoperative

4. May require excessive cleaning

5. Some dry chemicals are slightly corrosive

   a) Should be removed from undamaged surfaces as soon as possible

6. Does not produce lasting inert atmosphere above surface of a flammable liquid

   a) Fire can reignite if sufficient heat or persistent electrical arcing are present

Page: SM 8.10

VII. Metal Extinguishers

A. Many types, each of limited use

B. Types of agents:

1. Dry powder most common

2. Liquid agents also available

Question:
How do metal extinguishing agents work?

C. Work primarily by smothering

RETIRED CURRICULUM

PRESENTATION | APPLICATION

D. Two most common are:

1. Met-L-X
2. G-I Powder

E. Met-L-X

1. Most common in fire service
2. Suitable for most Class D fires
3. Sodium chloride base with additives
   a) Additives include:
      1) Tricalcium phosphate to improve flow
      2) Metal stearates for water repellency
      3) Thermoplastic material to bind sodium chloride particles into solid mass under fire conditions
4. Stored in sealed containers or extinguishers
5. No known health hazards
6. Non-abrasive
7. Non-conductive

F. G-I Powder

1. Composed of:
   a) Screened graphitized foundry coke
      1) Acts as heat conductor
      2) Absorbs heat from fire to lower temperature of metal
      3) Also serves to smother fire
   b) Organic phosphate additive
      1) Breaks down with heat to yield gas that penetrates spaces between graphite particles, excluding air

RETIRED CURRICULUM

PRESENTATION | APPLICATION

2. Non-toxic

3. Non-combustible

G. Comparison of Met-L-X and G-I Powders

1. Met-L-X and G-I Powder are the most popular and the most versatile of all metal extinguishing agents

Instructor Note:
Refer students to Table 8.6 on page 8.11 in their student manuals for a comparison of how the two agents perform on fires involving common combustible metals. (Source: NFPA Fire Protection Handbook, fifteenth edition)

Page: SM 8.11

VIII Selecting the Proper Extinguishing Agent

Question:
What are some guidelines for selecting the proper extinguishing agent

A. Selecting proper agent depends on:

1. Type and amount of fuel

2. Rate and intensity of combustion

a) Very hot fire will cause some extinguishing agents to break down faster

3. Availability

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Instructor Note:
Refer students to Table 8.7 on page 8.12 in their student manuals for an overview of the various extinguishing agents and the types of fires they work best on. (A copy is provided below.)

Instructor Note:
Refer students to the Review Questions on page 8.13 in their student manuals.

Table 8.7: Extinguishing Agent Overview

Agent	Form	Primary Extinguishing Property [1]	Most Effective Application	Limited or Additional Applications
Water	Liquid	Cooling	Class A Fires	Class B Fires
Foam	Liquid	Smothering	Class B Fires	Class A Fires
Carbon Dioxide	Gas	Smothering	Class B and C Fires	Class A Fires
Halon	Gas/Liquid	Inhibits Chemical Chain Reaction	Class B and C Fires	Class A Fires
Dry Chemicals	Powder	Inhibits Chemical Chain Reaction	Class B and C Fires	Class A
Dry Powders	Powder	Smothering	Class D Fires	

1 - Several agents have additional, though minor extinguishing properties.

RETIRED CURRICULUM

SUMMARY:

There are a variety of extinguishing agents which may be used, depending on the type of fire. Water is the most common extinguishing agent used in the fire service. It works primarily by cooling the fire. There are a number of different additives which can be used to make the water more effective. Foam can be used to "modify" water so that it can be used effectively on flammable and combustible liquids. Foam may also used on Class A fires to more easily penetrate the combustible fuels.

Other extinguishing agents include carbon dioxide, halon, dry chemical and dry powder. These are used most commonly in portable fire extinguishers and fixed extinguishing systems.

Each of these extinguishing agents has advantages and disadvantages. Fire officers must be familiar with the types of fires they may be used on, the fires they should *not* be used on, and the hazards associated with each.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

RETIRED CURRICULUM

TOPIC: **Water Application**

TIME FRAME: :45

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify when and how to use the direct, indirect and combination methods of fire attack. The student will also identify the factors that affect the application of water, and the minimum staffing requirements necessary to deploy hose lines and fire streams.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 9.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 9
IFSTA, *Essentials of Fire Fighting*
Richman, *Engine Company Fireground Operations*
Coleman, *Management of Fire Service Operations*

PREPARATION:

Water has always been the primary extinguishing agent used by the fire service. Yet, when applied inappropriately, water can cause far more damage. It can even compromise the safety of firefighters. There are three methods of fire attack; direct, indirect and combination. Understanding how and when to apply these methods are very important to the fire officer.

PRESENTATION | APPLICATION

Water Application

Page: SM 9.1

I. Methods of Fire Attack

Question:
What are the three methods of fire attack?

A. Three methods of fire attack:

1. Direction Method
2. Indirect Method
3. Combination Method

B. The Direct Method

Question:
When and how is the direct method used?

1. Apply fire stream directly onto burning fuel
2. Most appropriate for:
   a) Small incipient fires
   b) Confined fires prior to flashover
   c) Exterior attack on totally involved structures
3. Direct method employs:
   a) A straight stream, or
   b) Very narrow fog pattern (30 degrees or less)
4. Extinguishment obtained by cooling the fuel

C. The Indirect Method

Question:
When and how is the indirect method used?

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PRESENTATION	APPLICATION
1. Used when: a) The fire is confined, and b) High heat levels are present 2. Apply a fog pattern to the area above the fire a) Direct a fog pattern (30° - 60°) at the ceiling b) Play it back and forth at ceiling level 3. Heat converts the water to steam: a) Cools the atmosphere b) Displaces smoke and heated gases 4. Extinguish hot spots after initial knock down 5. No one must be in the area during indirect attack a) Resulting atmospheric change can: 1) Make egress difficult 2) Cause injury D. The Combination Method	
	Question: When and how is the combination method used?
1. Uses both direct and indirect methods 2. Used to extinguish a free burning fire involving an entire room or structure 3. Water is applied to both: a) The burning fuel 1) To cool the fuel b) The area above the fire 1) To cool the atmosphere in the room	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
4. Accomplished with a single hose line by:	
a) Directing a 30° - 60° fog pattern at the ceiling	
b) Then rotating it in a clockwise direction	
	Question: Why should the nozzle be rotated clockwise?
1) Although the phenomenon is not fully understood, clockwise rotation is more effective at pushing heat, smoke and gases away from firefighters on the nozzle	
	Page: SM 9.2
II. Maintaining the Thermal Balance	
A. The Thermal Balance	
1. Major factor in determining fire attack method	
	Question: What is meant by the term "thermal balance"?
2. Temperature differential caused by movement of heated gases	
a) Incipient stages	
1) Source of heat is fairly localized	
2) Temperatures near floor are near normal	
3) Temperatures start to become stratified as convected heat rises	
4) Heated air	
• Spreads out to the corners of the room	
• Cools off	
• Begins to sink back to the floor	
5) Temperature in the room is stabilized and in thermal balance	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

6) Heat differentials are very slight

- Generally less than 5-7 degrees

b) As the fire continues to build:

1) It generates more heat

- Increases temperature differentials

2) Circulation occurs more rapidly

3) If circulation becomes too rapid the atmosphere becomes turbulent

3. Amount and distribution of heat and products of combustion are different at different stages a fire

4. Different methods of attack may be needed

a) A fire stream directed improperly can upset the thermal balance

1) Hampering fire suppression activities

2) Endangering firefighters

B. Incipient Fires

1. Direct attack causes convected column to lose its source of heat

a) Smoke and heated gases at ceiling level can be easily removed by normal ventilation

Question:
How is it possible to disturb the thermal balance in incipient fires?

2. If the hose stream is directed at the ceiling:

a) Smoke and steam will cool and drop rapidly

b) The thermal balance is disrupted

c) Visibility is lost immediately

d) Entry becomes difficult

RETIRED CURRICULUM

PRESENTATION	APPLICATION
3. A similar reaction will occur if a wide fog pattern is directed on the burning fire	
C. Smoldering Fires	
1. Indirect method is used because the burning fuel is not as crucial as the heated gases above	**Question:** How is the indirect method applied?
2. Applying the indirect method:	
a) Fire area must first be ventilated at the highest point	
1) Provides escape for unburned fire gases and steam	
b) Entry into the fire area must be carefully timed	
1) Waiting too long after ventilation will cause the fire to quickly enter the free burning stage	
2) Entry before ventilation will result in a backdraft and possible injury	
c) Fog pattern should be directed above the fire	
d) Nozzle should be moved back and forth	
1) Water will quickly evaporate	
2) Steam will displace smoke, heated gases and other products of combustion	**Question:** How is it possible to disturb the thermal balance in smoldering fires?
3. Hose line should not be directed to floor level yet	
a) Premature cooling may complicate ventilation by making smoke less buoyant	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 9.3

D. Free Burning Fires

1. Require a combination attack

Question:
Why does a free burning fire require a combination attack?

a) Attacking the base of the fire can't adequately cool the fire and the atmosphere above it

b) Too wide a fog pattern won't effectively penetrate the fire area

c) Turbulence and hot spots can result from:

1) Cooling only the perimeter of the fire

2) Failing to cool the entire fire area evenly

Question:
How is the combination method applied?

2. Applying the combination method:

a) The first fire stream should be:

1) Relatively narrow

2) Directed overhead deeply into the fire area

b) A 30° - 60° fog pattern should then be rotated clockwise

c) Proper extinguishment will allow the temperatures to continue to fall after open flame production has stopped

d) The hose line should be shut down once steam production begins to decrease

1) Warm smoke and gases are buoyant and facilitate ventilation

2) If smoke and gases are cooled too much they will sink to the floor and have to be removed by mechanical means

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Question:
How do you select the appropriate method of attack?

E. Selecting the Appropriate Method of Attack

1. Primary objective in choosing a method is to:

   a) Control spread of flames and heat quickly

   b) Confine the fire to the smallest possible area

2. The relationship between method and fire stage:

   a) Direct method is best up to flashover

   b) Combination method is best after flashover

   c) Indirect method is best for smoldering stage

3. Fire is a dynamic event

   a) Can change quickly from one stage to another

   b) Be aware of:

      1) Fire behavior

      2) What's happening to thermal balance

   c) Be able to adapt to conditions

      1) As conditions change, so should the application of the fire stream

III. Factors Affecting Water Application

A. Numerous factors affect application of water

B. They should be carefully considered when positioning apparatus and deploying hose lines

Question:
What are some of the factors that affect the application of water?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
C. These factors include:	
1. Fire conditions	
a) Fire stage	
b) Degree of involvement	
c) Amount of heat present	
2. Volume of water needed for extinguishment	
3. Reach needed	
4. Personnel available to handle hose lines	
5. Speed of deployment	
6. Type of attack	
a) Offensive	
b) Defensive	
7. Mobility needed	
8. Availability of hose lines	
a) Hose diameter and length	
b) Nozzle size and type	
9. Location and capacity of pumper	
10. Adequacy of water supply	
a) Location	
b) Pressure	
c) gpm of hydrants	
11. Wind conditions	
12. Potential for fire spread	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Instructor Note: Refer students to Table 9.1, Hose Stream Characteristics, on page 9.4 in their student manual. (A copy of that table is provided on the following page.) Emphasize that these are basic guidelines only. They are not meant to replace department standard operating procedures or good judgment. **Instructor Note:** Refer students to the Review Questions on page 9.5 in their student manuals.

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Table 9.1: Hose Stream Characteristics

Size	GPM	Reach (Max.)	# Persons on Nozzle	When Used	Area of Involvement
Booster 3/4" - 1"	10 - 30	25' - 50'	1	Very small interior fire. No possible chance of extension. Mop up or overhaul.	Less than one room.
1 1/2" 1 3/4"	50 - 120	25' - 50'	1 or 2	Developing fire which can be stopped with a relatively limited quantity of water. For quick attack. For rapid relocation of hose streams. When personnel are limited. When ratio of fuel load to area is relatively light. For exposure protection.	One to three rooms.
2 1/2"	150 - 250	50' - 100'	2 to 4	When size and intensity of fire is beyond the capacity of a 1 1/2" line. When ample water and personnel are available. When required for safety of personnel. When more water or greater reach are required for exposure protection.	One floor or more fully involved.
Master	350 - 2000	100' - 200'	1	When hand lines are insufficient for the size and intensity of the fire. When water is ample but personnel are limited. When required for safety of personnel. When more water or greater reach are required for exposure protection. When sufficient pumping capability is available. When massive runoff water can be tolerated. When interior attack can no longer be maintained.	Large structures fully involved.

RETIRED CURRICULUM

SUMMARY:

Different methods can be used to extinguish a fire depending on what stage the fire is in. The direct method is used most frequently for fires in their incipient stage. Smoldering fires are best managed with an indirect attack. The combination method should be used for a free burning fire involving an entire room or structure. Applying the proper method of attack is essential for maintaining the thermal balance to both more effectively fight the fire and maintain safety for the firefighters.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Fire Protection Systems**

TIME FRAME: 1:00

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the primary purpose of sprinkler systems, standpipe systems, alarms systems, and special protection systems; and identify the firefighting practices that are compatible to the operation and function of each system.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 10.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 10
Richman, *Engine Company Fireground Operations*
NFPA, *Fire Protection Handbook* (17th edition)
IFSTA, *Essentials of Firefighting*

PREPARATION:

Fire protection systems within a structure are a valuable resource to firefighters during a fire emergency. Detection and alarm systems provide for earlier occupant and fire department notification. Fixed extinguishing systems can slow or stop the fire's progress long before firefighters arrive on scene. The presence of a sprinkler or standpipe system can drastically reduce the time and effort needed to perform certain evolutions and operations. The fire officer must have a basic knowledge of these fire protection systems in order to use them effectively during fireground operations.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Fire Protection Systems

Instructor Note:
This chapter contains a lot of background information on fire protection systems. Much of this is more appropriate in a class on fire prevention. But, it's provided here for the benefit of students who may be unfamiliar with it.

Emphasis how these systems impact fire department operations and the decisions that a fire officer will make when assigning tactical priorities. It's not necessary cover the background information if students are already familiar with it.

Page: SM 10.1

I. Automatic Sprinkler Systems

A. Introduction

1. Designed to control fire in incipient stage

2. Highly effective in safeguarding life and property

a) Reduces smoke and heat by:

1) Rapidly extinguishing small fire, or

2) Confining it to area of origin

b) Easier for people to escape

c) Reduces risk to firefighters

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. NFPA has no record of a multiple death fire in a completely sprinklered building where the system was properly operating, except in the case of an explosion or flash fire where victims were killed prior to system operation

   a) In most cases, victims were either:

      1) Involved in the ignition of the fire

      2) Physically or mentally impaired

4. Sprinklers reduce damage from fire and smoke

Page: SM 10.1 - 10.2

B. Types of Sprinkler Systems

1. 6 major types, each designed for specific purpose:

Question:
What are the different types of sprinkler systems?

   a) Wet-Pipe Systems

   b) Regular Dry-Pipe Systems

   c) Pre-Action Systems

   d) Deluge Systems

   e) Combined Dry-Pipe and Pre-Action Systems

   f) Special Types

2. Wet-Pipe Systems

Question:
What are wet-pipe systems and when are they used?

   a) Contains water under pressure

   b) When a fire occurs:

      1) Individual sprinklers actuated by heat

      2) Water flows immediately

RETIRED CURRICULUM

PRESENTATION	APPLICATION
c) Generally used where:	
1) No danger of water freezing	
2) No special conditions	
d) Used commonly in California	
3. Regular Dry-Pipe Systems	
	Question: What are regular dry-pipe systems and when are they used?
a) Piping contains air or nitrogen under pressure	
b) When a sprinkler is opened:	
1) Dry-pipe valve opens when pressure drops	
2) Water flows out of opened sprinklers	
c) Used in locations that can't be properly heated	
4. Pre-Action Systems	
	Question: What are pre-action systems and when are they used?
a) Basically dry-pipe systems	
b) Air in pipe may or may not be under pressure	
c) When fire occurs:	
1) Supplemental detection device actuates	
2) Valve opens allowing water into piping	
3) Water is not discharged until a head fuses	
d) Faster than regular dry-pipe system	
e) Two sources of actuation	
f) Reduces risk of water damage from accidental activation	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
5. Deluge Systems	**Question:** What are deluge systems and when are they used?
a) Similar to pre-action systems except all sprinklers are open	
b) When heat actuates detecting device:	
1) Water flows into the system	
2) Water is discharged from all heads	
c) Designed for extra hazard occupancies	
1) Flammable liquids	
2) Rocket propellants	
6. Combined Dry-Pipe and Pre-Action Systems	**Question:** What are combination systems and when are they used?
a) Includes essential features of both types	
1) Piping contains air under pressure	
2) Detecting device opens water valve and air exhauster	
3) Now operates as a wet-pipe system	
4) If the detectors should fail the system will operate as a dry-pipe system	
b) Used where it may be hard to protect a long supply main from freezing	
7. Special Types	
a) Used when impractical to meet all requirements of the NFPA Sprinkler Standard	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) May involve:

1) Water supplies of limited capacity

2) Reduced pipe sizes

3) Partial protection

4) Sprinklers with different orifice sizes

5) Other non-standard features

Page: SM 10.2 - 10.3

C. System Components

Instructor Note:
It is beyond the scope of this course to go into great detail on system components. However, the fire officer must be familiar with those components that he or she may have to use or attend to during a fire or other problem involving the sprinkler system.

1. Waterflow Alarms

a) Several types of alarm systems

1) Local alarm only

2) Transmit signal to alarm company or fire department

3) Transmit signal to annunciator panel

2. Control Valves

a) Every system is equipped with:

1) Main water control valve

2) Various test and drain valves

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) Control valves cut off water when:

1) Heads must be replaced

2) Maintenance is performed

3) Operation must be interrupted

c) Should always be returned to open position

d) OS&Y valve:

1) Yoke with threaded stem

- Out when open
- In when closed

e) PIV is a gate type control valve

1) Marked "Open" or "Shut"

f) Generally located:

1) Near main riser

2) Inside or outside

3. Water Supply Systems

a) May have one or more water sources

1) Reliable public works system is preferred

2) Other sources may include:

- Gravity tanks
- Pressure tanks
- Fire pumps with reservoirs or sumps

4. Fire Department Connections (FDC)

a) Standard component of sprinkler systems

b) To boost pressure and/or volume

RETIRED CURRICULUM

PRESENTATION | APPLICATION

c) Each system must have its own FDC

1) May be interconnected

d) Determine proper connection

e) Check pre-plans for this information

5. Sprinkler Heads

a) Deflector creates spray pattern

b) Different kinds depend on:

1) Where located

2) Hazard(s) or areas they protect

3) Type of system

c) Cap or plug is released by heat

1) Except in deluge systems

d) Different temperature ratings

Instructor Note:
Refer students to Table 10.1 on page 10.4 in their student manuals for the temperature ratings, classifications and color codings of sprinkler heads.

Page: SM 10.4

Question:
What actions are needed at sprinklered buildings? What precautions should be taken?

D. Fire Department Operations at Sprinklered Buildings

1. One unit assigned to FDC

a) Make sure FDC is not obstructed

b) Check that PIV or OS&Y is open

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Check annunciator panel to determine location	
3. Treat every alarm as real	
4. Prevent needless water damage	
5. Check for extinguished fires	
6. Approach cautiously	
a) Live utilities	
b) Disrupted thermal balance with additional heat, smoke and steam at lower levels	
7. Don't shut down too early	
a) No hidden fires	
b) Station someone at control valve	
8. Plug individual heads	
a) Sprinkler stops or wooden wedges	
9. Restore system to full service if possible	
a) Replace heads with same type and rating	
	Page: SM 10.5
II. Standpipe Systems	
A. For getting water to upper stories or remote areas	
1. Essentially an "in place hose line"	
B. Types of standpipe systems	
1. Classifications based on intended user	
	Instructor Note: Refer students to Table 10.2 on page 10.5 in their student manuals for a description of the three types of systems.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

2. Class I

   a) For fire departments and those trained in handling heavy hose

   b) 2 1/2 inch connections

3. Class II

   a) For building occupants

   b) Equipped with:

      1) 1 1/2 inch single jacketed hose lines

      2) Open nozzles or spray/straight stream nozzles with shut off valves

   c) Firefighters shouldn't use Class II lines

Question:
Why shouldn't firefighters use a Class II system?

      1) Inadequate volume and pressure

      2) Hose lines not well maintained

4. Class III

   a) Combination system equipped with

      1) 2 1/2 inch hose connections, and

      2) 1 1/2 inch hose lines

C. The standpipes

1. Class I and Class III systems:

   a) Standpipes 4, 6 or 8 inches in diameter

      1) Depending on height and whether or not the building is sprinklered

   b) 2 1/2 inch outlets on each floor

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Wet standpipe systems a) Water pressure in the system at all times b) Supplied by one or more sources: 1) City water works system 2) Fire pumps 3) Pressure tanks 4) Gravity tanks 3. Dry standpipe systems a) Normally no water in the system b) May have independent water supply, or rely solely on water pumped through FDC 4. Standpipes connect to standard fire hoses 5. In a combined system, risers may feed both standpipe and sprinklers D. Operation of Standpipe Systems	
1. Supply the standpipe 2. Take adequate hose 3. Connect below fire floor 4. Don't connect on fire floor without safe refuge 5. Don't utilize house lines 6. Use standpipes in other buildings for exposure protection	**Question:** What actions will be needed at buildings with standpipe systems?

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 10.6

III. Automatic Fire Detectors

A. Provide protection when people are asleep or buildings are unoccupied

B. Types of detectors:

1. Heat Detectors

a) Respond to convected heat:

1) Fixed temperature detectors

2) Rate of rise detector

b) Least expensive type of detector

c) Lowest false alarm rate

d) Slowest at detecting fires

e) Used where ambient conditions would cause excessive false alarms with other detectors

2. Smoke Detectors

a) Faster than heat detectors

b) Most victims die from smoke inhalation

c) Photoelectric type

1) Three different types, each containing a light source and a photosensitive device

2) Detectors will either activate:

- When light source is obscured
- If the light beam is scattered

3) Respond faster to smoldering fires with larger smoke particles

d) Ionization type

1) Radioactive material ionizes air in chamber

RETIRED CURRICULUM

PRESENTATION | APPLICATION

2) Operate when smoke particles decrease conductance of the air

3) Respond faster to open flaming fires with smaller smoke particles

3. Gas Sensing Detectors

a) Detect gases produced by fire

b) Semiconductor type

1) Oxidizing or reducing gases create electrical changes

c) Catalytic element type

1) Temperature rises with oxidation of combustible gases

d) Slower than smoke detectors, but faster than heat detectors

4. Flame Detection Detectors

a) Respond to radiant energy:

1) Flowing embers

2) Coals

3) Actual flames

b) Used in high hazard areas for fast detection:

1) Fuel loading platforms

2) Industrial process areas

3) Hyperbaric chambers

4) High ceiling areas

5) Where explosions or rapid fires may occur

c) Infrared or ultraviolet types, each sensitive to a different spectrum of light

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 10.7

VI. Alarm Systems

A. Delays in calling 911 cause loss of life and property

B. Detection and alarm systems provide:

1. Early warning to occupants

2. Fire department notification

C. General operating features

1. Triggered by:

a) Heat, smoke or flame

b) Flow of water in a sprinkler system

c) Tampering with the system

2. Most have back-up power supply

3. One or more initiating devices connected to:

a) Smoke or heat detectors

b) Manual pull stations

c) Waterflow alarms

d) Other devices

4. Tied to alarm devices (bells, horns, etc.)

5. May be tied to an annunciator panel in:

a) Lobby

b) Control room

c) Maintenance area

D. Types of Alarm Systems

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Instructor Note:
Refer students to Table 10.3 on page 10.7 in their student manuals for an overview of the different types of alarm systems.

1. Several types depending on function

   a) Local

      1) Local alarm only

      2) Alerts building occupants

      3) Someone must notify fire department

   b) Auxiliary

      1) Local system connected to municipal fire alarm system

   c) Remote Station

      1) Similar to auxiliary system

      2) Transmits to remote location attended by trained personnel

      3) Receiving equipment located at:

         - Fire department facility,
         - Police station, or
         - Telephone answering service

      4) Remote station personnel notify fire department

   d) Proprietary

      1) Central supervisory station operated by someone with a proprietary interest

      2) Central supervisor station is generally a guard office in or near the building(s)

RETIRED CURRICULUM

PRESENTATION | APPLICATION

e) Central Station

1) Similar to proprietary system

2) Remote central station with operators who collect a fee and have no proprietary interest

E. Supplementary Functions

1. Some systems have supplemental functions

a) Smoke Control

1) Most common in high rises

2) Shut down HVAC

3) May pressurize stairwells or elevator shafts

4) May pressurize and exhaust the fire area

5) May be tied to automatic fire doors

b) Elevator Capture

1) Control elevators

2) May have elevators bypass the fire floor

3) May cause all elevators to return to ground floor and remain until released

- Requires occupants to use the stairs

5) Often required in high rises

c) Extinguishing Systems

1) Some actuate extinguishing systems

2) May require activation of two or more detectors to prevent accidental discharge

d) Energy Management

1) Some systems monitor and control HVAC and electrical distribution functions

RETIRED CURRICULUM

PRESENTATION | APPLICATION

e) Combination Systems

1) May control features listed above, plus coordinate with other systems

- Burglar alarm
- Door entry control
- Background music
- Employee paging systems

F. Fire Department Operations with Alarm Systems

Question:
What fire department operations are needed at buildings with alarm systems?

1. Don't be complacent
2. Treat every alarm as a working structure fire
3. Check the annunciator panel
   a) Information may while en route
4. Manually activate evacuation alarm if needed
5. Assist owners to reset alarm if SOPs allow

Page: SM 10.9

V. Special and Fixed Extinguishing Systems

Instructor Note:
It's beyond the scope of this course to go into detail on the numerous systems which may be encountered. However, you should emphasize how these systems may impact fire department operations.

RETIRED CURRICULUM

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PRESENTATION

A. Fixed Extinguishing Systems

1. Used where quick extinguishment is desired

2. Systems may include:

   a) Dry chemical

   b) Carbon dioxide

   c) Halon

3. May be used in place of automatic sprinklers

4. Often used in conjunction with sprinklers for back-up protection

5. Wear SCBA

   a) Dry chemical irritates respiratory system

   b) Carbon dioxide and halon displace oxygen

   c) Halon break downs when heated

      1) Concentration of decomposition products will depend on:

         - Amount of extinguishing agent
         - Size of the fire
         - Size of the room
         - Elapsed time before extinguishment

APPLICATION

Instructor Note:
Detailed information regarding the extinguishing agents was covered in chapter 8.

Question:
What do firefighters need to do at facilities with fixed extinguishing systems?

RETIRED CURRICULUM

PRESENTATION | APPLICATION

6. Make sure fire is completely out
   a) Problem areas:
      1) Deep seated fire
      2) Continued presence of ignition sources
      3) Room not tightly sealed
   b) Bring portable extinguisher
7. Do atmospheric testing as needed
   a) Carbon dioxide and halon may flow to unprotected lower levels:
      1) Cellars
      2) Basements
      3) Tunnels
      4) Pits
   b) Could create oxygen deficient atmosphere
8. Occupants may need information
   a) May have questions about:
      1) Health hazards of extinguishing agents
      2) Putting system back in operation
   b) There may have been problems:
      1) Blocked discharge nozzle
      2) Improper use of override switch
   c) Prevent future fire loss through education

B. Smoke Control Features

1. Other features control smoke movement or assist with ventilation
   a) Smoke curtains

RETIRED CURRICULUM

PRESENTATION	APPLICATION
b) Automatic vents	
c) Explosion vents	
2. Be aware of occupancies that have them	
3. Recognize how they might:	
a) Influence fire behavior	
b) Assist with ventilation	
C. Utility Controls	
1. Turn off utilities to prevent:	
a) Injuries to personnel	
b) Damage to property	
2. Know how to quickly locate	
3. Sometimes it's *not* a good idea to shut off utilities	
a) Clandestine drug labs	
b) Specific industries	
4. Be familiar with target hazards that might need to be handled differently	**Instructor Note:** Refer students to the Review Questions on page 10.11 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

This chapter provided a brief overview of the different fire protection systems that firefighters might encounter, with an emphasis on fire department operations. Most of these systems are designed to provide automatic detection and suppression, but it's generally necessary to either supplement the systems or assist in placing systems back in service before leaving the scene. The fire officer must take these factors into account when performing the size-up so that he or she can assign resources appropriately when determining tactical priorities.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

PRE-FIRE PLANNING

11. Building Construction
12. Occupancy Types
13. Pre-Fire Planning
14. Fire Data
15. Local Resources
16. State & Federal Resources

RETIRED CURRICULUM

TOPIC: **Building Construction**

TIME FRAME: :45

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the five types of construction and provide an example of each; describe how common construction materials behave when exposed to heat; and describe firefighting hazards and conditions associated with remodeled structures, balloon construction, arch truss roofs, light weight construction, and poke through construction.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 11.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 11
ICBO, *Uniform Building Code*
Brannigan, *Building Construction for the Fire Service*
NFPA, *Fire Protection Handbook*, 17th edition
NFPA, *Fire Inspection Manual*, 6th edition

PREPARATION:

Building construction is a significant factor in both how a fire spreads and how well a building will hold up under fire conditions. The fire officer must understand some of the basic concepts regarding building construction both to safeguard personnel on the fireground and to determine the appropriate firefighting tactics.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Building Construction

Instructor Note:
Advise students that this is just a basic overview of building construction. Fire officers should obtain additional training.

Page: SM 11.1

I. Construction Types

A. Five types of construction identified in UBC and UFC

Question:
What are the five types of building construction?

1. Type I (Fire-Resistive)
2. Type II (Non-Combustible)
3. Type III (Exterior Protected Combustible)
4. Type IV (Heavy Timber)
5. Type V (Wood Frame)

B. Type I (Fire-Resistive Construction)

Question:
What is Type I construction?

1. Structural members are non-combustible and have a high fire resistance rating
   a) Generally 2 to 4 hours
   b) Withstand fire without major damage
2. May include the following construction when designed and constructed properly:
   a) Monolithic reinforced concrete
   b) Precast concrete
   c) Protected steel-frame

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. Only non-combustible materials permitted for structural elements

4. Some combustible materials are allowed when they do not add significantly to the fire hazard

   a) Roof coverings

   b) Some types of insulating materials

   c) Limited wood for interior finish and flooring

5. Other requirements, depending on occupancy:

   a) Limitations on building size

   b) Automatic fire extinguishing equipment

   c) Sprinkler systems

C. Type II (Non-Combustible Construction)

Question:
What is Type II construction?

1. Made with materials that:

   a) Don't contribute to development or spread of fire

   b) Do not provide same level of protection as Type I construction

2. Buildings may be:

   a) Metal-framed

   b) Metal-clad

   c) Concrete-block with metal deck roofs supported by unprotected open-web steel joists

3. Can't withstand fire for long periods of time without damage or structural failure

4. Should only be used where:

   a) Anticipated fire severity is low, or

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PRESENTATION	APPLICATION
b) Built-in fire protection equipment is expected to handle the most severe fire that might occur	
D. Type III (Exterior Protected Combustible Construction)	**Question:** What is Type III construction?
1. Once called ordinary construction	
2. Exterior walls:	
a) Non-combustible or limited-combustible materials:	
1) Brick	
2) Concrete	
3) Reinforced concrete	
b) Required to have a degree of fire resistance	
1) With hourly ratings	
c) Exhibit stability when exposed to fire	
3. Floors, roofs and interior framing made of:	
a) Wood	
b) Any material permitted by applicable codes	
4. Floors and structural members may or may not be protected with fire resistive materials	
5. Concealed spaces must have firestopping	
E. Type IV (Heavy Timber Construction)	**Question:** What is Type IV construction?
1. Structural members made of unprotected wood (solid or laminated)	
a) Columns	

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b) Beams	
c) Arches	
d) Floors	
e) Roofs	
2. Very few concealed spaces permitted	
a) Strict requirements when permitted	
3. Fire resistive rating comes from large size of structural members	
a) Larger surface-to-mass ratio	
1) Takes longer to burn	
2) Relatively slow to conduct heat	
4. Materials other than wood are permitted if:	
a) Fire-resistance rating of at least 1 hour	
b) Allowed by applicable building codes	
5. Bearing walls and bearing portions of walls must:	
a) Be of non-combustible materials	
b) Have fire-resistance rating of 2 hours or more	
c) Remain stable under exposure to fire	
6. Exterior walls must be non-combustible materials	
a) Whether bearing or nonbearing	
F. Type V (Wood Frame Construction)	**Question:** What is Type V construction?
1. Structural members and exterior walls made of:	
a) Wood	
b) Any material permitted by code	

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2. Variety of materials may cover interior and exterior walls	
3. More vulnerable to fire than other types	
a) Both internally and externally	
4. Firestopping:	
a) Within walls and partitions	
b) Between floors	
G. Mixed Types of Construction	
1. Two or more types of construction used in same building	
2. Additional restrictions ensure that no additional risks are created	
a) Fire walls or area separation walls	
b) Applying the most restrictive requirements	
	Page: SM 11.3
II. How Construction Materials are Affected by Fire	
A. All materials can be affected by fire, regardless of fire-resistance ratings	
1. Effects depend on:	
a) Intensity of fire	
b) Duration of exposure	
2. Chemical changes:	
a) Contribute to fire spread	
b) Emit toxic products of combustion	
3. Physical changes:	
a) Contraction and expansion of materials	
b) May result distortion and structural collapse	

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PRESENTATION	APPLICATION
B. Wood	
1. All wood will eventually burn	
2. Factors that affect fire resistance	**Question:** Under what conditions will wood have a higher degree of fire resistance?
a) Heavy timber maintains integrity longer than wood frame construction	
1) Due to size	
b) Wood treated with a fire-retardant	
c) Higher moisture content	
3. Wood gives less protection than other materials	
C. Gypsum	
1. Excellent fire protection	
2. High moisture content absorbs heat as it evaporates	
a) Plaster	
b) Plaster board	
3. Often used to cover wood frame construction to provide greater fire protection	
4. Loses its strength when it gets wet	
D. Glass	
1. Amount and type of glass used varies	
2. Little resistance to fire because it cracks quickly	
3. Wire-reinforced glass provides more integrity if properly installed	

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E. Concrete

1. Different types of concrete

a) Each behaves differently in fire

Question:
What factors affect how concrete will perform?

2. Factors that affect performance:

a) Aggregate

1) Lightweight aggregates have more fire endurance

- Expanded shale
- Expanded slag

2) Normal-weight concretes have less endurance

- Carbonate aggregates
- Siliceous aggregates

b) Moisture content

1) More moisture absorbs more heat

2) However, evaporation causes voids in the concrete

- High heat or prolonged exposure will cause concrete to lose strength and start spalling

c) Type of load

1) Lightweight concrete, made with non-combustible aggregates, resists high temperatures extremely well

- Retains more strength than normal-weight concrete
- Conducts less heat

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d) Reinforced-concrete structures generally hold up very well under fire conditions

1) But, when temperature of a reinforced concrete member is raised, the member loses strength

3. Prestressed concrete

a) Higher strength concrete

b) Overall fire resistance is higher

1) But, high heat or prolonged exposure can weaken the structure considerably

c) Greater tendency to spall, exposing prestressing steel beneath it

d) Steel used for prestressing is more sensitive to elevated temperatures than steel used in reinforced-concrete construction

1) Loses strength at lower temperatures

2) Strength not regained after cooling

Question:
At what temperature will prestressed steel be permanently weakened?

3) Prestressing wires are permanently weakened when they reach a temperature of about 800°F

Page: SM 11.4

F. Steel

1. Does not burn

2. Does not emit products of combustion

3. Unprotected steel loses strength at high temps

a) Excellent conductor of heat

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PRESENTATION	APPLICATION
	Question: What happens when load bearing steel is cooled rapidly?
b) Rapid cooling can cause abrupt failure to load bearing steel	
	Question: How can steel be insulated or "fireproofed"?
4. Methods to insulate or "fireproof" structural steel	
a) Encase in concrete	
1) Adds considerable dead load weight	
b) Surface treatments	
1) Materials:	
• Sprayed-on mineral fibers	
• Cementitious materials	
• Intumescent paints and coatings	
2) Will not protect steel if:	
• Not applied properly	
• Scraped off	
3) Must be considered when assessing structural integrity of a burning building	
c) Asbestos	
1) Often removed because of health hazards	
2) Still found in many places	
3) Great deal of fire resistance and protection	

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4) Concerns at a fire: • Respiratory protection • Decon of protective clothing d) Suspended ceilings 1) Materials: • Lath and plaster • Gypsum panels • Acoustical tile on a grid system 2) Fire protection may be compromised by: • Improper installation • Breaches e) Sheet steel membranes over a layer of insulation materials G. Masonry 1. Behaves well when exposed to fire 2. Brick a) Can withstand high temperatures without severe damage b) Some spalling can be expected 3. Tile 4. Concrete masonry products a) Hollow concrete blocks may crack from heat, but generally retain their integrity	

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Page: SM 11.5

III. Building Construction Concerns

A. Background

1. There are several concerns for evaluating potential for fire spread and building integrity

2. Many concerns associated with human error

a) Contractors that do not build to code

1) Trying to save time

2) Trying to cut costs

3) May not understand importance of codes

3. Building not built to code will not perform as expected

4. Problems created during reconstruction and remodeling projects are more common

a) Permit and inspection processes make it possible to catch and correct problems before building is occupied

5. Older buildings pose more problems

a) Older standards and codes

b) Older materials

B. Common Problems

Question:
What are some common construction problems encountered?

1. Examples:

a) Breached fire walls

b) Holes poked through walls, floors and ceilings

c) Concealed spaces

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d) Fire doors or shutters blocked open, broken or removed

2. These permit fire and smoke to travel more rapidly to other areas

3. Remodeled buildings may have excess of dead loads

4. Blocked exits

a) Impair occupant evacuation

b) Impair fire department access

5. Sprinkler systems impacted by construction:

a) Systems are turned off

b) Broken sprinkler heads

c) Nuisance water flow alarms

C. Other Construction Concerns

1. Buildings reflect codes that were in existence when they were constructed

a) Upgrading to current codes is expensive

b) Most owners only upgrade if required by law or their insurance carriers

c) Many requirements for upgrading are only applied when building undergoes extensive remodeling

2. Attics and basements

Question:
What are some problems associated with attics and basements?

a) Difficult to access

b) Storage and fire loading

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c) Attics

1) Fires often spread rapidly as convection preheats attic space

- Big problem with common attics

d) Basements

1) Fires often burn longer before being discovered

2) Often spread quickly to upper floors through:

- Pipe chasers
- Elevator shafts
- Other vertical openings

3) Often very difficult to ventilate

- Mechanical ventilation to evacuate smoke from below-grade levels

3. Specific types of structural features

a) Balloon construction

1) Popular at turn of century

2) Used up until the 1930s

3) Lacks firestopping

b) Arch truss type roofs

1) Failure of one member can cause a domino effect with rapid failure of adjacent members

c) Lightweight construction

1) Gusset plate trusses

2) Open web trusses

3) Wooden "I" beams

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4) Popular for use in floors and roofs 5) Quick failure when exposed to heat 6) Hanging ceilings create concealed spaces	**Instructor Note:** Refer students to the Review Questions on page 11.7 in their student manuals.

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SUMMARY:

The fire officer must understand some of the basic concepts regarding building construction both to safeguard personnel on the fireground and to determine the appropriate firefighting tactics. There are five types of building construction identified in the Uniform Building Code (UBC) and the Uniform Fire Code (UFC). Type I provides the highest level of protection, Type V the lowest. Which type of construction is used depends on several factors such as the ability of building occupants to protect themselves and/or quickly evacuate in the event of a fire, the number of occupants, the types of hazards associated with the particular occupancy, and the size and height of the structure.

The various different materials used in building construction can all be affected by exposure to fire. The effects can range from emitting toxic products of combustion to losing structural integrity. Although the fire officer can't actually measure how much damage has been done to a structure, he or she can anticipate potential problems based on how the materials behave when exposed to fire, the approximate intensity (heat) of the fire, and how long the fire is thought to have been burning.

The fire officer must also be alert to problems associated with particular areas within structures or particular types of structures. Attics and basements, for example, are difficult to access and require somewhat different tactics than other areas of a building.

Finally, it's important to recognize that human error can greatly impact both fire spread and a building's integrity. A building which is not built to code, or one which has numerous violations due to reconstruction and remodeling projects, will not perform as expected during a fire. Unfortunately, the fire officer will often not be aware of these problems until a fire occurs.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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TOPIC: **Occupancy Types**

TIME FRAME: :15

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will describe how occupancy type is related to building construction, occupant loads and fuel loading; and identify how fire officers can use a knowledge of occupancy type to anticipate fireground conditions and the number of people that may need to be evacuated from a structure. They will be able to distinguish between "controlled" and "uncontrolled" occupants; and be able to identify the three levels of fire loading, and give examples of each.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 12.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 12
1994 Uniform Fire Code
NFPA, *Fire Protection Handbook,* 17th edition

PREPARATION:

Understanding occupancy types is important to the fire officer when sizing-up an emergency scene. It allows the fire officer to make some general assumptions about such things as occupant load, exiting capacity, fuel loading, and construction and fire protection features.

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PRESENTATION | APPLICATION

Occupancy Types

Page: SM 12.1

I. How Occupancy Type Impacts Fire Department Operations

Question:
How can the fire officer utilize knowledge of occupancy types to anticipate fire scene conditions?

A. Occupancy type influences fireground priorities

1. A or I occupancies with rescue problems

2. H occupancies with hazardous materials

B. Occupancy type affects construction

1. Codes requirements based on planned occupancy

2. Problems can occur when new occupants move in

a) Greater hazards may compromise life safety

C. Anticipate type of occupants and assistance required based on occupancy type

1. Occupants are "controlled" or "uncontrolled"

Question:
What is the difference between "controlled" or "uncontrolled" occupants?

a) Controlled occupants

1) Closely managed by employees

2) Examples:

- Prisoners
- Hospital patients
- School children

3) Employees perform initial evacuation

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b) Uncontrolled occupants

1) Nearly everyone else

2) Examples of occupancies:

- Residential
- Assembly
- Business

3) Require direct fire department assistance only if they cannot evacuate themselves

D. There can be many variables

1. This is a guide, not an absolute

a) Examples:

1) Building may exceed rated occupant load

2) Illegal use/storage of hazardous materials

3) Malfunction of fire protection features

Instructor Note:
Have students cite other examples where actual conditions may vary from what might be expected based on occupancy type.

2. No guarantees about what firefighters will find

a) Knowledge of occupancy types only reduces the guesswork

E. Understanding occupancy types is important during inspections

1. Requirements vary based on occupancy

a) Examples:

1) Use of hazardous materials

2) High occupant loads (i.e. assemblies)

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Question:
How familiar must the fire officer be with the specific requirements for each occupancy type?

2. Fire officer must be able to:

   a) Recognize there are different requirements for different occupancies

   b) Know where to go for more information

Page: SM 12.2

II. Specific Occupancy Types

A. An "occupancy" is the purpose for which a building, or part thereof, is used or intended to be used

Instructor Note:
Refer students to Table 12.1 on page 12.2 in their student manuals for a listing of the major occupancy groupings.

B. Arranged into groups or classifications based on usage:

Group	Occupancy Type
A	Assembly
B	Business
E	Educational
F	Factory
H	Hazardous
I	Institutional
M	Mercantile
R	Residential
S	Storage
U	Other

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Instructor Note:
Refer students to Table 12.2 on pages 12.3 - 12.5 in their student manuals for more detailed descriptions of the occupancy types by group and division. Take some time to review some of the more common or more hazardous occupancy types.

Question:
What table in the 1994 UFC describes occupancy types?

C. This comes from the 1994 UFC, Table 3-A

1. Complete descriptions in UFC, Section 216

Point out that students may be familiar with slightly different occupancy descriptions if they are working from an older version of the UFC, or from California supplements.

Page: SM 12.5

III. Occupant Loading

A. Maximum occupant loading varies by occupancy

Question:
Where can one find occupant load factors?

B. Occupant load factors can be found in:

1. UFC, Table 10-A

2. UBC, Table 33-A

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Question:
How are occupant loads figured?

C. Load factors are based on a minimum allowable square footage for each occupant

Instructor Note:
Refer students to Table 12.3, Occupant Load Factors, on page 12.6 in their student manuals.

1. Divide usable square footage by occupant load factor

   a) Example:

      1) 1000 sq. ft. auditorium, no fixed seating, has maximum occupant load of 142 people

         - Occupant load factor in UFC, Table 10-A is 7 square feet per person
         - 1000 divided by 7 is roughly 142

D. These are only guides

1. Places of assembly may exceed occupant loads

   a) More customers = more money

Page: SM 12.7

IV. Fuel Loading

A. Fuel loading is the amount of fuel available to the fire

1. Includes structure and contents

B. Important in determining resources needed

C. Determined largely by type of occupancy

Instructor Note:
Refer students to Table 12.4 on page 12.7 in their student manuals for an overview of the approximate fuel loading based on occupancy.

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PRESENTATION	APPLICATION
1. Light Load (5-10 lbs./sq. ft.) a) Offices b) Hotels c) Hospitals d) Schools e) Museums f) Restaurants g) Public Libraries h) Institutional Buildings i) Administrative Buildings 2. Moderate Load (10-20 lbs./sq. ft.) a) Retail Shop b) Factories c) Workshops 3. Heavy Load (>20 lbs./sq. ft.) a) Warehouses b) Bulk Storage Facilities D. General guidelines only 1. Many variables exist a) Example: 1) Mercantile occupancies may have higher load depending on: • Type and amount of material stored • Time of year (holiday season)	

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PRESENTATION	APPLICATION
E. Become familiar with occupancies and fuel loading during inspections 1. Seldom have that opportunity during an actual fire	**Instructor Note:** Have students complete Activity Sheet #12.1 on page 12.9 in their student manuals. A blank copy of this activity sheet and answers have been provided for you at the end of this lesson plan. **Instructor Note:** Refer students to the Review Questions on page 12.10 in their student manuals.

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SUMMARY:

Understanding occupancy types allows the fire officer to anticipate some of the problems crews may encounter in a fire situation, as well as some of the fire protection features which may assist them in their suppression efforts. This chapter provided an overview of occupancy types, occupant loading and fuel loading.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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ACTIVITY SHEET #12.1

Occupancy Load Limitations

1. Use Table 12.2 in this chapter to identify the occupant load limitations generally associated with the occupancy type listed.

Occupancy Type	Occupant Load	Occupancy Type	Occupant Load
A-1		E-1	
A-2		E-2	
A-2.1		E-3	
A-3		I-1.1	
B		I-1.2	
R-1		I-2	
R-3			

2. What is the maximum occupant load that you would normally expect to find in the following occupancies? Use Table 12.3 in this chapter (UFC Table 10-A) to complete the table below.

Occupancy Type	Size (Square Feet)	Maximum Occupant Load
Auditorium (no fixed seats)	10,000	
Restaurant	1,700	
Church	2,500	
Library Reading Room	6,000	
Nursery for Children (Day Care)	750	
Dance Floor	1,500	
Theater Lobby Area	500	
Classroom	700	
Conference Room	325	
Retail Store (Ground Level)	2,600	

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ANSWERS TO ACTIVITY SHEET #12.1

Occupancy Load Limitations

1. Use Table 12.2 in this chapter to identify the occupant load limitations generally associated with the occupancy type listed.

Occupancy Type	Occupant Load	Occupancy Type	Occupant Load
A-1	≥ 1000	E-1	≥ 50
A-2	< 1000	E-2	< 50
A-2.1	≥ 300	E-3	> 6
A-3	< 300	I-1.1	> 5
B	< 50	I-1.2	> 5
R-1	> 10	I-2	> 5
R-3	≤ 10		

2. What is the maximum occupant load that you would normally expect to find in the following occupancies? Use Table 12.3 in this chapter (UFC Table 10-A) to complete the table below.

Occupancy Type	Size (Square Feet)	Maximum Occupant Load *
Auditorium (no fixed seats)	10,000	143
Restaurant	1,700	113
Church	2,500	357
Library Reading Room	6,000	120
Nursery for Children (Day Care)	750	21
Dance Floor	1,500	214
Theater Lobby Area	500	71
Classroom	700	35
Conference Room	325	22
Retail Store (Ground Level)	2,600	87

* Rounded to the nearest whole number.

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TOPIC: **Pre-Fire Planning**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the purpose of pre-fire planning, describe the benefits of pre-fire planning, define "target hazard," and identify the essential data that should be gathered and recorded on a pre-fire plan.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 13.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 13
FEMA, *Incident Command Student Manual*
Coleman, *Managing Fire Service Operations*
IFSTA, *Fire Inspection and Code Enforcement*
Manteca Fire Department, Pre Incident Survey

PREPARATION:

Of all the resources available to the fireground officer, the information contained within a current pre-fire (or pre-incident) plan is possibly the most valuable. When decisions are based on inadequate data, the fire officer loses the opportunity to quickly implement an efficient plan of operation. Pre-fire plans allow the officer to base decisions on a higher percentage of "knowns" as opposed to "unknowns."

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Pre-Fire Planning

Page: SM 13.1

I. Types of Pre-Plans

A. No uniform standard

B. Various terms may be used

1. Incident profile
2. Building profile
3. Structure survey

Instructor Note:
Have students identify what term(s) are used in their departments.

Question:
What kinds of pre-plans are there?

C. Types of pre-plans

1. Hazard Listing
2. Site (or Block) Pre-Plans
3. Occupancy Pre-Plans
4. Combination Plans
5. Hazardous Materials Management Plans

D. Pre-plans vary depending on need

1. Hazard Listing

Question:
What information can be found on a Hazard Listing?

a) Type and location of specific hazards

b) Doesn't require much detail

c) Usually brief and simple

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2. Site (or Block) Pre-Plans	**Question:** What information can be found on a Site (or Block) Pre-Plan?
a) Similar to "run cards"	
b) Geared towards large complexes	
1) Shopping centers	
2) Industrial parks	
3) Trailer parks	
4) Apartment or condominium complexes	
c) Designed to show:	
1) Access routes	
2) Anything which might hamper access	
• Railroads	
• Fences	
• Walls	
• Overhead obstacles	
• Narrow streets	
3) Hydrants	
4) Fire department connections	
5) Utility shut-offs	
d) No information on specific occupancies	
3. Occupancy Pre-Plans	**Question:** What information can be found on Occupancy Pre-Plans?
a) Most specific kind of pre-plan	

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b) Detailed analysis of specific occupancy	
1) Occupancy type	
2) Occupants (rescue considerations)	
3) Fire loading	
4) Construction features	
c) Site map	
4. Combination Plans	
	Question: What is the purpose of combination plans?
a) More than one type may be needed	
b) Examples:	
1) Industrial complex	
2) Shopping center	
c) Pre-planning process be flexible	
5. Hazardous Materials Management Plans	
a) Two types:	
1) Hazardous materials inventory statements (HMIS)	
2) Hazardous materials management plans (HMMP)	
	Question: Who is responsible to develop and maintain Hazardous Materials Management Plans?
b) Developed and maintained by personnel at facilities which store hazardous materials	
c) A copy must be given to the agency having emergency response authority	

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Page: SM 13.2

II. Pre-Fire Information

A. The amount of data can be enormous

B. What is of immediate importance?

1. Plan must be easy to use

2. "Need to know" versus "nice to know"

Question:
What are some of the most important things to include on a pre-plan?

C. Important information includes:

1. Construction type and features

2. Occupancy type and features

3. Prediction of fire behaviors

4. GPM availability and requirements

5. Identification of hazards

6. Units/staffing within response assignments

7. Anticipated firefighting problems

8. Anticipated strategical objectives

9. Protection systems

10. Plot and floor plans

Instructor Note:
Refer students to Information Sheet #13.1 on page 13.3 in their student manuals for a detailed list of items which might be included on a pre-fire plan. Remind them that most pre-plans will not require this much information.

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D. Building the pre-fire plan may require:

1. Starting with most important details
2. Adding less important items as appropriate
3. Until you reach a balance

Page: SM 13.4

III. Target Hazards

A. Every community has "target hazards"

Question:
What is a target hazard?

1. Occupancies or areas that present a greater degree of risk, and/or
2. Require extraordinary efforts to control an emergency

B. A "working" incident might automatically receive:

1. Second alarm
2. Mutual aid assignment
3. Special equipment such as Haz Mat

Instructor Note:
Refer students to Table 13.1 on page 13.4 in their student manuals for an overview of some typical target hazards.

Point out that candidates are often asked to identify examples of target hazards on promotional examinations.

C. Examples of target hazard occupancies:

1. High risk to life safety
   a) Hospitals
   b) Convalescent homes

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c) Jails	
d) Hotels	
e) Apartment complexes	
f) High rise buildings	
g) Places of public assembly	
h) Schools	
i) Large day care centers	
j) Large restaurants	
k) Airports	
2. Hazardous materials	
a) Bulk chemical storage facilities	
b) Production and manufacturing facilities	
c) Research and development facilities	
d) Bio-tech companies	
e) Airports	
f) Hospitals	
3. High property values	
a) Shopping malls	
b) Warehouses	
c) Computer centers	
4. Large quantities of water required for firefighting	
a) Bulk storage yards	
b) Lumber yards	
c) Industrial complexes	

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5. Conflagration potential	
a) Large tracts with wood-shingled roofs	
b) Closely built combustible occupancies	
c) Urban interface areas	
6. Access or operational problems	
a) High rise structures	
b) Large apartment complexes	
c) Unusually shaped or interconnected buildings	
d) Bridges	
e) Freeways	
7. Occupancies with frequent fires	
D. Each jurisdiction will define target hazard differently	
E. Responsibility for pre-planning target hazards	
1. May be divided between line personnel and specialists in the fire prevention bureau	
a) Specialists have more technical knowledge:	
1) Applicable codes	
2) Hazardous materials	
3) Emergency planning on a community level	
b) Line personnel respond to emergencies	
2. These pre-plans are generally more complex	
3. Development generally requires:	
a) Preparation	
b) Research	
c) Site visits and inspections	
d) Completion of detailed forms and maps	

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IV. Use of Pre-Plans

A. Vital information may impact tactics and strategy

B. Fire officer must have information regarding:

1. Operations
2. Building layout and construction
3. Contents (particularly hazardous materials)
4. Utility controls

C. Pre-plans must be easily accessible

1. On the engine
2. With the Battalion Chief
3. Computers in response vehicles
4. Not generally accessible in fire prevention office

Instructor Note:
Have students identify where their pre-plans are kept.

D. Must be easy to use

1. Easy to understand
2. Easy to see in poor lighting
3. Clear and concise
4. Printing bold and large
5. Symbols easily understood
   a) Color coded if appropriate

E. Must be accurate and updated

1. On a regular basis
2. When there are changes

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F. Personnel must be familiar with pre-plans

1. Plans should be reviewed whenever updated

2. Pre-plans should be used during company drills

a) Be proficient at using this "tool"

V. Developing the Pre-Plan

A. Be familiar with department SOPs

Question:
What are some basic guidelines for developing a pre-plan?

B. Basic guidelines

1. Understand what kind of pre-plan is needed

a) May require input from fire prevention bureau and line firefighters

Instructor Note:
Refer students to Information Sheets #13.2 and #13.3 on pages 13.7 - 13.13 for two examples of pre-fire survey forms.

2. Do research ahead of time

a) Other people's time is valuable to them

b) Good public relations to be prepared

c) Preparation includes:

1) Reviewing existing pre-plans

2) Reviewing fire and building codes

3) Being familiar with site hazards

3. Contact occupancy in advance

a) Scheduled site visit at a convenient time

b) Allow business owner time to prepare

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Instructor Note:
Refer students to Information Sheet #13.3 on page 13.14 in the student manual for a sample letter to business owners.

4. Someone should accompany fire department on inspection
   a) To answer questions
   b) To provide access to locked areas
   c) Opportunity to educate business owners about:
      1) Specific hazards at the facility
      2) How to make operations safer
      3) Fire department response to emergencies
5. Creating final pre-plan
   a) Create a rough draft during site visit
   b) Clean it up at the station
   b) Many pre-plans are done on computer
      1) Neat and professional
      2) Easily updated
      3) Easy to reproduce

Instructor Note:
Refer students to Information Sheet #13.5 on page 13.15 in their student manuals for a sample plot plan and floor plan that were drawn on computer.

Instructor Note:
Refer students to the Review Questions on page 13.17 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

Pre-fire plans can be an invaluable "tool" to response personnel at an emergency scene. They often provide vital information regarding an occupancy that may have a direct bearing on the fire officer's tactics and strategy.

There are various different kinds of pre-plans, each of which is designed to provide different kinds of information. The size and complexity of an occupancy will dictate which kind of pre-plan is needed. One must weigh the "need to know" versus the "nice to know" when developing a pre-plan because there's a lot of information that can be incorporated into those documents. Pre-plans must contain enough information to be useful, but not so much information that they become difficult to work with. Target hazards, occupancies or areas that present a greater degree of risk and/or will require extraordinary efforts to control an emergency, generally require more detailed pre-plans and a lot more involvement from different people within the fire department.

Finally, pre-plans are only of value when they're easily accessible and everyone is familiar with them. The use of pre-plans should be incorporated into company drills so that response personnel can become as proficient at using this resource on the fireground as they are any other tool.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Fire Data**

TIME FRAME: :15

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the benefits of a good fire incident reporting system, identify some of the leading causes of fire; and identify the state wide fire reporting system.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 14.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 14
NFPA, *Fire Protection Handbook* (17th edition)
California Fire Incident Reporting System (CFIRS)

PREPARATION:

Every fire officer has a responsibility to document emergencies, both to provide a record of the incident and to contribute to statistical data bases. Not everyone enjoys doing the paperwork that goes along with the job. But, ultimately, it *does* benefit the fire officer. Understanding how this information is used, and knowing how to properly complete the documentation, becomes very important.

RETIRED CURRICULUM

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PRESENTATION | APPLICATION

Fire Data

Page: SM 14.1

I. The Incident Report (or Fire Report)

A. Reporting procedures vary

B. All departments must have some procedure to document responses

C. The report should provide information about:

1. What caused the incident
2. What contributed to any escalation of the incident
3. Emergency procedures undertaken and the results of those operations
4. Damage resulting from the incident

Question:
Why is it important to document incidents?

D. Reasons for documenting incidents

1. Provide a legal record of the incident
   a) Might end up in court
2. Keep management informed of activities
3. Develop a data base

II. NFIRS and CFIRS

Question:
What is NFIRS?
What information is documented on these reports?

A. NFIRS (National Fire Incident Reporting System)

1. Developed by U.S. Fire Administration (USFA), within FEMA

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2. Used in 40 states

3. Annually collects data on one million fires from more than 13,400 fire departments

   a) Data collected on different types of incidents

4. Computer programs are used to:

   a) Manage the data base

   b) Generate reports showing a variety of statistics

5. The data base is also available to others who wish to perform their own analyses

Question:
What is CFIRS?
What information is documented on these reports?

B. CFIRS (California Fire Incident Reporting System)

1. The state equivalent of NFIRS

2. Developed by the California State Fire Marshal

   a) Assisted by CFIRS Advisory Committee

      1) Representatives from large and small, paid and volunteer fire departments

3. Contains basic information "fields" required by the State Fire Marshal

4. Each department can customize their own records

5. There are several forms

   a) CFIRS-1

      1) Completed on every alarm

   b) CFIRS-2

      1) For injuries or deaths of fire service personnel

RETIRED CURRICULUM

PRESENTATION | APPLICATION

c) CFIRS-3

1) For injuries or deaths to civilians or other emergency personnel such as police officers or ambulance attendants

Instructor Note: Refer students to Figures 14.1 and 14.2 on pages 14.3 and 14.4 in their student manuals for copies of these forms.

d) CFIRS-HazMat

1) For haz mat incidents

6. Reports are sent by each department to the State Fire Marshal's Office at least quarterly

a) Diskette,

b) Magnetic tape, or

c) Hard copy

7. Information is entered into their computer system

a) Compiled in annual report showing statewide trends

8. Statewide data is tabulated and sent to FEMA for compilation with other states' data

Page: SM 14.2

III. NFPA 901, *Uniform Coding for Fire Protection*

A. Developed by NFPA Technical Committee on Fire Reporting

1. To maintain uniformity in fire reporting

B. Establishes basic definitions and terminology

RETIRED CURRICULUM

PRESENTATION | APPLICATION

C. Another standard, NFPA 902M, *Fire Reporting Field Incident Manual*, provides:

1. Specific forms for fires and other incidents
2. Instructions for completing those reports

D. The 902F (Basic Incident Report form) is used to document everything about the incident itself including:

1. Location
2. Type, construction and use of the structure
3. How the fire started and spread
4. Number of injuries and deaths
5. Information regarding fire department response and activities
6. This form is also used for non-fire incidents

Instructor Note:
Refer students to Figure 14.3 on page 14.5 for a copy of the NFPA 902F, Basic Incident Report.

E. The 902G (Basic Casualty Report) is used to document injuries and deaths in much greater detail:

1. Used both for civilians and firefighters
2. Designed to identify:
   a) Why and how the injuries and deaths occur
   b) Where victims were located
   c) What they were doing at the time of the injury or death
   d) Factors that contribute to firefighter deaths and injuries
      1) Emphasis on protective equipment failures

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 14.6

IV. Benefits of a Fire Reporting System

Question:
What are some of the benefits of a good fire reporting systems?

A. Identifying the fire problem

1. On several levels

a) Community

b) State

c) Federal

2. Statistics can show a variety of things:

a) Cause of ignition

b) Contributing factors

c) Type, age and condition of fire victims

d) Type of property involved

e) Dollar loss

B. Identifying the causes of deaths and injuries

C. Supporting budget requests

1. Save programs that are in danger of being cut

2. Justify funding for new programs

D. Identifying need for new or more stringent fire codes, or for better code enforcement

E. Determining need for new public education programs, and evaluating the success of existing ones

F. Improving allocation of resources and/or planning for future growth

RETIRED CURRICULUM

PRESENTATION | APPLICATION

G. Scheduling non-emergency activities at times when they least likely to:

1. Be interrupted by emergencies

2. Impact response times to emergency calls

H. Identifying safety problems associated with consumer products, and regulating product safety

I. Evaluating fire protection designs and systems

Page: SM 14.7

V. Ten Major Findings on the Nature of the U.S. Fire Problem

A. 17th edition of the NFPA Fire Protection Handbook lists ten major U.S. Data Based Findings (1980 - 1989)

1. Not arranged in any order of priority

2. May not be what every department or state would consider most important

3. Shows how data bases and information analysis can be used to:

a) Identify problems

b) Help design fire protection programs

Question:
What are some of the major fire findings on the nature of the U.S. fire problem?

B. Home smoke detectors can cut the risk of dying in half

1. By the late 1980s, 5/6 of U.S. homes had at least one smoke detector

2. One third were not operational, primarily because of dead or missing batteries

C. Automatic sprinklers are very effective in reducing loss of life and property

RETIRED CURRICULUM

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PRESENTATION | APPLICATION

D. Heating equipment has caused a sharp increase in the fires and fire deaths since the late 1970s

1. Equipment includes

a) Wood stoves

b) Portable kerosene heaters

c) Gas-fueled space heaters

2. Statistics related to heating equipment:

a) 30% of home fires

b) More than 16% of home fire deaths

E. Incendiary and suspicious fires dropped by nearly 40% from 1977 to 1988

1. Associated civilian deaths have increased by 17%

2. Associated property damage, adjusted for inflation, has been essentially constant since 1983

F. A large percentage of firefighter fatalities are attributed to heart attacks and activities away from the fireground

1. >25% of all fire service deaths in 1988 occurred while responding to or returning from a call

G. Rural areas have the highest fire death rates

1. More than double the rate in small cities

2. More than 50% higher than largest cities

H. The largest percentage of home fire deaths is due to smoking

1. Nearly 30% of residential fire deaths

2. 75% involved ignition of upholstered furniture, mattresses or bedding

I. U.S. and Canadian fire death rates are the highest of all developed countries in the free world

1. At least double Japan and western Europe

RETIRED CURRICULUM

PRESENTATION

J. The Old South has the highest fire death rates

1. Major factors are:

a) Heating equipment

b) Poverty

c) Poor education

K. Elderly are more vulnerable because of limited mobility

APPLICATION

Instructor Note: Figures 14.4 - 14.12 (pages SM 14.8 - 14.12) contain some of the statistics reported in the 17th edition of the NFPA Fire Protection Handbook. Sources for this information include both NFPA and NFIRS surveys.

(Interpret the pie graphs as follows: The first wedge in the pie starts at 12:00 and moves clockwise. The corresponding key starts at the bottom and works up.)

An important point illustrated by these graphs is that the majority of civilian fire deaths and injuries occur in the home. Elaborate on other details as appropriate.

Figures 14.13 - 14.16 (pages SM 14.13 - 14.16) contain California statistics provided by the State Fire Marshal's office. The source for this information is CFIRS.

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	It's important to note that while fire incidents have gone down over the years, property and content loss has escalated. Elaborate on other details as appropriate. Additional statistics regarding firefighter deaths and injuries can be found in Chapter 17 on Fireground Safety. **Instructor Note:** Refer students to the Review Questions on page 14.18 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

Documentation provides a legal record of incidents, keeps upper management informed of activities within the department, and provides a means to develop a data base of information. This data base can be used for many purposes including identifying the fire problem within the community, identifying the cause of deaths and injuries in order to implement more effective safety and public education programs, developing and evaluating fire codes, and supporting budget requests. Every company officer has a responsibility to accurately document incidents and to understand how this information is used.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

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TOPIC: **Local Resources**

TIME FRAME: :15

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz.

Behavior: The student will identify various resources available within their own departments, local government and private entities in the community, which can be called upon to assist during emergencies.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 15.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES: Command 1A Instructor Guide, Chapter 15

PREPARATION: There are numerous local resources that a fire officer can draw upon during an emergency. These resources begin within the fire department, but may also include other public agencies and private entities. Pertinent data concerning these resources must be identified prior to an emergency so that they may be summoned promptly when needed.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Local Resources

Page: SM 15.1

I. Fire Department Resources

A. Fire officer must be familiar with department resources

Question:
What are some of the things that a fire officer should know about resources within the department?

1. Number of personnel responding
   a) First and second due units
   b) Automatic and mutual aid companies
   c) Volunteers or reserves
2. Apparatus
   a) What kind
   b) Capabilities and limitations
   c) Pump capacity
   d) Tank capacity
   e) Special features
      1) Aerial with an elevated water tower
      2) Off-road capability
3. Equipment
   a) Large diameter hose
   b) Master stream appliances
   c) Power tools
4. Water system
   a) Strengths and weaknesses of the system

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) Is the water system adequate?

c) Will it be necessary to request water tenders?

d) Location of supplemental water supplies

1) Cisterns

2) Elevated tanks

3) Drafting sites

e) Can responding apparatus draft or to hook up to connections in remote locations?

6. Additional alarms

a) Resources assigned to each alarm

b) Response time for senior officers

B. Automatic and mutual aid agreements

1. How initiated?

2. Response times?

3. Protocols for working together on the fireground?

a) Will their SOPs work with your companies?

4. Local emergency plans?

a) Does one exist?

b) How is it activated?

c) Responsibilities of individual fire officers?

5. Use of ICS to manage multiple resources

Instructor Note: Specific details of fireground management will be covered in later chapters. Emphasize that ICS training is covered in an entire class and should be attended by all fire officers.

RETIRED CURRICULUM

PRESENTATION	APPLICATION
II. Public Agencies	
	Question: What are some of the public agencies that are available for assistance?
A. Agencies available within local government	
1. Law enforcement	
a) Traffic and crowd control	
b) Maintain scene security	
c) Evacuation	
2. Water department	
3. Public works	
4. Street department	
B. Disaster Relief Organizations	
1. Red Cross	
2. Salvation Army	
	Question: What kinds of information must the fire officer know about available resources?
C. The fire officer must be familiar with community resources	
1. What resources exit	
2. Their general capabilities	
3. How to access them	
4. Who has authority to summon them	
5. Their response times	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 15.2

III. Private Entities

A. Examples

Instructor Note:
Have students identify examples and add to this list. Discuss the practical need for these types of resources at a fire scene.

1. Utility and power companies
2. Towing services
3. Salvage and sanitation services
4. Hazardous waste haulers
5. Heavy equipment and trained operators

B. The fire officer must be familiar with these resources, just as with public agencies

C. Some private entities will require a purchase order promising payment before they respond

Instructor Note:
Refer students to Activity Sheet #15.1 on page 15.3 in their student manuals. This activity asks students to identify the various resources that their department can call upon and the functions they might serve. This can be done as a class exercise, a homework assignment, or simply completed during lecture as appropriate.

Instructor Note:
Refer students to the Review Questions on page 15.4 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

It can be a very lonely feeling when "all hell is breaking loose" on the fireground and you're in charge. But, there are a lot of resources available to the fire officer. He or she must be familiar with the resources within the department, as well as public agencies and private entities that are available to help. Getting these resources on scene early can make the whole operation a lot smoother.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **State and Federal Resources**

TIME FRAME: :15

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify some of the state and federal agencies that may offer assistance to fire departments during local emergencies.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 16.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 16
NFPA *Fire Protection Handbook*, 17th edition

PREPARATION:

Less widely known are some of the resources available within state and federal government. Information on these agencies may be kept at the department communications center or within Emergency Action Plans. However, fire officers must be at least familiar enough with them to know what resources are available, the assistance they can provide, and how to access them.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

State and Federal Resources

Page: SM 16.1

I. State and Federal Agencies

Instructor Note: This chapter has been kept brief because it is not the focus of this course. However, feel free to elaborate as appropriate to the needs of your class.

A. Many agencies exist at state and federal levels

B. Federal agency assistance is normally requested through a state or regional emergency plan

C. Agencies that fire departments work with most often include:

1. State Fire Marshal's Office

   a) Primary authority on fire protection in the state

2. U.S. Forest Service (USFS)

   a) Provides fire protection to more than 200 million acres of forests, grasslands, and nearby private lands (National Forest System)

   b) Conducts research and develops improved methods in forest fire management

   c) Provides technical and financial assistance to state forestry organizations

3. California Department of Forestry (CDF)

   a) Provides fire protection and rescue services to areas of state responsibility

4. Highway Patrol / State Police

   a) Enforce the laws related to the highways and byways of the state

RETIRED CURRICULUM

PRESENTATION	APPLICATION
b) Responsible for Incident Command at hazardous materials incidents on public roads	
5. Office of Emergency Services (OES)	
a) Provides for the state's needs in preparing for and handling major emergencies	
6. Environmental Protection Agency (EPA)	
a) Responsible for numerous programs that impact:	
1) Storage of hazardous materials	
2) Mitigation of hazardous materials releases	
7. Department of Transportation (DOT)	
a) Concerned with safety in all modes of transportation	
b) Ten major operational units:	
1) U.S. Coast Guard (USCG)	
2) Federal Aviation Administration (FAA)	
3) Federal Highway Administration	
4) Federal Railroad Administration	
5) National Highway Traffic Safety Administration	
6) Maritime Administration	
7) Urban Mass Transportation Administration	
8) Materials Transportation Board (MTB)	
9) Transportation Safety Institute	
10) Transportation Systems Center	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
D. Some of the other agencies a department might work with, depending on the type and magnitude of the incident, include: 1. Bureau of Land Management 2. National Park Service 3. Bureau of Indian Affairs 4. National Disaster Offices 5. Military a) Navy b) Air Force c) Army d) Marines e) National Guard	**Instructor Note:** Refer students to the Review Questions on page 16.2 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

It is beyond the scope of this class to go into detail on all the various state and federal agencies that are available for assistance. However, the Incident Commander must keep in mind that they can be a valuable resource, particularly with large or complex incidents. Information on these agencies, as well as how to access them, must be kept in a convenient location within the department or the communications center so that these resources can be used in an emergency.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

Fire On Scene

17. Fireground Safety
18. Size-Up
19. Strategy, Tactics & Methods
20. Report on Conditions
21. Role of the First-In Officer
22. Company Operations
23. Determining Resource Requirements
24. Apparatus Placement
25. Initial Fire Attack

RETIRED CURRICULUM

RETIRED CURRICULUM

TOPIC: **Fireground Safety**

TIME FRAME: :30

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the leading cause of death and injuries to firefighters, recognize the fire officer's primary responsibilities in ensuring fireground safety, and identify common fireground safety practices.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 17.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 17
NFPA #201
NFPA, *Annual Death and Injury Report for U.S. Firefighters*
NFPA, *Fire Protection Handbook*, 17th edition
Cal/OSHA, *Guide to Developing Your Workplace Injury & Illness Prevention Program*

PREPARATION:

Firefighting is one of the most hazardous occupations in the country. Firefighters are often working in environments that are hostile, unstable, toxic or otherwise dangerous. The job frequently puts extreme physical demands on the body. Fire officers must be aware of the activities and conditions that result in firefighter deaths and injuries, and must take appropriate measures to protect themselves and their crews at all times while on duty.

PRESENTATION | APPLICATION

Fireground Safety

Page: SM 17.1

I. Statistics

A. Over 100 firefighters killed in the line of duty each year

B. Over 100,000 injured

Instructor Note: Refer students to Figures 17.1 - 17.9 in their student manuals for a statistical breakdown of how and where these deaths and injuries occur. (Source: NFPA Fire Protection Handbook, 17th edition.)

(Interpret the pie graphs as follows: The first wedge in the pie starts at 12:00 and moves clockwise. The corresponding key starts at the bottom and works up.)

Some of the important points are listed below. Elaborate on other details as appropriate.

C. Firefighter deaths by type of duty:

1. 50% - firefighting

2. 24% - responding/returning from alarm

D. 54.3% of deaths caused by stress-related heart attacks

E. Almost 40% of deaths occur in residential structures

F. 57.8% of the injuries occurred on the fireground

RETIRED CURRICULUM

PRESENTATION | APPLICATION

G. Major causes of firefighter injuries:

1. Fell, slipped (24.8%)
2. Overexertion (20.6%)
3. Exposure to Fire Products (18.5%)

H. 43.6% of injuries were strains, sprains, muscular pain

Page: SM 17.6

II. Areas of Emphasis for Firefighter Safety

A. Firefighting is a dangerous occupation

B. Most deaths and injuries can be prevented through commitment to department safety programs:

Question:
What are some areas of emphasis for firefighter safety?

1. Management Support

a) Essential for success

b) All managers must proactively promote safety

c) Management must be open to input from firefighters

1) Often they have the best insight

d) Department should have a designated safety officer

e) Safety procedures should be strictly enforced

f) All injuries should be carefully investigated

g) An employee safety committee is strongly recommended to:

1) Get employees involved

2) Provide a forum for employees to express concerns

RETIRED CURRICULUM

PRESENTATION | APPLICATION

h) A safety officer should be assigned at working structure fires or other large scale operations

1) A safety officer, and often an assistant safety officer, are *required* at haz mat incidents

2) These positions are built into ICS

2. Physical Fitness

Question:
What is the greatest cause of firefighter line-of-duty deaths?

a) The greatest cause of firefighter line-of-duty deaths is heart attack

b) Firefighters are more susceptible than the general population because of:

1) Job stress (physical and emotional)

2) Exposure to smoke and toxic fire gases

c) Risk of death and injury can be reduced by:

1) Good physical fitness program

2) Cardiovascular exercise

3) Medical check-ups

4) A weight control program

5) Nutrition education

d) Smoking should be discouraged

Question:
What is cited as perhaps the most effective way to improve firefighter safety?

3. Training

a) Effective training is perhaps the single most effective way to improve firefighter safety

RETIRED CURRICULUM

PRESENTATION	APPLICATION
b) Firefighters must know:	
1) How to perform each task safely	
2) Hazards associated with each task	
3) How to protect themselves from hazards	
c) They must be confident and competent in their skills	
d) They must train as a team to function smoothly and efficiently with others	
e) Annual performance evaluations help firefighters stay sharp	
f) Proper training can be even more of a concern with volunteer firefighters because:	
1) They may not have a regular training schedule	
2) Attendance at drills may be less consistent	
4. Protective Equipment	
a) Many injuries can be prevented with PPE:	
1) Turnouts	
2) Helmets	
3) Gloves	
4) SCBA	
5) Personal alarm devices	
b) Proper equipment for specific tasks	
1) Turnouts for structure fires	
2) Chemical protective clothing for haz mat incidents	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

c) Equipment must fit properly to be effective

1) If too large or too small it may:

- Restrict movement
- Hamper performance
- Be more subject to damage

2) Firefighters may not wear uncomfortable equipment

3) Proper fit is a concern with firefighters that are not "average" in size

- Especially women

d) Damaged equipment must be:

1) Taken out of service

2) Repaired or replaced as appropriate

e) Contaminated equipment must be:

1) Decontaminated, or

2) Disposed of and replaced

f) Consider contamination from:

1) Chemicals

2) Ashes and soot

3) Blood and body fluids

g) SCBA

Question:
What are some guidelines regarding when to wear or remove SCBA?

1) Helps protect against heart attacks and cardiovascular disease

- The leading cause of firefighter deaths

RETIRED CURRICULUM

PRESENTATION | APPLICATION

2) One of the greatest risks is during overhaul

- Many firefighters remove SCBA once smoke level has dropped
- There are often high levels of carbon monoxide present during overhaul

3) The department should have SOPs for monitoring CO levels before firefighters remove SCBA

5. Appropriate Risk Assessment

a) Some risks are inherent in the job

b) Sometimes a firefighter may risk his or her life in order to rescue another person in danger

c) Most firefighter deaths and injuries are not associated with rescue operations

d) Most deaths and injuries occur either when:

1) The firefighter takes risks unnecessarily

2) The firefighter fails to adequately assess the risks of a dangerous situation

e) Adequate risk assessment and good judgment are essential

6. Prompt Follow-Up to Injuries and Exposures

a) Appropriate measures must be taken to:

1) Prevent infection

2) Allow for proper healing

- Resting injured part

3) Decontamination

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) Important to report injuries

1) Firefighters sometimes won't report injuries to avoid:

- Showing weakness
- Being bothered with paperwork and doctors
- Being assigned to "light duty"

2) Reasons for reporting injuries

- To ensure proper medical follow up
- To identify trends or problems
- To prevent other injuries

Page: SM 17.8

III. NFPA 1500, Standard on Fire Department Occupational Safety and Health

A. Background

1. Written to reduce risk of death or injury to firefighters

2. Also geared toward making firefighters healthier and more physically fit

3. Drafted by a committee

a) Career and volunteer fire departments

1) Fire chiefs

2) Company officers

3) Line firefighters

4) Union officials

b) Apparatus and equipment manufacturers

c) Independent experts

d) United States Fire Administration

RETIRED CURRICULUM

PRESENTATION | APPLICATION

4. An NFPA standard

   a) Not mandatory until adopted

   b) Departments encouraged to comply voluntarily

5. Describes minimum level of care

Question:
What are the basic components of NFPA 1500?

B. Basic Components of NFPA 1500

1. Department must identify a safety officer

   a) More info is provided in NFPA 1501, Standard for Fire Department Safety Officer

2. An occupational safety and health committee

   a) Made up of a cross section of department members

3. Data collection system to track:

   a) Accidents

   b) Injuries

   c) Illnesses

   d) Deaths

   e) Exposures to toxic substances or contagious diseases

   f) Training

   g) Inspection, maintenance and repair of vehicles and equipment

4. Training to perform in a safe manner

   a) Basic firefighting

RETIRED CURRICULUM

PRESENTATION	APPLICATION
b) Handling special hazards	
1) Haz mat incidents	
2) Confined space rescues	
c) Based on SOPs	
d) Firefighters not fully trained must be closely supervised by qualified, experienced personnel	
1) Emergency scene duties limited to those which fall within training and capabilities	
5. Riding apparatus	
a) Seated before moving or when in motion	
b) Seat belts fastened	
c) Riding tailboard prohibited	
d) The standard only recognizes riding in enclosed areas as being safe	
1) Canopy areas open to the rear are acceptable on existing apparatus	
2) New requirements will mandate fully-enclosed cabs on all new fire apparatus	
6. Apparatus and equipment inspected periodically and after use to identify unsafe conditions	
a) Deficiencies must be corrected before vehicle or equipment is placed back in service	
7. Hearing protection	
a) For anyone exposed to noise > 90 dB	
8. PPE	
a) Department must provide full protective clothing and SCBA	
b) Other protection provided as appropriate for the hazards	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
c) Items must comply with NFPA standards	
d) Department must ensure PPE is used properly	
9. Precautions to assist if someone is injured	
a) Buddy System	
b) Someone accountable for crews working in a hazardous area	
c) Imminently hazardous situations require	
1) Safety officer	
2) Back-up rescue team	
3) Medical support personnel with:	
• Medical equipment	
• Transport capability	
10. An incident command system	
a) Based on written procedures that identify roles and responsibilities	
11. Emergency operations limited to those that can be accomplished safely with available personnel	
a) Recommendation for minimum staffing of 4 firefighters on engine and truck companies	
12. Fire department facilities must comply with applicable health, safety, building and fire codes	
a) Smoke detectors in all sleeping areas	
b) Monthly health and safety inspections	
c) 1 hour separation between apparatus rooms and living areas	
d) Vehicle exhaust system	
e) Sprinklers recommended	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

13. Annual physical examinations and a structured physical fitness program

    a) Standards for fitness must be job-related

    b) Data base to track exposures and occupational illnesses

14. Program to protect against exposures to contagious diseases

15. Employee wellness program recommended

    a) Substance abuse

    b) Stress reduction

    c) Critical incident stress debriefing

    d) Smoking cessation

    e) Personal and family problems

C. Obtaining NFPA 1500

1. NFPA, Batterymarch Park, Quincy, MA 02269

2. Volume 8, *National Fire Codes,* 1991 edition.

Page: SM 17.10

VI. California's Workplace Injury & Illness Prevention Program

A. Background

1. California Labor Code (Section 6400) requires that every employer (including government) provide and maintain a safe and healthful workplace for employees

Question:
Where are the requirements found for California's Workplace Injury & Illness Prevention Program?

2. A written, effective injury and illness prevention program is required by the California Code of Regulations (Title 8, Section 3203)

RETIRED CURRICULUM

PRESENTATION | APPLICATION

3. Managers at all levels are expected to contribute to the effectiveness of the program

B. Basic components:

1. Management commitment, and identification of person(s) with authority for implementing the program

2. Communication with employees through:

   a) Training

   b) Safety committees

   c) Written communications

   d) Provision for employees to notify management about hazards without fear of reprisal

3. Ensuring that employees comply with safe and healthy work practices through:

   a) Employee recognition for safe performance

   b) Training

   c) Disciplinary actions for safety violations

Instructor Note:
It is beyond the scope of this course to go into detail on the requirements of the Injury and Illness Prevention Program. The student manual only provides a brief overview of the basic components.

Question:
What are some of the basic components of the Injury and Illness Prevention Program?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
4. Hazard identification and evaluation a) Scheduled periodic inspections done when: 1) Injury and Illness Prevention Program is first established 2) A new hazard is introduced into the workplace • Substances • Processes • Procedures • Equipment 3) Employer is made aware of a new or previously unrecognized hazard 5. Injury or illness investigation 6. Correcting problems in a timely manner based on severity a) Unsafe or unhealthy conditions b) Work practices and procedures 7. Safety training and instruction a) New employees b) Employees given new job assignments for which training has not been received c) For new substances, processes, procedures or equipment d) When employer is made aware of a new or previously unrecognized hazard e) To familiarize supervisors with hazards to which their employees may be exposed	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

8. Record keeping and documentation of:

   a) Safety inspections

   b) Hazards found

   c) Corrective action taken

   d) Training

   e) Minutes of safety committee meetings

   f) Accident investigation reports

C. More information can be obtained from Cal/OSHA Consultation Service

   1. 455 Golden Gate Ave, Room 5246, San Francisco, CA 94102

   2. (415) 703-4050

Page: SM 17.11

Question:
What are some recommended fireground safety practices?

V. Fireground Safety Practices

A. Wear full protective equipment

B. Use SCBA and personal alarm devices

   1. Someone should monitor for contaminants

   2. When in doubt, use SCBA

C. Stay low in smoke and heat

D. Use the buddy system

E. Be aware of surroundings

   1. Stay alert to potential hazards

   2. Continually monitor building integrity

   3. When in doubt, get out

RETIRED CURRICULUM

PRESENTATION	APPLICATION
4. Advise IC and Safety Officer of hazards	
F. Do not run on the fireground	
G. Secure utilities as soon as possible	
H. Use proper tools	
1. Use tools properly	
I. Establish and maintain adequate communications	
1. Noise will make it difficult for people to hear or understand	
2. Often helpful to have the other person repeat back what you've said	
J. Remember many injuries take place during overhaul	
1. Don't become complacent	
2. Don't remove SCBA or PPE too soon	
3. Lift with your legs	
4. Take time out for "rehab"	**Instructor Note:** Refer students to the Review Questions on page 17.12 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

Firefighting is one of the most dangerous occupations in the country. Nevertheless, many firefighter deaths and injuries can be prevented by an effective safety program which includes management support, physical fitness programs, training, proper protective equipment, appropriate risk assessment and prompt follow-up to injuries and exposures. Safety procedures should be communicated to all employees and strictly enforced throughout the department.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

RETIRED CURRICULUM

TOPIC: **Size-Up**

TIME FRAME: 1:00

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will define size-up, describe the value of doing a good size-up, and identify the information sources and mental discipline that an Incident Commander needs to use in the size-up process. The student will also identify the five major components of size-up as defined by Lloyd Layman, and describe the factors involved and how they may impact the tactics and strategy used on the fireground.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 18.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 18
Layman, Lloyd, *Fire Fighting Tactics*
Coleman, *Management of Fire Service Operations*
NETC, *Incident Command Student Manual*
Brunacini, *Fire Command*

PREPARATION:

Size-up is a critical component of any emergency response; it is the basis for all decisions that follow. A good size-up lays the foundation for successful incident mitigation. On the other hand, if a fire officer does not perform an adequate size-up, the results can be disastrous. Your safety and the safety of everyone else on scene depends on doing size-up properly.

PRESENTATION | APPLICATION

Size-Up

Page: SM 18.1

I. What is Size-Up?

Question:
What is size-up?

A. Lloyd Layman describes size-up as the process of evaluating an incident in order to determine which course of action to pursue

B. On-going process

1. Done throughout the incident
2. Begins with receipt of alarm
3. Started by first-in officer
4. Continued by additional officer(s)

C. Not limited to IC

1. Each division or sector officer performs a size-up and report s back to command post

D. Process must be systematic and thorough

1. Many factors to address

Question:
What is the value of doing a good size-up?

2. Each can be critical for:

a) Safety of personnel

b) Successful control of the emergency

E. Size-up is the basis for strategy and tactics

Question:
What information sources are available in performing size-up?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
II. Information Sources A. Personal Observation 1. Includes: a) Visual observations b) Sounds which might indicate: 1) Impending structural collapse 2) Unstable containers of hazardous materials c) Odors indicating presence of toxic substances 2. Normally done from outside B. Reconnaissance 1. Some info is not visible from Command Post 2. IC will have to rely on input from others C. Pre-Planning 1. Pre-plans provide information on: a) Layout of facility b) Hazards which might be anticipated c) Fire protection features d) Suggested tactics and strategies 2. This info may be hard to obtain during an incident a) Particularly after-hours D. On-Site Resources 1. Perhaps the least reliable resource	**Question:** Why is this the least reliable resource?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
a) Facility personnel seldom respond to emergencies 1) Unless part of site ERT b) May underestimate or overestimate emergency 2. They can provide info which might otherwise be unavailable to the IC 3. Become acquainted with on-site ERTs	
	Page: SM 18.2
III. Lloyd Layman's Size-Up System	**Question:** What are the components of Lloyd Layman's size-up system?
A. 5 components: 1. Facts 2. Probabilities 3. Own Situation 4. Decision 5. Plan of Operation	
B. Each involves several different factors:	**Question:** What are some of the factors involved in these components?
1. Facts a) Data available through pre-planning b) Data acquired upon receipt of the alarm c) Data acquired on arrival or observed at scene d) Implement policies or SOPs based on facts	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Probabilities a) Anticipated fire growth b) Anticipated threat to life c) Anticipated threat to property and environment d) Reflex times e) Weather changes f) Abnormal conditions 3. Own Situation (Resources) a) Apparatus b) Personnel c) Equipment d) Cooperating agencies available e) Extinguishing agents f) Fire protection equipment on site 4. Decisions a) The initial decision(s) b) Supplemental decisions 5. Plan of Operation a) Issue orders/instructions that will initiate actions b) Provide management and supervision	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Instructor Note:
Refer students to Activity Sheet #18.1 on pages 18.4 - 18.11 in their student manuals. (A copy is provided on the following pages of this lesson plan.) This activity sheet is an opportunity to take a more detailed look at each of the factors and how they may impact tactics and strategy.

Take time to review this information with students. It is recommended that students either complete this activity sheet during lecture or as part of a group exercise. If you choose to use it as a homework assignment, be certain to review it in class the following day. This will provide a valuable foundation for the scenarios that will be done later in class.

RETIRED CURRICULUM

ACTIVITY SHEET #18.1

Size-Up

The following pages take a more detailed look at each of the size-up factors identified by Lloyd Layman. Individual factors are listed in the left column. The right column provides space for you to identify how they may impact the tactics and strategies you decide to use. A few have been filled in as examples. This may be completed during lecture, as part of a group exercise or as a homework assignment. It will help you prepare for the simulation portion of this course.

Facts

Data available through pre-planning

Individual Factors	Possible Impact
Location	
Occupancy classification	This will impact occupant load, construction and requirements for fire protection features.
Occupant load	
Structural type	
Internal and external building features	
Required fire flows	
Available fire flows	
Fire load	
Built-in protection systems	They will assist in confining and/or extinguishing the fire. It may be necessary to assign a company to handle the system.
Topography	
Access routes at the site	
Anticipated fire behavior	
Ambient weather	
Anticipated operational priorities	

RETIRED CURRICULUM

Data acquired upon receipt of the alarm

Individual Factors	Possible Impact
Nature of the emergency (description of the problem)	As given by the reporting party
Time of day	
Number of responding units	
Weather conditions	

Data acquired upon arrive or observed at scene

Individual Factors	Possible Impact
True nature of incident (fire, haz mat incident, vehicle accident, medical emergency)	As observed by the fire officer. May be different than the problem described by the reporting party.
Ease of access to location	
Location, intensity and color of fire or smoke	
Nature of threat to life or property	

Implementation of policies or SOPs based on observed facts

Individual Factors	Possible Impact
Officer must know how much authority he or she has	
Departmental policies on deployment of apparatus and equipment must be followed	
Departmental policies on the handling of specific problems must be followed	

RETIRED CURRICULUM

Probabilities

Anticipated fire growth

Individual Factors	Possible Impact
Direction (vertical, horizontal)	
Intensity	
Effects of heat and smoke	

Anticipated threat to life

Individual Factors	Possible Impact
Occupants	
Fire department personnel	
Police and other officials	
Bystanders	
Unaware citizens	

Anticipated threat to property and the environment

Individual Factors	Possible Impact
Direct damage (Flame spread, heat, smoke)	
Indirect damage (Smoke, water)	

RETIRED CURRICULUM

Reflex times

Individual Factors	Possible Impact
Required for evolutions	
Required for assistance	Additional alarm assignments or other resources should be ordered early.

Weather changes

Individual Factors	Possible Impact
Wind speed and direction	
Temperature	
Humidity	
Inversions	
Abnormal conditions	

Abnormal conditions influencing the state of emergency

Individual Factors	Possible Impact
Structural deficiencies and failures	
Accelerated fire behavior	
Explosions	
Lack of time for normal operations	

RETIRED CURRICULUM

Own Situation

Apparatus

Individual Factors	Possible Impact
Type and number on scene	
Type and number responding	
Type and number available	
Configuration of hose loads	

Personnel

Individual Factors	Possible Impact
Staffing levels on scene	
Staffing levels responding	
Staffing levels available	
Performance capabilities and limitations of companies	
Command and control organizational structure	
Staff support available	

Equipment

Individual Factors	Possible Impact
Equipment inventories	
Specialized equipment on the scene	
Specialized equipment available	

RETIRED CURRICULUM

Cooperating agencies available

Individual Factors	Possible Impact
Police	
Utility and public works departments	
Mutual aid, citizens	
Staff support (chemists, researchers, etc.)	

Extinguishing agents

Individual Factors	Possible Impact
Water	Available fire flow, applied fire flow capabilities
Foams	
Powders	
Gases	

RETIRED CURRICULUM

Fire protection equipment on site

Individual Factors	Possible Impact
Sprinkler system	
Standpipe system	
Smoke detectors	
Fire alarms	
Special extinguishing equipment	
Smoke and heat vents	To assist with ventilation.
Fire doors and windows	To help confine fire and smoke.
Fire walls, division walls	To help confine fire and smoke.

Decisions

The initial decision(s)

Individual Factors	Possible Impact
Must be made in light of the primary mission of protecting lives and property	
Must be based on the accomplishment of objectives for companies or personnel	
Must be made objectively and as quickly as possible	
Must be made in light of all known threat potentials	
Must be made in light of all priorities and utilization of resources	
Must be made in view of the integration of efforts with resources	

RETIRED CURRICULUM

Supplemental decisions

Individual Factors	Possible Impact
Must consider the effects of the control effort on the problem	
Must consider the effects of the problem on the control effort	
Must consider the input of new facts on the nature of the problem	
Must be a continuous process until the emergency is completely over	
Must consider input of the staff in reassessing conditions	

Plan of Operation

Issue orders/instructions that will initiate actions

Individual Factors	Possible Impact
An overall strategy	
The setting of tactical objectives	
The selection of methods that will be employed	

Provide management and supervision

Individual Factors	Possible Impact
Adhere to sound management principles	
Utilize appropriate management techniques	
Exercise command	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Page: SM 18.12

IV. Mental Discipline

A. It takes mental discipline to know:

1. What info is important
2. How to use that info in decision making process

Question:
How does mental discipline help the fire officer with size-up?

B. Dealing with Facts

1. All facts aren't relevant or immediately important
2. They must be filtered and screened
3. Facts must be evaluated in terms of "big picture"

C. The Probabilities

1. IC must look ahead at probable hazards/concerns
2. The most important:
   a) Are fairly probable
   b) Present high degree of risk

D. Resources

1. Don't hesitate to "think big"
   a) Turning back units is easier than requesting them too late
2. Resources extend beyond initial response
3. Resources include reference items:
   a) Pre-fire plans
   b) Maps
   c) Building guides

RETIRED CURRICULUM

PRESENTATION | APPLICATION

E. Decisions

1. Obtaining pertinent facts to make decisions

a) Personal observation and input from others

2. Remember decisions are not cast in concrete

a) Stay flexible and receptive to input

b) Review and assess effectiveness of decisions

F. Plan of Operation

1. Plans may require modification

2. Exercise management and supervision

a) Issuing orders and instructions

Page: SM 18.13

V. Specific Fireground Factors

A. Focusing on fireground factors

1. Previous info dealt with the overall operations

2. The following focuses more on:

a) The fire itself

b) The people and structures it impacts

c) Resources needed for suppression

Instructor Note:
Refer students to pages 18.13 - 18.14 in their student manuals for a list of thoughts that pass through an experienced officer's mind en route and upon arrival. Generate a discussion of how these factors impact fireground operations.

RETIRED CURRICULUM

PRESENTATION	APPLICATION
B. The Building	
1. Size	
2. Interior arrangement/access	
a) Stairs	
b) Hallways	
c) Elevators	
3. Construction type	
4. Age	
5. Condition of the building	
a) Faults	
b) Weaknesses	
6. Compartmentation/separation	
7. Vertical and horizontal openings	
a) Including shafts and channels	
8. Outside openings	
a) Doors and windows	
b) Degree of security	
9. Utilities	
a) Hazards	
b) Methods for control	
10. Concealed spaces, attics	
11. Exterior access	
12. Effect the fire has had on the structure thus far	
13. Projection on continuing fire effect on building	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
C. Fire	
1. Size	
2. Extent (% of structure involved)	
3. Location	
4. Stage	
5. Direction of travel (most dangerous)	
6. Time of involvement	
7. Type and amount of material involved	
a) Structure	
b) Interior	
8. Finish/contents/everything	
9. Type and amount of material left to burn	
10. Product of combustion liberation	
D. Occupancy	
1. Specific occupancy	
2. Occupancy type	
3. Value characteristics associated with occupancy	
4. Fire load	
a) Size	
b) Nature	
5. Status	
a) Open or closed	
b) Occupied, vacant or abandoned	
c) Under construction	
6. Occupancy associated characteristics/hazards	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
7. Type of contents (based on occupancy)	
8. Time - as it affects occupancy use	
9. Property conservation profile	
a) Susceptibility of contents to damage	
b) Need for salvage	
10. Moral hazard	
E. Life Hazard	
1. Number of occupants	
2. Location of occupants	
3. Condition of occupants	
a) By virtue of fire exposure	
4. Incapacities of occupants	
5. Commitment required for search and rescue	
a) Personnel	
b) Equipment	
c) Command	
6. Fire control needed for search and rescue	
7. Needs for EMS	
8. Time estimate of fire effect on victims	
9. Spectators	
a) Possible hazards to spectators	
b) Need for crowd control	
10. Hazards to fire personnel	
11. Access to victims needing rescue	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
12. Characteristics of escape routes/avenues of escape	
a) Type	
b) Safety	
c) Fire	
d) Condition	
F. Arrangement	
1. Access, arrangement, and distance of exposures	
a) Internal	
b) External	
2. Combustibility of exposures	
3. Severity and urgency of exposure (fire effect)	
4. Value of exposures	
5. Most dangerous direction - avenue of fire spread	
6. Time estimate of fire effect on exposure	
a) Internal	
b) External	
7. Obstructions to operations	
8. Capability/limitations on apparatus movement and use	
G. Resources	
1. Manpower and equipment	
a) On scene	
b) Responding	
c) Available in reserve	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Estimate of response time	
a) Personnel	
b) Equipment	
3. Condition of personnel and equipment	
4. Capability and willingness of personnel	
5. Capability of commanders	
6. Nature of command systems	
7. Number and location of hydrants	
8. Supplemental water sources	
9. Adequacy of water supply	
10. Built-in private fire protection	
a) Sprinkler	
b) Standpipe	
c) Alarms	
11. Outside agency resource and response time	
H. Other Factors/Conditions	
1. Time of day/night	
2. Day of week	
3. Season	
4. Special hazards due to holidays, special events	
5. Weather	
a) Wind	
b) Rain	
c) Heat	
d) Cold	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

e) Humidity

f) Visibility

6. Traffic conditions

7. Social conditions

a) Strikes

b) Riots

c) Mobs

d) Rock festival

e) Union meeting

Page: SM 18.15

VI. Size-Up and Divisions of Firefighting

A. Size-up requires:

1. Evaluating the situation

2. Applying that info to divisions of firefighting

B. It involves looking at:

1. Problems

2. Solutions or objectives

C. This process can take the form of questions

1. Examples:

a) What are the facts concerning rescue?

b) What is the probability of rescue being needed?

c) What resources are available to conduct the rescue?

d) What decisions must be reached regarding rescue?

e) What will the rescue plan entail?

RETIRED CURRICULUM

PRESENTATION | APPLICATION

2. The process is repeated for each fire division

   a) Exposures

   b) Confinement

   c) Extinguishment

   d) Overhaul

   e) Ventilation

   f) Salvage

D. Process can be interrupted or modified as needed

   1. If the facts and probabilities indicate that rescue is not needed, there's no point assessing resources or establishing a rescue plan

VII. Application of Size-Up

A. Fire officers don't often command large incidents

B. They may find:

   1. Skills are not as sharp

   2. More likely to make mistakes

   3. Increased threat to life and property

C. Important to practice size-up

   1. Mental evaluation can be applied to all responses

      a) Regardless of size or complexity

Question:
How can regular practice of the size-up process help the fire officer?

   2. Regular practice will:

      a) Increase mental skills

      b) Enhance mental discipline

      c) Allow the process to become a habit

RETIRED CURRICULUM

PRESENTATION | APPLICATION

d) Reduce frequency and impact of "surprises"

e) Reduce mental lapses

f) Better prepare officer to assume command

D. Size-up is an essential component of command

1. Lloyd Layman, in his book "Firefighting Tactics," states that "Individuals who are unable to maintain self-control and to think clearly and logically amid confusion and excitement on the fireground should not aspire to positions of operational command."

Instructor Note:
Have students complete Activity Sheet #18.2 on page 18.15 in their student manuals. This exercise will also help prepare them for the scenarios that will be done later in class. (Allow 15 minutes maximum for this exercise.)

Instruction Note:
Refer students to the Review Questions on page 18.17 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

Size-up is a critical component of any emergency response; it is the basis for all decisions that follow. Lloyd Layman describes size-up as the process of evaluating an incident in order to determine which course of action to pursue. It is an on-going process that is done throughout the duration of the incident. The Incident Commander often uses multiple information sources in performing the size-up process: personal observation, reconnaissance, pre-planning, and on-site resources. Size-up can be broken into five distinct components: facts, probabilities, own situation, decision, and plan of operation. Each of these components involves several different factors. It also takes mental discipline to know what information is important and how to use that information in the decision making process that follows.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Strategy, Tactics and Methods**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will define strategy, tactics and methods, and describe the relationship between all three. The student will also describe the three strategic modes of attack, plus identify when each should be used and how to determine the appropriate mode of attack.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 19.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 19
NETC, *Incident Command Student Manual*

PREPARATION:

Fireground decisions are made on three different levels consisting of a strategy, tactics and methods. It is important for the fire officer to recognize these three levels, as well as the major components of each.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Strategy, Tactics and Methods

Page: SM 19.1

I. Strategy

Question:
What is "strategy"?

A. Strategy defined

1. Basic plan which

a) Identifies major goals

b) Prioritizes objectives

Question:
What three components form the basis for determining strategy?

2. Components of this strategy are based upon:

a) The officer's size-up

b) Mode of attack

c) Strategic priorities

3. The size-up portion involves:

a) First responder's data collection abilities

b) His or her experience

4. The fire officer needs to evaluate:

a) Facts

b) Probabilities

c) Own situation (resources and capabilities)

d) Available options or decisions rendered

e) Any plan of operation implemented

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Question: During what phase of size-up is the strategy established?

5. Strategy is established during the last two phases of size-up (decisions and plans)

6. The *mode of attack*:

   a) Operational process determined by size-up

      1) Offensive

      2) Defensive

      3) A combination of both

   c) One of the most significant factors in the success or failure of the operation

B. Offensive Strategy

Question: When is it appropriate to use an offensive strategy?

1. Offensive strategy is used when:

   a) The fire is small, or

   b) Attack made directly on main area of the fire

2. Purpose is to completely control entire fire

3. Sufficient personnel and equipment must be available to generate required fire flow

4. Offensive strategy is:

   a) Close-up

   b) Aggressively fought

   c) Followed up with support functions:

      1) Control of utilities

      2) Salvage

5. Generally an interior attack

RETIRED CURRICULUM

PRESENTATION	APPLICATION
C. Defensive Strategy	**Question:** When is a defensive strategy used?
1. Fire is generating so much heat that forces cannot deliver sufficient fire flow to extinguish it	
2. Involves protection of exposures only	
3. No advancing qualities found	
4. Generally a "surround and drown" operation	*Page: SM 19.2*
D. Combination Strategies	**Question:** What is meant by "combination strategies"?
1. Both offensive and defensive qualities	
a) May occur in either order	
2. Examples:	
a) Large fires	
1) First arriving companies often committed to protecting one side of the building	
• To confine the fire	
2) Augmented by additional companies who take up offensive mode upon arrival	
3) When first-in unit completes their objective, they may be reassigned	
b) May be used when rapid control is possible	
1) Primary force deployed directly on area of major involvement	
2) Often based on unknown fire extension	
3) Officer makes contingency plans should extension be more than first suspected	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Question: How should the appropriate strategic mode be determined?
E. Determining Strategic Mode 1. Compare resources available to apply gpm a) While successfully accomplishing other tasks 2. Can you handle emergency available resources? a) Yes = Offensive Strategy b) No = Defensive Strategy c) Maybe = Combined Strategy 3. Strategic priorities are set into motion using: a) RECEO, b) REVAS, or c) Department SOPs	
	Instructor Note: Have students give examples of how these strategies were employed at various incidents they have been involved in. Ask them to reflect on whether or not they were effective, and why.
II. Tactics	**Question:** What are "tactics"?
A. Objectives for accomplishing overall goal(s) or strategy B. Based on tactical priorities: 1. Search and rescue 2. Exposure protection	

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PRESENTATION	APPLICATION
3. Confinement	
4. Extinguishment	
5. Overhaul	
6. Ventilation	
7. Salvage	
III. Methods	
	Question: What are "methods"?
A. Individual evolutions to accomplish tactical objectives	
B. Example:	
1. Search and rescue may require multiple tasks:	
a) Hose and pumping evolutions for safety line	
b) Forcible entry	
c) Search procedures	
d) Lifts, drags or carries to get victim out	
2. May require coordination of multiple companies	
a) One may place ladders for rescue	
b) Another ventilates the roof	
C. Methods are based upon:	
1. Existing company evolutions	
2. Performance standards	
D. Methods employed may depend on:	
1. Resources available	
2. Their individual capabilities	
E. Usually decided by company officer and crew	

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PRESENTATION	APPLICATION
	Instructor Note: For those students who seek further information on methods, refer them to IFSTA manuals, Richmond's text on Engine and Truck Company Operations, and other appropriate materials. An in-depth discussion of methods is not within the scope of this course.
	Instructor Note: Refer students to the Review Questions on page 19.4 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

Fireground decisions are made on three different levels; strategy, tactics and methods. A strategy is a basic plan which identifies major goals and prioritizes objectives. One of the most fundamental decisions that must be made in developing a strategy is mode of attack (offensive or defensive). Tactics are specific individual objectives that must be completed to accomplish the overall goal(s) or strategy. They include the tactical priorities of search and rescue, exposure protection, confinement, extinguishment, overhaul, ventilation and salvage. Methods, or tasks, are the individual evolutions conducted to accomplish the tactical objectives. They are usually decided by the company officer and his or her crew.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Report on Conditions**

TIME FRAME: :15

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will describe an initial report on conditions at an emergency scene including what the report is, benefits of an accurate report, information contained in the report, and those factors that must be considered when transmitting the report.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 20.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 20
Coleman, *Management of Fire Service Operations*

PREPARATION:

Communications will always be a vital link in any emergency response operation. This is particularly true of the report on conditions provided by the first-in fire officer. He or she is the eyes and ears of the other response personnel that follow.

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PRESENTATION | APPLICATION

Report on Conditions

Page: SM 2.91

I. Introduction

A. Timely and accurate report on conditions allows other personnel to:

1. Better prepare themselves mentally

2. Begin planning evolutions

B. It's also the time when first-in officer either:

1. Assumes command

2. Passes command to next-in officer

II. Components of the Report

Question:
What information should be included in a report on conditions?

A. Report should contain the following:

1. Notification of arrival

a) Establishes time of arrival

b) May include updated address or location

2. Type of structure or area threatened

a) Brief description of:

1) Occupancy

2) Construction type

3) Building size

4) Vehicle

5) Terrain

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PRESENTATION	APPLICATION
b) Helps other responding crews anticipate:	
1) Potential problems	
2) Fire protection features	
3. Occupancy status	
a) Occupied or vacant	
b) Impacts need for rescue	
4. Statement of actual conditions	
a) What's visible or not visible	
b) Degree of involvement	
c) Identification of immediate problems	
4. Proposed course of action	
a) Assignment or task first-in company will be responsible for	
5. Instructions to other units	
a) Response routes	
b) Where to position apparatus	
c) Operational assignments	
6. Estimation of resources required	
a) Can incident be handled by units on scene?	
b) Will it require additional alarm assignment?	
7. Implementation of command structure	
a) Officer identifies him or herself as IC	
b) Officer provides name for incident	
B. Report can be transmitted relatively quickly	
C. This information is extremely valuable in setting the stage for all subsequent operations	
1. Even if all facts are not known yet	

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PRESENTATION | APPLICATION

Page: SM 20.2

III. Radio Procedures

A. Knowing how to provide a radio report is just as important as knowing what to say

1. If transmission cannot be heard and understood, it might as well not be given

2. If radio report is misunderstood it can have dire consequences

Question:
What are some guidelines for giving a clear, professional report?

B. Guidelines for providing a clear, professional radio report:

1. Pay attention to other radio traffic to avoid cutting off another transmission

2. Hold microphone a couple inches from mouth

3. Hesitate briefly after depressing button

   a) If you speak too soon the beginning of your message will not be heard

4. Speak clearly and distinctly

   a) Remain calm so message will be understood

5. Use common language

   a) "Clear text" preferred

   b) "10 Codes"

6. Be brief, accurate and to the point

   a) Provide only pertinent data

   b) Avoid unnecessary transmissions

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PRESENTATION	APPLICATION
7. Update initial report, if necessary, to include: a) Significant changes in situation b) Updated objectives	**Instructor Note:** Refer students to the Review Questions on page 20.3 in their student manuals.

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SUMMARY:

Communications are a vital link in any emergency response operation. A timely and accurate report on conditions allows other personnel to better anticipate the problems they may face and the role they are about to play in the incident.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Role of the First-In Officer**

TIME FRAME: :45

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will describe the three general roles that a first-in officer may assume, identify the factors which influence choice of roles, and identify the responsibilities normally associated with each role.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 21.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 21
NETC, *Incident Command Student Manual*

PREPARATION:

One of the most difficult decisions the first-in company officer must make is whether to remain with his or her company or to assume command of the fire. Although there may be a tendency to want to get directly involved in firefighting operations, the first-in officer is pretty much obligated to take command.

The company officer must be familiar with the different roles that he or she may have to assume, the criteria for selecting the proper role, and how that selection might impact the overall incident.

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PRESENTATION | APPLICATION

Role of the First-In Officer

Page: SM 21.1

I. Role of Company Officer

A. Company officer will assume one of three roles:

Question:
What are the three roles that a company officer might assume?

1. Investigative
2. Company member
3. Command

B. Size and complexity of incident are determining factors

C. Investigative Role

Question:
What is the investigative role?

1. Nothing showing on arrival
   a) Officer must determine problem
2. Don't confuse with role of fire investigator
3. Examples:
   a) Smoke or gas investigations
   b) Small fires extinguished by occupants
   c) False alarms
4. Responsibilities include:
   a) Report on conditions
   b) Safely positioning apparatus

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PRESENTATION	APPLICATION
c) Investigating situation	
1) Check out area or structure	
2) Talk to reporting party	
d) Determining what further action is required	
D. Company Member Role	
	Question: What is the company member role?
1. Nuisance or initial attack type fire that can be handled by a single unit	
2. Responsibilities	
a) Report on conditions	
b) Size-up	
c) Determine objectives	
d) Assign crew members	
e) May get involved in hands-on activities depending on needs and resources	
f) Monitor results	
g) Request additional resources as needed	
E. Command Role	
	Question: What is the command role?
1. Large or growing emergency beyond capability of first-in company	
2. Basic responsibilities change in size and scope	
a) Report on conditions	
b) Size-up	
c) Determine objectives	

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PRESENTATION | APPLICATION

d) Make assignments

e) Call for or verify additional resources

3. Additional responsibilities

a) Assume command

b) Designate command post location

c) Be available to incoming officers

d) Provide senior officer with thorough information

e) Transfer command

Page: SM 21.2

II. Determining the Appropriate Role

A. Decision regarding which role to assume is not always easy on the fireground

Question:
What are some of the factors to consider?

B. Factors to consider.

1. Whether or not company can handle the incident

a) Company member role

1) If immediate attack will extinguish or contain the fire

b) Command role

1) Fire is large and beyond capability of first company

2. What are the conditions on scene?

3. How far away is the next-due officer?

4. Is there an immediate threat to life?

a) If there's a rescue involved, first-in officer will probably have to pass command

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5. Limited staffing

   a) Officer may need to assist crew to prevent injuries from working without sufficient help

6. Specific SOPs or guidelines

C. When passing command, officer should provide sufficient information and instructions so the next officer doesn't have to repeat size-up

III. Command Considerations

A. An officer cannot properly command an incident while functioning as a company member

B. Officer must be able to determine where he or she will do the most good

1. Any incident beyond control of a single unit will require command function, regardless of other demands

2. First-in officer must not abdicate command because he or she:

   a) Is not comfortable with it

   b) Prefers to be directly involved in fire attack

C. Knowledge of ICS is essential for orderly control of resources

1. Provides a template

2. Makes it easier for the fire officer who might otherwise be overwhelmed

Instructor Note:
Refer students to the Review Questions on page 21.3 in their student manuals.

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PRESENTATION	APPLICATION
	Instructor Note: Refer students to Activity Sheet #21.1 on page 21.4 in their student manuals. A copy is included at the end of this lesson plan, along with instructions that students don't have in their manuals. Allow 30 minutes maximum for this activity. Allow 2 - 3 minutes for each student to complete each exercise.

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SUMMARY:

There are three different roles that a fire officer might assume, depending on the size and complexity of the incident. The investigative role is used for those incident where nothing is showing upon arrival and the officer must do some checking to determine what prompted the emergency call. When the incident is one which can be handled by a single company, the fire officer will function as a company member. Anything larger will generally require assuming the command role. However, there are exceptions to these guidelines. The fire officer must be able to determine where he or she will do the most good, while still ensuring that basic command functions are addressed.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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ACTIVITY SHEET #21.1

Assignment Sheet / Instructor Notes

This exercise requires considerable set up effort by the instructor, but can render a number of valuable learning experiences to the students:

1. Introduction to the simulator
2. Application of skills developed in the Fireground Operations section of this course
3. Orientation to simulator communication equipment

This exercise can be conducted in any manner deemed suitable by the instructor, but the following method has been proven successful:

1. Develop static fire slides for display, or utilize simulator equipment to broadcast smoke, flame, etc. onto a structure slide.
2. Provide students with necessary information regarding the scenario: time of day, level of response, resources, etc.
3. Set a time limit for completion of exercise (2-3 minutes).
4. Set student down at table in front of screen.
5. Project slide scenario onto screen.
6. Have student complete exercise worksheet.
7. At exercise conclusion, conduct constructive critique and discussion with the student and entire class.

Notes:

1. More than one student may participate in each exercise.
2. Item #5 of the worksheet may be deleted or changed to require a written response to be read at the end of the exercise.

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ACTIVITY SHEET #21.1

Role of the First-In Officer

The following exercise is designed to give you an opportunity to perform a size up and make some initial decisions regarding fireground operations. Your instructor will provide you with a scenario using either a fire simulator or slides. He or she will provide additional information concerning conditions found on arrival, resources available, level of response, time of day and any other factors which affect the scenario. Your instructor will also determine how many students will work in each group and how long each group will have to complete the activity.

You will be asked to complete the worksheet on the following page based on the scenario provided. The worksheet addresses the following questions:

1. Can you handle the incident with available resources?
2. Which strategic mode of attack is recommended?
3. What are your initial strategic objectives?
4. What role would you personally assume?
5. What information would you include in your initial report of conditions?

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Fireground Operations Worksheet

1. Can you handle the situation with available resources? (Check one.)

   [ ] Yes

   [ ] No

   [ ] Undetermined

2. Which strategic mode of attack is recommended? (Check one.)

   [ ] Offensive

   [ ] Defensive

   [ ] Combination

3. What are your initial strategic objectives?

   a. _____

   b. _____

   c. _____

4. What role would you personally assume? (Check one.)

   [ ] Investigative

   [ ] Company Member

   [ ] Command

5. What information would you include in your initial report of conditions?

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TOPIC: **Company Operations**

TIME FRAME: :15

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will describe the primary functions of engine and truck companies, and identify those functions normally assigned to truck companies which are vital to successful fireground operations.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 22.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 22
Richman, *Engine Company Fireground Operations*
Richman, *Truck Company Fireground Operations*

PREPARATION:

Fire apparatus is designed and staffed to accomplish various operations and tasks required on the fireground. Traditionally these operations/tasks have centered around trucks and engines, although there are specialty units designed to cope with unique problems. Fire officers must be familiar with the operational capabilities of each.

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PRESENTATION | APPLICATION

Company Operations

Page: SM 22.1

Instructor Note:
Advise students that this information is general in scope, and that each jurisdiction may vary slightly.

I. Engine Company Operations

A. The engine is usually designed around the pump

Question:
What are the functions typically associated with engine companies?

B. Engine company operations are centered around pumping and related activities

1. Search and rescue
2. Applying water
   a) Exposure protection
   b) Confinement
   c) Extinguishment
3. Utilizing built-in fire protection systems
4. Overhaul

Instructor Note:
Point out that these are not necessarily listed in order of priority.

C. The engine company has primary responsibility for:

1. Laying supply lines
2. Advancing and setting up attack lines or master streams

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PRESENTATION	APPLICATION
II. Truck Company Operations	
	Question: What are the functions typically associated with truck companies?
A. Truck operations may or may not involve application of water	
1. May provide elevated streams	
B. Common truck companies operations:	
1. Rescue	
2. Ventilation	
3. Laddering evolutions	
4. Forcible entry	
5. Control of utilities	
6. Salvage and overhaul	
7. Determining fire extension	
	Instructor Note: Point out that these are not necessarily listed in order of priority.
III. Relationship Between Engine & Truck Company Operations	
A. Effective suppression efforts require the combination of both engine and truck work	
	Question: What are some examples of how engine and truck companies must work together?
B. Examples of working together:	
1. Vertical ventilation by truck companies:	
a) Creates a more tenable atmosphere for search and rescue or suppression	

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PRESENTATION	APPLICATION
b) Greatly reduces risk of flashover or backdraft	
2. Horizontal ventilation by engine companies:	
a) Will reduce time that truck companies need to spend on a roof	
3. All companies must coordinate application of water to avoid endangering other crews	
4. All companies must warn one another when:	
a) They see signs of danger	
b) Their operations might endanger others	
C. Individual crews must work together as a team	
D. Engine and truck company responsibilities may overlap	
1. Firefighters may take on other activities when:	
a) Resources are not available	
b) A company needs assistance	
c) Staffing is limited	
2. Engines and trucks may be designed to permit these overlapping functions	
a) Engines carry some truck equipment	
b) Trucks may have limited pumping capabilities and tank water	
E. Importance of both companies	
1. Fire officers must be careful not to:	
a) Develop tunnel vision	
b) Overlook the contributions of other companies	
2. Engine company operations generally take precedence for fire extinguishment	

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PRESENTATION | APPLICATION

3. Truck company operations may take precedence:

   a) Vertical ventilation to:

      1) Prevent a backdraft

      2) Permit hose line advancement

   b) Placing ground ladders for:

      1) Rescue

      2) Hose line placement

   c) Salvage in occupancies with high content value

   d) Obtaining an aerial view of the fire's growth and extension

4. "Taking precedence" does not mean without due regard for safety

   a) A truck company should not be on the roof venting directly above the fire without first:

      1) Sounding the roof

      2) Traveling over main structural members

      3) Monitoring fire conditions

      4) Coordinating with fire attack crews

F. The fire officer must:

1. Understand roles of engine and truck companies

   a) How those responsibilities are interrelated

2. Be able to recognize when resources are inadequate to perform specific functions

3. Be ready to assign personnel different tasks as needed

Instructor Note:
Refer students to the Review Questions on page 22.3 in their student manuals.

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SUMMARY:

Most fireground operations center around engine and truck companies. There are different functions generally associated with each, but there is often overlap between the two. Fire officers must be familiar with the primary responsibilities of engine and truck companies, and how the various responsibilities are interrelated.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Determining Resource Requirements**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will utilize the basic formula for determining gpm flow requirements for a given structure, and identify the three factors which must be analyzed and considered in addition to the gpm flow requirements when determining resource needs.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 23.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 23
NETC, *Incident Command Student Manual*
Clark, *Firefighting Practices and Principles*

PREPARATION:

At every fire emergency, the fire officer in charge must make a determination of the resources that will be required to control the incident. One very critical resource is fire flow. The officer must be able to quickly calculate how much water is needed to extinguish the fire, and what resources will be required to deliver that water.

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PRESENTATION | APPLICATION

Determining Resource Requirements

Page: SM 23.1

I. A Quick Field Formula for Calculating Fire Flow

A. The need for a quick, easy formula

1. Previous chapter provided information on how to calculate fire flow for pre-fire plans

2. Many formulas are available:

a) Exact, precise desktop types

b) Field estimates

c) ISO system

3. These formulas won't help during emergency if:

a) Building hasn't been pre-planned

b) Pre-plan isn't immediately available

4. Need "quick and dirty" formula that gives reasonably accurate fire flow *right now*

Question:
What "quick and dirty" formula can be used in the field?

5. The formula:

Instructor Note:
Refer students to the following illustration on page 23.1 in their student manuals.

$$\text{GPM} = \frac{\text{Cubic Feet of Area Involved}}{100} \times \text{\% of Involvement} \times \text{Fuel Load Factor}$$

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B. Calculating Cubic Feet of Area Involved

1. Cubic footage is calculated by multiplying:

   a) Length

   b) Width

   c) Height

2. Simplify by rounding off numbers

Question:
How are the numbers for length, width and height rounded off?

   a) Length and width are rounded off to even numbers that are easy to work with

      1) Examples:

         - 100' x 40' is rounded off to 100' x 50' to come up with 5000 square feet

         - 90' x 120' could be rounded off to 100' x 100' even though the square footage is actually a little bit more

   b) Height is expressed in 10 foot increments

      1) A single story structure with a flat roof is approximately 10' high

      2) 20' is used to calculate height of a single story dwelling with a high peaked roof

3. Cubic footage is then divided by 100

   a) The number 100 is a constant

C. Calculating Percent of Involvement

Question:
How should percent of involvement be calculated?

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1. Percent of involvement in increments of 25%
   a) 1/4
   b) Half
   c) 3/4
   d) Fully involved
2. Multiply by factors of:
   a) .25
   b) .50
   c) .75
   d) 1.00

D. Calculating Fuel Load Factor

Question:
How are fuel load factors determined?

1. Fuel load factor is based on occupancy type:

Instructor Note:
Refer students to the table on page 23.2 in their student manuals.

   a) Light load = 1
      1) Examples:
         - Dwellings
         - Apartments
         - Offices
   b) Moderate load = 2
      1) Examples:
         - Mercantile
         - Factories

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PRESENTATION | APPLICATION

- Shopping centers

c) Heavy load = 3

1) Examples

- Refineries
- Warehouses
- Bulk plants

2. Can be adjusted as needed

a) A house packed with materials might be considered moderate instead of light

b) This fire will need more water than normal

Question:
How are multiple stories calculated?

E. Calculating Multiple Stories

1. Calculations based on height of floor(s) involved or threatened

a) Not entire structure

F. Estimate of gpm required

1. To determine fire flow in gpm

a) Take cubic footage of structure

b) Divide by 100

c) Multiply by percent of involvement

d) Multiply by fuel load factor

2. This is the *minimum* gpm needed

a) If fire flow is applied efficiently

3. Increase gpm is problems are anticipated

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PRESENTATION | APPLICATION

Page: SM 23.2

II. Resources Required to Deliver Needed Fire Flow

A. Not sufficient just to calculate fire flow

1. Need sufficient resources to deliver water

a) Pumping capabilities of responding apparatus

b) Personnel

B. Estimating required resources

1. As a rule of thumb, every firefighter should be able to supply 80 to 100 gpm

2. A four person engine company will deliver approximately 500 gpm at a working fire

3. Accuracy of estimates

a) Estimates provide slightly different results

b) Either can be used as a guide for determining:

1) Number of personnel

2) Fire apparatus

4. Estimates are for fire flow only

5. Additional resources needed for other activities:

a) Rescue

b) Exposure protection

c) Ventilation

d) Salvage

e) Crowd control

C. Remember it takes time to get resources on scene

1. All operations take time

a) Summoning resources

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PRESENTATION | APPLICATION

b) Response time

c) Receiving instructions

d) Laying lines and getting water to the nozzle

2. Additional engines should be requested early

Page: SM 23.3

III. Planning and Practice

A. Many questions regarding resource requirements can be answered prior to the emergency

B. Pre-plans should include information about:

1. Fire flows

2. Response times

3. Access routes

4. Water supplies

C. Info not developed ahead of time must be determined during size-up

D. Practice helps determine resource requirements

1. Use department SOPs

2. Practice should be varied

a) Individually as single companies

b) Part of multi-company drills

c) Simulating conditions that might be expected at target hazards in the community

Instructor Note:
Refer students to the Review Questions on page 23.4 in their student manuals.

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SUMMARY:

The fire officer has an important responsibility to determine resource requirements at a fire emergency. He or she must be able to quickly calculate required fire flow in the absence of a detailed pre-fire plan. And, he or she must be able to determine what resources will be required to deliver the needed fire flow.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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TOPIC: **Apparatus Placement**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify a basic rule of thumb for placing engines and trucks, describe factors which may affect placement of apparatus, and identify guidelines for positioning apparatus.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 24.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 24
Richman, *Engine Company Fireground Operations*
Richman, *Truck Company Fireground Operations*
Coleman, *Management of Fire Service Operations*

PREPARATION:

The positioning of apparatus has a direct influence on the overall fireground operations. Proper placement will ensure the safety of response personnel and facilitate suppression activities. Incorrect placement can seriously hamper an officer's ability to achieve specific goals and objectives. The responsibility of placing apparatus in the proper position rests with both the Driver/Engineer who must know the capabilities of his or her vehicle, and with the Incident Commander who must orchestrate the entire operation.

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PRESENTATION | APPLICATION

Apparatus Placement

Page: SM 24.1

I. Rule of Thumb for Placement

A. Many details impact placement of apparatus

Question:
What guideline can be used to position apparatus?

B. Rule of thumb based on primary functions of engine and truck companies

1. First-in engine positioned at front of emergency

   a) Start attacking fire

   b) Vantage point to establish initial command post

2. Second-in engine at rear of emergency

   a) By positioning engines front and rear:

      1) Both crews can better protect:

         - All four sides of building
         - Nearby exposures

      2) Both officers can better assess entire perimeter

3. First-in truck positioned where aerial capabilities may be required

   a) Generally in front

   b) Will depend on conditions:

      1) Rescue

      2) Ventilation

      3) Aerial attack

   c) Greatest need will dictate proper placement

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PRESENTATION	APPLICATION
	Instructor Note: Refer students to Information Sheet #24.1 on page 24.4 in their student manuals. It is an article called "Leave Room for the Truck." A copy is included at the end of this lesson plan.
II. Factors Affecting Placement	**Question:** What are some of the key factors affecting placement of apparatus?
A. Many factors affect placement of engines and trucks	
1. Emergency itself is biggest factor	
a) What type of emergency is this?	
1) Structure fire	
2) Wildland fire	
3) Building collapse	
4) Explosion	
b) How large is emergency?	
1) Placement more critical on large incidents	
2. Access to and from site	
a) Positioning apparatus is more difficult:	
1) On narrow streets	
2) In "urban interface" areas	
b) May not be possible to get close enough for convenient operations	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
3. What's happening on all six "faces"? a) Consider: 1) All four sides 2) Top 3) Bottom b) Is there a need to cover another location? c) Is there better access from another direction?	
4. Safety	**Question:** What are some of the safety considerations that impact placement?
a) Positioning in an unsafe area may result in: 1) Vehicles damaged or destroyed 2) Firefighters killed or injured b) When there's a possibility of danger, apparatus must be positioned: 1) At a safe distance 2) Facing direction of escape c) Possible hazards include: 1) Structural collapse 2) Explosion 3) Rapid escalation of incident 4) Being overrun by fire 5) Overhead electrical wires	
4. Strategic goals and tactical priorities a) Placement must be considered early in size-up	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) Consider apparatus responding

1) Number

2) Type

3) Capability

c) If resources are limited, apparatus must be positioned for maximum flexibility

5. Department policies

6. Pre-fire plans

Page: SM 24.2

III. Additional Guidelines

Question:
What are some additional guidelines that might be used?

A. Apparatus placement should be included in pre-plans of target hazards

1. May vary depending on emergency

2. Pre-planning allows decisions to be made in calm environment

3. Consider important factors:

a) Potential hazards

b) Access to site

c) Access to fire protection equipment

B. Avoid "trapping" units

1. With other apparatus

2. With hose lines

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PRESENTATION	APPLICATION
C. Apparatus should be positioned in general area of tactical objectives 1. Minimize distance firefighters have to walk or carry equipment 2. Parking too far away: a) Slows down operations b) Tires out firefighters D. Once units are positioned they tend to become anchored 1. No longer as mobile a) Particularly trucks 2. Trucks require more room for aerial operations 3. Apparatus should not be positioned and set up until fire officer is sure of where to locate them E. IC should provide basic directions about positioning 1. Should not try to park apparatus for company officers 2. Company officer and driver know capabilities of their apparatus and will park accordingly F. IC should leave incoming units unassigned for indefinite periods of time 1. They will have tendency to find their own position and assignment 2. Unassigned units should be placed in "staging" a) Apparatus should not be allowed to stack up at front of emergency or at command post G. When personnel are needed, but not apparatus, staging may be further away 1. Example: high rise incident	

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PRESENTATION	APPLICATION
2. Mutual aid companies may need someone to physically guide to them to staging a) If they are not familiar with the area, trying to direct them by radio may be confusing H. IC must think about keeping apparatus in reserve as long as they may be needed 1. Staged units should not be released too early	**Instructor Note:** Refer students to the Review Questions on page 24.3 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

The positioning of apparatus is important to the success of any fireground operation. First and foremost, apparatus must be placed in a position where personnel will be safe from any potential hazards on the scene. Engines and trucks must be positioned where they can best accomplish the tactical objectives they've been assigned. This will vary depending on the incident, access to the area, and the resources available. Positioning cannot be haphazard. It must be carefully thought out by the Incident Commander and the Driver/Engineers in charge of each vehicle.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

INFORMATION SHEET #24.1

Leave Room for the Truck

by Joseph A. McNeece

Aerial ladders are raised at fires primarily to effect rescues, to ventilate and to provide a means for operating streams or advancing hose lines. Considering these three uses, we can set forth some methods and considerations for using the aerial on the fireground.

Save the front of the building for the aerial. Place pumping apparatus so that it does not obstruct access. You can stretch more hose, but you can't stretch more apparatus.

Rescue

A rescue via an aerial ladder is a serious task. There is no room for failure caused by inefficiency or poor judgment. Members of your department actually or potentially responsible for operations involving aerial ladders should know all that is to be known on the subject.

Whenever rescues are attempted by aerial ladders, the officer in charge of the apparatus is directly responsible. Sound, quick judgment and training is required because human life is in the balance and time is a pressing element. The firefighters who are assigned to the "truck company" should be alert in anticipation of aerial ladder work. Driver operators should listen and communicate with the officer in charge as to what action is to be taken and advise whether it can be done. Driver operators are responsible for proper positioning with a minimum of maneuvering. The aim is the successful accomplishment of the rescue. Other factors to consider when positioning the truck are number of stories, occupancy, set backs, long and short frontage, and obvious rescue (victims at windows, etc.).

Ventilation

When placing the aerial for ventilation, remember that it may be the only means of escape for the ventilation team. If conditions become untenable and dangerous, the aerial must be where they left it. Always place the ladder 4 to 5 rungs over the edge so that it can be located. Paint the tip! The truck officer may consider the use of adjoining buildings if possible for ventilation work.

Streams

The use of the master stream device indicates a need for access to more than one point in the building. Place the truck on a corner to allow use on at least two sides. What is easier: advancing hose up and down hallways and stairs or up an aerial ladder? The initial hose line may be advanced via the interior of the building, but consideration should be made to take a second line via the aerial ladder.

Summary

The truck company is a specialized piece of equipment; use it to its full potential. How can you find out this potential? The answer is multiple company training; engine and truck. It's very important that you anticipate the use of the truck company at all fires. It's not an expensive taxi cab.

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Remember, position is very important. So, leave room for the truck!

Reference: WNYF Magazine, New York City Fire Department, Truck Company Fireground Operation - Richman.

RETIRED CURRICULUM

TOPIC: **Initial Attack**

TIME FRAME: :30

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify basic guidelines for initial fire attack including hose line size and placement, direction of attack, need for vertical ventilation, and the results and benefits of quick extinguishment. The student will also identify primary construction hazards, primary content hazards and key firefighting methods for specific occupancies.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 25.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 25
Commanding the Initial Response, National Fire Academy Student Manual

PREPARATION:

The actions taken in the early stages of the fire have a significant impact on the rest of the incident. The fire officer must be familiar with basic guidelines for a successful initial attack. This includes a knowledge of primary hazards one can expect to find in different types of occupancies.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Initial Attack

Page: SM 25.1

I. Basic Rules of Initial Attack

Instructor Note:
This information is based on an article entitled *"Improve Initial Fire Attack by Following Basic Rules"* written by Dick Sylvia. It was published in the July, 1975 issue of Fire Engineering.

Question:
What dictates placement of the first hose line?

A. Life safety dictates placement of first line

1. Life safety is first priority

a) Firefighters

b) Civilians

2. If people are trapped, hose line is part of rescue

a) Protects victims and firefighters

b) Marks escape route

3. Deployment of lines must be done in conjunction with ventilation

B. Keep line between fire and occupants

1. Buy time to safely get occupants out

C. Control stairways

1. Stairs are a vital link

Question:
Why is it important to control the stairways?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Primary means of egress a) Elevators not safe b) If stairwells are lost, more extreme measures may be needed: 1) Taking people down ladders 2) Helicopters for rooftop evacuations c) These measures: 1) Are extremely slow 2) Require extensive resources 3. Most efficient means for getting personnel and equipment to fire floor 4. Stairwells are path for fire extension a) Convection can carry fire to distant floors b) Particularly a problem with: 1) Unenclosed stairwells 2) Enclosed stairwells if doors are open	
	Page: SM 25.2
D. If fire is burning out a building, keep it moving in same direction	**Question:** How would you determine which direction to push a fire?
1. Push a free burning fire that has already vented out the building in the same direction 2. Trying to force it back: a) Is slow and difficult b) May push fire toward uninvolved areas 3. Avoid endangering exposures	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
E. Do vertical and/or horizontal ventilation as appropriate	
1. Type of ventilation depends on:	
a) Type of structure	
b) Condition and location of fire	
2. Small fire may only need opening windows	
3. Large fire or attic fire requires cutting hole in roof	
4. Determine how to best remove smoke and heat, while minimizing damage to the structure	
F. If hose line is not advancing	
1. Interior attacks depend on advancing hose lines	
a) If hose is stalled fire will grow	
b) No such thing as a standoff	**Question:** What things may slow or stop an advancing line?
2. Things that may stop or slow an advancing line	
a) Excessive heat and smoke	
1) Ventilation needed to progress further	
b) Limitations of operations or equipment	
1) Hose too short	
2) Hose too heavy for personnel available	
3) Hose too small for required fire flow	
4) Hose tangled somewhere	
5) Engineer having trouble delivering required volume or pressure	
3. Determine problem and keep line advancing	
G. Use appropriate size hose from beginning	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Question:
What guidelines should be used to determine appropriate size lines?

1. Seldom appropriate to start small and work up
2. Large hose stream applied immediately is:
   a) More effective than a small line
   b) Safer for firefighters
3. If resources are limited it may be necessary to start with smaller lines
   a) Example: working fire in a remote area with:
      1) Limited water supplies
      2) Extended response time for other units
   b) Can be dangerous if tank is emptied before more water is available
      1) Firefighters may be too close to fire

H. Extinguishing fire can minimize other problems

1. Normally rescue and exposure protection are higher priorities
2. Extinguishing fire can minimize other problems
   a) Fire in a high life-hazard occupancy (hospital or nursing home)
      1) Serious rescue problem
      2) Extinguishing fire quickly can:
         - Eliminate need for rescue
         - Buy time to safely relocate patients to uninvolved areas
   b) Reduces need for exposure protection

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Instructor Note: Refer students to the Review Questions on page 25.3 in their student manuals.
	Instructor Note: Refer students to Information Sheet #25.1 (Considerations for Initial Attack) on page 25.4 in their student manuals. A copy is included at the end of this lesson plan.

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SUMMARY:

A successful initial attack can make a significant impact on the overall operations at an incident. The fire officer must understand where to place the first hose line for the greatest protection of life and property, and must be able to choose the appropriate size hose line both for effectiveness and for safety of the firefighters. He or she must also recognize how actions taken in the first few minutes affect activities that may be required later.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

RETIRED CURRICULUM

INFORMATION SHEET #25.1

Considerations for Initial Fire Attack

The following information is adapted from the National Fire Academy's student manual for Incident Command. It provides an overview of primary hazards found in different types of occupancies, as well as key firefighting guidelines for initial attack.

Residential Occupancies		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Open stairways or stairways blocked open. Lack of proper exiting. Fast fire spread in wood frame building. Buildings too close together. Adjoining automobile garages. Large framed attic areas. Balloon construction in older homes (approx. pre-1915). Wood shingle roofs or siding. Electrical systems. Elevators.	Decorative material. Carpeting. Furniture and clothing. Vehicles and stored fuel in garage. Trash and combustibles (like paints).	Rescue occupants. Place a line between the occupants and the fire. Support automatic systems. Move an interior attack line (1 1/2" or 1 3/4") with a fog nozzle to the seat of the fire. Gain control of stairways. Prevent vertical and horizontal spread. Ventilate. Usually horizontal venting will do. Check for attic fire and other hidden fire.
A single family house fire can usually be considered no more than a 250 gpm fire. A first alarm assignment should be able to handle the fire. It should only be necessary for one engine to pump. The second-in engine can be left free to respond to other alarms. There is probably little need to have two engines pumping at a house fire unless a relay is needed.		

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Places of Assembly (churches, halls, theaters)		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Exit problems (blocked, poorly marked or insufficient). Fast fire spread if a wood frame building. Large undivided areas in the building. Exhaust ducting systems for cooking operations. Ducting for heating and ventilation. Lightweight or unstable roofs.	Decorative materials. Furnishings. Drapes and curtains.	Get people out. Get a line between the occupants and the fire. Mount a fast attack on the seat of the fire. Open the exits. Ventilate. Support the automatic systems. Use large hand line (2 1/2") or monitors to control a spreading fire in a large undivided area with high ceilings.

Stores (small or large shopping centers and malls)		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Common attics and hanging ceilings. Balconies and lofts. Basements. Lightweight or unstable roofs. Large undivided areas. Fire separations which have been pierced. Fire doors blocked open. Rear doors heavily secured. Air handling systems.	Hazard Class: Moderate. Various chemicals in large quantities (pharmaceutical drugs, pesticides, dry pool chlorine, acids, paint thinners, barbecue lighter fluid, solvents, paints). Aerosol containers. Large amounts of clothing. Large amounts of plastic products. Rack storage of combustibles. Trash and boxes in storerooms.	Get the people out. Support the automatic fire protection systems. Stop horizontal and vertical spread. Ventilate. Get hand lines to the seat of the fire. Get lines into the adjoining occupancies. Use master streams if the fire is beyond the ability of hand lines. Be aware of high levels of toxicity from combustion of various products, and of possible exploding pressurized containers. Be alert for flashover in large retail sales areas.

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Office Buildings		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Open stairways. Elevators (passenger and cargo types). Basement storage areas. False facades on front of building, and framed out areas resulting from remodeling of old buildings. Lack of adequate exits. Air handling systems. Lightweight or unstable roofs.	Furnishings. Carpets and drapes. Valuable records. Paper products and record storage.	Get occupants out. Support the automatic fire protection systems. Make a fast attack with an interior hand line to the seat of the fire. Gain control of stairways and vertical shafts. Stop vertical and horizontal spread. Ventilate. Remove or protect business records. Be aware of construction faults in the building.

Institutions (school, hospital, nursing home, jail)		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Fire doors blocked open. Open stairways. Locked doors in jails. Hospital patient room doors blocked open. Air handling systems. Heavy facades and "gingerbread" decorations on fronts of buildings. Elevators and vertical shafts. Roofs and floors of heavy timber or concrete construction (hard to ventilate).	Hazard Class: Low Life hazard: non-ambulatory. Oxygen or anesthetic gas system hazards. Sterilizing equipment fire hazards. School records. Linen and supply rooms. Heating and electrical systems in older buildings. Mattresses and furniture.	Remove occupants from building or ensure their safety. Be sure exits are unlocked and unblocked. Isolate the fire by closing fire separation doors. Support the automatic fire protection systems. Get lines between the fire and the occupants. Usually 1 1/2" or 1 3/4" lines will suffice. Ventilate. Stop horizontal and vertical spread. Remove or protect valuable records.

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Industrial Occupancies (factories, warehouses, grain elevators)		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Lightweight or unstable roofs. Truss construction. Fire walls with unprotected openings. Fire doors blocked open. Large undivided areas. Heavy machinery on upper floors causing excessive weight and vibration. Metal buildings having no fire resistance. Grease pits, mechanic's pits, sumps. Cargo elevators with open shafts. Open stairways. Balconies and lofts. Conveyor systems piercing fire walls. Absence of fire separation between offices and factory area.	Hazard Class: Varies but is generally moderate to high. Stock or other contents which can absorb water, expand and push out walls, overload floors, or cause collapse and obstruct firefighting. Chemicals and hazardous materials. Rack storage and high piled stock. Dust and finely divided particles which can cause dust explosion. Process hazards.	Support fire protection systems. Take interior hand lines to the seat of the fire. For small fires use 1 1/2" or 1 3/4" lines. For medium involvement or fast moving fires use 2 1/2" lines. Cut off vertical and horizontal fire spread. Ventilate to channel the fire and clear the atmosphere. Use portable monitors in areas of heavy or extensive involvement or untenable locations. Reinforce untenable locations with more lines if the position is strategic and successful against the fire. Resort to exterior master streams if defensive operation is indicated. Be alert for falling stock, failure of metal racks, etc. Be alert to signs of potential building collapse or overloading of floors and roofs. Prevent dust explosions by using fog streams to avoid stirring up and dislodging dust and finely divided particles.

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Fuel Facilities (gas, petroleum, gasoline storage)		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Pressure vessels. Piping. Liquid tanks. Cylinders. Metal building. Loading docks.	Hazard Class: High to Extreme Petroleum products (gas and liquid) Hazardous chemicals.	Evacuate exposed humans. Cool exposed containers with heavy fog streams (2 1/2" or master stream). Shut off source of fuel supply. Use heavy fog streams on the main body of the fire and the involved containers from a safe location. Use the monitors or remotely controlled elevated nozzles. Keep the firefighters in a safe location and off of aerial ladders or platforms due to the potential of explosion occurring at a major fire. Use light water or other foam product to extinguish the fire. Flush, direct and contain the flow of spilled product. Plug leaks if possible.

RETIRED CURRICULUM

Construction Sites		
Primary Construction Hazards	**Primary Content Hazards**	**Key Firefighting Methods**
Exposed, unprotected construction members. No usable fire protection systems. Danger of early collapse. Fast fire spread in wood construction with large amount of flames and heat. Access to upper floors limited by lack of completed stairways. Quick horizontal and vertical spread and quick involvement of exposures.	No content hazards.	Apply heavy fog streams to cool exposures and darken the fire. Be aware of potential collapse. Stay out of, and away from structures. Be careful where apparatus are spotted so they are not overrun by fire. Treat the fire as a lumber yard fire if in wood construction.

As a summary, it might be helpful if one could associate key words with the occupancy type and hazard presented. The following chart offers such an association pattern. It is not complete in and of itself, but may help trigger other responses.

Occupancy	Load	Content Hazard Class
Residential	Life	Low
Assembly	Life	Low
Store	Stock	Moderate
Office	Records	Low
Institutions	Non-Ambulatory	Low
Industrial	Chemicals	Moderate to High
Fuel Facility	Explosion	High to Extreme
New Construction	Collapse	High

MANAGEMENT SKILLS

26. Management Overview
27. The Fire Service
28. The Company Officer
29. Pressure of Command
30. Performance Standards
31. Levels of Emergency
32. Decision Making
33. Communications
34. Management by Objectives
35. Divisions of Fire Fighting
36. Command/Control Components

RETIRED CURRICULUM

TOPIC: **Management Overview**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will provide a basic definition of "management," identify the four functions of management, and distinguish between technical and managerial skills.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 26

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 26
Coleman, *Management of Fire Service Operations*
NFPA, *Management in the Fire Service*

PREPARATION:

The fire officer fulfills numerous roles in his or her job, and is charged with widely diverse responsibilities. In any duty cycle, he or she may be required to assume a dozen different roles including Incident Commander, company member, or fire prevention inspector. Regardless of the role, the company officer is the first level of management within the department and must have an understanding of the responsibilities associated therein.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Management Overview

Page: SM 26.1

I. Introduction

A. The term "management" is often used with little thought given to the meaning of the word

Question:
What does the term "management" mean?

B. Defined as the "technique of accomplishing work or obtaining results through people"

C. Example:

1. At a fire, Battalion Chiefs provide direction to captains, who in turn direct their firefighters

Instructor Note:
This chapter provides an overview to the concept of management. Specific principles and practices are discussed in later chapters.

II. Management Concepts

A. 5 management concepts are important to the fire officer:

Question:
What are the 5 basic concepts that are of particular importance to fire officers?

1. A manager must work with and through others

a) They cannot do everything themselves

2. Managers are often less "hands on" oriented than the people they supervise

a) Strengths are in managing resources (people) and the project as a whole

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) Responsible for how the team's efforts fit into the "bigger picture"

c) Concerned with the overall goal rather than individual details

d) "Hands on" activities are delegated to the crew

3. Managers are often more comfortable performing manipulative tasks than managerial functions

a) May feel it's easier to do something themselves than to assign the task to others

1) Immediate results

2) Task is done the way they want it done

b) Some don't like delegating for fear of resentment

c) Supervision will suffer if managers get too involved in "hands on" activities

d) Referred to as "reverting to the tailboard"

4. The higher the level of management, the less important manipulative skills become

a) Examples:

1) IC doesn't have to be a good firefighter to successfully direct fire scene operations

2) Company officer doesn't have to be proficient at operating a pump

b) NFPA recommends fire officers have skills equivalent to a certified Firefighter II

c) Staffing levels often dictate required technical expertise

1) A company officer in a two person engine company is going to end up on a nozzle

RETIRED CURRICULUM

PRESENTATION | APPLICATION

5. For objectives to be met effectively, managers must manage

   a) When management is lacking confusion and inefficiency are often the result

Page: SM 26.2

III. Functions of Management

A. Management consists of four basic functions

Question:
What are the 4 basic functions of management?

1. Planning
2. Organizing
3. Leading
4. Controlling

Instructor Note:
Refer students to Table 26.1 on page 26.2 in their student manuals for examples of management functions. Ask them to identify other examples from their own personal experience.

B. Planning

1. At an emergency scene:

   a) Size-up

   b) Anticipating potential problems

   c) Anticipating resources needed

2. In non-emergency conditions:

   a) Analyzing department needs

   b) Developing a plan to address those needs

RETIRED CURRICULUM

PRESENTATION

c) Example:

1) Making up a duty roster

C. Organizing

1. Coordinating resources and activities

2. Examples:

a) Creating divisions

b) Assigning work crews

D. Leading

1. Directing the efforts of others

2. Setting an example for other folks

3. Examples:

a) Setting objectives

b) Providing guidelines to work crews

E. Controlling

1. Measuring and regulating results

2. Examples:

a) Allotting resources

b) Soliciting progress reports

c) Conducting performance evaluations

F. Fire command is largely a management exercise

1. Management skills aren't unique to the fire service

2. Manager accomplish work or obtain results by directing the activities of others

APPLICATION

Instructor Note:
Refer students to the Review Questions on page 26.3 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

In order to properly fulfill his or her role as a manager, the fire officer must understand the basic concepts of management. A manager must work with and through other people. Managers are often less technically oriented than the people they supervise. They may sometimes be more comfortable performing technical skills than managerial ones. However, if objectives are to be met, managers must manage. Management consists for four basic functions; planning, organizing, leading and controlling. Each has applications both on and off the fireground.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **The Fire Service**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify at least four problems currently facing the fire service, compare the traditional and systematic methods of problem solving, and describe the systematic approach to problem solving.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 27.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 27
Coleman, *Management of Fire Service Operations*
National Commission on Fire Prevention and Control, *America Burning*
NFPA, *Fire Protection Handbook* (17th edition)

PREPARATION:

Each individual firefighter or fire officer is an integral part of the larger organization known as the fire service. It's important to understand the goals of this organization, the problems facing the fire service today, and how the fire service can effectively respond to these problems.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

The Fire Service

Page: SM 27.1

I. Introduction

A. Fire service consists of approximately 30,000 separate fire protection agencies

1. From larger paid departments to small rural districts

2. Most agencies are relatively small

B. Estimated number of fire service personnel in the U.S.

1. At least 200,000 career personnel

2. More than a million on-call or volunteer personnel

Question:
What is the overall goal common to all fire departments?

C. All have the same goal - protection of life and property

D. Most departments provide many other services

1. EMS

a) Many respond to twice as many EMS calls as fire alarms

2. Hazardous materials incidents

II. Problems Facing the Fire Service

A. Most departments are operated as separate entities

1. Managed independently

2. Decisions and policies implemented locally

B. Most departments face common problems

Question:
What are some of the common problems facing most fire departments?

RETIRED CURRICULUM

PRESENTATION | APPLICATION

C. Problems include:

1. Diminished revenues, compounded by inflation
2. Increased demands for service
3. Apathy and indifference from the public
4. Increasing number of arson fires
5. Exposure to hazardous materials
6. Increased growth in the community
7. Changing work ethic of newer employees
8. Changing hiring practices (equal opportunity)
9. Integration of women firefighters
10. Greater influence of labor organizations
11. Growth of private fire protection agencies

Instructor Note:
Ask students if they have anything to add to the list.

D. Fire service traditionally faced problems individually

1. Everyone seeking their own answers and solutions
2. Each problem viewed as a single entity unrelated to the others

E. "Systems approach" is more effective

Page: SM 27.2

III. The Systems Approach

Question:
What is meant by the systems approach?

A. Looks at the total picture to see how elements are interconnected

1. Identifies the overall problem and the individual components that contribute to it

RETIRED CURRICULUM

PRESENTATION | APPLICATION

2. Recognizes that each component affects others

3. Example: putting a man on the moon

a) Massive planning and coordination efforts

b) Required ten years and ten billion dollars

c) Resources all over the country were involved

d) Roles and contributions were different, but efforts were directed toward one common goal

B. The systems approach is the preferred method of problem solving

Question:
What are the major advantages associated with the systems approach to problem solving?

1. Two major advantages

a) Synergy from pooling resources often leads to more effective solutions

b) Possible to develop solutions that:

1) Positively impact other components, or

2) At least don't negatively impact them

C. Fire service can benefit from the systems approach by:

1. Identifying overall goals

2. Recognizing that all problems consist of numerous components

3. Recognizing that all resources and activities are related

Instructor Note:
Refer students to the Review Questions on page 27.3 in their student manuals.

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Instructor Note: Activity Sheet 27.1 (on page 27.4 in the student manuals) is designed to give the students an opportunity to take a closer look at how the systems approach to problem solving applies to the fire service. (A copy of that Activity Sheet is included at the end of this lesson plan.) Break the students in to groups of 3 - 5 people. Give them about 20 minutes to discuss the questions. Then, take a few minutes to discuss the results with the class as a whole.

RETIRED CURRICULUM

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SUMMARY:

There are a number of problems facing the fire service today. The best method for resolving those problems is to take systems approach that looks both at the overall problem and the individual components that contribute to it.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

ACTIVITY SHEET #27.1

The Systems Approach

The purpose of this exercise is to take a closer look at how the systems approach to problem solving applies to the fire service. It is designed to be done by groups of 3 to 5 people. Within your group, decide on a problem facing your fire department or the fire service in general. You may choose from the list on page 27.1 or come up with your own example. Take the next 20 minutes to discuss the following questions among the members of the group.

1. What is the overall problem?

2. What are some of the individual components within this overall problem?

3. What are some of the solutions your department(s) have implemented thus far?

4. How did these solutions impact other components? Was the impact positive or negative?

5. Did these solutions solve the overall problem?

RETIRED CURRICULUM

TOPIC: **The Company Officer**

TIME FRAME: :30

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the skills, knowledge and abilities essential to the company officer position; identify the direct relationships between organizational management and emergency scene management; and identify at least one obligation that the fire officer has to the public, the department, his or her crew, and to him or herself in both organizational and emergency scene management situations.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 28.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 28
NFPA 1021

PREPARATION:

If company officers are to fulfill the role of fireground commanders, they must posses certain skills, knowledge and abilities. They must be able to draw from experience; building on the positive ones and avoiding repeating mistakes from the negative ones. Further, they must recognize the managerial obligations of the command position. This is true regardless of the size of department or individual company, whether the department is paid or volunteer, or years of service within the department.

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The Company Officer

Page: SM 28.1

I. Skills, Knowledge and Abilities Required

Instructor Note: This section provides just a general overview of required skills, knowledge and abilities. Inform students that complete, detailed requirements can be found in various references such as local agency job descriptions, NFPA #1201, and state training or certification standards.

A. Skills

Question: What are skills?

1. Abilities acquired or developed by experience
2. Fire officer must be proficient in the use of tools to the level of a Certified Firefighter I and II
3. Though focused more on managing people and activities, some fire officers work side by side with their crews
   a) All must be familiar with the skills required of their firefighters

Question: What are some of the skills that a fire officer must possess?

4. Some skills are universal in the fire service:
   a) Fire suppression
   b) Operation of fire apparatus and equipment
   c) Emergency medical services

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d) Hazardous materials control and mitigation

5. The fire officer may also need to be proficient at:

a) Wildland firefighting

b) Heavy rescue techniques

c) Aircraft crash rescue and fire suppression

d) Working with special apparatus and equipment

B. Knowledge

Question:
What are some of the things that fire officers must be knowledgeable about?

1. Must be knowledgeable about topics specific to the fire service:

a) Fire chemistry and behavior

b) Fire control measures

c) Extinguishing agents

d) Fireground safety

e) Size-up procedures

f) Tactics and strategy

2. Must be familiar with topics specific to their jurisdiction:

a) Local building design

b) Construction and codes

c) Target hazards

d) Department policies and procedures

e) Resources available within the community

f) Mutual aid agreements

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PRESENTATION	APPLICATION
3. Must also be acquainted with:	
a) Basic supervision and management skills	
b) Characteristics of human behavior	
c) Team building techniques	
C. Abilities	
	Question: What are abilities?
1. The power, mental or physical, to accomplish something	
a) Usually implies doing it well	
	Question: What are some of the abilities that a fire officer must have?
2. The fire officer must be able to:	
a) Conduct a proper size-up	
b) Solve problems and make decisions	
1) Usually under considerable pressure	
3. Abilities common to any management position:	
a) Delegation	
b) Instill confidence in others	
1) Especially other crew members	
c) Communicate, listen and accept new ideas	
d) Motivate others	
e) Train others	
f) Share knowledge and experience	
g) Manage people and activities	

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Page: SM 28.2

II. Managerial Obligations

A. Detailed descriptions are available within various departmental documents:

1. Standard Operating Procedures (SOPs)
2. Rules and Regulations manuals
3. Operational memorandums
4. General and special orders
5. Mission or value statements

B. Obligations can be categorized into two classifications which are both closely related:

1. Organizational management
2. Emergency scene management

C. Success at fulfilling one positive effects the others

D. Failure to address one can negatively effect others

E. Examples:

1. Failure to provide proper leadership and direction may cause difficulty working as an efficient team
2. Making sound decisions under pressure will earn respect and loyalty off the fireground as well

F. Managerial obligations apply to various entities:

1. The public
2. The fire department
3. Your crew
4. Yourself

G. Managerial obligations apply to both:

1. Organizational management
2. Emergency scene management

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PRESENTATION | APPLICATION

Instructor Note:
Refer students to Table #28.1 on page 28.2 in their student manuals for highlights of key managerial obligations. Encourage them to add to this list.

H. Examples of Managerial Obligations:

1. To the public

   a) Organizational management

      1) Ensure efficiency in programs and activities

   b) Emergency scene management

      1) Eliminate threats to life and property

      2) Reduce and control the impact of emergencies as quickly as possible

2. To the fire department

   a) Organizational management

      1) Attain declared missions and goals

      2) Adhere to SOPs

      3) Develop and deliver programs

   b) Emergency scene management

      1) Adhere to emergency plans, disaster preparedness and SOPs

      2) Utilize resources efficiently

      3) Integrate actions and resources with the department's overall efforts

3. To your crew

   a) Organizational management

      1) Provide leadership and direction

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PRESENTATION	APPLICATION
2) Develop a positive working environment	
3) Develop individual and group skills	
b) Emergency scene management	
1) Look out for their safety	
2) Assign objectives	
3) Provide leadership and direction	
4. To yourself	
a) Organizational management	
1) Reinforce knowledge and experience; continue to learn	
2) Remain mentally and physically fit	
b) Emergency scene management	
1) Place yourself in a managerial position as soon as possible	
2) Recognize the effects of stress and implement appropriate coping mechanisms	**Instructor Note:** Refer students to the Review Questions on page 28.3 in their student manuals.

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PRESENTATION

APPLICATION

Instructor Note:
Refer students to Activity Sheet #28.1 on page 28.4 in their student manuals. (A copy is included at the end of this lesson plan.) Allow a maximum of 30 minutes for this exercise.

Break the class into groups of 3 to 4 people. Have each group, develop a list of specialty areas that a fire officer may evolve into during his or her career. Then have them indicate the skills that are involved in the development of these specialty areas. Have each group share their answers during a group discussion. Point out that a number of these skills will be further developed throughout their careers.

Instructor Note:
Refer students to Activity Sheet #28.2 on page 28.5 in their student manuals. (A copy is included at the end of this lesson plan.) They may want to do this as a homework assignment.

This is an opportunity for them to conduct a personal assessment of their skills, knowledge and abilities. Point out that while they will not be required to share these with anyone else, it may help them get more value out of this and other classes they may take in the future.

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SUMMARY:

The fire officer must possess certain skills, knowledge and abilities. Some are specific to the fire service. Others apply to managers in any profession. The fire officer must also be familiar with the specific managerial objectives that apply to organizational management and emergency scene management.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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ACTIVITY SHEET #28.1

Development of Specialty Areas

Break into groups of 3 to 4 people. Within your group, develop a list of specialty areas that a fire officer may evolve into during his or her career. Indicate the skills that are involved in the development of these specialty areas. Be prepared to discuss your answers with the rest of the class. (Note: a number of these skills will be further developed throughout your career.)

Specialty Areas	Skills Required

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ACTIVITY SHEET #28.2

Skills, Knowledge and Abilities

Periodic self-assessment will assist any fire officer in determining areas that may require personal development. Take a few minutes to identify what you feel are your personal strengths and weaknesses in the areas of skills, knowledge and abilities. This is your personal assessment. You do not need to share them with anyone else.

Area	Strengths	Weaknesses
Skills		
Knowledge		
Abilities		

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TOPIC: **Pressure of Command**

TIME FRAME: :45

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz.

Behavior: The student will define stress; identify common causes of stress and distress; identify signs and symptoms of stress, as well as ways in which stress may impact fireground operations; identify effective coping mechanisms; and define "critical incident stress."

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 29.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 29
NFPA, *The Almanac*
IFSTA, *Fire Department Company Officer*, 2nd Edition

PREPARATION:

All personnel involved in an emergency situation will experience some degree of anxiety or stress. The fireground commander is especially prone to this. The stress associated with command functions can have an adverse effect upon the commander's performance. Therefore, it's extremely important for the fire officer to understand what causes stress, the effects it can have on people, and techniques to minimize that stress.

RETIRED CURRICULUM

PRESENTATION	APPLICATION
Pressure of Command	
	Page: SM 29.1
I. Stress	
	Question: What is stress?
A. Stress is an adjustment to change	
1. Good stress (eustress)	
2. Bad stress (distress)	
B. Stress is a normal reaction to:	
1. Change	
2. Excessive demands on the mind or body	
	Question: How can stress benefit a person?
C. Benefits of stress:	
1. Heightened awareness	
2. Can perform more quickly and efficiently	
a) Mentally and physically	
D. Distress occurs when firefighters can no longer cope effectively	
1. Mental and/or physical exhaustion	
2. Unable to function at that level	
E. Stress can be acute or chronic	
	Question: What is the difference between acute and chronic stress? Which is most harmful?

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PRESENTATION	APPLICATION
1. Acute a) Short term b) Response to a specific incident or event c) Usually disappears when stimulus is removed 2. Chronic a) Longer duration b) Numerous stimuli from different sources c) Individual may feel helpless to deal with overwhelming pressures that won't go away d) Most often linked to health problems: 1) Heart disease 2) Ulcers 3) Migraines 4) Insomnia 5) Cancer	
F. A variety of stimuli can trigger stress	**Question:** What are some things that can cause stress in any person?
1. Emotions common to all people: a) Fear b) Anger c) Exhaustion d) Frustration e) Excessive demands	

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PRESENTATION	APPLICATION
2. Problems at work: a) Conflicts with others b) Inadequate working conditions c) Lack of recognition and appreciation	
3. Situations off the job: a) Relationship problems b) Health problems in the family c) Financial difficulties d) Problems with the house, car, etc.	**Question:** What are some stressors that are unique to the fire service?
4. Stressors unique to the fire service a) Responding to emergencies b) Risks to personal safety c) Fire officers under pressure to "call the shots" d) Excessive physical demands: 1) Fire suppression activities 2) Extremes of heat and cold 3) Hazardous atmospheres 4) High noise levels 5) Abrupt interruption of meals and sleep	**Instructor Note:** Refer students to Table 29.1 on page 29.2 in their student manuals for a more detailed list of fireground stress factors. Elaborate as appropriate.

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PRESENTATION | APPLICATION

Instructor Note:
Have students complete Activity Sheet #29.1 on page 29.3 in their student manuals. (A copy is provided at the end of this lesson plan.) Have them list 5 or 6 emergency experiences that they considered to be the most distressing and traumatic, as well as how they dealt with each situation, and whether or not it effectively managed the stress. Ask the students to share some of their experiences with the class as an introduction to the following material on response to stress and coping with stress. Allow 15 minutes maximum.

Note - Guide the discussion carefully. This is not intended to be a counseling session! The intent of this chapter is to give students some simple tools for dealing with stress, and to help them avoid some of the common pitfalls. Do not attempt to counsel students about major problems they may be dealing with.

Page: SM 29.4

II. Response to Stress

A. Response to stress varies depending on:

1. An individual's ability to cope

2. Type, duration and intensity of the stressor

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PRESENTATION	APPLICATION
	Question: What are some of the ways in which the body responds to stress?
B. General signs and symptoms 1. Increased heart rate 2. Increased blood pressure 3. Increased respiration 4. Senses become sharpened a) Heightened awareness of the problem and the environment 5. "Butterflies" in the stomach 6. Queasiness 7. Muscle tension	
	Question: What are some general indications that stress may be building to dangerous levels?
C. Signs that stress may be building to dangerous levels: 1. General irritability 2. Emotional instability 3. Inability to concentrate 4. Fatigue 5. Insomnia or restless sleep 6. Loss of appetite or overeating 7. Using alcohol or drugs to escape	

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PRESENTATION

APPLICATION

Question:
What are some indications that the fire officer is experiencing distress on the fireground?

D. Signs of distress on the fireground:

1. Abdication of responsibility

   a) Not exercising authority

2. Communication collapse

   a) Issuing conflicting orders

   b) Failure to properly communicate

   c) "Hogging" radio time with trivial communications

3. Reverting to a level of comfort

   a) Avoiding management responsibilities

   b) Too involved with "hands-on" activities

4. Tunnel vision

   a) Losing sight of the "big picture"

   b) Concentrating on a single objective without considering how it impacts other activities

5. Dysfunctional behavior

   a) Expending effort and resources without a goal

   b) "Running in circles"

6. System overload

   a) Inability to cope

   b) Inability to function in a command role

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PRESENTATION | APPLICATION

III. Coping with Stress

Question:
What are some mechanisms for coping with stress?

A. General categories of coping strategies

1. Health and wellness programs
2. Coping mechanisms
3. Critical Incident Stress Debriefing
4. Stress reduction training

B. Maintaining Health and Well-Being

1. A good physical fitness program
   a) Annual medical check-ups
   b) Cardiovascular exercise
      1) Benefits mind and body
      2) Increases stamina
      3) Reduces "distress threshold"
      4) Relieves daily stress
   c) Weight control programs
2. Adequate rest
   a) Mental and physical exhaustion increase stress
   b) Get enough sleep
   c) Slow down and relax
   d) Vacations
3. Personal protective equipment
   a) Firefighters must be properly trained
   b) Policies strictly enforced

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PRESENTATION

APPLICATION

Question:
What are some coping mechanisms that might be used on the fireground?

C. Coping Mechanisms for the Fireground

1. Recognize that stress is natural and unavoidable
2. Cope with it - don't resist it
3. Take advantage of benefits:
   a) Heightened awareness
   b) Improved mental and physical performance
4. Realize you are not responsible for the emergency
   a) You didn't start the fire
   b) You didn't cause the accident
   c) The emergency has already occurred
5. Focus on preventing further losses
   a) Reducing the impact of the emergency
      1) Not making things perfect or returning to normal
6. Realize available resources will not always allow you to accomplish your objectives
   a) Learn to write off losses and go on
   b) Work towards the overall goal
7. Approach command systematically, objectively
   a) Follow your training
   b) Follow fireground basics
   c) Treat the emergency as a challenge
      1) Not an overwhelming problem

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PRESENTATION	APPLICATION
d) Don't be afraid to ask for assistance	
1) Appoint an aide	
2) Delegate responsibilities	
8. Be alert to signs of stress in yourself and others	
a) Recognizing stress first step to coping	
	Page: SM 29.5 – 29.6
IV. Critical Incident Stress	
	Question: What types of situations can cause Critical Incident Stress?
A. Associated with traumatic or disturbing incidents	
1. Fellow firefighter killed or injured	
2. Mass casualty incidents	
3. Accidents where children are killed	
4. Seeing someone suffer extreme pain	
5. Being helpless to save a life	
B. Symptoms may occur any time:	
1. At the scene of the incident	
2. Hours or days later	
3. Weeks or months later	
	Question: What symptoms are associated with Critical Incident Stress?
C. Common symptoms at the scene:	
1. Denial	
2. Anger	

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3. Self-doubt
4. Guilt
5. Anxiety
6. Frustration
7. Sense of helplessness

D. These feelings may linger for some time

E. Later symptoms may include:

1. Depression
2. Restlessness
3. Irritability
4. Flashbacks
5. Sleep disturbances
6. Changes in eating patterns
7. Use of alcohol or drugs to escape

F. Critical incident stress may severely impact:

1. Performance on the job
2. Personal well-being

G. It cannot be ignored

Question:
What are some measures for dealing with Critical Incident Stress?

H. Training is an important tool for dealing with stress

1. Recognize stress is a normal response
2. Recognize signs and symptoms
3. Know coping mechanisms

RETIRED CURRICULUM

PRESENTATION	APPLICATION
I. Peer support	
1. No one understands as well as another firefighter	
2. Different formats	
a) Informal discussion with co-workers or friends	
b) Formal peer support network within the department	
1) With personnel who have received special training	
J. Critical incident stress debriefing	
1. Formal process led by specially-trained mental health professionals	
a) Trained to recognize feelings	
b) Familiar with coping mechanisms	
2. Held within a few days of the incident	
3. Should be mandatory	
4. Opportunity to share feelings and discuss impact of the incident	
5. Helps firefighters see:	
a) They are not alone	
b) Others are experiencing similar feelings and problems	
6. Don't talk about tactics and strategies	
7. How has incident has touched their lives?	
a) What are they feeling?	
b) How has it affected them emotionally?	

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PRESENTATION	APPLICATION
c) What physiological or psychological changes:	
1) Have they noticed?	
2) Have others noticed in them?	
d) What changes have they made in their lives?	
8. Supportive atmosphere	
a) Confidential	
b) No criticism or blame	
c) Participants must feel safe to share feelings or ask questions	
9. It should include strategies for dealing with these feelings in the future	
a) Emotions may resurface on "bad days"	
b) An action plan (individual or group) keeps people moving in a positive direction	
K. Individual counseling may be needed for severe stress or excessive depression	
	Instructor Note: Refer students to Information Sheet #29.1 (Command Presence) on page 29.7 in their student manuals.
V. Command Presence	
A. An officer's "presence" or "bearing" can have a direct effect upon emergency scene activities	
1. Positive or negative	
B. "Emergency" implies:	
1. Sense of urgency	
2. Excitement	
3. Threat of immediate danger	

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PRESENTATION	APPLICATION
C. We must reduce and control of these dangers	
D. Our "workshop" is in the street	
1. Typically environments that others have fled	
E. Exciting, demanding and challenging task	
F. Requires cool, logical, competent behavior	
1. An officer who "loses his/her cool," "overloads," or "goes bonkers" cannot operate efficiently	
2. Emotional displays and irrational behavior may undermine everybody else's confidence and performance	
G. Remember: Be like a duck	
1. Above the surface ... look composed and unruffled	
2. Below the surface ... paddle like hell!	
	Instructor Note: Refer students to the Review Questions on page 29.7 in their student manuals.

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SUMMARY:

Stress is a normal response to change or excessive demands on the mind or body. Good stress can enable fire officers to perform more quickly and efficient. However, when stress builds to a level at which a person can no longer cope effectively, it becomes distress. The pressure of having to "call the shots" when lives and property are at stake intensifies the stress faced by the fire officer. It's extremely important for the fire officer to understand what causes stress, the effects it can have on people, and techniques to minimize that stress.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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ACTIVITY SHEET #29.1

Your Most Stressful Experiences

Take the next several minutes to list 5 or 6 emergency experiences that you considered to be the most distressing and traumatic. Then, indicate how you dealt with each situation, and whether or not it effectively managed the stress. Be prepared to share at least one of these experiences with the class during group discussion.

Experience	How You Dealt With It

RETIRED CURRICULUM

TOPIC: **Performance Standards**

TIME FRAME: 1:15

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will cite the benefits of declared performance standards, identify the basic components of a performance standard, and describe those factors which may affect company performance.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 30.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 30
Coleman, *Management of Fire Service Operations*
Santa Clara County Central Fire Protection District Training Manual

PREPARATION:

One of the most useful tools that the fire officer has at his or her disposal on the fireground is the performance standard. As the fire officer is sizing-up the situation and determining objectives, he or she must also consider how to deploy resources. Consider how difficult this would be if the fire officer was unfamiliar with the capabilities of the engine and truck companies within the department. How long would it take for an engine company to lay a line or a truck company to ventilate a roof? This could add additional stress to the Incident Commander.

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PRESENTATION | APPLICATION

Performance Standards

Page: SM 30.1

I. Benefits of Performance Standards

Question:
What are some of the benefits of performance standards?

A. Enable fire officer to more accurately size-up incident and determine resources needed

1. Greater control over basic resources
2. Better able to assign objectives and anticipate how long it will take to accomplish them

B Everyone knows minimum level of proficiency at which firefighters are expected to perform

C. Increase proficiency within the department because everyone knows:

1. What they are expected to do
2. How well they are expected to do it
3. Time frame they are expected to do it in

D. Help build individual and team confidence

E. Can identify potential problems

1. Need for additional training
2. Need for procedural changes
3. Need for equipment adjustments

II. Components of Performance Standards

Question:
What are the components of a performance standard?

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PRESENTATION	APPLICATION
A. 3 components: 1. Condition a) Tools, work force and equipment needed 2. Behavior a) Specific action, job or evolution 3. Standard a) How well job is to be performed b) Time frame c) A measure of quality B. Format may vary C. Considerations for designing performance standards 1. Must accurately reflect capabilities 2. Must be designed with safety in mind a) Is evolution appropriate for the number of people? 3. Multiple performance standards may be needed depending on staffing levels D. Speed and proficiency 1. Performance standards often specify time frame 2. Time frame must be safe and reasonable 3. Safety and accuracy is more important then speed 4. Proficiency and speed will improve with practice	
III. Checklists for Scoring the Evolutions A. Many performance evaluations include a checklist	*Page: SM 30.2*

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PRESENTATION	APPLICATION
B. Point values assigned to each step 1. Perfect performance is worth 100 points 2. Points deducted for each step missed or performed incorrectly IV. Task Errors A. Outlining every step may not be appropriate for complex evolutions B. May be more appropriate to identify task errors 1. Any mistake which could affect: a) Safety of personnel on scene 1) Including citizens b) Outcome of the evolution within acceptable time parameters	**Instructor Note:** Refer students to the sample performance standards on pages 30.2 - 30.5 in their student manuals. Copies are provided on the following pages in this lesson plan. Elaborate as appropriate.

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Sample Performance Standards

The following are some different examples of performance standards:

Example #1 - A simple performance standard for raising a 24 foot extension ladder:

Evolution: *24 Foot Extension Ladder*

Condition: A fire apparatus with a full complement of ground ladders.

Behavior: The firefighter will remove, carry, raise, lower and return the 24 foot extension ladder to the apparatus.

Standard: The evolution is to be completed according to the department training manual within established safety guidelines and with 70% accuracy.

Example #2 - A performance evaluation containing a list of task errors for a wildland progressive hose lay.

Evolution: *Wildland Progressive Hose Lay (400')*

Condition: A three person engine company and simulated wildland fire.

Behavior: Spot fire engine at simulated anchor point.

Complete a 400' progressive hose lay utilizing a 200' preconnect and two 100' hose packs (one with nozzle, one without).

Standard: The evolution is to be completed according to the department training manual, within a time frame of 5:00 minutes.

Task Errors: There will be a five second penalty for each of the following:

1. Failure to spot engine.
2. Failure to don all wildland safety gear.
3. Failure to place engine in pump and set at desired pump pressure.
4. Failure to don hose packs properly.
5. Failure to flow water while extending hose, extinguishing a simulated fire.
6. Failure to effectively work as a team.
7. Failure to use correct hose pack at first connection.
8. Failure to bleed hose off when applying hose clamp.

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Example #3 - A simple performance standard for donning SCBA, followed by a sample checklist for scoring the evolution.

Evolution: *Don Self-Contained Breathing Apparatus*

Condition: A positive pressure breathing apparatus.

Behavior: The firefighter will demonstrate the proper procedure to don self-contained breathing apparatus.

Standard: The evolution is to be completed according to the department training manual with 85% accuracy. The time standard for this evolution is 1 minute. (Time begins when the compartment door is touched and ends when the unit is on and operating properly, and gloves are on.)

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Performance Standard Checklist

Donning Self-Contained Breathing Apparatus

Name: _____ Date: _____

Step	Points Possible	Points Deducted
Remove face piece from compartment; take off helmet	5	
Check cylinder supply, open valve	10	
Don back-pack assembly	5	
Adjust straps	5	
Check valves for proper position	5	
Don mask	5	
Don Nomex hood	5	
Test mask	10	
Replace helmet	5	
Connect hose to regulator - Switch to "ON"	10	
Turn on personal alarm device	5	
Time (60) seconds (Deduct one point for each second over 60 seconds)	30	
Points Possible		100
Points Deducted		
Score		

Remarks: Collar up, gloves on. Time starts when compartment opens. Time stops when positive pressure switch is "ON."

Evaluator's Signature: _____

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Example #4 - A more detailed performance standard for a fireground evolution, along with an illustration showing the location of the building, the hydrant and the fire engine.

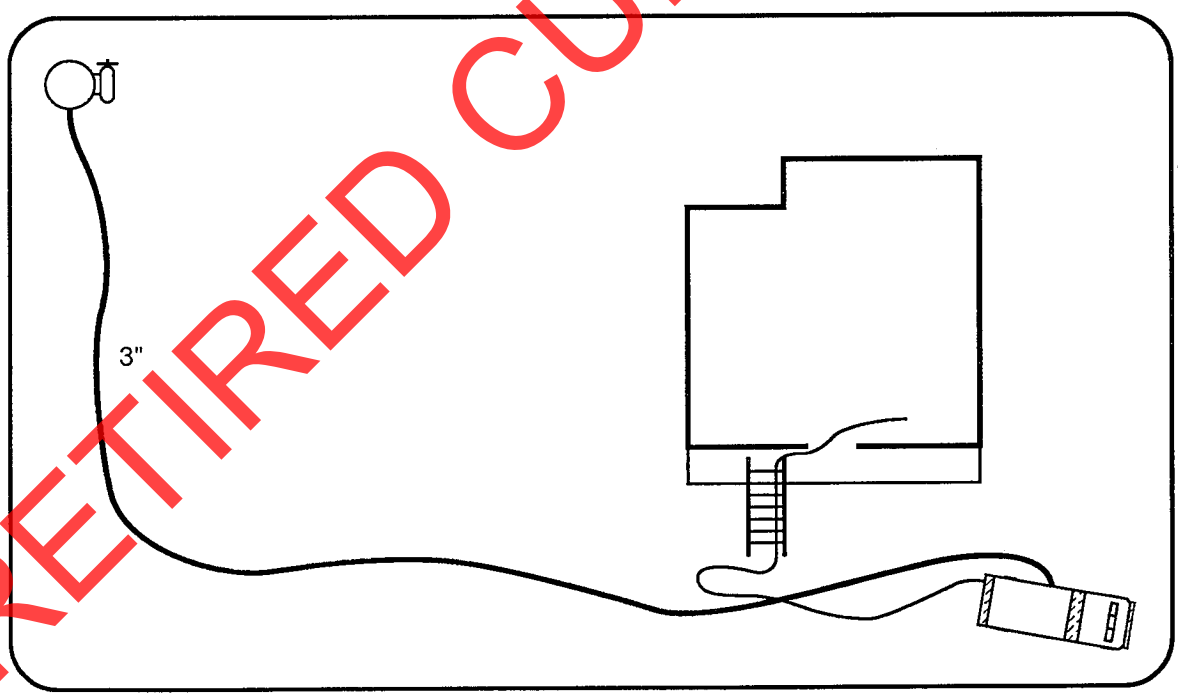
Evolution: *Single Line In (Forward Lay); 1 1/2 Inch Line Aloft*

Condition: A three person engine company and a simulated building fire.

Behavior:

1. Lay a minimum of 100 feet of hose from the hydrant to the simulated building fire. (Place a hydrant gate valve on the hydrant.)
2. Ladder the building with a 24 foot extension ladder.
3. Company officer sizes up the incident.
4. Two firefighters, wearing breathing apparatus and taking appropriate ventilation equipment, extend a 1 1/2" preconnect line to the second floor via the 24 foot ground ladder. (This supply line is charged.)

Standard: The evolution is to be completed according to the department training manual, within established safety guidelines, and within 4:30 minutes. (An additional 30 seconds will be added for companies using 35 foot ground ladders.)



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Page: SM 30.6

V. Factors Affecting Fireground Performance

A. Performance standards are a guide

B. Numerous factors can affect performance

1. Some are beyond the control of company officers

C. Factors to consider

1. Fatigue

a) Commonly overlooked

b) Crews will not function at 100% at all times

c) Firefighting is exhausting work

d) Firefighters may tire more quickly if they have been working hard

1) Working for an extended period of time

2) Responding from another call or drill

e) Can cause people to:

1) Make judgment errors or manipulative mistakes

2) Overlook safety precautions

f) Common to rotate personnel at 20 - 30 minute intervals when performing exhaustive work

1) IC must take this into account when requesting additional resources

2) Depleted staffing will cause a drop in performance, whether for

- Scheduling rest breaks
- Any other reason

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2. Weather

   a) Bad weather will impact operations

      1) Extreme heat or cold

      2) Rain

      3) High winds

   b) Firefighters may become slower and more deliberate to avoid injury

   c) If uncomfortable enough they don't pay close attention to procedures or safety precautions

3. Nature of the emergency

   a) Emergencies commonly encountered will probably produce steady, predictable efforts

   b) "Once in a career" emergency is likely to increase initial company performance

      1) Firefighters respond to "stress"

         - Heightened awareness
         - Increased mental and physical performance

      2) Eventually performance levels out

   c) Critical emergencies can have opposite effect

      1) If firefighters are overwhelmed:

         - May not be able to cope effectively
         - Performance drops
         - Safety may be a major concern

Instructor Note:
Refer students to the Review Questions on page 30.7 in their student manuals.

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Instructor Note:
Refer students to Activity Sheet #30.1 on pages 30.8 - 30.9 in their student manuals. (A copy is provided at the end of this lesson plan.) Break the class into small groups. Have each group review the sample performance standards in the student manual, then practice developing two different performance standards of their own. Allow 30 minutes for this part. Then have a representative from each group share at least one performance standard with the entire class. Allow 30 minutes.

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SUMMARY:

Performance standards are one of the most useful tools that the fire officer has at his or her disposal on the fireground. They enable the fire officer to more accurately size up the incident and determine the resources necessary to handle the problem. They also increase proficiency within the department, help to build confidence and can be used to identify potential problems. The fire officer must be familiar with the particular performance standards used within his or her department.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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ACTIVITY SHEET #30.1

Performance Standards

The goal of this exercise is to give you practice in developing performance standards. Your instructor will break you into small groups. Review the information in the chapter concerning the components of a performance standard. As a group, you will develop two different performance standards. The first should be a simple one containing only the "condition," "behavior" and "standard." The second should be a more complex company evolution containing a list of task errors. (Refer to examples #1 and #2 in the chapter.)

Performance Standard #1

Evolution: _____

Condition: _____

_____

Behavior: _____

_____

_____

_____

Standard: _____

_____

_____

_____

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Performance Standard #2

Evolution: _____

Condition: _____

Behavior: _____

Standard: _____

Task Errors: _____

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TOPIC: **Levels of Emergency**

TIME FRAME: :15

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify the four levels of emergencies; determine the degree or level of supervision and management required for each; cite typical errors committed by first-in officers; and identify the significance of experience when commanding major emergencies.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 31.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 31
Coleman, *Management of Fire Service Operations*

PREPARATION:

Nationwide, fire departments respond to millions of fires every year. Obviously these fires are not all of the same size and intensity. Fire officers must be familiar with the various levels of emergency and how to best manage them.

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c) Working fire with high life hazard potential

1) High rise buildings

2) Hospitals

d) Major wildland fires, especially if:

1) Located in mountainous areas

2) Influenced by high winds

Page: SM 31.2

II. Emergency Management / Command

A. Every fire requires some elements of command

B. Degree and complexity of command varies

1. Nuisance or initial attack fire

a) Company officer may be IC and nozzle person

2. Sustained attack or major campaign fire

a) First-in officer assumes IC, then fills other roles after transferring command

III. Common Errors

A. Fire officers don't often command major fires

B. Lack of experience may lead to errors:

Question:
What are some of the common errors made by the first-in officer on a major incident?

1. Delays in upgrading the alarm or summoning additional resources

2. Inadequate deployment of resources:

a) Personnel

b) Apparatus

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Levels of Emergency

Page: SM 31.1

I. Four Levels of Emergency

A. Levels are based on size and complexity of operations

Question:
What are the four levels of emergency (fire)?

1. Nuisance Fire
2. Initial Attack
3. Sustained Attack
4. Campaign Fire

B. Nuisance Fire

Question:
What is a nuisance fire?

1. More of a nuisance than a danger
   a) Can become dangerous
2. Effort to extinguish them is minimal
   a) May often be handled by citizens
3. Examples:
   a) Trash can fires
   b) Small grass fires
   c) Surface fires in a dumpster

C. Initial Attack

Question:
What is an initial attack fire?

1. Incipient fire, or a free-burning fire confined to a relatively small area
2. Usually handled by a single engine

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3. Examples: a) Fires confined to a closet b) Small out building c) Single vehicle d) Small grass fire e) Working dumpster fire	
D. Sustained Attack	**Question:** What is a sustained attack fire?
1. "Working" fire a) Free-burning fire, or b) Smoldering fire with backdraft hazard 2. Requires full first alarm assignment 3. Examples: a) Working structure fire b) Large grass or brush fire c) Flammable liquid fire	
E. Campaign Fire	**Question:** What is a campaign fire?
1. Large, prolonged fire 2. More of a defensive attack 3. Requires multiple alarms or mutual aid 4. Examples: a) Multiple structures and exposures b) Large fires in a commercial, industrial or warehouse occupancy	

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c) Equipment	
d) Hose lines	
3. Failure to exercise command	
C. Know when to request assistance	
	Question: What guideline can officers use regarding when to request additional resources?
1. Rule of thumb:	
a) Once existing resources are committed it's time to order more	
b) A second alarm should be requested as soon as all first alarm units have an assignment	
1) Whether or not they are already on scene	
	Instructor Note: It is beyond the scope of this course to address all the decisions that a fire officer will be faced with when commanding a major fire.
E. To avoid some of these common errors	
1. Expand knowledge of fireground operations and scene management at:	
a) Classes	
b) Drills	
c) Table-top exercises	
	Instructor Note: Refer students to the Review Questions on page 31.3 in their student manuals.

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SUMMARY:

There are four general categories of fire based on size and complexity of operations. Each requires some degree of command functions. The most difficult for any fire officer are the sustained attack or the campaign fire because of the multitude of details that must be handled and the pressures of being in command of an emergency which is beyond the resources of the first-in unit. The fire officer must be aware of the errors commonly made because of lack of experience, and must take advantage of various opportunities to practice the skills necessary to command a major incident.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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TOPIC: **Decision Making**

TIME FRAME: :45

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will define and describe the relationships between alternatives, objectives, priorities and evaluation; identify the decision making process within both simple and complex models; identify the abilities and needs of decision makers; and describe those factors that influence decision makers.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 32.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 32
Coleman, *Management of Fire Service Operations*

PREPARATION:

One of the most important skills that a fire officer must have is the ability to make decisions, particularly under the pressure of an emergency situation. He or she must be able to identify the problem, analyze the available information, weigh the alternatives based on valid criteria, and implement an appropriate solution. He or she must also be able to evaluate the results and adjust as needed. It's also important to realize that most decisions are not isolated acts; they very often affect other activities on the fireground.

INSTRUCTOR NOTE: This chapter has been divided into two lesson plans because of length. The lesson plan for Post Incident Analysis follows this one. It is also identified as "Decision Making" in the header. However, the pages are numbered 32.2.# instead of 32.1.#.

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Decision Making

Page: SM 32.1

Instructor Note
Remind students that the processes of size-up and determining the appropriate strategy, tactics and methods were discussed in earlier chapters. This chapter focuses on the decision making process itself.

I. Identification of the Problem

A. Essential to identify problem before any intelligent decision can be made

1. Size-up

Question:
What is the major difference between problem identification on the fireground and in the business world?

B. No time to study the problem on the fireground

C. Still must have fairly thorough understanding of the problem to determine appropriate course of action

Instructor Note:
Ask students for examples of how not having sufficient information can get them into trouble.

D. With any problem, it's necessary to:

1. Accurately define the problem

2. Collect as much information as possible

E. Information may come from:

1. Personal observation

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2. Reporting parties	
3. On-site personnel	
4. Other firefighters	
II. Evaluating Alternatives and Their Possible Impacts	
A. Often several ways to handle a problem	
B. Decisions are not necessarily linear	
1. Don't always proceed logically in a straight line	
2. May introduce new variables	
C. Analyze available information to determine alternatives	
D. Be able to identify:	
1. Advantages and disadvantages of each alternative	
2. Impact on other operations	
3. Whether implementation is possible with current conditions and resources	
a) If not, what must be done first?	
	Question: What is the term usually associated with the relationship between alternatives, decisions and results?
E. Interrelationship between alternatives, decisions and results is often referred to as "branching"	
F. No alternative is without risks	
1. Best alternative has greatest potential outcome for degree of risk involved	
2. "Cost-benefit analysis"	
a) If benefits outweigh costs or risks, solution may be viable	

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b) Risk of death or injury is not acceptable, except perhaps to save a life	
	Page: SM 32.2
III. Determining Objectives	
	Question: What is an objective?
A. An objective is a statement of measurable performance that identifies the task(s) to be completed	
B. 3 categories based on when they are established	
	Question: What are the three categories that objectives fit into? What distinguishes these categories?
1. Predetermined objectives	
a) Established during:	
1) Pre-fire planning	
2) Company inspections	
3) Training or drills	
b) Based on potential scenarios	
c) May or may not be necessary, depending on the actual incident	
2. Operational objectives	
a) Developed at the actual time of emergency	
	Question: How are operational objectives determined?
b) May use predetermined objectives as a foundation	

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c) Based specifically on:	
1) Observations made during size-up	
2) RECEO	
3. Post-determined objectives	
a) Established after emergency	
1) During critique or post incident analysis	
b) Fire officer evaluates:	
1) Decisions made during the emergency	
2) Results of decisions	
c) Foundation for improving performance	
C. Most decisions are made at the emergency scene	
1. Decisions are easier when based on:	
a) Predetermined objectives	
b) Post-determined objectives	
c) Established systems such as RECEO	
D. Establish objectives that are achievable with resources available	
E. Designed with measurable results	
F. Must adhere to department SOPs	
G. Must also be in sync with objectives of other officers	
H. Necessary to prioritize multiple objectives	
IV. Prioritizing Objectives	
A. Prioritizing is somewhat subjective	
1. People may prioritize differently	
2. Officers have different knowledge and experience	
3. Perceptions differ	

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B. At any emergency scene, priorities will center around:

1. Protecting lives
2. Controlling the incident
3. Protecting the environment
4. Protecting property

Question:
What are some guidelines for prioritizing objectives?

C. First priority is life safety

1. Personal safety first

D. Anything which might cause the incident to escalate:

1. Vertical fire spread
2. Tank ruptures
3. Structural collapse
4. Explosions
5. Leaks
6. Conditions which might hamper operations
   a) Untenable atmospheres
   b) Ventilation needed for interior attack

E. Protecting the environment

1. A concern with different incidents
   a) Hazardous materials
   b) Fires
      1) Smoke and combustion products
      2) Runoff

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2. Questions to consider:
   a) What impact will this have on environment?
   b) What can be done to minimize effects?

F. Protect property
   1. Structure
   2. Contents
   3. Exposures

Page: SM 32.3

V. Evaluating Results

A. Monitor operations and evaluate results
   1. How are decisions impacting other activities?
   2. Is the objective still desirable?
   3. Have priorities changed?
   4. Are resources sufficient to accomplish objectives?
   5. Are objectives producing desired results?
   6. What other decisions are needed at this stage?

B. Dynamic environment where things are changing
   1. Continue to assess problem and evaluate results

C. Not every decision will be the right one
   1. Be able to recognize when a decision is:
      a) Not working
      b) Contributing to the problem
   2. Be able to adjust accordingly

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VI. Decision Models A. Decision making process can be expressed with models	**Instructor Note:** Refer students to the Simple Decision Model (Figure 32.1) on page 32.4 in their student manuals. (A copy is included at the end of this lesson plan.) The students should be "walked through" the model. Using examples of typical emergencies will assist the students to understand the model and the process involved.
B. Simple decision model 1. Problems that can be handled by first-in company 2. Does not identify specific fireground objectives a) Illustrates a decision making process 3. Fire officer is faced with emergency or problem 4. Must determine whether or not it can be handled with resources immediately available a) Examples that can be handled 1) Trash fire 2) Vehicle fire 3) Small grass fire 5. Analyze possible solutions and decide on plan 6. Evaluate results	

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7. Decision making process related to knowledge and experience a) Knowledge and experience are used to make decisions b) If decisions were right, the officer will be confident about making same decisions again c) If decisions were not right, the officer must determine what should have been done differently to produce the desired result 8. This is part of the learning process	**Instructor Note:** Refer students to the Complex Decision Model (Figure 32.2) on page 32.5 in their student manuals. (A copy is included at the end of this lesson plan.) The students should be "walked through" the model. Using examples of typical emergencies will assist the students to understand the model and the process involved.
C. Complex decision model 1. When the problem cannot be handled by units on scene, attack parts of the problem 2. Each part is addressed with individual objectives 3. As each objective is completed, results are evaluated to determine if problem has been completely resolved 4. If not, additional objectives are identified and implemented until the desired results are obtained	

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Page: SM 32.6

VII. Profiling the Decision Maker

Question:
What are some things needed by a decision maker?

A. Needs of Decision Makers

1. Constant Feedback (Progress Reports)

   a) Gives dimension to decisions

   b) Statement of results achieved

   c) Based on objectives and obstacles encountered

2. Continuous Evaluation

   a) Prevents tunnel vision

   b) Must be in a position to re-evaluate results

Question:
What abilities must a decision maker have?

B. Ability of Decision Makers

1. Ability to Increase "Channels"

   a) Receive input from a variety of sources

   b) Use ICS

2. Ability to Prioritize

   a) And establish new priorities as each objective is achieved

3. Ability to Delegate

   a) To keep the demands manageable

   b) Ability to group related objectives

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4. Ability to "Filter" Data and Requests

   a) Not all information or requests are important

   b) Be able to:

      1) Filter information that is not significant

      2) Tactfully deny requests that are not in alignment with overall objectives

5. Ability to "Write Off" Losses

   a) Be able to:

      1) Recognize objectives that will do the most good

      2) Let go of things you cannot control

Question:
What are some of the factors which influence decision makers?

C. Factors Influencing Decision Makers

1. Supplemental Information

   a) Perceptions may change as more info becomes available

2. Staff and Subordinate Input

   a) Weigh feedback and progress reports

3. Effects of Control Efforts

   a) What are the results of your operations?

4. Escalation of the Problem

   a) Re-evaluate objectives and priorities as needed

5. Stress

   a) Both mental and physical effects

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Instructor Note:
This chapter has been split into two lesson plans. The next lesson plan focuses on Post Incident Analysis.

Instructor Note:
Refer students to the Review Questions on page 15 in their student manuals.

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SUMMARY:

The ability to make decisions under pressure is essential for any fire officer. This involves analyzing the problem, evaluating alternatives and their possible impacts, determining objectives, and prioritizing those objectives. The fire officer must continually evaluate the results of decisions made throughout the operation and adjust as needed. Two decision models were presented in this chapter to help illustrate how these various components in the decision making process are interrelated.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

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Figure 32.1: A Simple Decision Model

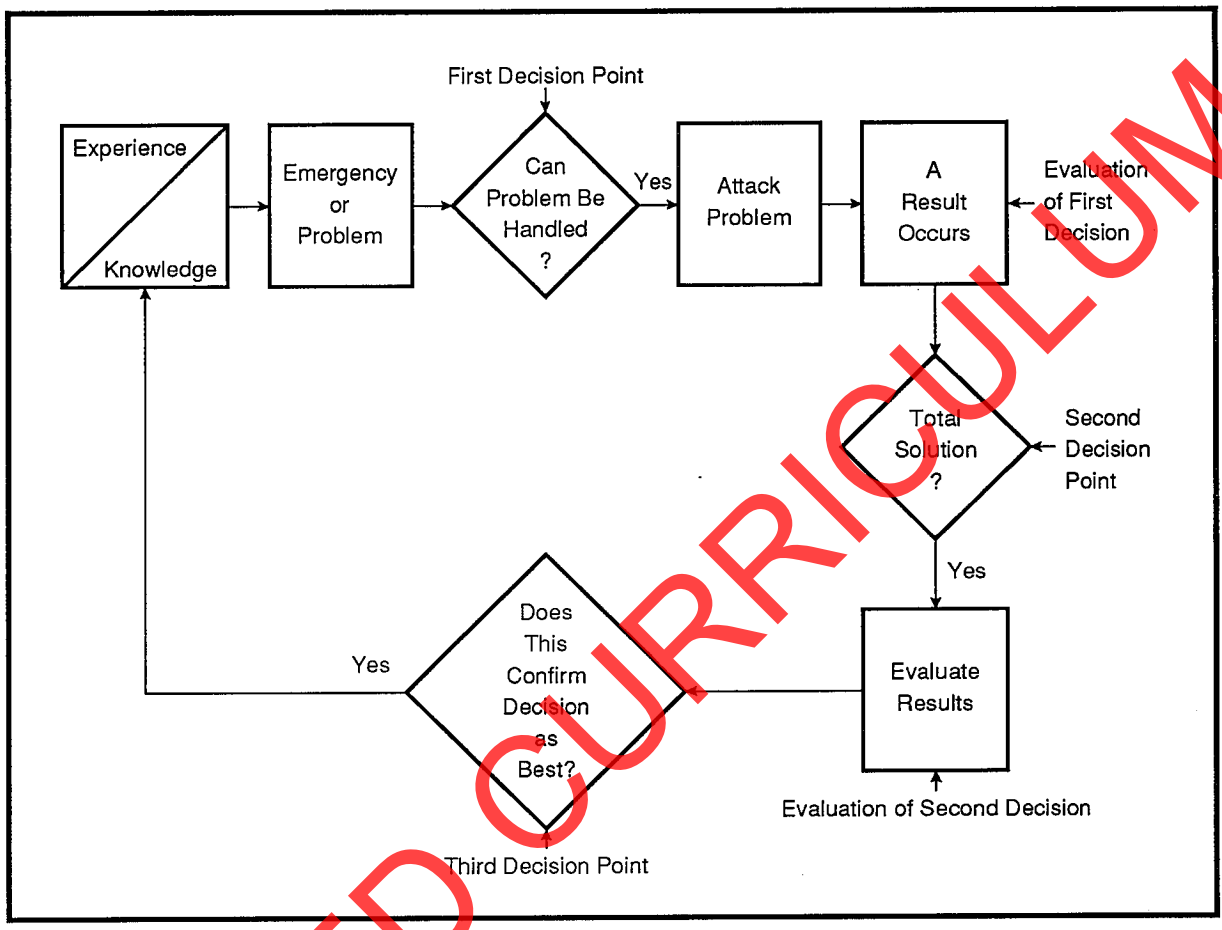

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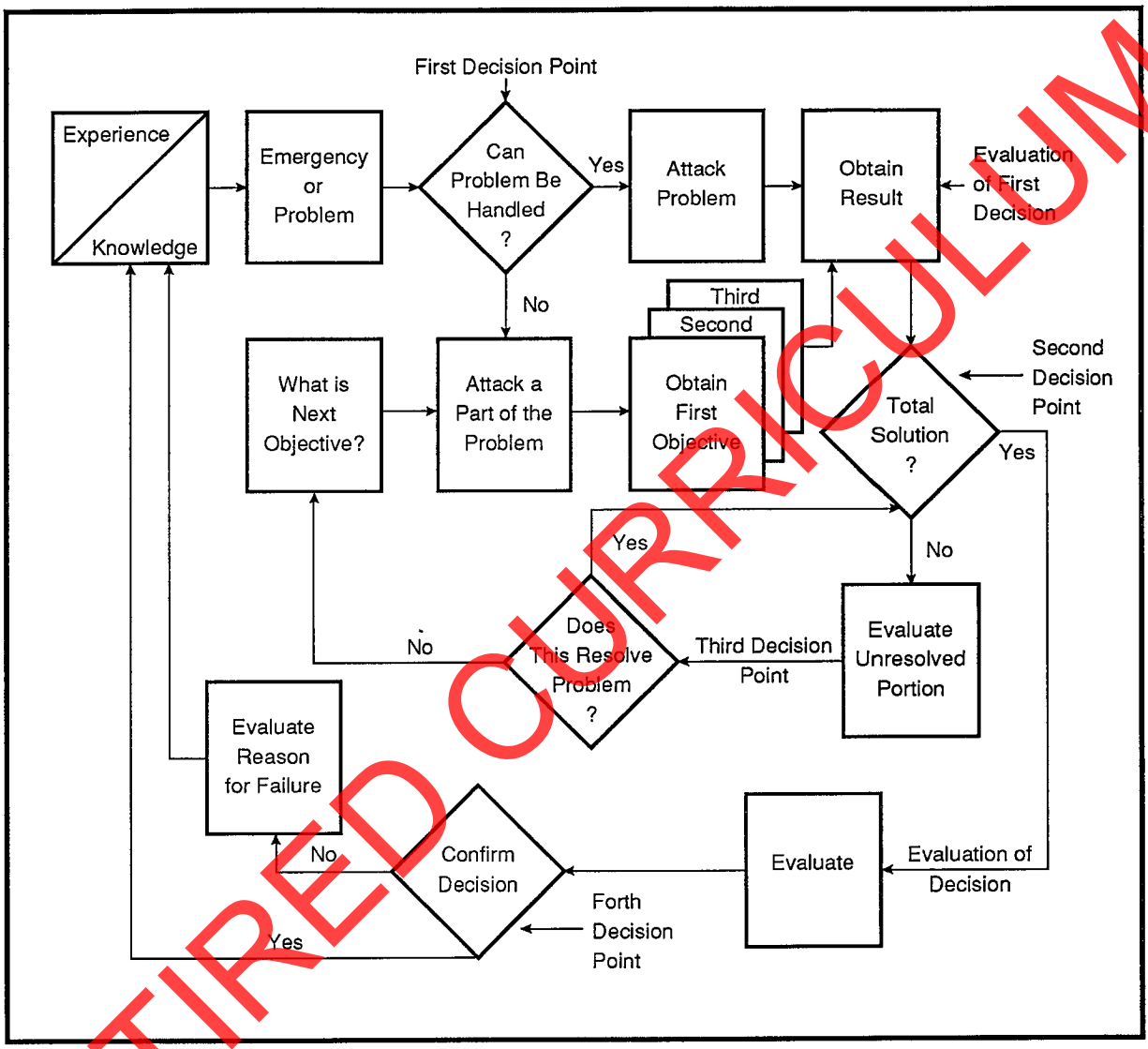
Figure 32.2: A Complex Decision Model



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TOPIC: **Post Incident Analysis**

TIME FRAME: :15

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify elements that will ensure a successful critique, basic procedures for conducting a Post Incident Analysis, and suggested topics to cover during the Post Incident Analysis.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 32.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES: Command 1A Instructor Guide, Chapter 32

PREPARATION: Each emergency should be reviewed or critiqued as part of an overall program to improve individual, company and department operations.

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Post Incident Analysis

Page: SM 32.7

I. Conducting a Successful Critique

Question:
What are some things which must be done to ensure a successful critique?

A. Maintain constructive, objective atmosphere

B. Determine if activities produced desired results

1. No blame

2. Focus on task or procedure

C. Agenda should be prepared ahead of time

D. Moderator keeps critique on track and ensures important points are covered

E. Equal opportunity for participation

Instructor Note:
Refer students to Information Sheet 32.2 (pages 32.8 - 32.13) which contains a sample procedure for conducting a post incident analysis., followed by a list of suggested topics which can be used as an outline.

Page: SM 32.8

II. Sample Procedure for Conducting a PIA

Question:
What are the goals and objectives of a Post Incident Analysis?

A. Goal is to improve effectiveness of operations

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B. Objectives: 1. Improve emergency scene operations 2. Identify and correct potential problems 3. Everyone participates in constructive analysis 4. Allow everyone to learn and benefit	
	Question: What types of fires should be analyzed?
C. Types of Fires to Be Analyzed: 1. Large dollar loss (50,000+) 2. Loss of life to citizens or firefighters 3. Injury or "close call" to firefighters 4. Suspicious incidents 5. Unusual or extraordinary incidents 6. Any incident deemed appropriate by management	
D. System of Analysis	
	Question: What analysis should be conducted before leaving the scene?
1. Scene Debriefing (Single or multiple companies) a) Companies review and analyze operations b) Identify concerns which need attention either: 1) Before leaving the scene or 2) Before a more formal critique c) Any company member may be requested to prepare an incident report	

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Page: SM 32.9

2. Incident Critique or Post Incident Analysis (PIA)

Question:
What are some guidelines for conducting the Post Incident Analysis?

a) Every officer reviews respective operations

1) As soon as possible after the incident

2) No later than next on-duty tour

b) Battalion Chiefs:

1) Review reports

2) Forward reports as applicable

3) Copy reports if PIA is to be conducted

4) Notify everyone of PIA time and location

c) Post Incident Analysis participants:

1) Officer in charge of the incident

2) All responding platoon personnel

3) Other involved officers (if applicable)

4) Operations Chief

5) A member of the Training Division

6) The fire investigator

d) The officer in charge leads discussion using Incident Critique Outline as a guide

1) Summarize actions, conclusions and recommendations

e) Other officers report on respective operations

1) Utilize previously prepared reports

2) Include conclusions and recommendations

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3) Reports made in order of arrival at scene

4) Officer in charge presents reports for off duty personnel

f) Fire investigator provides info on fire losses, causes and/or other pertinent data

g) Follow-up documentation:

1) Brief written report should be prepared if conclusions and recommendations:

- Include proposed changes
- Merit documentation

2) Designated company member prepares report and forwards it as appropriate

3. Training

a) Special training session can be presented if appropriate

Page: SM 32.10

III. Incident Critique Outline

Question:
What should the PIA focus on?

A. Discussion should cover tasks assigned and completed, focusing on:

1. Who
2. What
3. When
4. Where
5. Why
6. How

Question:
What topics should be addressed in the PIA?

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B. Topics and Questions

1. Alarm

   a) How was alarm received?

   b) Was dispatch information correct?

   c) Were communications satisfactory?

   d) Time of alarm

   e) Can procedure be improved?

2. Response

   a) Was initial response adequate?

   b) Did the closest company respond?

   c) Were proper routes taken considering time of day, traffic and construction problems?

3. Size-Up

   a) Was appropriate report of conditions given?

   b) Did this help additional responding units?

   c) Discuss facts, probabilities and possibilities

4. Tactics and Strategy

   a) What was the fire strategy?

   b) Why was this strategy employed?

   c) Was this the most effective strategy?

   d) What were the initial tactical objectives?

   e) What was the plan of attack?

   f) Was this an offensive or defensive operation?

   g) What outside help was needed (ambulance, police, other)?

5. Initial Orders

   a) What were the first orders given?

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b) Did any problems arise with initial operations (e.g. too long lay, not enough water)?	
c) How were orders communicated?	
d) How were apparatus placed at the incident?	
e) Were orders understood?	
f) Were communications satisfactory?	
6. Rescue	
a) Was there a rescue problem? What was it?	
b) Could the initial response assignment handle the rescue problem?	
c) What operations were needed to facilitate rescue?	
	Page: SM 32.11
7. Exposures	
a) What exposure problems existed (interior and exterior)?	
b) What measures could have been taken to limit fire extension?	
8. Confinement	
a) How did the fire extend from the area of origin (horizontally, vertically, other)?	
b) Was fire confined with initial line placement?	
c) Was the fire confined to the smallest area in the shortest time?	
d) Could other means of confinement been employed?	
9. Extinguishment	
a) What extinguishing agent was employed?	
b) Was the application effective?	

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c) Would another extinguishing agent have been more effective?

d) Was water applied using adequate volume and pressure?

e) Was the best type of application utilized?

1) Fog or straight stream

2) Hand lines or master stream appliances

f) How was the attack (direct or indirect) related to the phase of the fire?

10. Ventilation

a) How was ventilation coordinated with attack?

b) What was the ventilation technique used?

c) Did ventilation produce positive results?

d) Did ventilation cause additional problems?

11. Salvage

a) What salvage actions were taken before, during and after the attack?

b) Did salvage procedures reduce fire or water damage?

c) Were security operations undertaken?

d) How could salvage procedures have been improved?

12. Overhaul

a) Were contents left undisturbed prior to overhaul to allow for investigation?

b) Were the objectives of overhaul obtained?

c) Was the structure released to an authorized person?

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13. Water Supply

    a) Were apparatus able to supply hose lays ordered?

    b) Was the water system capable of supplying needed fire flow?

    c) Were the pumpers placed in such a manner to fully utilize available water?

    d) Was hydrant spacing satisfactory?

Page: SM 32.12

14. Investigation

    a) Were there any indications of arson?

        1) Multiple fires

        2) Unusual smoke or odor

        3) Damaged fire protection systems or equipment

    b) Was there a major area of involvement upon arrival?

    c) How soon was the fire investigator notified?

    d) Did responding personnel communicate their observations to the fire investigator?

    e) Was evidence retained for the fire investigator?

    f) What was the area of origin?

    g) What was the cause?

15. Pre-Fire Plan

    a) Was there a pre-fire plan?

    b) If so, was it used? If not, why not?

    c) When was the last pre-fire plan written?

    d) Does the plan need to be changed or updated?

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16. Communications

    a) Was a communications plan established?

    b) What means of communications were used (radios, face-to-face)?

    c) Was this means of communications the most effective?

    d) What problems arose during the incident?

17. Public Information

    a) Was a Public Information Officer assigned?

    b) Was the media dealt with tactfully and courteously?

    c) Was the media provided with all the information they needed?

    d) Were there any problems with the media?

    e) Was the media helpful in communicating important information to the public?

    f) What information was broadcast/printed on this incident?

18. Safety (Firefighter and Public)

    a) Was a Safety Officer assigned to the incident?

    b) Were all operations conducted in a safe manner?

    c) Did all personnel use appropriate safety equipment?

    d) Was other safety equipment needed?

    e) Is it necessary to reevaluate or change any procedures to ensure safety on the fireground?

    f) Was the safety of the public considered?

19. Unexpected Contingencies

    a) What unexpected problems came up?

RETIRED CURRICULUM

PRESENTATION | APPLICATION

b) How were unexpected problems handled?

c) What other problems might have arisen?

d) How would they have been handled?

Page: SM 32.13

20. Utilities

a) Who shut off the utilities?

b) When were they shut off?

c) Was time lost in searching for shut-off switches and valves?

d) Was the utility company called?

e) How long did it take for them to respond?

21. Command

a) Was a command post established?

b) Where was the command post located?

c) Were all officers aware of the location of the command post?

d) How was the command post identified?

e) Were resources used to the best advantage?

f) Was ICS used to manage resources?

g) Were there any problems using ICS?

22. Public Relations

a) Did anything occur which might adversely affect public relations?

b) What good feedback was received regarding public relations?

Instructor Note:
Refer students to the Review Questions on page 16 of their student manuals.

RETIRED CURRICULUM

SUMMARY:

Some of the decisions made on the fireground are based on experience and lessons learned at previous incidents. The process of conducting a Post Incident Analysis is an evaluation of fireground activities to determine if they produced the desired results. The focus is not to place blame, but rather to take a careful look at what works and what doesn't work. The ultimate goal is to improve individual, company and department operations.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Communications**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will cite the advantages and disadvantages of both radio and face-to-face communications: identify those situations where face-to-face communications are necessary; describe the three styles of communications; identify at least four command considerations regarding communications; cite the importance of two way communications; and identify basic guidelines for issuing orders, resolving conflicting orders, and using radios.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 33.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 33
Coleman, *Management of Fire Service Operations*
FEMA, *Incident Command Student Manual*
Brunacini, *Fire Command*

PREPARATION:

Communications in a vital aspect of any emergency scene. It is the link by which all elements of the organization are tied together on the fireground. Efficiency of fireground communications can often be measured by the quality and amount of communications. Effective command cannot occur in the absence of effective communication.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Communications

Page: SM 33.1

I. Communication Methods

A. 2 methods of communicating on fireground:

1. Radio

2. Face to face

B. Each has advantages and disadvantages

Instructor Note:
Refer students to Table 33.1 on page 33.1 in their student manuals for advantages and disadvantages of the two communication methods. Ask them if they can think of any others.

1. Radio

a) Advantages

1) Rapid

2) Doesn't require meeting at a single point

3) Can broadcast to entire incident scene

- Emergency evacuation notice
- Hazards

b) Disadvantages

1) Awkward for lengthy, complex instructions

2) Not every firefighter has a radio

3) Can't gauge reactions

4) Competition for "air time"

RETIRED CURRICULUM

PRESENTATION | APPLICATION

5) Dead spaces and radio problems

6) Traffic heard by anyone with a scanner

7) Traffic recorded at dispatch center

8) Impersonal

2. Face to face

a) Advantages

1) Opportunity for questions and discussion

2) Reduces demand for "air time"

b) Disadvantages

1) Logistically awkward at large incidents

2) Time consuming

3. Selecting method depends on many variables

a) Radios

1) Generally more efficient

2) Best for most fireground communications

Question:
What are some situations where face to face communication would be preferred over radios communication?

b) Face to face should be used when:

1) There's a change of command

2) Messages are lengthy

3) Messages are complex

4) Messages require discussion

5) Personnel must visually see something:

- Map

RETIRED CURRICULUM

PRESENTATION	APPLICATION
• Pre-fire plan • Other items which cannot be adequately described over the air 6) Discussion should not be overheard by public and media 7) Recorded communications could pose a problem in court someday	
II. Communication Styles	**Question:** What communication styles may be used by the fire officer?
A. 3 distinct styles of communication: 1. Permissive 2. Autocratic 3. Consultative	*Page: SM 33.2*
B. Permissive Style	**Question:** What is the permissive style and when is it generally used?
1. Basically a "do what you think best" approach a) Officer identifies the objective(s) b) Allows crew freedom to determine how they will carry out the mission 2. Provides no guidelines or restrictions 3. Usually employed when: a) Subordinates are competent and predictable b) IC is overwhelmed and must delegate c) IC relinquishes command to another officer	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
C. Autocratic Style	**Question:** What is the autocratic style and when is it generally used?
1. Officer provides specific directions	
2. Officer does not delegate authority	
3. When appropriate:	
a) Dangerous situations	
b) IC desires greater level of control	
D. Consultative Style	**Question:** What is the consultative style and when is it generally used?
1. Most desirable method	
2. Officer discusses situation and solicits input	
3. Provides for sharing of responsibilities	
4. Enhances firefighters' sense of participation	
5. Additional insight and expertise available	
6. Used most frequently when:	
a) A high level of teamwork exists	
b) Officer feels comfortable delegating authority	
III. Radio Communications	
A. Important to be professional and courteous	**Question:** What are some guidelines for providing professional and courteous radio communications?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
1. Be brief, specific and clear	
2. Know what to say before "keying" microphone	
3. Use standard firefighting terms	
a) "Clear text"	
4. Messages should be task specific	
5. Use a natural tone of voice	
6. Avoid whispering, shouting or speaking fast	
7. Avoid distracting mechanisms	
8. Remember there may be competition for air time	
a) Critical messages have highest priority	
b) Maintain radio discipline	
9. Make sure receiver is ready for your message	
10. Don't interrupt others unless it's an emergency	
11. Make sure orders are clearly understood	
a) Acknowledgment best done by repeating order	
	Page: SM 33.3
IV. Command Considerations	
A. Recognize that radios are a resource	
B. May be necessary to redistribute available radios	
1. Command personnel have first priority	
C. Multiple frequencies may be needed	
1. One frequency for "command"	
2. A second frequency for "operations"	
3. Not necessary for everyone to hear all radio traffic	

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PRESENTATION	APPLICATION
D. May be appropriate to utilize runners 1. Too much radio traffic 2. "Dead areas" 3. Too much static	
V. Conflicting Orders A. Conflicting orders may occur when firefighters are: 1. En route from one task to another 2. Headed to apparatus for a tool	**Question:** How can you best minimize and deal with conflicting orders?
B. Minimize conflicting orders by adhering to chain of command C. Advise second officer of original assignment so that he or she may either: 1. Pre-empt the original assignment 2. Find someone else to carry out the second order D. May be necessary to advise both parties of the conflict and let them establish priorities together E. Make sure first officer is advised if there's going to be a delay in carrying out original order	
VI. Emergency Evacuation Order A. May be necessary to evacuate an interior operation: 1. Impending structural collapse 2. Hazardous condition inside 3. Locate lost personnel	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
B. There must be a predetermined signal 1. All personnel must be aware of it a) Including crews from other agencies	**Question:** What is the recommended way to give an evacuation order?
C. Usually this evacuation order involves: 1. Verbal signal over radio 2. Series of blasts on the air horn	**Instructor Note:** Refer students to the Sample Fireground Building Evacuation Signal Procedures (Information Sheet #33.1) on page 33.4 in their student manuals. **Instructor Note:** Refer students to the Review Questions on page 33.6 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

Communications is a vital aspect of any emergency operation. Communications on the fireground may be by radio or face to face. There are advantages and disadvantages to each. The fire officer must determine which will best meet his or her needs at the time. Fire officers must also be familiar with guidelines for using the radios, both in terms of ensuring clear communications and to best manage the radio traffic at an incident.

There are three distinct styles of communication which may be used by the fire officer: permissive, autocratic and consultative. The consultative style is the most desirable of the three since it gives the fire officer the benefit of additional insight and experience, plus enhances the firefighters' scene of participation. However, the style used will depend on the urgency of the situation and the firefighters' level of training, skills or expertise.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

TOPIC: **Management by Objectives**

TIME FRAME: :30

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will define and describe MBO; identify the benefits of using MBO; and describe how MBO relates to the size-up process.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 34.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 34
Coleman, *Management of Fire Service Operations*
Kramer, *Management by Objectives in the Fire Service*

PREPARATION:

There are a number of different management styles and techniques available to the fire officer. We've heard of such styles as "Management by Exception" and "Management by Crisis." However, the technique which is much more suited to the fire service is called "Management by Objectives" or MBO. Since the size-up process is based on setting objectives, it sets the stage for this management style.

RETIRED CURRICULUM

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PRESENTATION | APPLICATION

Management by Objectives

Page: SM 34.1

I. The Basis of Management by Objectives

Question:
What is meant by "Management by Objectives"?

A. Method of controlling efforts by:

1. Identifying tasks and results to be obtained
2. Allotting resources

Question:
What is an objective?
What should it include?

B. An "objective" is a statement of measurable performance that identifies:

1. What task is to be accomplished
2. Who is to execute it
3. When it is to be completed
4. How well it is to be done

C. Objective doesn't include *how* task is to be completed

D. MBO works as well on fireground as in business world

1. Many officers have used principles for years
   a) Even without formal training
2. It's not a new concept
3. Nor, is it an answer for all problems
4. Helps to formalize good management practices

E. MBO is results oriented

RETIRED CURRICULUM

PRESENTATION	APPLICATION
1. Requires fire officer to look at the questions:	
a) "What do we want to accomplish?"	
b) "What does it take to get there?"	
2. Identifies overall tasks to be completed, but not how they are accomplished	
	Question: Who makes decisions about how individual tasks are accomplished?
a) That decision is left to company officers and their crews	
F. Employing MBO on the fireground	
1. First-in officer conducts size-up	
2. Decisions made regarding objectives	
3. Resources committed to specific objectives	
a) Strategic or tactical	
4. Process continues if command is transferred	
	Question: What are some of the benefits of MBO?
II. Benefits of MBO	
A. Works well with fire department structure	
1. Easily integrated into size-up	
B. IC must establish objectives before assigning resources	
1. Site Safety Plan with objectives is required by law before entry is made at haz mat incidents	
C. Allows for more input	
1. Consultative style of communication	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
D. IC is not required to give exhaustive details 1. IC provides overall strategy 2. Company officer establishes tactics 3. Crew determines methods E. Prevents wasting resources on less important tasks	
	Page: SM 34.2
III. MBO Considerations A. Everyone must understand how it works and what their roles will be 1. Not necessary to have formal training 2. Personnel must understand: a) How objectives are determined b) How they're communicated c) How results are measured d) How to identify and correct problems B. MBO is a process, not a step or a phase 1. Applied whenever applicable C. Requires participation of individuals capable of functioning and making decisions without close supervision	
	Instructor Note: Refer students to the Review Questions on page 34.2 in their student manuals.

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PRESENTATION	APPLICATION
	Instructor Note: Pages 34.3 and 34.4 in the student manual contain an Activity Sheet to help students better understand the concepts of Management by Objectives. This can be done with the class as a whole, in small groups, or as part of a homework assignment. If time permits, either a role playing skit or verbal examples of MBO versus authoritarian techniques on the fireground may be useful.

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SUMMARY:

Management by Objectives (MBO) is a management style that is results oriented. It requires the fire officer to consider the questions: "What do we want to accomplish?" and "What does it take to get there?" He or she must then allocate the necessary resources to accomplish those tasks. The individual company officers and their crews are the ones who actually determine *how* the task gets done.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

RETIRED CURRICULUM

ACTIVITY SHEET #34.1

Management by Objectives

The following exercise is designed to help illustrate how the fire officer should use MBO on the fireground. The first line is filled in as an example. Identify several objectives or tasks which may need to be accomplished on the fireground (or other emergency scene). For each objective, identify who will be assigned that task, when it is to be completed, and how well is to be done (or how successful completion will be measured). Then, in the far right column, list some of the methods that should be determined by the individual company officer and his or her crew.

Objective	Assigned to	Time for Completion	Measurement(s)	Methods
Ventilate the roof.	Truck 1	Immediately - prior to entry by "fire attack."	Cut a 4 foot by 4 foot hole directly above the fire to relieve pressure and prevent a backdraft.	Which specific tool to use for cutting the hole. Which hose line to take up for protection. Who will handle each part of the assignment. Where to place ladders for access.

Objective	Assigned to	Time for Completion	Measurement(s)	Methods

RETIRED CURRICULUM

TOPIC: **Divisions of Firefighting**

TIME FRAME: :45

LEVEL OF INSTRUCTION: I

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will list the seven divisions of firefighting, provide examples of firefighting operations typical of each division, and identify the order in which these priorities are generally considered on the fireground.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 35.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 35
Layman, Lloyd, *Firefighting Tactics*
Coleman, *Management of Fire Service Operations*
Brunacini, *Fire Command*
Emergency Resource, Inc., *Fire Attack*

PREPARATION:

All emergencies require the performance of numerous activities or operations. The size and complexity of these operations will be based on the size and complexity of the emergency. This chapter provides an overview of major goals of fireground operations, keys to successful scene management and the divisions of firefighting.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Divisions of Firefighting

Page: SM 35.1

I. Major Goals of Fireground Operations

Question:
What are the four major goals at any fire incident?

A. 4 major goals

1. Firefighter safety
2. Occupant safety
3. Stop fire
4. Conserve property

II. Keys to Successful Scene Management

Question:
What are the three distinct phases of successful scene management?

A. 3 phases:

1. Think
2. Plan
3. Act

B. Think

1. "Open-ended" decision allow for expansion and reversal
2. Distinguish between facts and assumptions
   a) Factual info is often incomplete
   b) Assumed info is often all that is available
3. Be flexible
4. Require feedback and revise operations as needed

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
C. Plan 1. Base plans on info obtained during "think" step a) Goals 1) What has to be done first? b) Objectives 1) How is it going to be done? D. Act 1. Assignment of tactics to meet objectives 2. IC will be less involved in tactics on large fires	
	Page: SM 35.2
III. Tactical Priorities: RECEO	**Instructor Note:** RECEO comes from "Firefighting Tactics" by Lloyd Layman
A. Essential fireground divisions or priorities:	**Question:** What are the seven tactical priorities identified by RECEO?
1. Rescue 2. Exposure 3. Confinement 4. Extinguishment 5. Overhaul 6. Ventilation 7. Salvage	

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PRESENTATION	APPLICATION
	Question: How should these tactical priorities be ordered (prioritized) on the fireground?
B. Order of priorities 1. Divisions are listed by *general importance* 2. Generally performed in this order 3. Order may change with situation and resources 4. Priorities often overlap	
C. Rescue 1. Life safety is first priority 2. Not limited to "Rescue"	**Question:** What must firefighters think of ever before rescue?
a) Firefighter safety 1) Reasonable chance of successful rescue 2) Don't risk life for body recovery 3. "Rescue" operations will vary depending on: a) Size of the fire b) Type of structure c) Number and condition of victims d) Resources available 4. Examples: a) Single family dwelling at night 1) Standard search and rescue operations	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
b) Multi-story hospital	
1) Aggressive fire attack may be more effective	
2) Relocate beyond fire doors first	
3) Evacuation is a last resort measure	
D. Exposure Protection	
1. Keep fire from uninvolved areas	**Question:** What are some factors that determine how urgent exposure protection is?
2. Urgency depends on:	
a) Proximity of other structures	
b) Building construction	
c) Type of occupancy	
3. Exposure protection is a defensive action	
E. Confinement	
1. Keep fire small	
2. Prevent vertical and horizontal spread	
3. May involve offensive and/or defensive strategies	
4. May require use of built-in fire protection:	
a) Automatic sprinkler or extinguishing systems	
b) Fire doors and dampers	
c) Building ventilation systems	
F. Extinguishment	
1. The ultimate goal	
2. Usually requires water	
a) May involve other extinguishing agents	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
3. Offensive operation	
4. In a defensive attack, extinguishment may only be possible after the structure has burned down to a workable size	
	Page: SM 35.3
G. Overhaul	
	Question: What are the reasons for conducting overhaul?
1. Check for complete extinguishment	
a) Overhaul may be brief or lengthy	
b) May require special equipment	
2. Make the structure as safe as possible	
a) Restore utilities	
b) Remove an unsafe roof	
c) Arrange for contractor to secure perimeter	
3. Determine fire cause	
a) Don't disturb evidence	
b) May delay overhaul while investigator:	
1) Examines the area	
2) Takes pictures	
3) Collects evidence	
H. Ventilation	
1. Removes heat, smoke and fire gases	
2. Vital component of most other tactical priorities	
	Question: How can ventilation facilitate accomplishing other tactical priorities?

RETIRED CURRICULUM

PRESENTATION	APPLICATION
a) Ventilation may be needed for rescue	
1) Removing heat, smoke and fire gases	
• Increases victim's chances of survival	
• Makes it easier to advance	
b) Ventilation also:	
1) Provides safer working environment	
2) Helps extinguishment by removing heat	
3) Reduces overall damage:	
• Less heat and smoke	
• Less water needed for extinguishment	
3. Vertical or horizontal ventilation	
a) Decision based on safety	
1) Imminent backdraft - vertical	
2) Unsafe roof - horizontal	
b) Other factors:	
1) Height of the building	
2) Roof construction	
3) Access to roof	
c) Positive-pressure ventilation may be needed	
I. Salvage	
1. Done ASAP to minimize damage:	
a) Fire	
b) Smoke	
c) Water	
d) Other extinguishing agents	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Question: What are some ways in which salvage can be accomplished?
2. Cover unburned items and remove excess water	
3. Methods for protecting valuable contents	
a) Cover with salvage cover or plastic sheet	
b) Use cabinets or closets	
c) Take contents outside	
1) To a safe area	
2) To the building occupant	
4. Items of most importance to occupants:	
a) Valuable records	
b) Photos	
c) Items which cannot be replaced	
d) Personal computers and business equipment	
	Page: SM 35.4
IV. REVAS	
A. Used by several departments in Southern California	
	Question: What are the major differences between REVAS and RECEO?
B. 2 major differences between REVAS and RECEO	
1. In REVAS, ventilation is given a definitive spot higher on the priority list	
2. REVAS also distinguishes evacuation as a separate step	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Instructor Note: Refer students to Information Sheet #35.1 in their student manual for an overview of REVAS. Discuss how this alternative acronym might be used in the field. Ask students what system(s) they use in their departments. **Instructor Note:** Refer students to the Review Questions on page 35.7 in their student manuals.

RETIRED CURRICULUM

SUMMARY:

There are four major goals at any fire incident; provide for firefighter safety, protect endangered occupants, stop the fire, and conserve property. These can be accomplished by through a series of fireground divisions or priorities which Lloyd Layman defined with the acronym RECEO. Those divisions include rescue, exposure, confinement, extinguishment and overhaul. They are listed in their order of importance, and are generally performed in this order. Two additional divisions, ventilation and salvage, are incorporated into the fireground operations where appropriate. These tactical priorities often overlap. And, they may need to be accomplished in a different order depending on the situation and the resources available.

Another system, identified by the acronym REVAS, is used by several departments in Southern California. There are two major differences between REVAS and RECEO. In REVAS, ventilation is given a definitive spot higher on the priority list. REVAS also distinguishes evacuation as a separate step.

Individual departments may have their own systems which differ from these two. However, regardless of the system used, the fire officer must make sure that all essential fireground priorities are accomplished.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

RETIRED CURRICULUM

TOPIC: **Command and Control Components**

TIME FRAME: :45

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: A written quiz

Behavior: The student will identify and describe command and control components of fireground organization, chain of command, unity of command, span of control, division of labor, command structure, and supervision/leadership. The student will also identify the first-in officer's responsibility within the chain of command, and describe the principle of delegating authority.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, chapter 36.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES:

Command 1A Instructor Guide, Chapter 36
Coleman, *Management of Fire Service Operations*
Brunacini, *Fire Command*

PREPARATION:

Efficiency on the fireground depends on exercising command and control over resources. It doesn't "just happen" by itself, not in the otherwise chaotic presence of an emergency situation. The basic components of the command and control functions include Organization, Chain of Command, Span of Control, Unity of Command, Division of Labor, Command Structure, and Supervision or Leadership. This chapter will provide an overview of each of these components and how they fit into the Incident Command System used by the fire service.

PRESENTATION | APPLICATION

Command and Control Components

Instructor Note:
Emphasize that this chapter only provides a brief overview as to how various components fit into ICS. There is an entire class on ICS which is recommended for all fire officers.

Page: SM 36.1

I. Organization

A. Resources must be organized into a manageable entity

1. Gone are the days "freelancing"

2. An organizational structure:

a) Provides more efficient fireground operations

b) Better protects the safety of all personnel

B. This organization must be flexible

Question:
What are some of the advantages of ICS?

C. The Incident Command System:

1. Provides a template

a) A basic organizational structure

b) Tried and tested extensively on a variety of incidents of different sizes

2. Positions are designed to accomplish specific objectives

3. The structure is flexible:

a) Can grow in size and scope as the incident escalates

RETIRED CURRICULUM

PRESENTATION	APPLICATION
b) Can shrink again as the incident is brought under control	
c) Any department can adjust the command structure to accommodate their needs	
D. Training and practice is essential	
1. Most fires are relatively small in size	
a) Require only first or second alarm assignment	
b) Fireground organization remains small	
2. Personnel must practice ICS on a larger scale	
a) Table top exercises	
b) Actual drills	
E. There must be a written plan outlining:	
1. How various objectives will be met	
2. Resources available to the IC	
F. The "real" organization process is based on accomplishing objectives	
1. Not on just the organizational structure	
	Page: SM 36.2
II. Chain of Command	
A. Hierarchical structure that defines:	
1. Roles	
2. Relationships	
3. Authority of each member	
B. Different types of command structures are appropriate for different situations	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Instructor Note: Refer students to Figure 36.1 on page 36.2 in their student manuals. Emphasize that this is a very simplified look at the organizational structure
1. Most departments are organized like a pyramid a) Firefighters at base and fire chief on top	
	Instructor Note: Refer students to Figure 36.2 on page 36.2 in their student manuals.
2. On the fireground a) Engine and truck companies report to battalion chiefs or task force leaders	
	Instructor Note: Emphasize that this merely looks at a portion of the department. The org chart for the department as a whole might include positions for Fire Prevention, Training, Public Education, Fire Investigation, etc., depending on the size of the department.
3. With ICS companies or officers are designated by their functions or locations	
	Instructor Note: Refer students to Figure 36.3 on page 36.3 in their student manuals. This example may be used at a major wildland incident.

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
a) The structure will vary for different incidents: 1) Wildland fires 2) Ordinary structure fires 3) High rise fires 4) Hazardous materials incidents b) It can be modified easily depending on: 1) Type and complexity of the incident 2) Resources available	**Instructor Note:** Elaborate as appropriate on different structures.
C. IC must delegate tasks or objectives	
D. Chain of command facilitates communication 1. Vertical a) Information and orders transmitted down through the ranks b) Feedback or information transmitted upwards through supervisors 2. Horizontal or lateral between units	
E. Organization and chain of command are built from the bottom up 1. Officers arrive on scene in the inverse order of the department's rank structure a) First-in company officer has command authority until relieved by a senior officer	
F. First-in officer has definite responsibilities 1. Establish command by either: a) Assuming command upon arrival 1) Without hesitation	

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
b) Passing command to the next-in officer	
2. Conduct a thorough size-up	
3. Provide a report of conditions	
G. First-in officer is the foundation for the command structure that follows	
1. Must "set the stage" by taking appropriate actions	
2. That will facilitate the transfer of command	
H. Transfer of command	
	Question: What are some guidelines for transferring command?
1. Whether or not command is transferred will depend on:	
a) Extent of emergency	
b) Departmental policies	
2. Generally expected that a battalion chief (or other senior officer) will take command of a working structure	
a) But it cannot be assumed	
3. Command must be transferred with formal acknowledgment	
4. First-in officer must advise the senior officer of:	
a) Conditions on the fireground	
b) What's been done so far	
c) Established objectives	
5. First-in officer must then be prepared to function in any capacity as needed	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

6. If command is not transferred, the fire officer must:

   a) Continue to fulfill the command role

   b) Ensure appropriate objectives are being met

Page: SM 36.4

III. Span of Control

A. Any supervisor can effectively manage a limited number of subordinates

Question:
What is the recommended span of control?

B. Five to one ratio

1. Generally accepted in the fire service
2. Used as a basis for ICS

C. When the span of control is exceeded

1. A manager's effectiveness begins to drop
2. It's more difficult to keep track of people and activities
3. Communication begins to suffer
4. If emergency is intense enough, responsibilities become overwhelming for the fire officer

D. Span of control is frequently exceeded in the initial stages of a major emergency when:

1. The situation is most intense
2. Necessary resources are not yet on scene

Instructor Note:
Have students cite examples of personal experiences where this has happened and discuss the eventual outcomes.

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
E. Fire officer must create sections, divisions or groups as appropriate to ensure proper span of control 1. Incident Command System	
IV. Unity of Command	**Question:** What does Unity of Command mean?
A. Each individual can only effectively work for one manager 1. Must know who he or she reports to B. Officers should generally avoid giving orders to firefighters that are not assigned to him or her 1. Except when someone's life is endangered C. Unity of command is often violated under the stress of emergency situations 1. Particularly with an excess of fire officers D. Violating unity of command causes several problems 1. Firefighters become confused about: a) What they should be doing b) Who they actually report to 2. Often fireground activities are less efficient 3. Fire officer's expectations are not met because firefighters are being pulled in other directions	*Page: SM 36.5*
V. Division of Labor	**Question:** What are some guidelines for dividing labor?

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
A. Work can be divided as personnel become available 1. Each person or crew may focus on a specific objective B. Fire service is divided into line and staff functions 1. Line personnel a) Responsible for suppression activities 2. Staff personnel a) Management or information oriented b) Fill more of a support role on the fireground 1) Interfacing with the media 2) Procuring supplies and equipment 3) Liaison with other agencies	**Question:** How is labor divided under ICS?
C. Division of labor under ICS 1. Sections - management elements: a) Operations b) Planning c) Logistics 2. Divisions - based on geographical areas: a) Perimeter of the structure b) Area or floor within a building 3. Groups - based on functional responsibilities: a) Rescue b) Ventilation c) Medical	

RETIRED CURRICULUM

PRESENTATION | APPLICATION

VI. Command Structure

A. Fire officer must establish a command post

Question:
What are some guidelines for establishing the command post?

1. In a convenient location
2. A safe distance from the emergency

B. Command post should be announced over the radio

1. Location
2. Name by which it will be identified

C. Incident Commander will then be referred to as:

1. "(Incident Name) Command," or
2. "(Incident Name) IC"

D. Features of the command post

1. A place for IC and officers to confer and make decisions
2. A vantage point from which to see
3. Should be well lit
4. Should provide some shelter from rain and wind
5. Access to a radio and cellular phone
6. CP may be simple or elaborate

E. Locating command post and officers

1. CP locations may be established based on:
   a) Pre-fire plans
   b) Department SOPs

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. First-in officer will usually establish CP at: a) The front of the building, or b) Some logical "front" of a fire outdoors 3. At a highway incident or wildland fire, consider: a) Direction of fire spread b) Wind direction c) Access 4. Second command officer is usually placed to the rear of the fire to provide a more complete overview of the fire area 5. Additional officers will be appointed to: a) Sections or divisions by location, or b) Tasks/objectives	
VII. Supervision/Leadership	**Question:** What is involved in supervision?
A. Supervision on the fireground includes: 1. Establishing objectives 2. Allotting resources 3. Providing data 4. Directing tactical operations 5. Monitoring results (getting feedback) 6. Identifying and correcting small problems before they become large ones	

RETIRED CURRICULUM

SUMMARY:

Efficiency on the fireground depends on exercising command and control over resources. There are several components of the command and control functions including organization, chain of command, span of control, unity of command, division of labor, command structure and supervision/leadership. The fire officer should be familiar with each of these components and how to apply them on the fireground.

EVALUATION:

A written examination.

ASSIGNMENT:

To be determined by the instructor(s).

RETIRED CURRICULUM

PRESENTATION	APPLICATION
	Question: What is involved in leadership?
B. Leadership involves: 1. Looking out for welfare and safety of personnel 2. Setting an example 3. Keeping personnel informed of overall progress and strategies 4. Developing sense of responsibility in subordinates	
	Question: What are some guidelines for delegating authority?
C. Guidelines for delegating authority: 1. Delegate authority: a) Within the chain of command b) To individuals who are capable of the tasks 2. Individuals to whom authority is delegated must be given: a) Adequate authority to function on their own b) Clearly defined parameters so that they don't run into problems c) Adequate resources to complete the task or assignment 3. Fire officer remember that ultimate responsibility cannot be delegated away a) Must ensure that all objectives are being met, even when using others to accomplish those objectives	
	Instructor Note: Refer students to the Review Questions on page 36.7 in their student manuals.

RETIRED CURRICULUM

SIMULATION EXERCISES

APPENDIX

A. Simulation Overview

B. Skull Session Exercises

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TOPIC: **Simulation Overview**

TIME FRAME: 1:00

LEVEL OF INSTRUCTION: II

BEHAVIORAL OBJECTIVES:

Condition: Simulation exercises

Behavior: The student will describe three types of simulation exercises: skull sessions, audio visual or two dimensional simulations, and gaming tables. Students will also identify why simulation is used, how simulation is done, the roles or positions that may be utilized during simulation, the do's and don'ts of simulation and how to rate simulation exercises.

Standard: With 70% accuracy, according to the information provided in the Command 1A student manual, appendix A.

MATERIALS NEEDED:

White board or chalk board with markers
Command 1A Instructor Guide and Student Manual
*Audio/visual (slide/overhead projectors)
*Overhead transparencies
*VCR and monitor

*These materials are optional

REFERENCES: Command 1A Instructor Guide, Appendix A

RETIRED CURRICULUM

PREPARATION:

At the onset of this course, we identified three broad goals for the curriculum:

1. Identification of those factors which affect fireground operations,

2. Introduction of those managerial techniques necessary to control fireground operations, and

3. Providing the opportunity to employ these techniques in simulated fireground activities.

Hopefully, the first two goals have been attained, and we are now prepared to undertake the third.

RETIRED CURRICULUM

PRESENTATION | APPLICATION

Command 1A Simulation Overview

Page: SM A.1

I. Introduction

A. The following unit is simulation exercises

B. Requires a great deal of participation

C. Opportunity to apply command skills in a dynamic, challenging atmosphere

D. Simulation is the most important activity in this course

1. Experience

2. Knowledge

E. This is an overview and orientation to simulator process

Instructor Note:
Encourage students to ask any questions that they might have throughout the orientation.

F. The following information was developed by Chief Ronny Coleman (current California State Fire Marshal) to orient students to simulation

Page: SM A.2

II. What is Simulation?

A. Method of exercising fire command practices and principles in a classroom environment

B. Uses mechanical and audio-visual means to produce an emergency

C. Opportunity to size-up incidents and conduct fireground tactics and strategy in a controlled environment

D. Situations are created and modified in response to actions taken

RETIRED CURRICULUM

PRESENTATION	APPLICATION
III. Kinds of Simulation Are There?	
A. How many different kinds of simulation are there?	
1. Dozens of methods depending on different:	
a) Fire departments	
b) Fire problems	
c) Training situations	
2. This program focuses on three types:	
a) "Skull Session" simulations	
b) Audio visual or 2 dimensional simulations	
c) Gaming tables	
B. Skull Sessions	**Question:** What Are Skull Sessions?
1. Technique of analyzing fireground situations	
a) Real and hypothetical	
b) Through sketches and diagrams	
c) To develop action plan for specific problems	
2. "Brainstorming" environment to review:	
a) Facts	
b) Possibilities	
c) Probabilities	
3. Group decision-making prior to working on a dynamic simulator	
4. "Skull Sessions" term coined by "American Fire Journal"	

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PRESENTATION	APPLICATION
C. How Are Skull Sessions Used? 1. Skull sessions are distributed to teams: a) Minimum three people b) Maximum eight people 2. Time frame allotted for exercise a) Usually at least 20 minutes b) Up to 45 minutes 3. Once groups review problem: a) Each group discusses its results with class b) A spokesperson describes: 1) Group's assessment of problem 2) Action plan they would have implemented 4. Afterwards, class may develop consensus regarding: a) Pertinent problems b) Course of action 5. Participants should identify major objective using concepts presented in class	
	Question: How Are Skull Sessions Developed?
C. Development of Skull Sessions 1. Derived from: a) Real or hypothetical emergencies b) Critiques of real emergencies c) Pre-fire plans 2. Must have sketch or diagram outlining problem	

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PRESENTATION | APPLICATION

3. Pertinent facts left for each group to decide

   a) Examples:

      1) Size and complexity of response group

      2) Hydrants

      3) Access

   b) Done on purpose for flexibility based on:

      1) Resource capabilities

      2) Specific problems or concerns

Page: SM A.3

C. Two Dimensional Simulations

Question:
What are two dimensional simulations?

1. Based on different premise

2. 2-4 audio/visual means used to cast image on screen

   a) Allows participants to visualize scope and breadth of problem

3. Include a means for:

   a) Demonstrating exterior of fire problem

   b) Locating fire

   c) Demonstrating smoke spread and locations

4. AV equipment shows clues on exterior of building as to what happened on interior

5. Realism difficult to generate

   a) Participants must use imagination

   b) Needs extensive pre-planning and control by training officer

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1-7

PRESENTATION	APPLICATION
6. Other sensory inputs are used a) Sound effects b) Simulated radio and communication systems 7. High degree of interaction between controller, participants and the exercise itself a) Controller changes visual image according to participant actions 8. Not limited in scope of problems a) Almost any emergency can be represented b) There are very effective programs for: 1) Watershed fires 2) Structural fires 3) Aircraft crashes 4) Hazardous materials incidents	
	Question: What are the advantages of two dimensional simulation?
9. Advantages a) Flexibility b) Reasonable in cost c) Relatively portable 1) Can be taken to the audience 2) Good for: • Rural training environments • Widely spread out fire departments • Training at company level d) Relatively little set up time	

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PRESENTATION	APPLICATION
e) Practical	
f) Within capabilities of fire service	
g) Closely related to familiar delivery methods	
1) Slides	
2) Movies/videos	
	Question: What are the disadvantages of two dimensional simulation?
10. Disadvantages	
a) Limited number of details can be presented	
b) Not well suited to simulate community wide disaster:	
1) Earthquake	
2) Flood	
3) Mass casualty incident	
c) Vulnerability of projection equipment	
1) Bulbs	
2) Lenses	
3) Equipment failures	
d) Substantial investment	
1) $3,000 to $4,000	
	Instructor Note: The bulk of this material was developed for two dimensional simulation.
D. Gaming Tables	
	Question: What are gaming tables?

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PRESENTATION	APPLICATION
1. Often used with two way simulators	
2. Physical layout on screen is represented using:	
a) Plywood, or	
b) Two dimensional map or plot plan	
3. Props demonstrate placement of equipment	
a) Model fire trucks	
b) Twine to represent hose lines	
c) Simulated ladders	
4. Combination of game tables and two dimensional simulators allows:	
a) IC to develop mental picture	
b) Many exercises in short time periods	
1) Up to 4 exercises in two hours	
	Page: SM A.5
IV. Why Do We Simulate?	
	Question: What are the reasons to use simulation?
A. Reasons to use simulation	
1. Improve command, control and management skills	
a) Routine and unusual emergencies	
b) Situations that happen infrequently	
2. Increase knowledge of fireground conditions and fire behavior	
a) Situation can be modified and predicted in response to actions	

RETIRED CURRICULUM

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PRESENTATION	APPLICATION

3. Allow firefighters to experience emergency in target hazards

   a) Prior to a real incident

   b) Officers can evaluate procedures and decisions

4. Improve communication skills, radio procedures

B. Simulator designed to:

1. Bridge gap between theory and practice
2. Evoke responses under stress conditions
3. Shorten training period
4. Expose participants to multiple situations

C. Purpose of exercises:

1. Expose trainee to many problems and conditions
2. Exercise trainee's ability to coordinate many units
3. Give trainee opportunity to evaluate decisions
4. Evaluate practices and procedures
5. Provide opportunity to try different things

V. How Is Simulation Done?

A. Simulator consists of:

1. Overhead projectors
2. 35 mm projectors
3. Mechanism for reproducing "fire" or "smoke"
4. Audio system that simulates a radio frequency

B. 35 mm slide projected on screen provides setting

1. Single or multiple family dwelling
2. Industrial or commercial structure

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PRESENTATION	APPLICATION
3. Vehicle	
4. Target hazards	
a) Lumber yard	
b) Water shed situation	
c) Aircraft	
d) tank farm	
C. Almost any fire situation can be created	
D. At first, only projected image of location is seen	
E. Overhead projector is used to project additional image	
1. Operator creates visual impressions by removing light trap	
a) Red for fire	
b) Gray for smoke	
2. Simulates smoke or fire coming from	
a) Buildings	
b) Windows	
c) Roofs	
3. Operator can manipulate fire behavior	
a) In response to:	
1) Actions taken by participants	
2) Directions from instructional staff	
b) Simulating:	
1) Fire spread	
2) Fire control	

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
4. Communication system simulates communications: a) Between officers b) With outside agencies c) With dispatch center	
5. Amplification system used for sound effects: a) Background noises b) Fire c) Sirens d) Explosions	
6. Display board shows location: a) Equipment b) Lines are laid c) Ventilation d) Other items as appropriate	
7. This is three dimensional on a projected system	*Page: SM A.6*
VI. Environment A. Participation must be realistic B. Exercise depends on trainee's ability to "fill" role C. Not a typical "classroom" environment D. Remove all materials not necessary to exercise	
VII. Role Playing A. Each participant assigned a "role" 1. Incident Commander	

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PRESENTATION	APPLICATION
2. Company Officer	
3. Chief Officer	
4. Dispatcher	
5. Facilitator	
6. Others as appropriate	
B. Each role player expected to carry out responsibilities and duties of assigned position	
1. Give appropriate orders	
2. React and communicate as on a real incident	
3. Use accepted fireground operations and tactics	
C. Each role player is provided with a scenario	
1. They should respond based on their own appraisal	
2. Responses should be a realistic application of their own experiences and knowledge	
	Page: SM A.7
VIII Positions That May Be Utilized During Simulation	
A. Umpire - Director (Fire God)	
1. In charge of all arrangements	
2. Determines reasonableness of actions taken by trainees and interprets them in control simulation	
3. Coordinates between role players to maintain exercise objectives	
4. Determines appropriateness of situation inputs	
5. May alter course of exercise to adjust for apparent misjudgment of trainees	
B. Fire and Audio Simulation Operator	
1. Programs spread of fire and smoke	

RETIRED CURRICULUM

PRESENTATION	APPLICATION
2. Increases or decreases effects as directed by Umpire - Director	
3. Monitors audio simulation	
4. Contributes audio simulation according to advice of Umpire - Director	
5. Advises Umpire - Director of developments which may affect exercise	
C. Dispatcher - Record Keeper	
1. Dispatches suppression resources on request of trainees	
2. Furnishes information on resources available, weather, etc. on request of trainees	
3. Maintains records of:	
a) Resources	
b) Assignments	
c) Roles	
d) Role players	
e) Estimated times of arrival	
4. Advises proper individual of role events due to occur	
5. Monitors simulated circuits and controls tape recorder to document chronology of events	
D. Players - Trainees	
1. Act within latitude of exercise	
2. Upon request, furnish information according to instructions	
3. Perform as would be expected for the roles	

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PRESENTATION | APPLICATION

4. Contribute information based on known facts

   a) If facts are not available, simulate information as reasonably as would be expected under emergency conditions

E. No "impossible" emergency situations

F. Position Relationship

1. Always in accordance with "Span of Control"

Page: SM A.9

IX. Do's and Don'ts of Simulation

Question:
What are some guidelines (do's and don'ts) for conducting simulations?

A. Do

1. Use representative cross section of occupancies
2. Have all handout material ready
3. Establish realistic time tables
4. Have results correspond to actions taken
5. Teach one technique at a time
6. Build from simple to complex
7. Use slides and diagrams of local problems when possible
8. Allow participants to analyze exercise
   a) They will probably find most errors
9. Allow participants to become familiar with equipment prior to exercise
10. Have sufficient number of facilitators
11. Ultimately show success
12. Check out equipment before class

RETIRED CURRICULUM

PRESENTATION	APPLICATION
B. Don't	
1. Don't overwhelm participants with extraneous information or problems	
2. Don't build problem too fast	
3. Don't overcrowd simulation area	
4. Don't embarrass participants	
5. Don't build in traps	
6. Don't use unrealistic situation	
7. Don't escalate problem beyond control of students	
8. Don't concentrate on only one type of problem	
	Page: SM A.9
X. Critiques	
A. Critique is held after simulation	
B. Each role player:	
1. Reports on responses and actions	
2. Explains why decisions or theories were applicable	
C. Class members participate in question and answer session	
D. Instructor will normally evaluate entire problem	
E. Sometimes radio communications are recorded and played back to substantiate and evaluate:	
1. Decisions made	
2. Orders given	
3. Basic radio procedures	
4. Other pertinent facts	
F. Keep critiques constructive	
1. Nothing learned by arguing	

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PRESENTATION

APPLICATION

XI. Rating Simulation Exercises

A. An Incident Commander should:

1. Remember fundamentals of communication

2. Think and give orders in terms of broad objectives

3. Teach and expect subordinate officers to accept and respond to orders given in broad terms

4. Remember strategy is an overall plan

5. Remember tactics are efforts directed toward accomplishment of plan

6. Maintain a concise thought process and leave details to firefighters

7. Remember large fires are like small ones, expect they need more personnel, equipment and time

8. Remember large fires need more fire flow applied at greater distances

Instructor Note:
Refer students to the Simulation Fact Sheet on page A.10 in their student manuals. A copy is included at the end of this lesson plan.

Instructor Note:
Students will be using one of the two rating sheets on pages A.13 and A.14 in their student manuals. (Copies are included at the end of this lesson plan.) The information below provides a brief recap of some of the management items necessary for exercising successful fire command.

Page: SM A.11

RETIRED CURRICULUM

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PRESENTATION	APPLICATION
9. Assign control criteria based on objectives a) With dimensions of quantity, quality and time 10. Encourage companies to stay together 11. Encourage company officers to use judgment and assume a command role if needed 12. Bear in mind specific objectives to be met: a) Rescue of occupants b) Life safety to firefighters c) Exposure protection d) Confinement e) Extinguishment f) Overhaul g) Ventilation h) Salvage 13. Avoid "tunnel vision" 14. Consider factors when establishing objectives: a) Type of construction b) Size and direction of fire travel c) Nature of occupancy d) Safety of citizens and firefighters e) Potential of emergency f) Priorities of operations needed g) Weather, traffic, water supply h) Manpower, equipment and resources 15. Set up command post and make location known	

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PRESENTATION	APPLICATION
16. Establish strong command structure and maintain unity of command 17. Re-deploy companies as needed	
	Page: SM A.15
XII. Skull Sessions A. 15 case studies may be used during simulation exercises 1. Instructions will be provided B. Each case study consists of: 1. Description sheet 2. Plot plan	

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SUMMARY:

Simulation is a method of exercising fire command practices and principles in a classroom environment through the use of mechanical and audio-visual means. It is done to improve command, control and management skills; increase knowledge of fireground conditions and fire behavior; allow firefighters to experience simulated emergencies in target hazards; and improve communication skills and radio.

This chapter focused on three types of simulation: skull sessions, two dimensional simulations and gaming tables. It's an introduction to the simulation exercises that follow in this class.

EVALUATION:

A written examination. Classroom exercises.

ASSIGNMENT:

To be determined by the instructor(s).

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Simulation Fact Sheet

During an emergency response, basic information/data is readily available to the response personnel. In simulation, however, much of the information must be provided by the instructor or dispatcher, or gleaned from the visual display.

By completing this fact sheet, as the information becomes available, you create a usable reference for use during the exercise.

Note: The exercise may not involve all of the information cited below.

1. Nature of Emergency: _____
2. Address: _____
3. Type of Occupancy: _____
4. Level of Response (response info): _____
5. Day/Date/Time of Report: _____
6. Weather Conditions _____
7. Additional Info from Dispatcher on R.P.: _____

	Engines	Trucks	Squads	V.F.C.	Officers	Water Tenders
1st Alarm						
2nd Alarm						
3rd Alarm						

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Simulation Rating Sheets
Rating Sheet #1

I. Size-Up

1. Evaluation of the situation
2. Clarity of initial radio report
3. Notification of mutual aid - A.R. - Chief Officers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Poor Average Above Average

Comments: _____

_____

II. Tactics and Strategy

1. Rescue
2. Exposures (Internal and External)
3. Placement of hose lines, ladders, equipment
4. Ventilation

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Poor Average Above Average

Comments: _____

_____

III. Use of Apparatus and Personnel

1. Realistic use of resources
2. Incoming units
3. Assignment of officers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Poor Average Above Average

Comments: _____

_____

IV. Control

1. Self control
2. Control of the problem

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Poor Average Above Average

Comments: _____

_____

Rater: _____ Incident Commander: _____

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Simulation Rating Sheet
Rating Sheet #2

During this exercise, the Incident Commander will be rated on specific characteristics important in controlling an emergency suppression situation. You, as the rater, are asked to make specific comments as necessary on each of the areas and indicate the level of performance.

Incident Commander's Specific Area of Performance	Rating			
	Below Average	Average	Good	Excellent
1. Making an initial size-up				
2. Giving clear, concise orders that contain an objective				
3. Tactically deploying personnel and equipment to the best advantage				
4. Establishing objectives based on time, quality and/or quantity				
5. Effectively coordinating the emergency situation with all units				
6. Effectively setting up fireground organization utilizing ICS principles				
7. Effectively communicating with other personnel				
8. Thinking in terms of broad objectives utilizing good management techniques				
9. Overall performance				

Comments: _____

_____

_____

_____

_____

_____

Rater: _____

RETIRED CURRICULUM

Fire Command Case Study #1

Nature of Problem: Structure fire, single family residence.

Facts Known Prior to the Emergency: This is an ordinary single-family dwelling with a wood frame-stucco exterior and shake-shingle roof, located in a medium-income area. The home is about 20 years old, and the apartment house next door is less than 5. The house under construction on the other side is in the framing stage.

Information Upon Dispatch: A police officer reports by radio that he sees smoke from a residence at 110 San Rafael. He does not respond to further radio calls. Fire equipment is dispatched. The time is 1230 hours. The date is October 15.

Observed Upon Arrival: A large glow can be seen by the first-in company. Fire is first observed coming from the front door and the kitchen. The peaked roof in the living room area is well involved. A police officer is observed in the driveway trying to restrain an elderly lady who is visibly upset. An elderly man wrapped in a robe is standing across the street, but is not moving or talking. Several people are observed trying to remove vehicles from the apartment garages which face the alley. Wind speed and direction are not a factor.

The fire is confined to the living room and kitchen at this time. It has not extended into the bedrooms, but they appear to be very hot and charged with smoke. The hall doors are ajar. The two occupants are art collectors, and many of the objects in the home are quite valuable. A cash box with over $1,000 in small bills is found in the back bedroom.

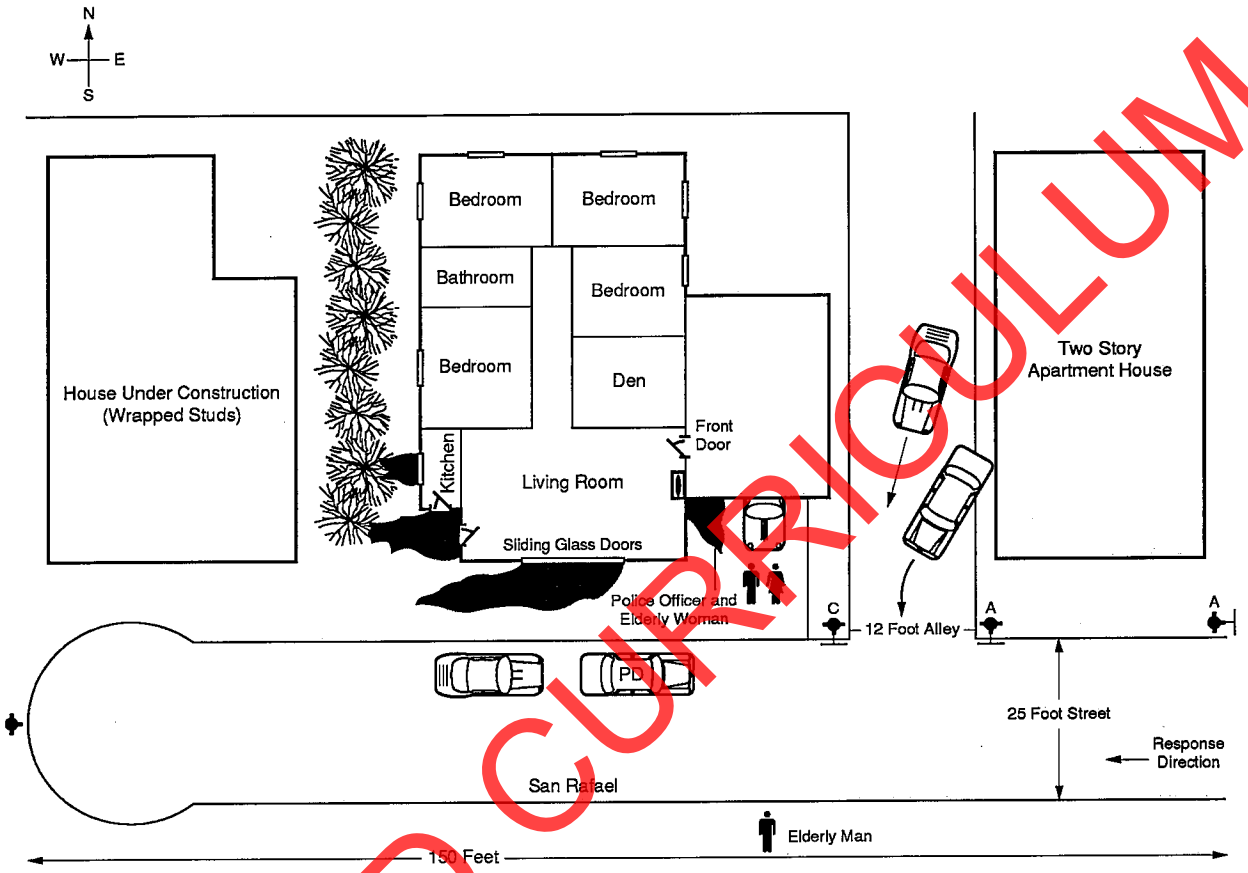
While you were making your call, the bushes located at the west end of the house ignited. They are a type of eucalyptus and burn freely. The vehicles exiting from the garage get involved in a slight fender bender while trying to avoid colliding with the fire equipment. The man who is standing on the other side of the street, who is one of the occupants, faints from shock after control is achieved.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #1



RETIRED CURRICULUM

Fire Command Case Study #2

Nature of Problem: Smoke inside a single-family residence.

Facts Known Prior to the Emergency: This is a typical wood frame-stucco residence with a shake-shingle roof. It is about 15 years old and was built as a single custom home, not as a part of a tract. The occupants recently remodeled the house and added a new patio roof.

Information Upon Dispatch: You are responding to a smoke investigation. The occupant could smell smoke, but could not locate it. The time is 1400 hours. The date is December 12.

Observed Upon Arrival: Smoke is seen coming out from under the shingles on the front of the roof. The smoke is whitish and not very thick. The occupants are standing in the door, beckoning you to come up the walkway. They do not appear to be too upset. Just as you start up the steps, you hear a loud yell from the woman. The message is indistinguishable. She exits from the front door, and a grayish-white smoke follows her. You can see from the door all the way into the living room, which appears clear. The hall doors are ajar. The smoke seems to be coming from an area to the right of the entrance hall.

The fire is in the attic, the result of a recently repaired heating vent not being properly restored. The fire is burning freely in the attic and has dropped burning material down onto the hallway carpet. The two occupants are art collectors, and the house is richly furnished with antique furniture. The repair in the next building over is a potential exposure problem when ventilating. It is merely a covering of tarpaper over a plywood roof. The tiles have been removed.

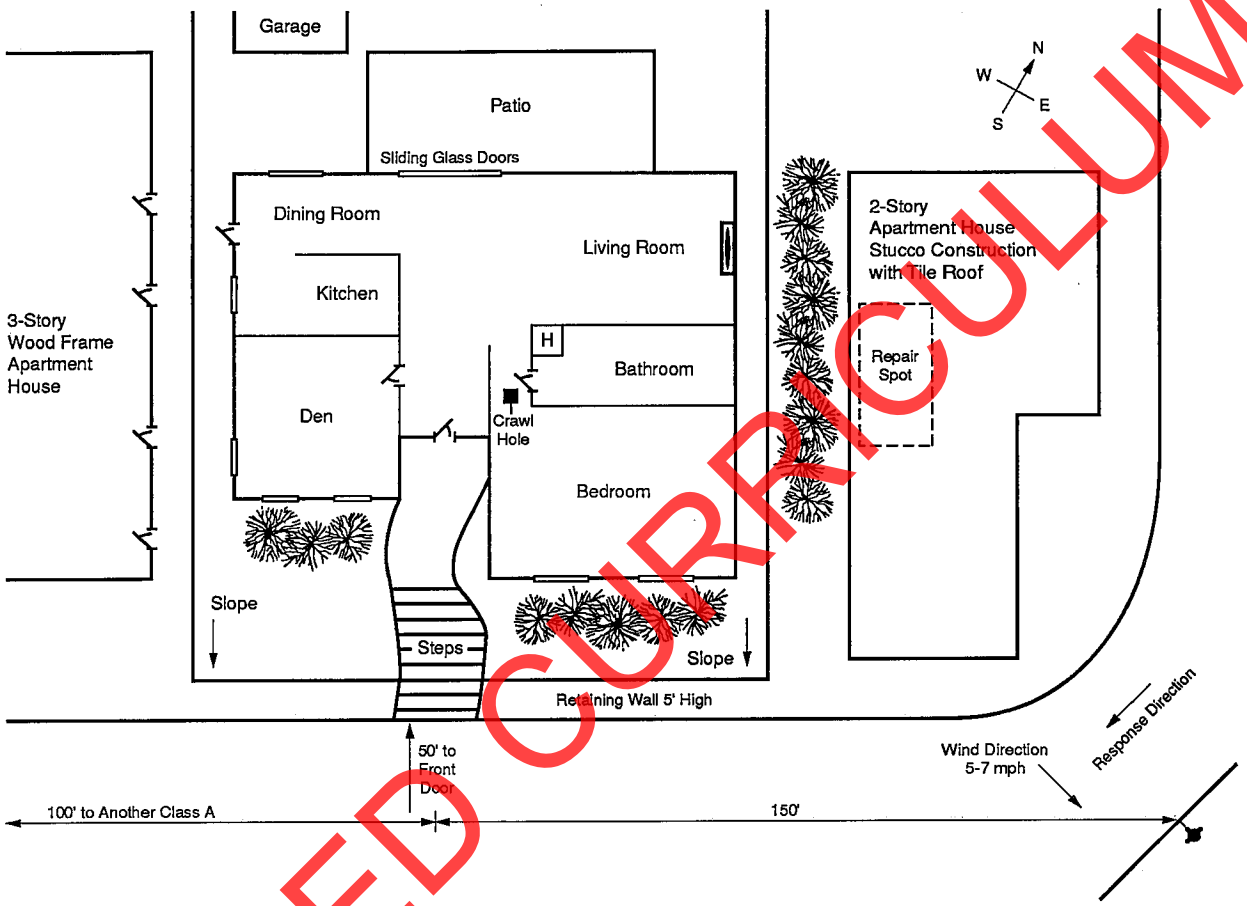
Laddering this house is difficult in the front because of the slope. The roof is weak in spots and a person can put his foot through it if he isn't careful.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #2



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Fire Command Case Study #3

Nature of Problem: Structure fire, single family residence.

Facts Known Prior to the Emergency: This is an area of one-family dwellings. Most are wood frame with some brickwork. The roofs are mixed tile or shake. The area is upper income and abuts a golf course.

Information Upon Dispatch: A vehicle pulls into the fire station and the driver reports that a house is burning "right down the street." He offers to guide you because he doesn't know the address. The time is 1209. The date is September 27.

Observed Upon Arrival: You can see smoke as soon as you leave the station. As you round the curve at the end of the block you observe fire coming out of what appears to be a sliding glass door. Smoke is not coming from any other window or door yet. Broken glass lies all over the sidewalk. A completely nude man is bleeding from numerous cuts and scratches. He is babbling incoherently and smells of liquor. A large crowd is gathering, and one civilian is attempting to raise the garage door. He is shouting something about a valuable car in the garage. Suddenly a small foreign car pulls up and a young woman jumps out of the car, running rapidly toward the house.

The front door is locked and has to be forced open. The fire is confined to the bedroom at this point, but is reaching out into the hallway. There is no attic. The victim is, as might be guessed, intoxicated. The fire actually started in the wall from a short in the electrical system. It then spread to the bed. The victim was awakened by one of his dogs. He subsequently threw a chair through the plate-glass door and exited that way. The roof is burning freely, and the house is completely charged with smoke. Visibility is zero. The two dogs are found dead in the living room.

The vehicle in the garage is a brand new Porsche. The girl who arrives runs right by the victim and attempts to enter the house. She starts screaming and crying that her mother may be in there. The mother is not there, in reality, but arrives on scene about 45 minutes later.

Piles of rocks and debris alongside the house and garage make for treacherous walking in this area. The roof fire gets all the way over the living room.

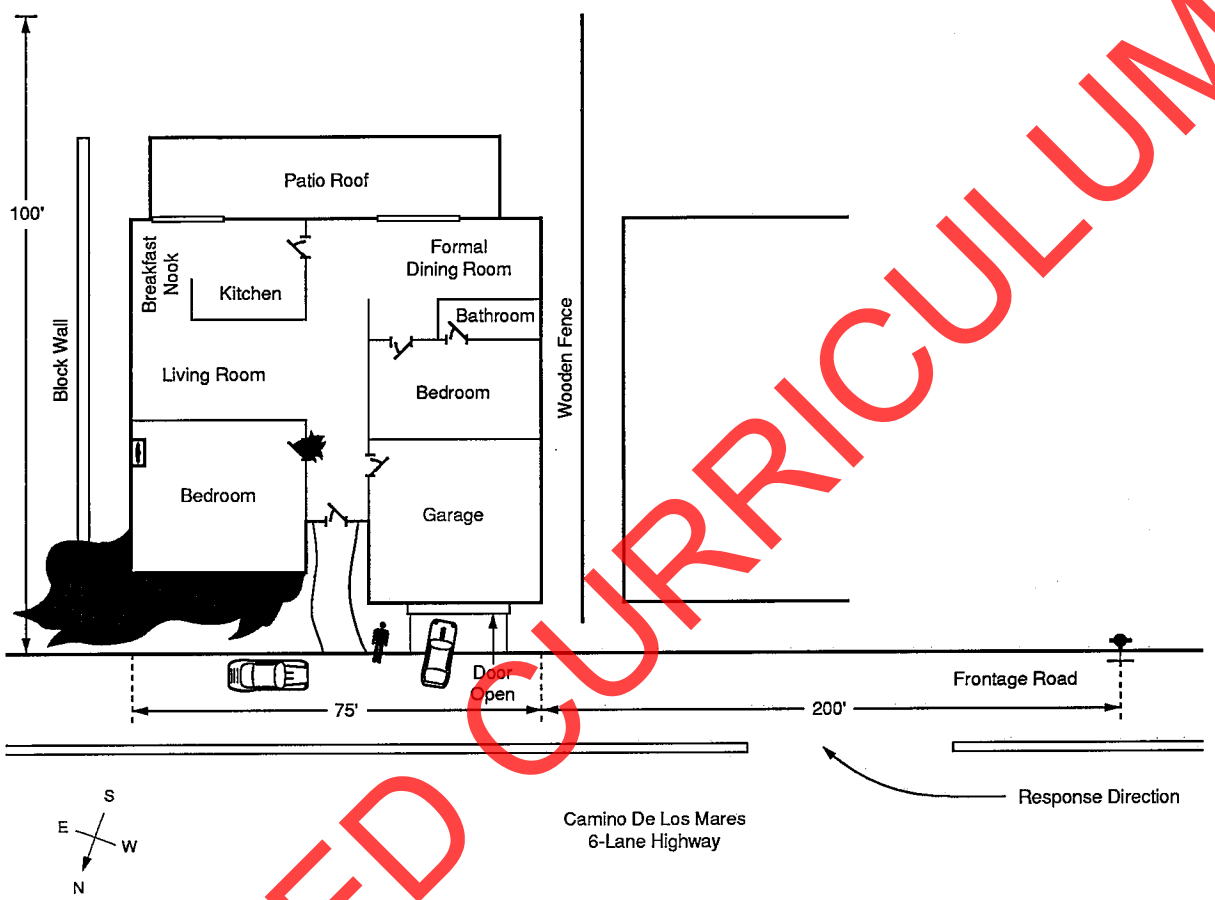
How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

457

Case Study #3



RETIRED CURRICULUM

Fire Command Case Study #4

Nature of Problem: Structure fire, garage.

Facts Known Prior to the Emergency: This condominium tract is about 9 years old. It is wood frame with a stucco exterior and an asphalt-shingle roof. The occupants are known to be predominantly middle class. It is also well known that there are access problems into the garage areas and that some of the occupants are engaged in illegal second businesses (such as car repair and car spray-painting) in their garages.

Information Upon Dispatch: Reported structure fire, no details. The time is 1510. The date is May 4.

Observed Upon Arrival: A large column of smoke is visible. The roof of the garage is almost completely consumed by the time you get there. The door on the garage is down but is burned through in spots. A vehicle is half out of the garage next door. The column of flames is over the top of the two-story apartment building directly to the rear. The smoke is obscuring your vision of the apartment directly behind the garage. There is hardly anyone in the street. Just as you arrive at the scene the fire seems to intensify and a low "whump" comes from the involved garage. The "whump" later proves to be exploding aerosol cans.

The man who owns the garage manufacturers dune buggies inside. The garage contains 35 to 40 gallons of gasoline and a large number of magnesium wheels which react violently to water. The fire walls on both sides of the garage hold, but smoke gets into the interior of the second-floor condominium. The curtains in the kitchen begin to burn. There is no one home in that unit.

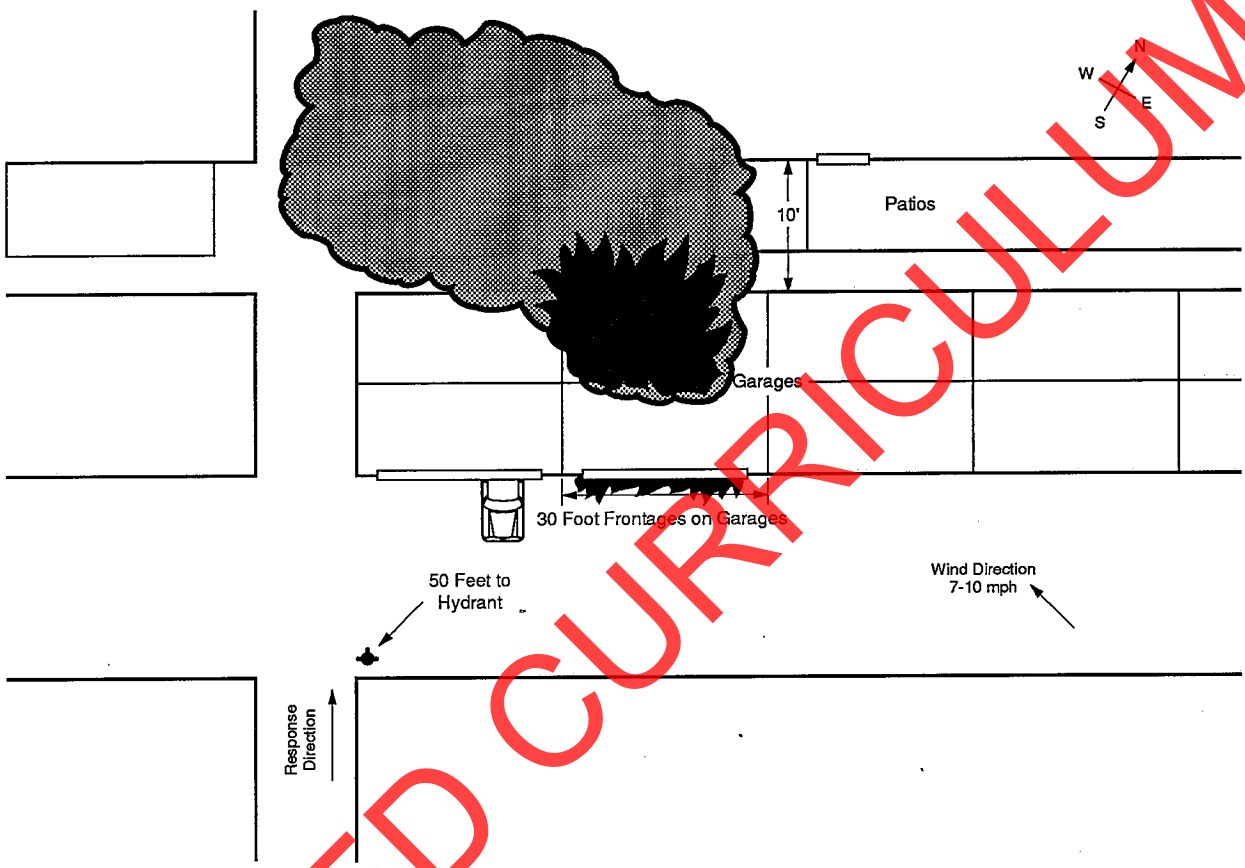
How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

461

Case Study #4



RETIRED CURRICULUM

462

Fire Command Case Study #5

Nature of Problem: Structure fire, condominium.

Facts Known Prior to the Emergency: The Monte Vista Condominiums are approximately 10 years old. They are occupied mostly by elderly people. The structures are wood frame and stucco, with mixed roof types. The homeowners' association in the area is known to be hostile to both the police and fire departments because of recent tax increases for these services.

Information Upon Dispatch: A police officer on the scene has reported that the condominium at 737 Monte Vista is well involved. The time is 0430. The date is June 15.

Observed Upon Arrival: You can see the glow of the fire as soon as you leave the station. A large crowd greets you upon arrival. They are agitated and accuse you of a delayed response. A police car is parked in front of a hydrant, but no police officer is in sight. One elderly man is seen walking down between garages. He is dressed in a bathrobe, has an armful of papers, and appears dazed. Fire is coming from three windows and has broken through the roof. The fence, patio roof, and bushes between 737 and 735 are burning freely. An elderly lady is observed at the gate leading to the steps. She has some garden furniture. It has gotten hung up on the gate and she is trying to free it.

There is a considerable delay of alarm on this fire. The elderly gentleman in the bathrobe later informs firefighters that he had gone to bed at 2200 and woke at 2300 to the smell of smoke. He had extinguished a fire in the sofa and went back to bed.

Smoke is showing inside the bedroom of 739 because of poor construction of the separation wall. The bushes are burning freely, and the entire roof of 737 is burning within 2 to 3 minutes of arrival. The den, bathroom and kitchen suffer the most structural damage. The fire burns through the wires outside the kitchen and live wires drop onto the sidewalk in that area. Because gas is fed into these apartments from overhead, the gas line begins to leak in the attic above the entrance to the bathroom.

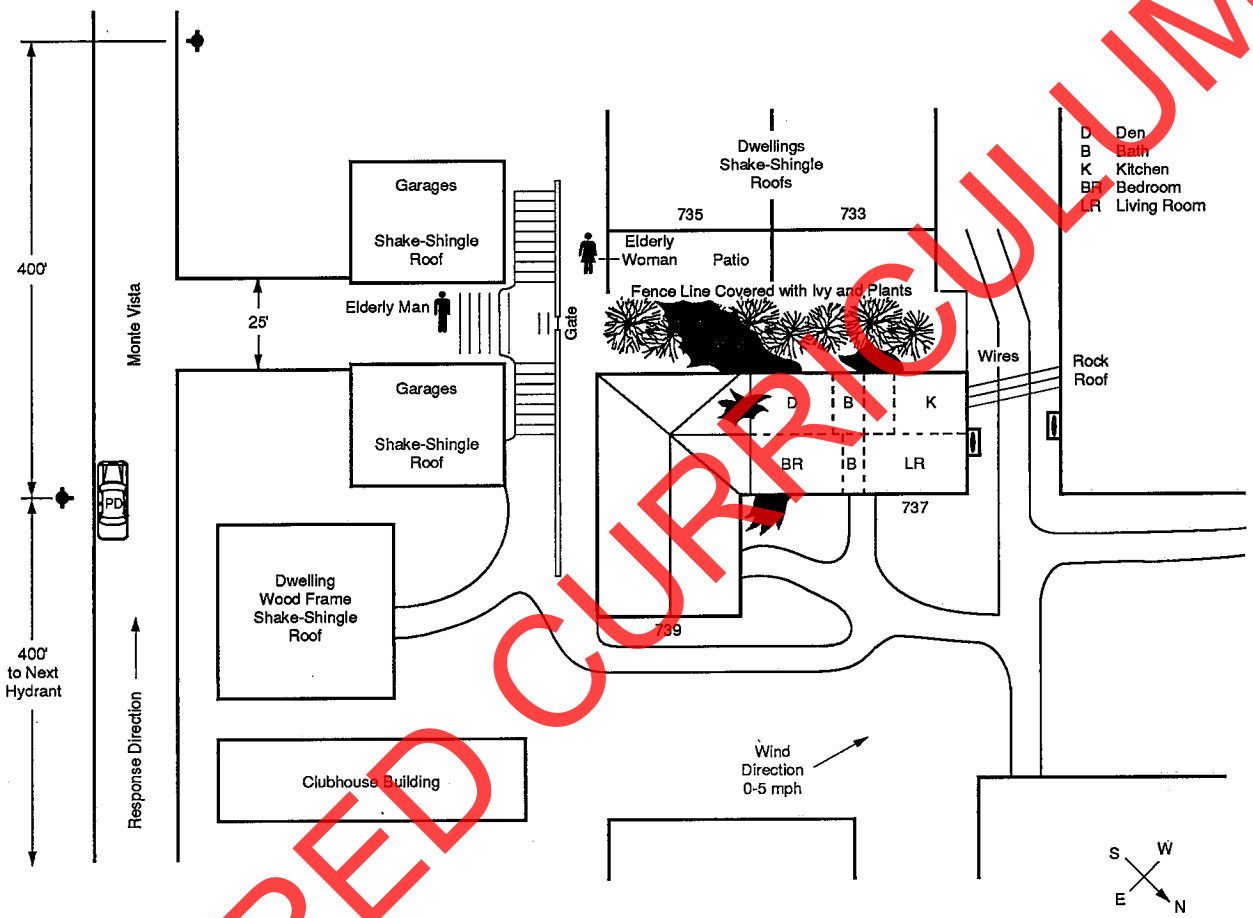
The occupant is a retired engineer. He advises firefighters that his files on the family genealogy are in the bedroom. The police officer is found trying to evacuate people from 733 and 735. The female occupant of 735 becomes distraught and has to be hospitalized.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #5



RETIRED CURRICULUM

464

Fire Command Case Study #6

Nature of Problem: Structure fire, county club.

Facts Known Prior to the Emergency: The country club is brand new. It is a two-story wood-frame building with a drop ceiling about 24 inches deep. The roof has a parapet 6 feet deep that creates the appearance of being tile. The flat surface is hot-mopped. The facility is city-owned, but operates with a lease. The building is not sprinklered.

Information Upon Dispatch: You are responding to a reported structure fire. The information is from an employee of the clubhouse. The time is 1320. The date is March 7.

Observed Upon Arrival: Large volumes of jet-black smoke are boiling up over the parapet. The smoke almost obscures the whole southeast corner of the building. There are not many cars in the parking lot. A busboy from the restaurant inside advises you that a group is meeting in the banquet room and has not exited. You do not observe any smoke at all upon entering the building. The place seems to be doing business as usual. Golfers in the lounge and restaurant do not appear alarmed.

The banquet room is full of police chiefs. It's their monthly meeting, and they regard the evacuation order as a practical joke on the part of the local fire chief. They weren't convinced until firefighters started poking holes in the drop ceiling.

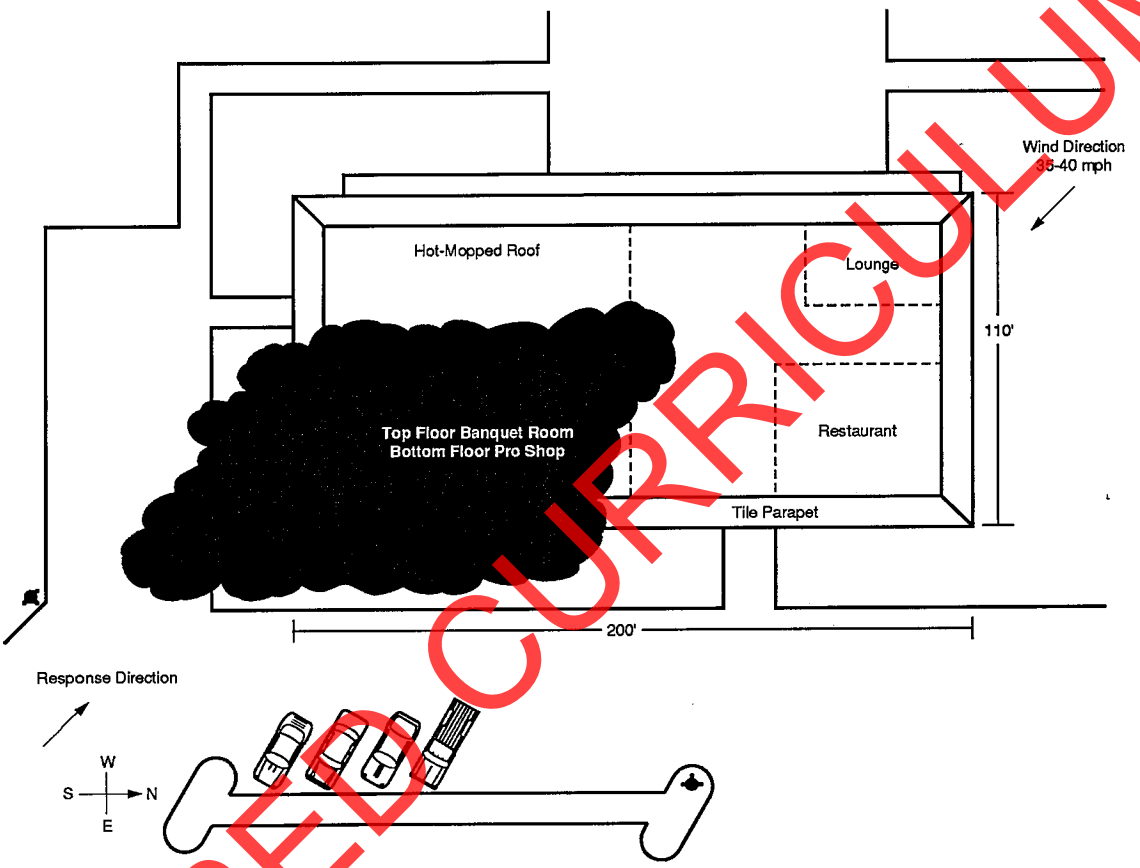
The fire is actually on the roof. It was started by a hot water heater. Its flame was inverted by the wind, and the tarpaper ignited. It burned across the roof and into the dead space behind the parapet. Eventually it wound up in the small dead space above the banquet room ceiling, where it reversed direction and burned back toward the lounge area. Cross ventilation is almost impossible in the structure because there are no windows on two sides. The other windows face the course and none of them are operable. The owners are concerned about water damage to clothing in the pro shop below.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #6



RETIRED CURRICULUM

Fire Command Case Study #7

Nature of Problem: Structure fire, fiberglass manufacturing plant.

Facts Known Prior to the Emergency: This plant manufactures fiberglass shower stalls and rest rooms for use at construction sites. It uses all the chemicals associated with fiberglass including acetone, methyl ethyl ketone, and resin. The facility uses an air-powered "chopper" gun to apply the gas and resin. It has a mediocre fire prevention record and is known to use unskilled labor.

Information Upon Dispatch: The smoke column is first observed by fire companies. They dispatch themselves. The time is 1500. The date is June 12.

Observed Upon Arrival: Large volumes of thick, black smoke are rising from the structure straight up into the air. Fire has broken through the roof in the rear of the building. Thick smoke, but no fire, can be observed at the rear of the structure. Flame is impinging on the tops of the second row of drums. A stack of lumber under the window is burning freely. Several trucks and cars are parked next to the side access area. What appears to be a group of employees are clustered against the building next door.

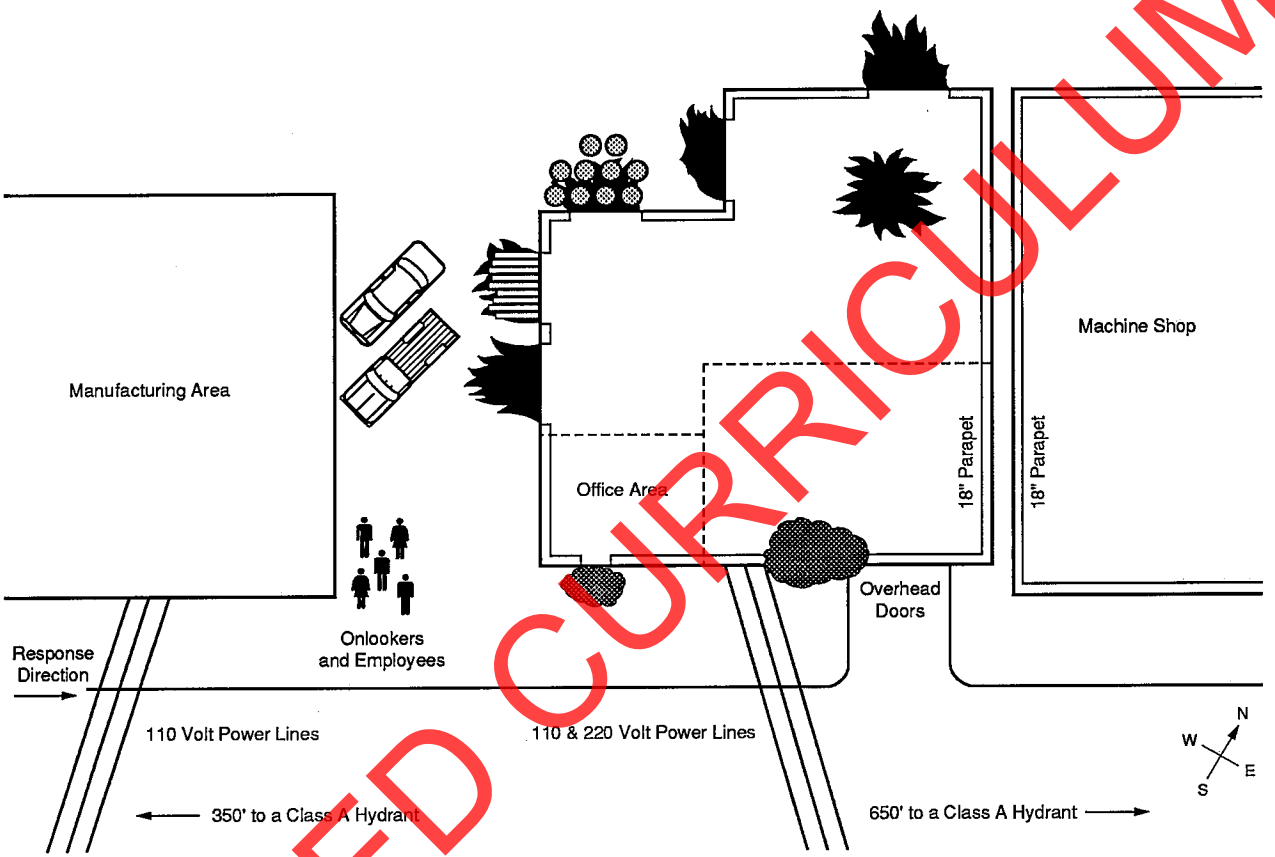
The drums in the rear are a real problem because they are only partially full of their products, acetone and resin. The wires above the street burn through and drop onto the street. The fire is very hard to knock down in the rear of the building because the occupants had not cleaned up the fiberglass debris for several weeks. The building is a total loss.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #7



RETIRED CURRICULUM

Fire Command Case Study #8

Nature of Problem: Explosion and fire at a chemical plant.

Facts Known Prior to the Emergency: The El Blanko Chemical Plant redistills solvents after industrial use. The building is of concrete tilt-up construction with a wood-joisted plywood-tarpaper roof. The entire area is primarily industrial with some mixed residential occupancies. The owner is a well-known local chemist. The building is sprinklered.

Information Upon Dispatch: The dispatcher receives a report of an explosion followed by fire at the plant. He reports numerous follow-up phone calls. The time is 1516. The date is April 4.

Observed Upon Arrival: An apparent explosion has destroyed the roof of the building. One tilt-up section is lying on the access roadway. All the walls of the plant are bulging. All other sections of the building have shattered glass, broken signs, etc. The main explosion area is involved in fire, its contents and structural members lying in huge piles and burning freely. The sprinkler bell is ringing loudly, but it's obvious that the piping is destroyed. Large volumes of water are running down the access roadways. Wires are down and the natural gas cannot be shut off due because of damage to the meter. There are two injured men lying in the street, which is loaded with people. Many are cut from broken glass. Police are on the scene.

The explosion was caused by a runaway reaction of the chemical plant's distillation equipment. It destroyed the sprinkler system.

The plant is still full of drums of solvent and chemicals. Identification of the chemicals is made difficult by the fire damage and the debris. The number of injured from glass and bruises is not as large as first appeared. Only a half-dozen required medical aid. A body was later found under the wall that had fallen down.

The fire did not get into Unit A or B, but did get beyond the damaged wall into other areas of the chemical plant.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #8

RETIRED CURRICULUM

470

Fire Command Case Study #9

Nature of Problem: Structure fire, warehouse.

Facts Known Prior to the Emergency: The occupancy is a glass jar manufacturing company. The construction type is concrete block wall on three sides. The roof is steel truss covered with plywood and tarpaper. The building is fronted with frame-stucco. It is only partially sprinklered. The company uses a night watchman service and the usual shift of workers is about 100. There is no fire brigade. The available fire flow is 10,000 gpm.

Information Upon Dispatch: The dispatcher notifies you of the alarm, which came from the night watchman. He reports numerous calls from the area. All reports indicate a very bad fire. The time is 1913. The date is October 29.

Observed Upon Arrival: Prior to arrival you can see large volumes of smoke. Upon rounding Florence and Roseberry you can see that the building has ventilated itself. Warehouse Section A is involved. The sprinkler system alarm is not ringing. There is a large crowd, but no one offers you information or identifies himself as an employee. The factory section contains a bottle-making machine that takes at least 30 minutes to shut down. It is not involved yet. The rated fire doors between all sections of the warehouse cannot be readily observed. The crowd and traffic attracted by the fire continue to grow.

The biggest problem is keeping the fire out of the glass-making equipment, which is extremely expensive. The equipment requires very long shut-down and startup times. The sprinkler system was working. However, the fire was set by an arsonist and quickly overwhelmed the sprinkler system.

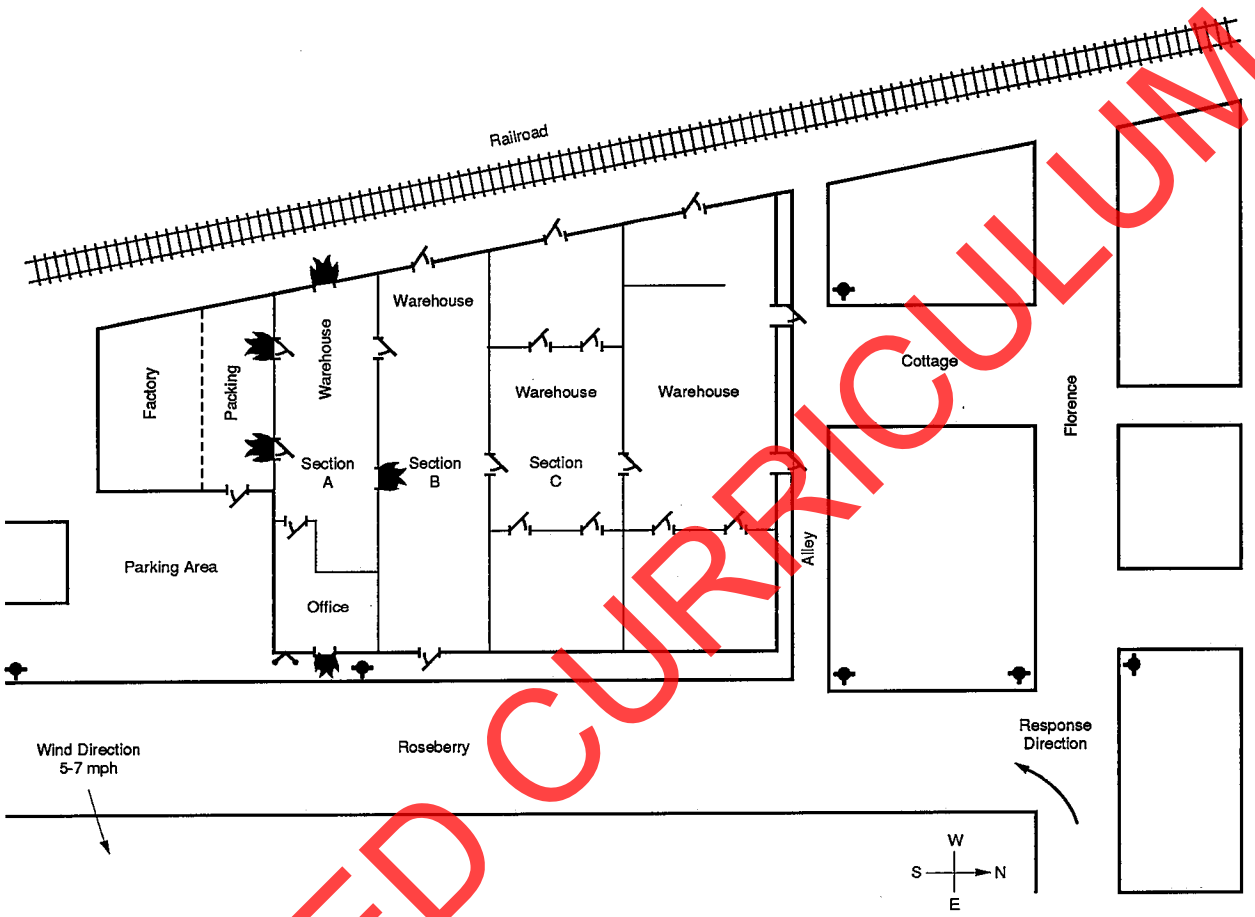
The fire eventually required a 5,000 gpm applied fire flow for 80 minutes (450,000 gallons). The concentrated fuel load and high values make this loss quite severe, about $350,000.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #9



RETIRED CURRICULUM

472

Fire Command Case Study #10

Nature of Problem: Leaking gas in the vicinity of an antique store.

Facts Known Prior to the Emergency: The area is hilly and contains mixed commercial and residential occupancies. The antique store has an excellent inspection record, but the living quarters upstairs are not routinely checked. The usual occupants are military personnel from a nearby base and their dependents.

Information Upon Dispatch: You are dispatched as a single-engine response to a smell of gas in the area. There are no other details. The time is 1930. The date is July 21.

Observed Upon Arrival: A man waves you down in the street and tells you that a car has rolled down from the carport and knocked over a gas meter. You observe a late-model sedan that has jumped the guardrail and knocked the house meter off about 4 inches above the ground. The car's engine was not running. There is very loud hissing sound. All windows of both floors of the building are wide open. The bystander advises you that he is not the owner of the vehicle and has not seen the owner. Several trash cans are scattered about, some jammed under the rear wheels of the car.

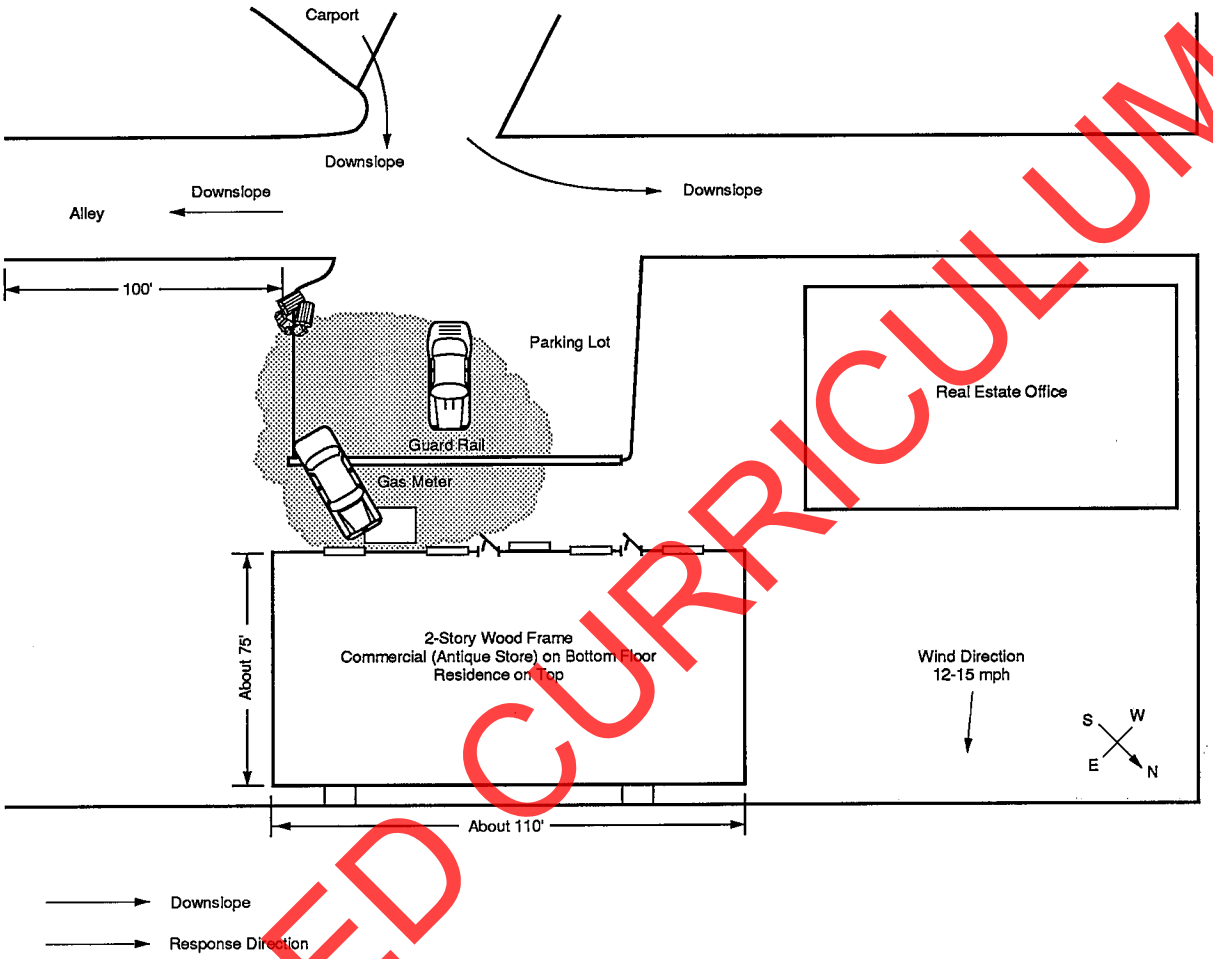
The antique store and apartments above are occupied and have to be evacuated. The entire structure is full of the odor of natural gas, but there is no clue as to its concentration. The gas meter's valve is broken off almost at ground level and a plug cannot be driven into it because the underside of the vehicle prohibits its placement. The car must be hauled off with a wrecker.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #10



RETIRED CURRICULUM

Fire Command Case Study #11

Nature of Problem: Structure fire, mobile home.

Facts Known Prior to the Emergency: The Seashore Colony Trailer Park is about 12 years old. Most of the trailers are used for vacation or weekend housing, but a few are occupied year round. The trailers are all 60 feet long and 20 feet wide. There is a limited access gate into the area. The park is bordered on one side by railroad tracks and on the other by the ocean.

Information Upon Dispatch: A police officer reports sighting smoke and fire over the bushes in the area of the trailer park. A few moments later, dispatch receives a confirming call of an explosion and fire. The time is 1530. The date is January 8.

Observed Upon Arrival: Visibility from the road is limited because of trees, but a very large column of smoke and fire can be seen. Four house trailers are involved already. Two are burning; two are fully charged with smoke. A car is also burning. There is a strong smell of natural gas. Bubbles are forming in standing water on the street. The fire has ignited the trees along the road, and the overhead wires are burning and falling. A fire ball exists at the end of trailer #91. There are a few occupants to be seen.

The two trailers on either side of #91 and #92 burst into flames almost instantly upon the arrival of the first-due company. Trailer #89 ignites with explosive force less than 2 minutes later. The overhead wires continue falling into the road. As lines are being laid to the fire, a passenger train approaches from the southeast. It is traveling at about 55 mph.

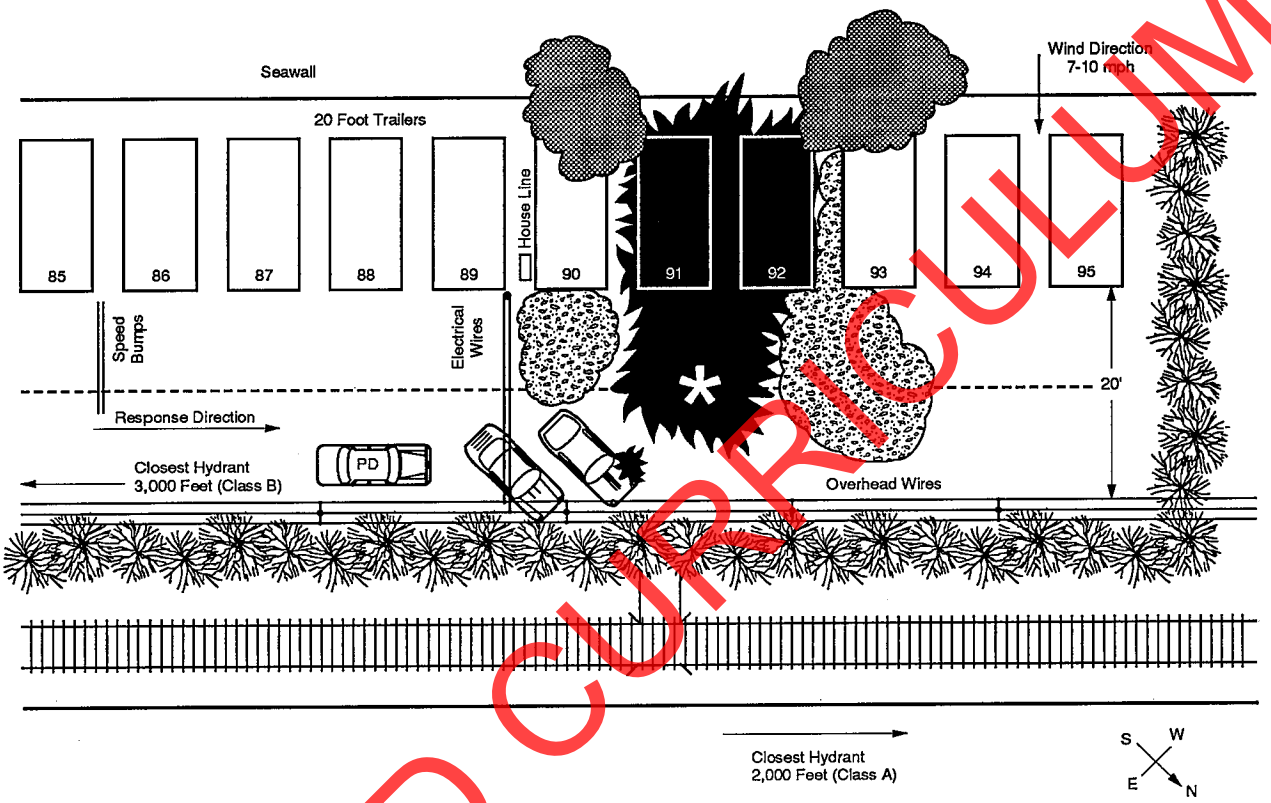
The fire ball in the street cannot be extinguished. It is being caused by a leak in an 18 inch wide pressure main (600 psi) that is buried about 8 feet under the street. The gas is leaking upward and is actually burning through a hole about 29 inches in diameter in the asphalt (indicated by the asterisk [*] in the diagram on the following page). Trailer #94 starts to burn about 10 minutes after arrival. Flames are seen under the trailer and can be reached only by pulling off the skirt around the trailer. The fire is gas fed.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #11



RETIRED CURRICULUM

Fire Command Case Study #12

Nature of the Problem: Fires in multiple vehicles.

Facts Known Prior to the Emergency: Main Street is a very busy 8-lane surface road that links the entire city's street network. It has a posted speed limit of 45 mph. Atom Street is a 6-lane surface road that feeds a junior college and funnels traffic into residential areas. The road surface is asphalt and is in excellent condition.

Information Upon Dispatch: You are responding to a reported vehicle fire in front of Kinney's Shoe Store. A loom-up can be seen for blocks. The time is 1845. The date is September 11.

Observed Upon Arrival: You see 6 passenger vehicles fully involved in fire. They are scattered all about and seem to have been struck from the rear. They are all in the left-turn pocket. At least five victims are observed lying either in the road or on the median strip. Most of them are being attended by civilians. A woman wearing what looks like a nurse's uniform advises you that Victim A is in critical condition. Gasoline is seen burning in the gutter against the median strip and flowing generally down slope. The first 4 vehicles in line are not burning, but they are damaged. Just as you pull up, the gas tank on the second vehicle from the front ruptures and intensifies the fire significantly.

This accident was caused by the last vehicle in line striking the stopped cars at a high rate of speed. Victim A was the driver at fault; he died on the scene. Other victims require medical aid and treatment at the scene.

Gasoline tanks exposed to high heat continue to rupture until fire streams are applied. Two other vehicles are ignited before the initial attack can be executed.

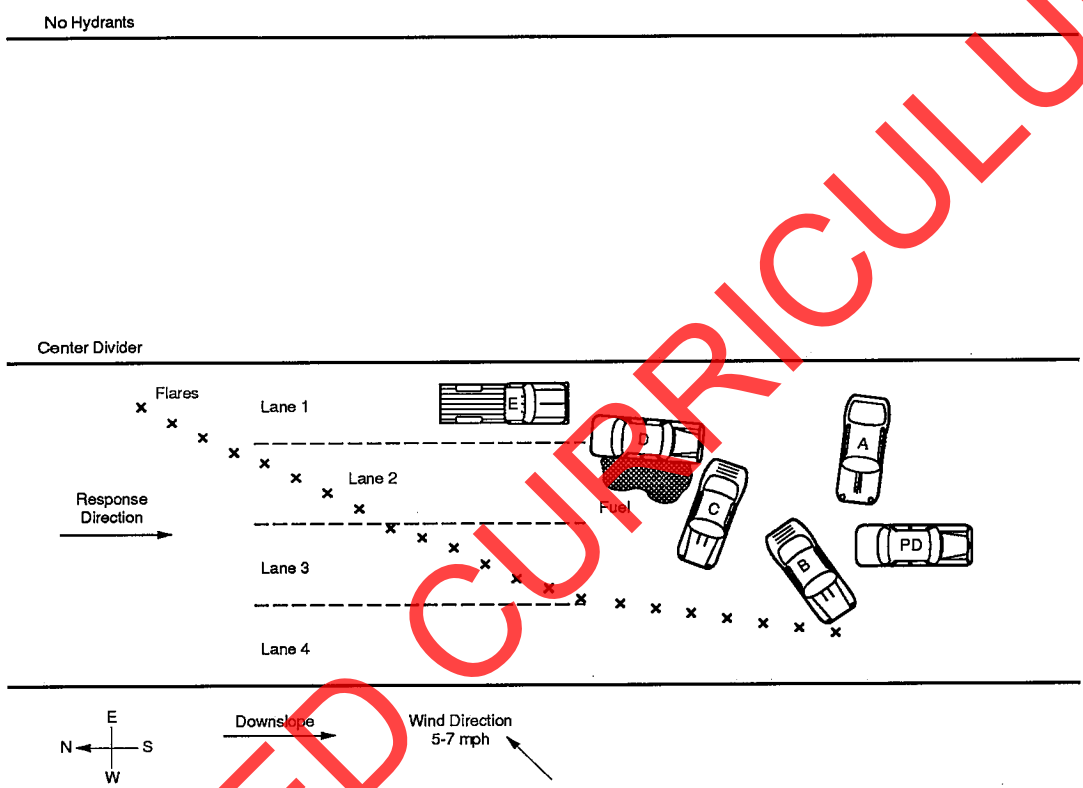
How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

477

Case Study #12



RETIRED CURRICULUM

Fire Command Case Study #13

Nature of Problem: Structure fire, hotel.

Facts Known Prior to the Emergency: This seven-story hotel was constructed in 1912. The upper five floors are residential. The bottom two floors are commercial. There are numerous elderly and low-income occupants, normally around 100 people. The building has a very bad inspection record, and the management is uncooperative. There is a dry standpipe. The open stairwells go from the basement to the fifth floor.

Information Upon Dispatch: The alarm came by telephone from a neighboring apartment house. The time is 1343. The date is December 2.

Observed Upon Arrival: Fire is showing at the northern and eastern sections of the building. It appears to have gone through the roof already. Flames are coming from numerous windows. The second floor windows next to the fire escape are full of fire, cutting off escape. Fifteen to 20 people are shouting from windows or hanging from ledges. One man is seen hanging from a bed sheet from a third floor window. On the sixth floor, fire is showing at the northwest corner of the building. Approximately 10 people can be seen on the roof of the court area. The second through fifth floors of the south side of the court area have smoke showing, but not fire. People are using the fire escape there. Wind speed is negligible.

This fire was set by an arsonist. All of the floors on the north wing collapse soon after the arrival of the fire companies. Inside access to the fire is impeded when the stairway in the center of the building collapses, injuring several firefighters. Eight firefighters are burned by the sudden reversal of flames. The fire is so intense at the rear that entry is deemed impossible by one of the chief officers. Large embers begin to drive from the hotel and endanger other structures.

Rescue work involved the removal of 40 people. Eighteen others died.

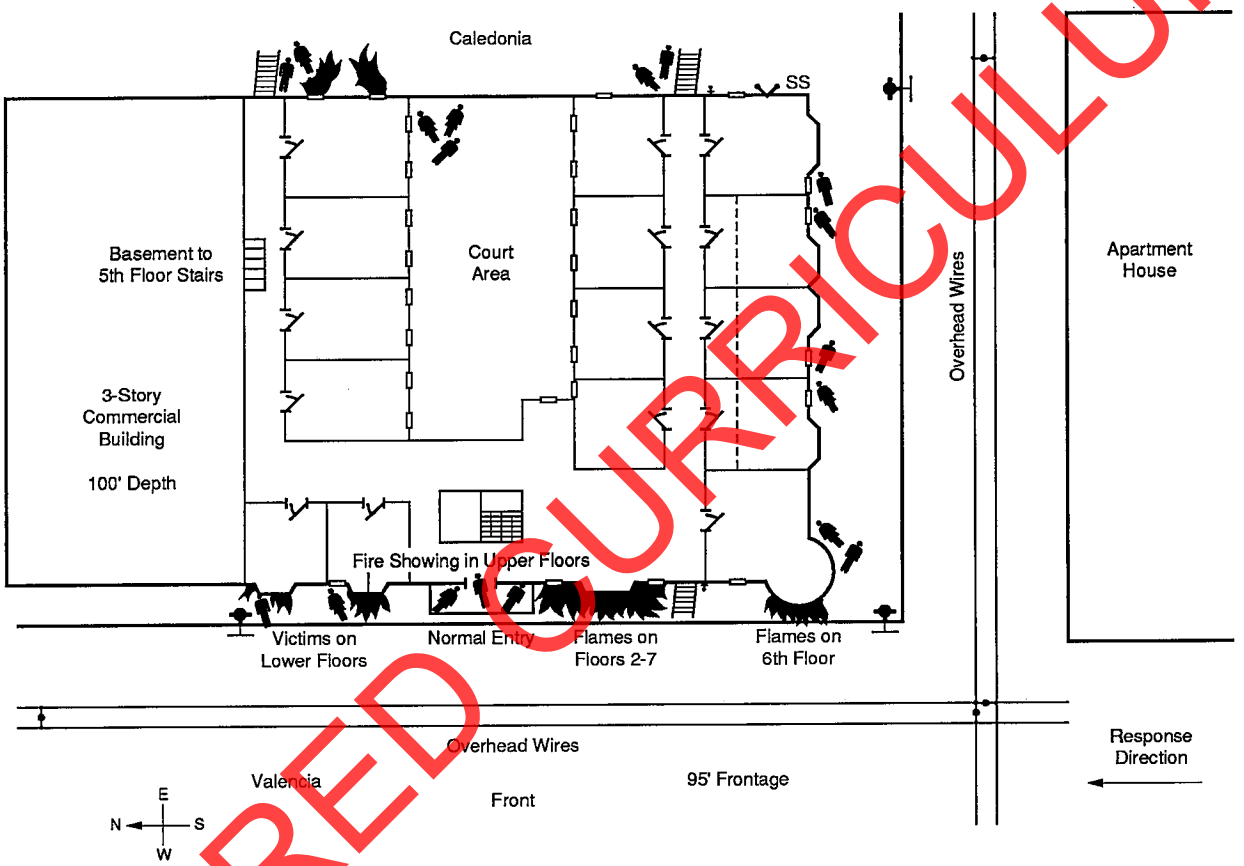
How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

47

Case Study #13



RETIRED CURRICULUM

Fire Command Case Study #14

Nature of Problem: Fire at a tank farm.

Facts Known Prior to the Emergency: This is a bulk plant that refuels tank trucks. The front portion is a service station and the rear is a small tank farm. The tanks are all horizontal cylinders and contain a variety of fuels, mostly gasoline, solvents, and kerosene. The owner-manager has always kept his place up to code and has been very cooperative in the past.

Information Upon Dispatch: You are responding to a reported gasoline tanker fire. While en route you are informed that structures are also involved. It is 1400 hours on a hot July day.

Observed Upon Arrival: A large volume of fire is showing. The front end of a tank truck can be seen on the loading dock. A badly burned man is found in front of the building. The fire is obviously being fed more and more fuel as it starts to flow out of the loading dock area and straight down into the street. Storm drains are located to either side of the driveway. The flow is steady and moving down slope right at the pump island as you arrive. There are numerous onlookers, but they are driven back to the opposite site of the street because of the heat. Hydrants are available on both sides of the block.

The key to this incident is the fact that the fire is pushed back under the tanks. They overheat, and the subsequent rupture and rocketing of the tanks cause many deaths.

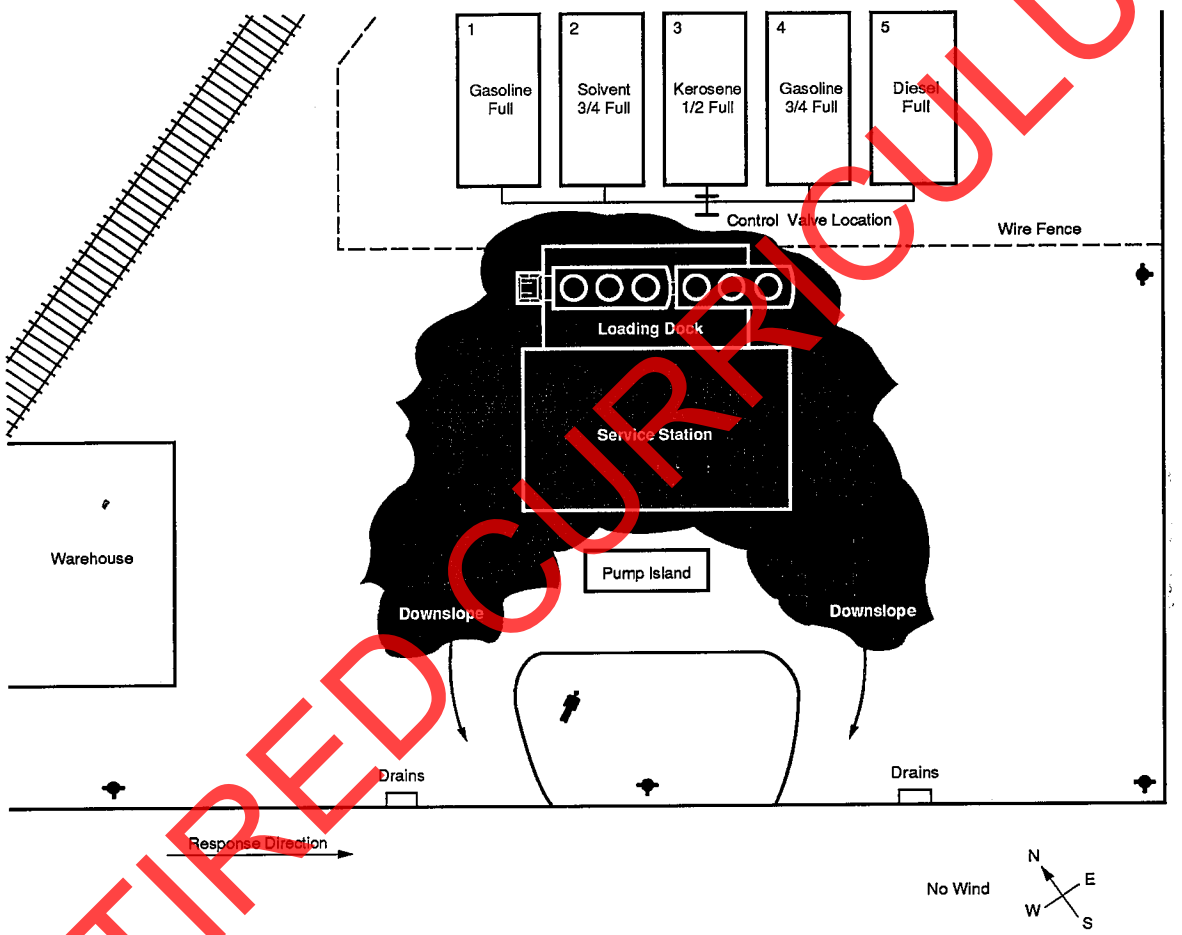
"Analysis of a Bulk Plant Fire," a film provided by the American Petroleum Institute, is highly recommended for a complete review of this incident.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #14



RETIRED CURRICULUM

Fire Command Case Study #15

Nature of Problem: Structure fire, high rise.

Facts Known Prior to the Emergency: The Golden Towers is an 18-story senior citizen's complex. All occupants are supposed to be ambulatory. The normal occupant load is 30 to 45 occupants per floor. It is of concrete and steel construction and was built three years ago. The building has no sprinklers. There are two risers on the standpipe. There is a complete fire alarm system with an annunciator panel in the lobby. There is a manager on duty 24 hours. The elevators are manufactured by Otis. The occupants are disdainful of evacuation and fire drills.

Information Upon Dispatch: There is a call from the manager. Fire alarms have been pulled on the 7th through 11th floors. This is followed by a phone call from an occupant on the 9th floor who smells smoke. The time is 0430. The date is August 12th.

Observed Upon Arrival: The lobby is full of occupants in night-clothes. They are milling around and do not want to go outside. The annunciator panel is lit up from floors 4 through 16 now. There is no smoke or fire showing outside yet. A second-due company advises you of smoke showing from the vestibule on the 8th or 9th floor. The elevators cannot be brought to the ground floors. The stairwells contain a steady but orderly stream of people. The range of reactions by occupants varies from hysteria to an almost calm indifference. The manager cannot be found, nor can the security officer.

The fire started on the 8th floor, center apartment, and rapidly spread to the hall. An outside window broke and the fire started to lap up the outside of the building. Many windows are open, and a primary concern is that the fire will leapfrog up the outside of the building.

The elevators are finally brought to the ground and are used by fire personnel. Because of an error in judgment, they take the crew to the fire floor.

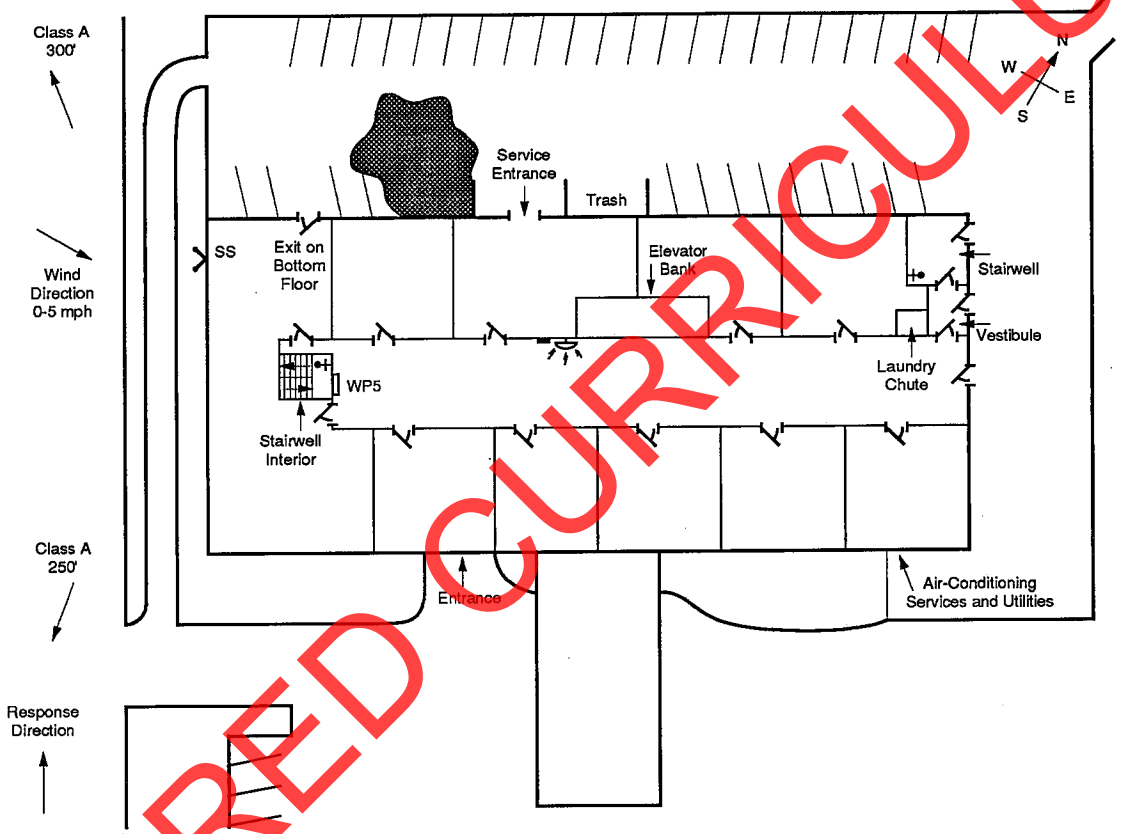
The entire building is never evacuated, not even the 8th floor, because there are sufficient safe-refuge areas on the floors below the 8th floor (not shown on the diagram). The alarm center receives phone calls throughout the fire from occupants requiring oxygen and related assistance.

How would you deal with this problem?

1. Report on conditions
2. Primary objectives
3. Resources needed
4. Plan of attack
5. Placement of equipment and command personnel
6. Potential for escalation

RETIRED CURRICULUM

Case Study #15



RETIRED CURRICULUM