

Fire Officer II
Student Study Guide



Fire Officer II -- Study Guide

Courtesy of:
HQ AFRC/CEXF
155 2nd Street
Robins AFB GA 31098-1635

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The AFRC Fire Training Committee developed this guide. Any comments, questions or suggestions should be directed to any member of this committee. Current members are found on the AFRC Fire Protection Web Site, under Working Groups, at:

<http://www.afrc.af.mil/~fire/pages/firehome.htm>

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Unit 2: Human Resource Management

REF: CO = Company Officer, 2nd Edition

ESP = Effective Supervisory Practices 3rd Edition

01 3-2.1 Local Policy

01 3-2.2 Factor Group Behavior

A) Understanding People

1. Understanding is putting yourself in the other persons shoes, and seeing the problem from another persons perspective.(ESP page 131)

B) Motivating the Member

1. Individual Behavior (CO Page 130)
 - i) Moral and Ethical Influences
 - ii) Perspectives
 - iii) Expectations
 - iv) Needs
 - v) These 4 factors combine to influence and guide the individual's choice of action, and can reinforce the individual attitude.
2. Organizational tasks (CO Page 136-138)
 - i) Achievement Task
 - ii) Power Task
 - iii) Affiliation Task
3. Indicators of needs (CO 136)
 - i) Indicators of high achievement needs
 - ii) Indicators of high power needs
 - iii) Indicators of high affiliation needs
4. McGregor's Theories (CO 89-94)
 - i) X
 - ii) Y
5. Ouchi's Theory Z (CO 89-94)
 - i) Z

C) Handling Disputes (CO 173-175)

1. Problems that involve someone's feelings.
2. Four basic reasons:

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- i) Bring about change
 - ii) Release pressure
 - iii) Get attention
 - iv) Confront personality conflicts
3. Be a good listener
 4. Questions to aid the individual
 - i) Perception of the problem
 - ii) Involvement of others
 - iii) Possible solutions
 - iv) What the individual expects the officer to do
 5. 8 step method of problem solving (CO 167-171)

D) Introducing Change (ESP 149-152)

1. Create a climate for change
 - i) Assure the employees participate in every part of the change process.
 - ii) Reduce the stress involved.

E) Gaining Cooperation (CO 101)

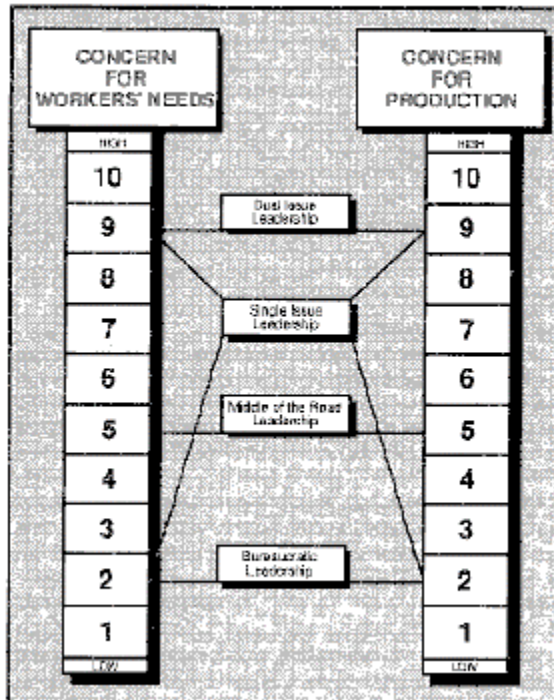
1. Structure relationships so firefighters cooperate to achieve shared goals.
2. Avoid competition among employees
3. Orders and Directives (CO 48-49)
 - i) Orders are directives based on administration of a policy, procedure or method.
 - ii) Directives are not based on administrative policy, procedure or method, but are essential to implementing formal guidelines.

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F) Supervisory Cooperation

1. 4 types of leadership styles (CO 95-97)
 - i) Bureaucratic
 - ii) Single Issue
 - iii) Middle of the Road
 - iv) Dual Issue

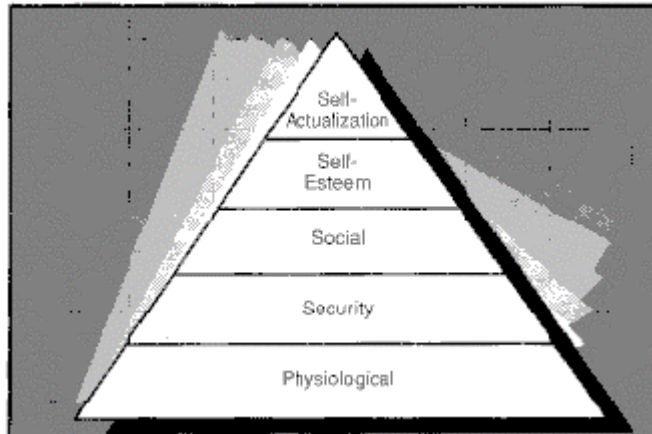


2. Power Structures – The ability to influence another (CO 103-105)
 - i) Reward
 - ii) Coercive
 - iii) Identification
 - iv) Expert
 - v) Legitimate
3. Transactional Analysis: Method of examining esteem and status fulfillment (CO 78-80)
 - (a) Parent Ego
 - (b) Child Ego
 - (c) Adult Ego

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4. Maslow's Hierarchy of Needs (CO 74-76)



5. Management by Objectives (CO 124-126)

- i) Objectives must be recorded in writing
- ii) Objectives must be realistic, attainable and measurable
- iii) Lines of communication must be open upward and downward
- iv) Authority of responsibility must be spelled out for each person involved
- v) Evaluation chart or form must be developed to answer the question "how are we doing?"

B) Job Attitude

1. Chapter 7, CO

C) Company policy (CO pages 46-47)

1. A guide to decision making within an organization.
2. Originates with top management
3. Defines boundaries the fire officer is to act within.

D) Emotional Status/Stress (CO pages 240-247)

1. Stress – adjustment to change
 - i) Acute – short term
 - (a) Usually no permanent damage occurs
 - ii) Chronic – long term
 - (a) Can lead to permanent damage
 - (b) Some health problems include heart disease, ulcers, cancer, and insomnia
2. Stressors

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- i) Exertion - Physical stressor
- ii) Weather – environmental stressor
- iii) Psychological stressors. Sometimes difficult to identify.

Examples are:

- (a) Sound of the alarm
- (b) Unknown dangers at a scene
- (c) Etc.

E) Handling complaints (CO pages 173-176)

- 1. Be a listener
- 2. Ask open ended questions to clarify
- 3. Chronic complainers
 - i) They are dissatisfied with themselves
 - ii) May feel insecure or inferior

F) Handling the problem member (CO pages 173-176)

003 3-2.3 Personnel situations and Corrective Actions

A) Actions that require correction (CO pages 152-154)

- 1. Problem must be recognized and defined precisely.
- 2. Spell out a specific standard.
- 3. Define a course of action to correct the unsatisfactory situation.

B) Informal Counseling (CO pages 145-146)

- 1. Evaluation by personality
- 2. Judgement by belief, not a standard

C) Formal Counseling (CO pages 145-146, ESP pages 91-92)

- 1. Set of criteria (standards)
- 2. Follows established guidelines that everyone can have an input into.
- 3. Allows the employee to give feedback about the supervisors performance to the supervisor

D) Disciplinary actions (CO 155-158 ESP pages 168-172)

- 1. Oral Reprimand
- 2. Written reprimand
- 3. Transfer
- 4. Suspension
- 5. Demotion

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6. Termination

004 3-2.4 Personnel Evaluations

- A) Objectives of member evaluation program (CO 144-145, ESP 91)
 - 1. An objective evaluation of the relationship between the firefighter and the fire department
 - 2. Determines how the firefighter is functioning relative to the needs of the department and defines how department requirements can be aligned with the firefighters goals.
- B) Avoiding common errors in evaluations (CO pages 145-146)
 - 1. Avoid evaluation by personality
 - 2. Do not judge by opinion, or beliefs
 - 3. Always have a standard to evaluate against.
- C) Procedures for conducting an evaluation program (ESP 92-96)
 - 1. Set goals
 - 2. Set standards
 - 3. Evaluate performance
 - 4. Interview the employee
 - 5. Document
- D) Planning an evaluation conference (ESP 95, CO 158)
 - 1. Review the firefighters record
 - 2. Fill out a evaluation form
 - 3. Set a agenda for the meeting
 - 4. Set a time for the meeting, and schedule sufficient, uninterrupted time
 - 5. Pick a private place to conduct the interview
- E) Conducting a evaluation conference (CO 158-160, ESP 95-96)
 - 1. Begin on time
 - 2. Review the agenda, and explain this is a tool to help the firefighter advance to his career goals, and is not designed to judge the firefighter.
 - 3. Talk *with* the employee, not *at* him.
 - 4. Discuss the firefighters' strengths, and what makes him/her an asset to the department.
 - 5. Encourage the firefighter to talk about how he/she views themselves in the department

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6. Discuss any shortcomings with the employee and discuss corrective actions.
 - i) Write down any solutions and review with the employee
7. Summarize and close the interview

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Unit 6: Budget

005 3-6.1 Budget Types (ESF 204-206)

A) Capital Budgets

1. More costly, non-recurring items
2. May be used to propose financing for capital items
3. Published with the operating budget

B) Operating budgets

1. Is the plan for allocating resources (tax dollars and other revenue) for personnel, supplies, equipment and operating expenses for facilities.
2. Generally recurring or small dollar items

006 3-6.2 Budget Revenue Sources (CHO 128-131)

A) Operations

B) Equipment

C) Training

- In addition to tax revenue, various types of service fees have been proposed.
- Public and Private Grants may be available for fire department use
- Self Insurance has been proposed for some departments

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Unit 7: Government Structure

REF: MFS: Managing Fire Services 2nd ED

HMFR: Hazardous Materials for First Responders 2nd ED

CO: Chief Officer 1st ED

007 3-7.1 Agencies, bureaus, departments and divisions of government

A) Local State Federal levels (MFS pages 30-36)

1. Appendix A, HMFR
2. City/county council and manager
3. Building department
4. Engineering Department
5. Water department
6. Planning/zoning department
7. Police department
8. Central and General services
9. Specialized fire protection
10. Private developers
11. Other fire departments
12. The insurance industry

B) Functions of Each (MFS 30-36)

1. See MFS for the above functions.

C) The need for interagency cooperation (MFS 37)

1. The components exist in most communities, but may not be viewed as part of the fire protection system.
2. Planing assures coordination and communication between all agencies.

008 3-7.2 Law Making Processes

A) Federal Level

1. Three Branches of Government **Company Officer Third Edition**
Page 107-108
 - i) Executive
 - ii) Legislative
 - iii) Judicial
2. Process

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- i) Bills – written description of legislation
 - ii) Committees – review the bills before presentation to Congress
 - iii) Released bills are placed on the congressional calendar for debate
 - iv) Vote on bills
 - (a) Passed – goes to other house of congress
 - v) If passes both houses of congress, is sent to the president.
 - (a) If he signs it, becomes law
 - (b) If veto's, goes to back to Congress
 - (1) Congress can override the veto with a 2/3rd vote. The act then becomes law.
 - (2) If no override, bill is dead
- B) State/Provincial level (CO 197-201)
1. Learn who power brokers are
 2. Contact representatives
 3. Establish friendly relations with state legislatures
 4. Send them information
 5. Present a united front
 6. State your positions clearly and concisely (be honest, be positive)
 7. Write letters
 8. Follow up after the bill has been acted upon
 9. Lobby, and go to public meetings
- C) Local Level (CO 196-197)
1. Analysis of the effects of the proposed ordinance
 2. Schedule meetings with local managers and the organization's attorney
 3. Present the proposal to the local city council
 4. If defeated, analyze what went wrong and try again
- D) Types of Law (CO 257-262)
1. Tort
 - i) A civil wrong or injury
 2. Administrative law

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- i) Agencies (examples are the EPA and OSHA) create rules, regulations and guidelines that are referred to as administrative law
 - ii) Congress creates these agencies.
3. Statutory Law
- i) Laws that are created by Congress.

0009 3-7.3 Local Forms of Government

- A) Base Command Structure – Local Structure of Authority having jurisdiction
- B) Local Government Structure of Local Structure of Authority having jurisdiction

See NFPA 1021

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Unit 8: Communications Skills

REF: MFS: Managing Fire Services 2nd ED

HMFR: Hazardous Materials for First Responders 2nd ED

CHO: Chief Officer 1st ED

CO: Company Officer 2nd ED

FI: Fire Inspection and Code Enforcement 5th ED

FPH: Fire Protection Handbook 17th ED

010 3-8.1 Preparation of Material from predetermined data

A) Reports (CO 59-61)

1. Complete sentences
2. Proper grammar
3. Appropriate use of words
4. Words spelled right

B) Specifications (MFS 181-182)

1. Be specific
2. Do lots of research on type, cost, configuration, durability
3. Use established documents for reference if available

C) Requisitions

D) Budgets (CHO 124-126)

1. Start with pervious budgets
 - i) Cut unneeded expenses
 - ii) Add new requirements
 - iii) Take into account cost of living and inflation
 - iv) Capital purchases needed

011 3-8.2 News Releases

A) Soft News (CHO 104-108)

1. Does not offer the excitement of a major fire or a departmental scandal
 - i) Human interest stories as a example
 - ii) Provides citizens with information

B) Hard News (CHO 104-108)

1. News coverage of department operations or scandals
 - i) Fires as a example

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C) Public safety announcements (CHO 104-108)

1. Seasonal announcements dealing with fire safety
2. Public fire education

012 3-8.3 Facility fire inspection report of an area used for storage, handling or transportation of flammable liquids, flammable gases or hazardous materials

A) Identify existing hazards (FI 240)

1. Evaluate the materials for hazards
 - i) Characteristics of the material
 - ii) Design of the storage container
 - iii) Foundations and supports
 - iv) Size and location of vents
 - v) Piping and connections

B) Recommending corrective actions for hazards (FPH Section 10, Chap 15)

1. Comply with specific codes
2. Write clear, well documented recommendations to correct problems

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Unit 9: Information Management

REF: MFS: Managing Fire Services 2nd ED

ESP: Effective Supervisory Practices 3rd ED

CHO: Chief Officer 1st ED

CO: Company Officer 2nd ED

FI: Fire Inspection and Code Enforcement 5th ED

FPH: Fire Protection Handbook 17th ED

013 3-9.1 Electronic Data processing Equipment

A) Personal Computers

1. Identify the capabilities of the computers of the authority having jurisdiction

B) Main Frame Computer Systems

1. Identify the capabilities of the computers of the authority having jurisdiction

C) Computer aided dispatching systems (CHO 169)

1. Identify the capabilities of the computers of the authority having jurisdiction
2. Can significantly shorten response time
3. Enable Dispatchers to handle a greater volume of calls
4. Can reduce the amount of voice communications between dispatchers and responding units

014 3-9.2 Interpreting output information from data processing equipment

A) Statistical information

B) Future planning

C) Program management

PERFORMANCE ITEMS

015 3-9.3 Record keeping systems (CHO 93-99)

A) Maintaining the system

1. Keep information current

B) Evaluating the system

1. Annually check the system for out of date data

C) Identifying necessary changes to the system

016 3-9.4 Reports based on personnel records

A) Standards of performance (CO 146-147)

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1. Cannot arbitrarily exclude a segment of society
2. Must apply to the employee's ability to accomplish a specific task and apply to the entire group

B) Evaluating performance (ESP 94-97)

1. All significant facts should be written down, kept up to date and shared with the employee
2. Write down all actions
 - i) Goals set
 - ii) Job production
 - iii) Achievements
 - iv) Recognition

C) Outlining future goals (CO 158-161, ESP 92-94)

1. Should be performance measurable objectives
2. Stated clearly
 - i) Concise description (not vague description)

017 3-9.5 Reports based on equipment maintenance records

- A) Type of Equipment
- B) Condition of Equipment
- C) Future replacement of equipment

PERFORMANCE ITEMS

018 3-9.6 Reports based on fire building records

- A) Purpose of Structure
- B) Condition of Structure
- C) Maintenance of Structure

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Unit 10: Planning














- REF: MFS: Managing Fire Services 2nd ED
 ESP: Effective Supervisory Practices 3rd ED
 HMFR: Hazardous Materials for First Responders 2nd ED
 CHO: Chief Officer 1st ED
 CO: Company Officer 2nd ED
 FI: Fire Inspection and Code Enforcement 5th ED
 FPH: Fire Protection Handbook 17th ED
 ESS: Essentials of Firefighting 3rd ED

019 3-10.1 Pre-fire plans for an identified target hazard

A) Symbols, maps and layout

1. NFPA 170 symbols, AF Form 1028

Walls and Partitions.

Wall	<p>(a) </p> <p>(b) </p> <p>(c) </p> <p>(d) </p> <p>(e) </p> <p>(f) </p> <p>(g) </p> <p>(h) </p> <p>(i) </p> <p>(j) </p> <p>(k) </p> <p>(l) </p> <p>(m) </p>	<p>Smoke barrier</p> <p>1/2 hr fire-rated</p> <p>1/2 hr fire-rated/ smoke barrier</p> <p>3/4 hr fire-rated</p> <p>3/4 hr fire-rated/ smoke barrier</p> <p>1 hr fire-rated</p> <p>1 hr fire-rated/ smoke barrier</p> <p>2 hr fire-rated</p> <p>2 hr fire-rated/ smoke barrier</p> <p>3 hr fire-rated</p> <p>3 hr fire-rated/ smoke barrier</p> <p>4 hr fire-rated</p> <p>4 hr fire-rated/ smoke barrier</p>
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Parapet



One cross for each 6 in. (150 mm) parapet extends above roof.

Floor Openings, Wall Openings, Roof Openings, and Their Protection.

Opening in Wall



Rated Fire Door in Wall (Less than 3 hours)



Fire Door in Wall (3-hour rated)



Elevator in Combustible Shaft



Elevator in Non-combustible Shaft



Open Hoistway



Escalator



Stairs in Combustible Shaft



Stairs in Fire-rated Shaft



Stairs in Open Shaft



Skylight




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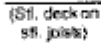
Special Symbols for Cross-Sections.

The following symbols shall indicate features of cross-sections. It is recognized that descriptive notes often are required.


Roof, Floor Assemblies.

Fire-Resistive Floor or Roof 

Wood Joisted Floor or Roof 

Other Floors or Roofs  Note construction.

Floor/Ceiling or Roof/Ceiling Assembly  Details indicated, as necessary.


Floor on Ground 


Truss Roof  Note construction.

Miscellaneous Features.

A number of features related to fire protection that do not fall under Sections 5-3.1 through are given below.

Boiler 


Chimney  Describe height and construction.


Fire Escape 


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Tank Aboveground

Horizontal  Indicate type, dimensions, construction, capacity, pressurization, and content.


Vertical  Indicate type, dimensions, construction, capacity, pressurization, and content.


Tank, Belowground  Indicate type, dimensions, construction, capacity, pressurization, and content.

Water Supply and Distribution Symbols.

Mains, Pipe

Public Water Main  Indicate pipe size and material.

Private Water Main  Indicate pipe size and material.



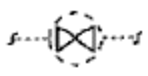


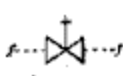

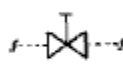

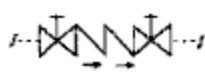
Water Main Under Building  Indicate pipe size and material.

Suction Pipe  Indicate pipe size and material.

Thrust Block 

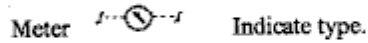
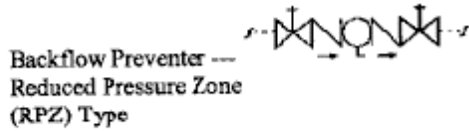
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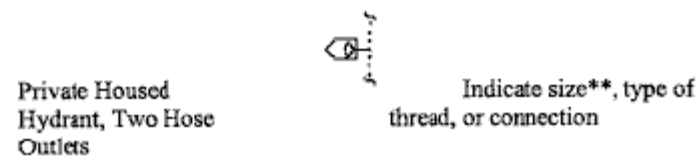
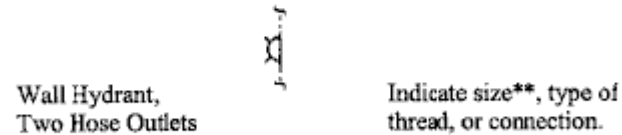
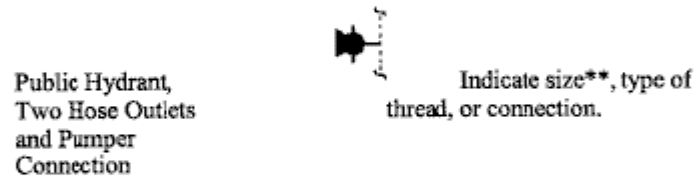
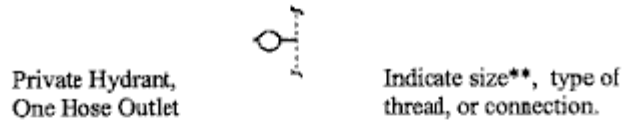
Rise		
Valves (general)		Basic shape. Indicate valve size.
Valve in Pit		Indicate valve size.
Post Indicator Valve		Indicate valve size.
Key-Operated Valve		Indicate valve size.
OS & Y Valve (Outside Screw and Yoke, Rising Stem)		Indicate valve size.
Indicating Butterfly Valve		Indicate valve size.
Nonindicating Valve (Nonrising-Stem Valve)		Indicate valve size.
Check Valve		Basic shape. Indicate valve size, direction of flow.
Backflow Preventer--- Double Check Type		Also referred to as a "double check valve assembly."

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Hydrants



Fire Department Connections

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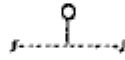
Siamese Fire
Department
Connection

Specify type, size, and
angle.



Free-Standing Siamese
Fire Department
Connection

Sidewalk or pit type,
specify size.



Single Fire
Department
Connection

Specify type, size,
thread, and angle.

**Symbol element may be utilized in any combination to fit the type of hydrant.

Fire Pumps



Fire Pump With
Drives



Fire Pump

Free standing.
Specify number and
sizes of outlets.



Test Header

Wall

Symbols for Control Panels.

Control Panel



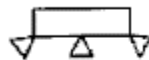
Basic shape.

- (a) Fire Alarm Control Panel
- (b) Fire System Annunciator
- (c) Fire Alarm Transponder or Transmitter
- (d) Elevator Status/Recall
- (e) Fire Alarm Communicator
- (f) Halon Control Panel
- (g) Control panel for heating, ventilation, air conditioning, exhaust stairwell pressurization, or similar equipment

Symbols Related to Means of Egress.

if

Emergency Light,
 Battery Powered



Number of lamps on unit
 to be indicated. Indicate

light head(s) [lamps(s)]
 is remote from battery.

Illuminated Exit
 Sign, Single Face



Indicate direction of flow
 for the face.

direction

of flow for the face.







Symbols for Fire Alarms, Detection, and Related Equipment.

**Signal Initiating
Devices and Switches**

Manual Stations






Basic shape.

- (a)  Halon
- (b)  Carbon Dioxide
- (c)  Dry Chemical
- (d)  Foam
- (e)  Wet Chemical
- (f)  Pull Station

Fire Service or
Emergency Telephone
Station



- (a)  Accessible
- (b)  Jack
- (c)  Hand-set

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Abort Switch







Automatic Detection
and Supervisory
Devices

Basic shape.





Heat Detector
(Thermal Detector)



- (a)  R/F Combination --- Rate of Rise and Fixed Temperature
- (b)  R/C Rate Compensation
- (c)  F Fixed Temperature
- (d)  R Rate of Rise Only

Smoke Detector



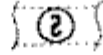
- (a)  P Photoelectric Products of Combustion Detector
- (b)  I Ionization Products of Combustion Detector
- (c)  BT Beam Transmitter
- (d)  BR Beam Receiver

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Smoke Detector in
Duct



Gas Detector



Flame Detector
(Flicker Detector)

Indicate ultraviolet,
infrared, or visible
radiation-type detectors.



Flow Detector/Switch



Pressure Detector/
Switch

Specify type --- water,
low air, high air, etc.

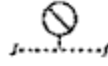


Level Detector/
Switch

†Symbol orientation must not be changed.

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Tamper Detector

Alternate term ---
Tamper Switch.



Valve with Tamper
Detector/Switch

Indicating Appliances



Speaker/Horn
(Electric Horn)

(a)

Mini-Horn

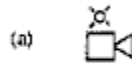


Bell (Gong)



Water Motor Alarm
(Water Motor Gong)

Shield optional.



Horn with Light

(a) Horn with light as separate assembly.

(b) Horn with light as one assembly.

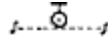
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nd Street



Light (Lamp,
Signal Light,
Indicator Lamp,
Strobe)

Related Equipment



Door Holder

Symbols for Fire Extinguishing Systems.

Symbols for Various Types of Extinguishing Systems.

NOTE: These symbols are intended for use in identifying the type of system installed to protect an area within a building.

Water-based Systems

Wet Charged
System



(a)

Automatically
Actuated



(b)

Manually
Actuated

Dry System



(a)

Automatically
Actuated

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(b)

Manually
Actuated

Foam System



(a)

Automatically
Actuated



(b)

Manually
Actuated

Dry Chemical
Systems

For Liquid, Gas, and
Electrical Type Fires



(a)

Automatically
Actuated



(b)

Manually
Actuated

For Fires of All Types
(Except Metals)



(a) Automatically Actuated



(b) Manually Actuated

Systems Utilizing a Gaseous Medium

Carbon Dioxide System



(a) Automatically Actuated



(b) Manually Actuated

Halon System or Clean Agent Extinguishing System



(a) Automatically Actuated

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(b)

Manually
Actuated

Supplementary
Symbols



Fully Sprinklered
Space



Partially Sprinklered
Space



Nonsprinklered Space

Symbols for Fire Sprinkler Heads.



Upright Sprinkler

Note 1



Pendent Sprinkler

Notes 1, 2

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Upright Sprinkler, Nippled Up		Note 1
Pendent Sprinkler, on Drop Nipple		Notes 1, 2
Sprinkler, With Guard		Upright sprinkler head shown. Note 1
Sidewall Sprinkler		Note 1
Outside Sprinkler		Specify type, orifice size. For example: Open sprinkler (window or cornice).

Symbols for Piping, Valves, Control Devices, and Hangers.

Sprinkler Piping and Branch Line		Indicate pipe size.
Pipe Hanger		This symbol is a diagonal stroke imposed

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on the pipe that it supports.

NOTE 1: Temperature rating of sprinkler and other characteristics may be shown via legends where a limited number of an individual type of sprinkler is called for by the design.

NOTE 2: Can notate "DP" on drawing and/or in specifications where dry pendent sprinklers are employed.



Angle Valve
(Angle Hose Valve)

Indicate size, type, and other required data.

Check Valve (General)

(See symbol in 5-4.2.7.)



Alarm Check Valve

Specify size, direction of flow.



Dry Pipe Valve

Specify size.



Dry Pipe Valve
With Quick Opening
Device (Accelerator
or Exhauster)

Specify size and type.



Deluge Valve

Specify size and type.

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Preaction Valve

Specify size and type.

Symbols for Portable Fire Extinguishers.



Portable Fire Extinguisher

Basic shape.



Water Extinguisher



Foam Extinguisher

Dry Chemical Extinguishers



For Fires of Liquid, Gas, Electrical Types

(BC-Type)



For Fires of All Types, Except Metals

(ABC-Type)



CO₂ Extinguishers

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Extinguisher for
Metal Fires

Symbols for Fire Fighting Equipment.



Fire Fighting
Equipment

Basic shape.
Generally for use with
other symbols to
represent specific devices.



CO₂ Reel Station



Dry Chemical Reel
Station



Foam Reel Station



Hose Station, Dry
Standpipe

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Hose Station,
Charged Standpipe



Monitor Nozzle,
Dry



Specify orifice size.

Monitor Nozzle,
Charged



Specify orifice size.

Symbols for Smoke/Pressurization Control.

Purge Controls

Manual Control



Fans

Arrow indicates direction
of flow.

General



Duct



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Roof 


Wall 

Dampers

Fire 

Smoke 

Fire/Smoke 

Barometric 



Pressurized Stairwell 

Orient as required for
base or
head injection.

Ventilation Openings 

Orient as required for
intake or exhaust.

Miscellaneous Symbols.

Agent Storage Container		Specify type of agent and mounting.
Special Spray Nozzle		Specify type, orifice, size, other required data (shown here on pipe).

Symbols for Use in Pre-Incident Planning Sketches

Scope.

This chapter presents symbols for use in pre-incident planning sketches.

Purpose.

The purpose of this chapter is to provide uniformity in the use of fire safety and related symbols in the preparation of pre-incident planning sketches.

Application.

The symbols in this chapter are provided to assist fire service or emergency response personnel who have the responsibility for preparing and using pre-incident planning sketches.

Symbol Shapes.

The symbol shapes were chosen for their ease of reproduction either free-hand or with the use of templates.

**Access Features, Assessment Features, Ventilation Features,
 and Utility Shutoffs**



Access Features

Fire Department Access Point 


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Fire Department Key Box 


Roof Access 


Assessment Features

Fire Alarm Annunciator Panel 

Fire Alarm Reset Panel 

Fire Alarm Voice Communication Panel 

Smoke Control and Pressurization Panel 

Sprinkler System Water Flow Bell 


Ventilation Features

Sky Light 

Smoke Vent 

Utility Shutoffs

Electric Shutoff 

Domestic Water Shutoff 


Gas Shutoff 


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Specific Variations:


LP-Gas Shutoff 

Natural Gas Shutoff 

Compressed Natural Gas Shutoff..... 

Detection/Extinguishing Equipment

Duct Detector 

Heat Detector 

Smoke Detector..... 


Flow Switch (Water)..... 

Manual Pull Station 

Tamper Switch 

Halon System 

Dry Chemical System 

CO₂ System..... 

















Wet Chemical System..... 

Foam System..... 

Clean Agent System 

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Beam Smoke Detector	
Water Flow Control Values and Water Sources	
Post Indicator Valve	
Riser Valve	
Sprinkler Zone Valve	
Hose Cabinet or Connection	
Wall Hydrant.....	
Test Header (Fire Pump).....	
Inspector's Test Connection	
Fire Hydrant	
Fire Department Connection.....	
Drafting Site	
Water Tank	
Equipment Rooms	
Air Conditioning Equipment Room	
(AHUs = Air Handling Units)	
Elevator Equipment Room	

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Emergency Generator Room.....	EG
Fire Pump Room.....	FP
Telephone Equipment Room	TE
Boiler Room	BA
Electrical/Transformer Room	ET

Identification of Hazardous Materials.

NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, shall be permitted to be used to identify the location of hazardous materials within a structure



2. Essentials 3rd P524
3. Layout (CO 192-194)
 - i) Plot Plan
 - ii) Floor plan
 - iii) Elevation drawing
4. Personnel and resources
 - i) CO page 181, 182
5. Extinguishing agent
 - i) CO page 185-188

020 3-10.2 Operational plans for resources and safety considerations necessary to control the following types of incidents:

- A) Flammable liquids (ESS 406-410; HMFR 183-187)
- B) Flammable Gases (ESS 410-412; HMFR 180-183)
- C) Poisons (HMFR 191-194)
- D) Explosives (HMFR 175-178)
- E) Radioactive materials (HMFR 194-195)

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- F) Flammable solids (HMFR 188-190)
- G) Reactives (HMFR 31-32)
- H) Corrosives (HMFR 195-197)

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Unit 11: Inspection, Investigation, and Public Education

- REF: MFS: Managing Fire Services 2nd ED
ESP: Effective Supervisory Practices 3rd ED
HMFR: Hazardous Materials for First Responders 2nd ED
CHO: Chief Officer 1st ED
CO: Company Officer 2nd ED
FI: Fire Inspection and Code Enforcement 5th ED
FPH: Fire Protection Handbook 17th ED
ESS: Essentials of Firefighting 3rd ED
PE: Public Fire Education 1st ED
WS: Water Supplies for Fire Protection 4th ED

021 3-11.1 Conducting Fire Inspections and Exit Drills (FI 21-36, 33-34, NFPA Inspection Manual)

- A) Assembly
- B) Educational
- C) Health Care
- D) Detention and correctional
- E) Residential
- F) Mercantile
- G) Business
- H) Industrial
- I) Storage
- J) Unusual structures
- K) Mixed occupancies

022 3-11.2 Public fire education programs

- A) Development Skills (PE 10-12)
 - 1. Identification
 - 2. Selection
 - 3. Design
 - 4. Implementation

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5. Evaluation

B) Implementation Skills (PE 10-12)

1. Identification
2. Selection
3. Design
4. Implementation
5. Evaluation

023 3-11.3 Detection and Signaling Systems (FI 111-162 [Chapter 7])

A) Installed fire protection systems

1. Automatic Sprinkler Systems
 - i) Wet
 - ii) Dry
 - iii) Deluge
 - iv) Preaction
2. Special agent fixed extinguishing systems
 - i) Foam
 - ii) CO₂
 - iii) Halon
 - iv) Dry chemical
3. Standpipe systems
 - i) Wet or Dry
 - (a) Class I
 - (b) Class II
 - (c) Class III
4. Portable fire extinguishers (FI 112-122)
 - i) Obsolete extinguisher
 - ii) Class A
 - iii) Class B
 - iv) Class C
 - v) Class D
 - vi) Ratings
 - vii) Use of
 - viii) Selection

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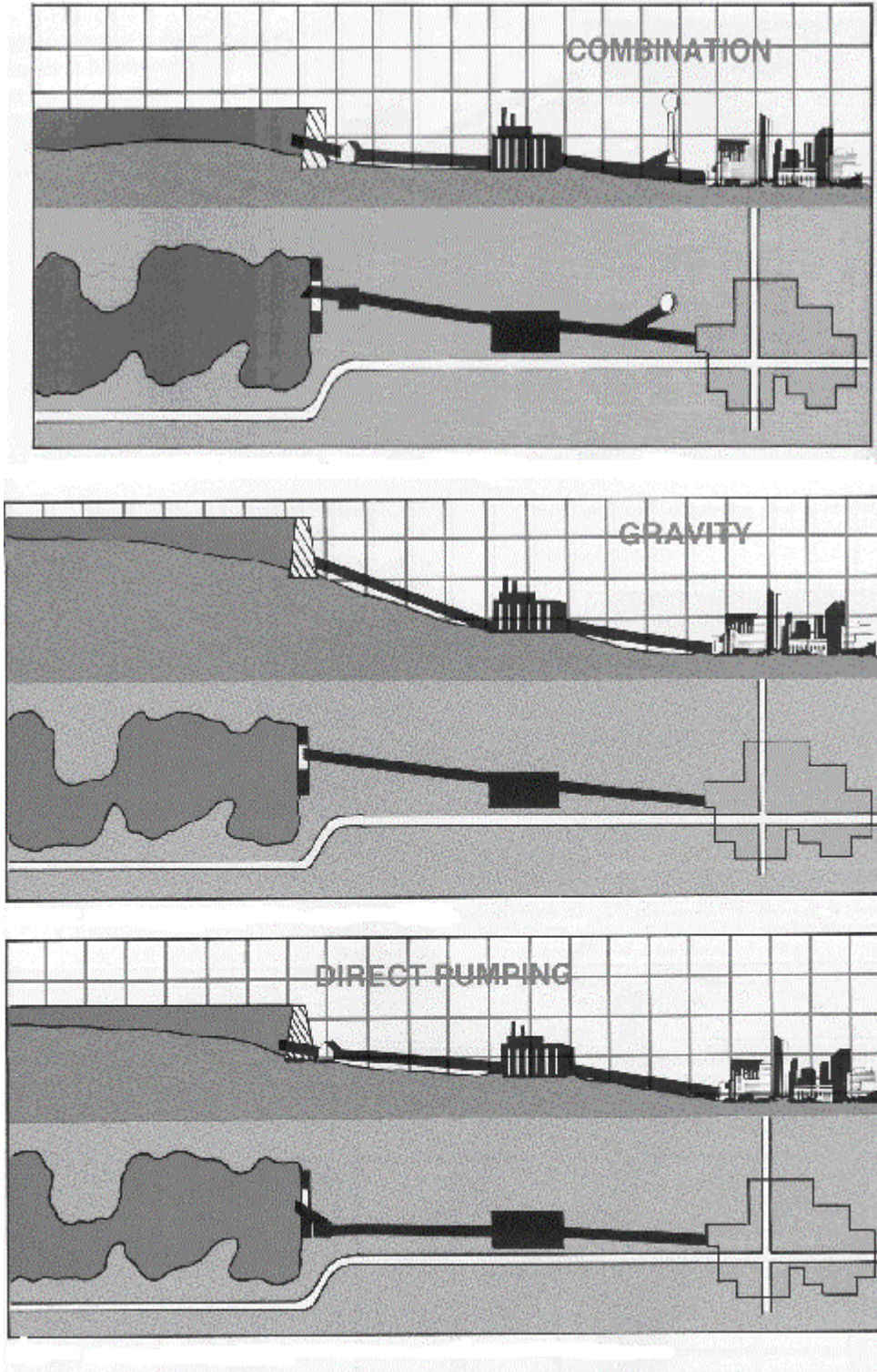
- ix) Placement
 - x) Inspection
 - xi) Maintenance
- B) Fire and smoke alarm systems (ESS 535-537)
- 1. Ionization
 - 2. Photoelectric
 - 3. Heat Detectors (FI 155-158)
- C) Fire reporting systems (ESS 503-508)
- 1. Public
 - i) Can be used by anyone to report an emergency.
 - (a) Telephone
 - (b) Radio
 - (c) Walk-ins
 - (d) Wired telegraph circuit box
 - (e) Telephone fire alarm box
 - (f) Radio fire alarm box
 - 2. Private
 - i) Private protective signaling systems are used to detect and transmit alarms to a fire department communication center.
 - (a) Alarm initiating devices
 - (b) Manually activated devices
 - (c) Thermal sensitive devices
 - (d) Visible products of combustion detectors
 - (e) Invisible products of combustion detectors
 - (f) Flame detectors
 - (g) Water flow detectors

024 3-11.4 Water Systems

- A) Water supply for fire department operations (FI 164)
- A) Water distribution systems
 - i) Combination
 - ii) Gravity
 - iii) Direct pumping

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2. Water Main Size (ESS 299)
 - i) Industrial 12 inch
 - ii) Business 8 inch

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- iii) Residential 6 inch
- 3. Hydrants (ESS 301-302; FI 169)
 - i) Wet barrel
 - ii) Dry barrel
 - iii) Color codes
 - (a) Class AA Light Blue 1500 GPM or more
 - (b) Class A Green 1000-1499 GPM
 - (c) Class B Orange 500-999 GPM
 - (d) Class C Red Less than 500 GPM
 - iv) Hydrant Spacing (WS page 77)
 - (a) General rule, spacing should not exceed 800 feet between hydrants
 - (b) Closely built areas no more than 500 feet
 - (c) High value areas, no more than 300 feet
 - (d) From the structure, no more than 50 feet
 - (e) Fire Dept connections shall be located no more than 100 feet from the nearest fire hydrant connected to a approved water supply
- 4. Valve Spacing (FI 168)
 - i) Maximum valve spacing
 - (a) High value district – 500 feet
 - (b) Other areas – recommended 800 feet by commercial risk services
- 5. Inspection of Fire Hydrants (FI 171)
 - i) Check for obstructions
 - ii) Check the direction of hydrant outlets
 - iii) Clearance between the outlet and the surrounding ground
 - (a) At least 15 inches from the bottom of the outlet to the ground (FI 171)
 - (b) NFPA 25 shows 18 inches from the middle of the stem to the ground
 - iv) Check for mechanical damage
 - v) Check for rust or corrosion
 - vi) Check the water flow

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B) Mapping auxiliary water supplies (FI 163-188)

1. Surface supplies
 - i) Rivers, lakes etc
2. Group supplies
3. Wells, water producing springs

C) Drainage and sewer lines (NFPA 820)

1. Sanitary Sewer: A sewer that carries liquid and water-carried wastes from residences, commercial buildings, industrial plants, and institutions together with minor quantities of storm, surface, ground waters that are not admitted intentionally.
2. Storm Sewer: Pipe or conduit carries storm water and surface water, street wash, and other wash water, or drainage but excludes domestic waste water and industrial wastes (also called storm drains)

025 3-11.5 Public Fire Alarm Systems

A) Functions (FI 150)

1. The system is a combination of alarm components designed to detect a fire and or transmit an alarm on the immediate premises only.

B) Operating procedures (FI 153-154)

1. Proprietary Alarm Systems
2. Central Station Alarm Systems
3. Remote Station Systems
4. Municipal Fire Alarm Systems
5. Multiplexing Detection Systems

026 3-11.6 Stationary Fire Pumps

A) Capacities (FPH 5-88)

1. 25GPM to 5000GPM

B) Pump Power Supplies (FPH 5-97 to 5-99)

1. Electric
2. Internal combustion engines

C) Pump Water Supply (NFPA 20 2-1)

1. A stored supply shall be sufficient to meet the demand placed upon it for the expected duration, and a reliable method of replenishing the supply shall be provided.

D) Inspection Procedures (FI 126, NFPA 20, NFPA 25)

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1. Minimum supply is 8 hours of fuel
2. Shall be run no less than 30 minutes a week.

027 3-11.7 Standpipe Systems

A) Classes of Standpipes (FI 123)

1. Wet or Dry
 - i) Class I
 - ii) Class II
 - iii) Class III

B) Standpipe water supply (FI 124; NFPA 14, 7-1)

1. Class I – minimum 500 GPM for 30 Minutes
2. Class II - minimum 100 GPM for 30 Minutes
3. Class III – Same minimum flow as Class I

C) Operation (FI 124-125)

1. Class II systems are designed to be operated by the occupants of the building
2. Class I and Class III are designed to be operated by Fire Protection Personnel

D) Inspection Procedures (FI 126-127)

1. Initial
2. Periodic

028 3-11.8 Special Extinguishing Systems

A) Foam injection systems (FPH 5-275)

1. Subsurface foam injection: Discharge of foam into a storage tank from a outlet from a tank bottom
2. Semi subsurface foam injection: discharge of foam at the liquid's surface within a storage tank from a floating hose that rises from a piped container near the tank bottom.
3. Should only be used with cone roofed tanks.

B) Gaseous agent discharge systems (FPH 5-290)

1. Inerting gas suppression
 - i) Carbon Dioxide
 - ii) Steam
 - iii) Nitrogen
 - iv) Halon

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C) Deluge/Mass application system (ESS 446)

1. The purpose of the deluge system is to wet down an area where a fire originates by discharging water from all open sprinklers in the systems. The system is normally used to protect extra hazardous occupancies. Activation of the system may be controlled by fire and heat detecting devices or smoke detecting devices plus a manual device.
2. Types include
 - i) Dry Chemical
 - ii) Wet chemical
 - iii) Foam

D) Inspections

1. Carbon Dioxide NFPA 12
2. Halon NFPA 12A and 12B
3. Chemical extinguishing systems NFPA 17 and 17A
4. Foam NFPA 11 and 11A

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Unit 12: Emergency Service Delivery

- REF: MFS: Managing Fire Services 2nd ED
ESP: Effective Supervisory Practices 3rd ED
HMFR: Hazardous Materials for First Responders 2nd ED
CHO: Chief Officer 1st ED
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WS: Water Supplies for Fire Protection 4th ED

029 3-12.1 Hazardous Materials Situations (HMFR 175-197, 1996 NAERG 3-7))

- A) Resources – also Appendix A HMFR
- B) Placement - Authority Having Jurisdiction
- C) Assignment - Authority Having Jurisdiction

PERFORMANCE TEST ITEMS

030 3-12.2 Information Resources required for managing hazardous materials situations. (HMFR Appendix A; NAERG 4-6)

- A) Federal agencies
- B) State/Provincial agencies
- C) Local agencies
- D) Private/industrial agencies

031 3-12.3 Fire Department command roles and responsibilities

The Authority Having Jurisdiction determines this (OI, SOP's)

- A) Fire Suppression
- B) Rescue Services
- C) Emergency Medical Services
- D) Hazardous Materials Response

LEPC: Local Emergency Planning Committee. Determine the roles of the fire department in HAZMAT response. The committee is composed of representatives of the emergency response agencies, and also representatives of state and local governments, emergency management

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and transportation. Also included are medical, media, environmental groups, and industry.

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Unit 13 Safety

REF: MFS: Managing Fire Services 2nd ED
ESP: Effective Supervisory Practices 3rd ED
HMFR: Hazardous Materials for First Responders 2nd ED
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PE: Public Fire Education 1st ED
WS: Water Supplies for Fire Protection 4th ED
FDOS: Fire Department Occupational Safety 2nd ED

032 3-13.1 Unsafe Acts, fire fighter injuries and deaths

- A) Physical Conditions
- B) Task Performance Conditions
- C) Equipment use conditions

All of the above are referenced in FDOS 26-29.

- ANSI classifies unsafe acts as follows:
 - Taking unsafe position or posture
 - Improper use of equipment, apparatus and tools
 - Using unsafe equipment
 - Failure to use available PPE
 - Failure to wear PPE
 - Operating without authority
 - Inattention to footing or surroundings
 - Operating or working at unsafe speeds
 - Improper use of hands or body parts
 - Failure to secure or warn
 - Making a safety device inoperative

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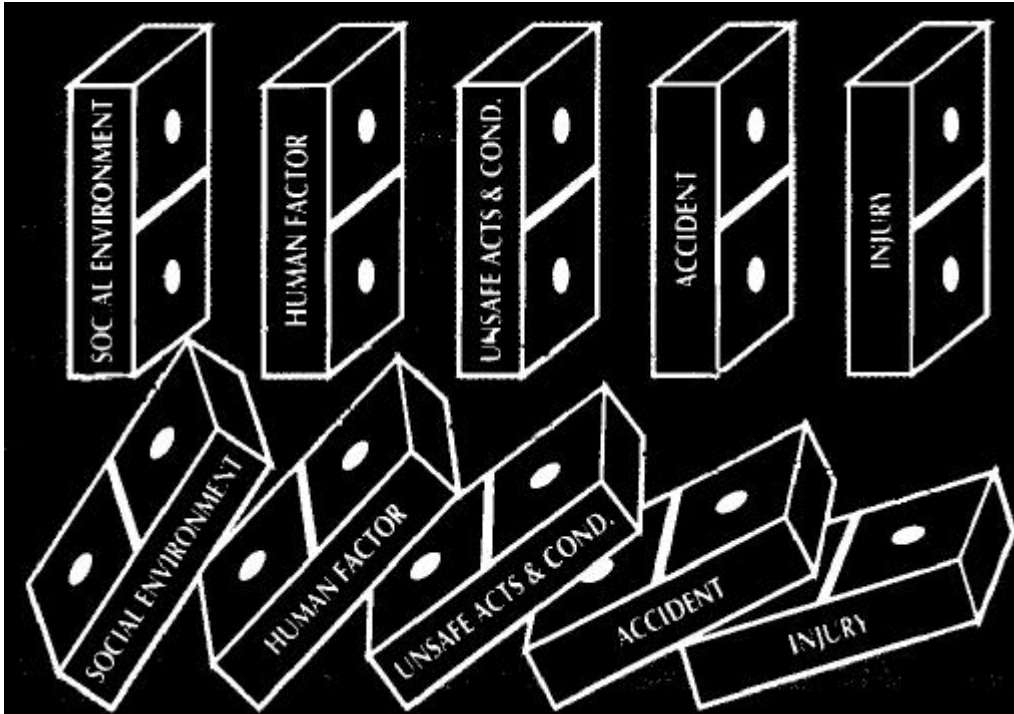
- Horseplay
- Unsafe placing, mixing, or combining of materials
- Cleaning, oiling, adjusting, or repairing equipment that is moving, electrically energized, or pressurized

- ANSI Classified Unsafe Conditions as follows:
 - Hazardous methods or procedures (planned, directed, or conducted by supervision)
 - Lack of safe dress, apparel, or PPE
 - Defective equipment
 - Hazardous outside environments
 - Placement hazards
 - Inadequately guarded
 - Public hazards (encountered in public places away from equipment)

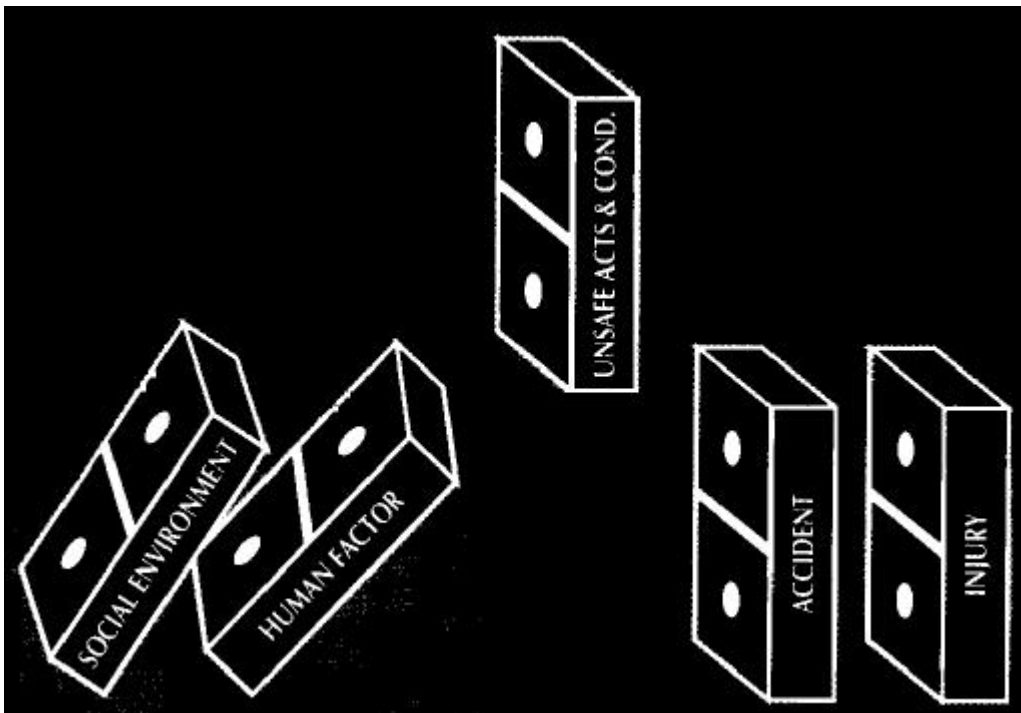
- H.W. Hienrich describe accident sequence in terms of 5 factors analogous to dominos placed on end. The dominos are labeled as follows:
 - Social environment
 - Human factors
 - **Unsafe acts and conditions (refer to ANSI above)**
 - Accident
 - Injury

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In Hienrich's analogy, a preventable accident is one of the 5 sequential factors listed above which may result in an injury.



The emphasis on accident control is focused in the middle of Heinrich's sequence, which are unsafe acts and conditions.

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- Stress (CO 237-251)
 - Acute
 - Chronic
 - Dr. Hans Selye's General Adaptation Syndrome (GAS) (CO 240-241)
 - ✓ Stage 1 - Alarm reaction
 - ✓ Stage 2 - Fight or Flight response
 - ✓ Stage 3 - Exhaustion
 - Types of Stress: (CO 241-247)
 - ✓ Physical
 - ✓ Environmental
 - ✓ Psychological
 - ✓ Critical
- 033 3-13.2 Report based on safety records (FDOS 17-41, 61-65)
 - A) Unsafe acts or conditions
 - B) Development of a safety program
 - C) Evaluation of a safety program