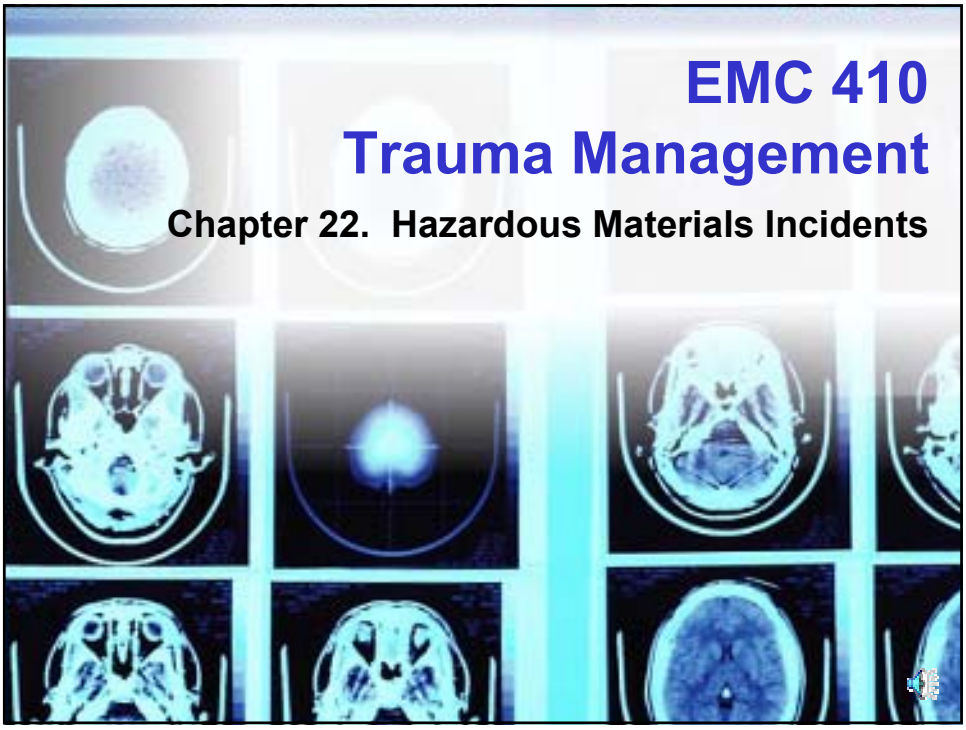


EMC 410
Trauma Management
Chapter 22. Hazardous Materials Incidents

Unit Objectives

- **Upon completion of this chapter, you should be able to:**
  - Define “hazardous material”
  - Discuss the importance of preplanning for a hazardous material incident
  - Identify 8 methods of hazardous material identification
  - List 4 key scene size-up questions
  - Discuss the organization of a hazardous material scene
  - Identify 3 on-scene roles for properly trained EMS personnel
  - Outline 6 preliminary steps to be taken at the scene of a hazardous material incident.

Unit Objectives continued

- Discuss the 4 levels of personal protective equipment (PPE)
- Describe 4 problems associated with the use of PPE
- Describe the purpose of patient decontamination
- Discuss the 3 phases of patient decontamination
- List the 3 zones of the hazardous materials scene and describe the activities that occur within each
- Describe the medical care practices to be followed when caring for the victim of a hazardous material incident

Hazardous Material

- "Any substance or material in any form or quantity which poses an unreasonable risk to safety and health and to property when transported in commerce." Department of Transportation
- 50,000 agents labeled as hazardous by government authorities
- 10,000 incidents each year

Preplanning

- **Hazard Analysis**
  - Hazardous material present in a community
  - Location
  - Quantity
  - Specific physical and clinical hazards
  - Risk of release
- **SARA title III**
  - Right to know
- **Community preplan**
  - Integrated response

Training

- **OSHA 1910.120**
  - First Responder Awareness
  - Operations
  - Technician
  - Specialist

Role of the Emergency Medical Dispatch Center

- Determine the exact location of the incident, the nature of the problem (including the names of the chemicals involved), the number of victims, and the types of injuries sustained).
- Reassure the caller and provide pre-arrival instructions
- Relay all information to responding agencies.
- Relay “size-up” information to agencies that have not yet reached the scene.

Identifying Hazardous Materials

- **Occupancy and Locations**
  – MSDS sheets
  – Common locations for hazardous materials


THE Clorox Company
7200 Johnson Drive
Tel. (415) 847 6100

Material Safety Data Sheets

I – CHEMICAL IDENTIFICATION

Name regular Clorox Bleach
CAS No. N/A
RTECS No. N/A

Other Designations
EPA Reg. No. 5813-1
Sodium hypochlorite solution

Manufacturer
The Clorox Company
1221 Broadway
Oakland, CA 94612

Emergency Procedure
• Notify your supervisor
• Call your local poison control center OR
• Rocky Mountain Poison Center

II – HEALTH HAZARD DATA

III – HAZARDOUS INGREDIENTS

Sodium hypochlorite 5.25%

IV – SPECIAL PROTECTION INFORMATION

V – SPECIAL PRECAUTIONS

VI – SPILL OR LEAK PROCEDURES

VII – REACTIVITY DATA

VIII – FIRE AND EXPLOSION DATA

IX – PHYSICAL DATA

Identifying Hazardous Materials

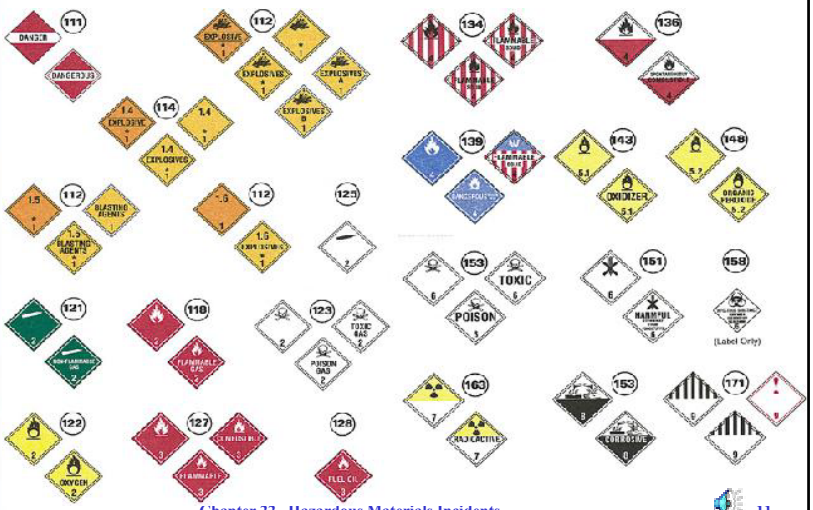
- **Container Shape**
  - Non-bulk packaging
    - 119 gallons or less of liquid
    - 882 pounds or less of solids
    - 1000 pounds or less of gases
    - 55 gallon drums most common
  - Bulk Packaging
    - Larger volumes
    - Tank cars, portable tanks, storage tanks or pools

Identifying Hazardous Materials continued

- **Markings and colors**
  - Fixed Facility
    - NFPA 704 Diamond
  - Bulk Transportation
    - Container shape, color, or name of chemical on rail car
  - Non-bulk packages and containers
    - Toxicity signal words (danger, warning, caution)
    - Statement of practical treatment
    - Physical or chemical hazard statement (explosion, fire, chemical hazard)
    - Product name
    - Ingredient statement
    - Environmental statement
    - EPA registration number

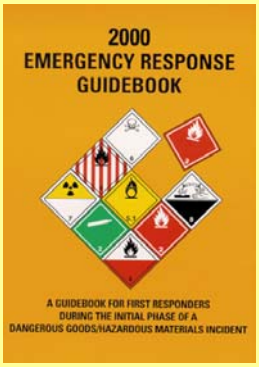
Identifying Hazardous Materials continued

- **Placards and Labels**



Identifying Hazardous Materials continued

- **Placards and Labels**
  - Diamond placards with UN identification code
  - Colors indicate a class of hazard
  - A single substance may have multiple placards
  - North American Emergency Response Guidebook used to identify material and obtain initial management instructions
  - Not all shippers comply with labeling requirements
  - Placard is not required when transporting less than 1000 pounds of material
  - A “Dangerous” placard may be substituted for two or more placards when transporting two or more substances
  - Many materials are exempted from regulation
  - Placards provide only limited information



Identifying Hazardous Materials continued

- **Shipping Papers and Documents**
  - Bill of lading (highway)
  - Dangerous cargo manifest (water)
  - Waybill/consist (rail)
  - Air bill (air)
  - Hazardous materials identified by being listed first, highlighted, special wording (poison, oxidizer, etc.), or by "**HM**" appearing next to the product

Identifying Hazardous Materials continued

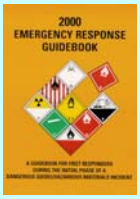
- **MSDS Sheets**
  - Format varies from business to business
  - Producer may not consider the product hazardous
  - All chemicals may not be listed in the ingredients
  - An ingredient may not be listed because it is a trade secret
  - Ingredients in small quantities may not be listed
  - Accuracy and completeness are variable
- **Monitoring and Detection Equipment**
  - Require specialized training and generally only measure one particular material.

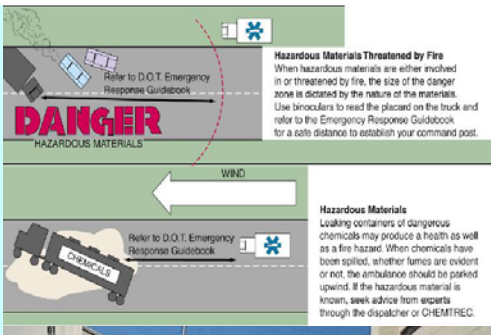
Identifying Hazardous Materials continued

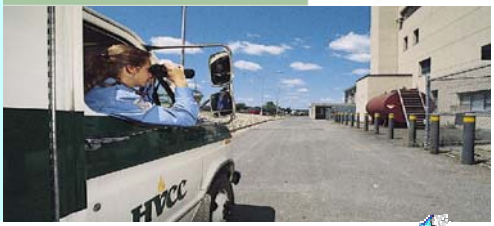
- **Senses and Behavior**
  - Smoke color
  - Vapor cloud
  - Hissing of pressurized gas release
  - Groaning of metal containers under stress
  - Irritation of eyes and respiratory tract
  - Odors
  - Symptoms of patients

Scene Operations

- **"Rule of Thumb"**
- **Emergency Response Guidebook**
- **CHEMTREC**

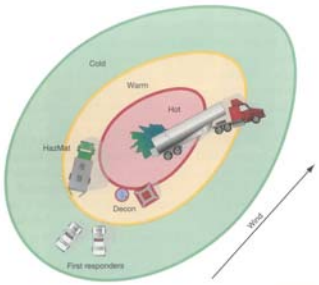






Scene Operations

- **Incident Command System**
  - Command post
  - Hot zone
  - Warm zone
  - Cold zone
  - Hazmat officer
  - Reference officer
  - Rehab officer
  - Decontamination zone
  - Medical surveillance



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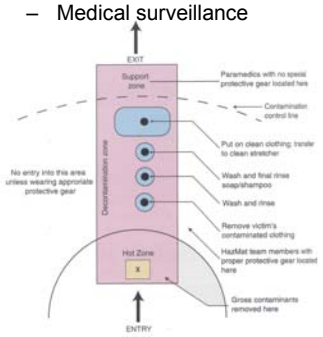

Personal Protective Equipment

- **Level of protection depends on**
  - Material involved
  - Physical properties of the product
  - Form, concentration, and amount of product
- **Pre-entry exam**
  - BP, pulse, respiration, weight, ECG
  - Inclusion criteria
    - BP < 160 systolic and 90 diastolic, P 50-110, R 12-20
- **Post-entry monitoring**
  - Mandatory rest periods

Personal Protective Equipment continued

- In general, EMS remains in the cold zone and does not require PPE other than universal precautions
- Protective Equipment Classifications
  - Structural firefighting
  - High temperature
  - Chemical protective clothing

Personal Protective Equipment continued

- **Chemical Protective Clothing**
  - Level A
    - Optimum protection against inhalation, skin, mucous membrane, and eye exposure
    - Consists of SCBA or in-line air, encapsulating suit, gloves, boots, airtight seals
  - Level B
    - Provides respiratory protection of level A, but lacks full encapsulation
    - SCBA, long-sleeved suit, gloves, boots, helmets
  - Level C
    - Used when there is little likelihood of skin, mucous membrane, or eye exposure
    - Filter type respirators, suit, gloves, and boots
  - Level D
    - Provides no respiratory or skin protection

Personal Protective Equipment continued

- **Problems of PPE**
  - Dexterity and vision
  - Operational time
  - Respirator and cartridge function
  - Rescuer injury
  - Partial protection
  - Delay in initiating care

Field Management

- **In the Hot Zone**
  - Triage
  - Spinal stabilization
  - Open airway
  - Hemorrhage control
  - Isolation of respiratory system with escape pack
  - Remove contaminated clothing
  - Gross decontamination

Field Management

- **In the Warm (decontamination) Zone**
  - Determine risk of secondary contamination
  - Conduct secondary decontamination if needed
  - In general, diagnostic equipment not used in the warm zone
  - Definitive decontamination
  - "Emergency" technical decontamination

Field Management continued

- **In the Cold Zone**
  - Airway and cervical spine
  - Oxygen and breathing
  - ECG
  - Hemorrhage control
  - Cautious drug therapy
  - Cautious invasive procedures
  - Transport