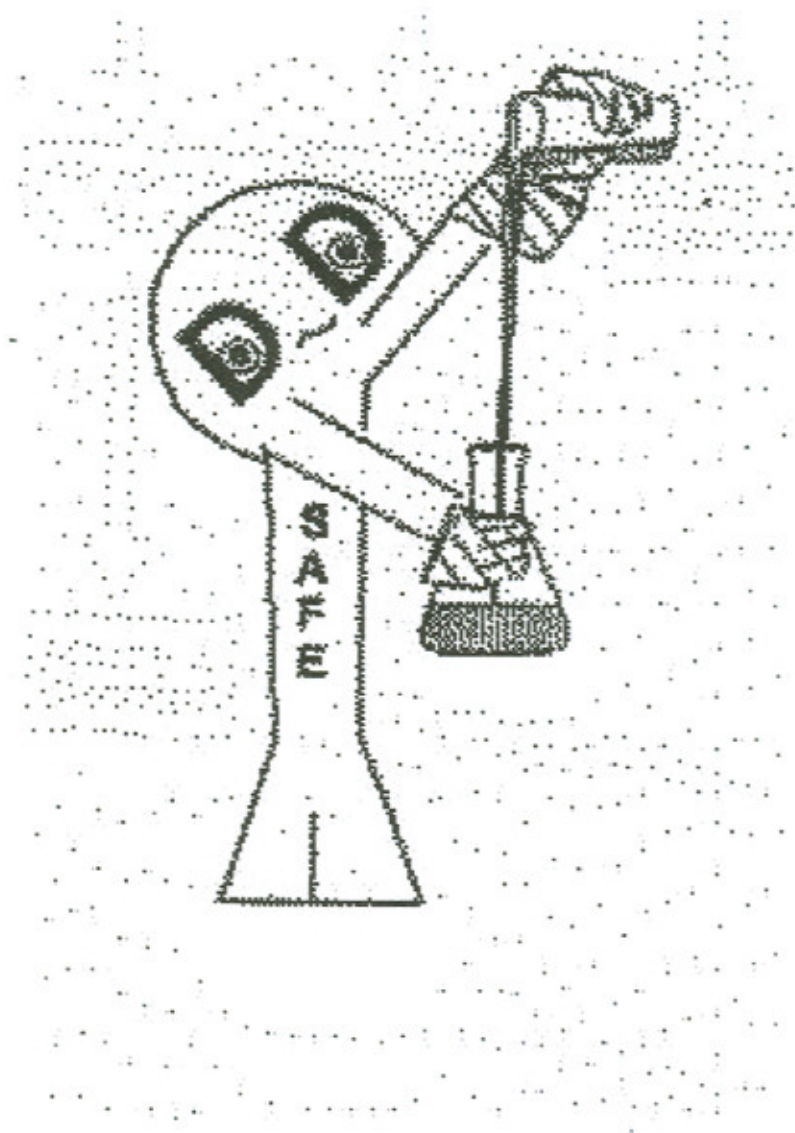


Safety Training for the Developmentally Disabled in Icon Recognition for the Safe Use of Hazardous Chemicals

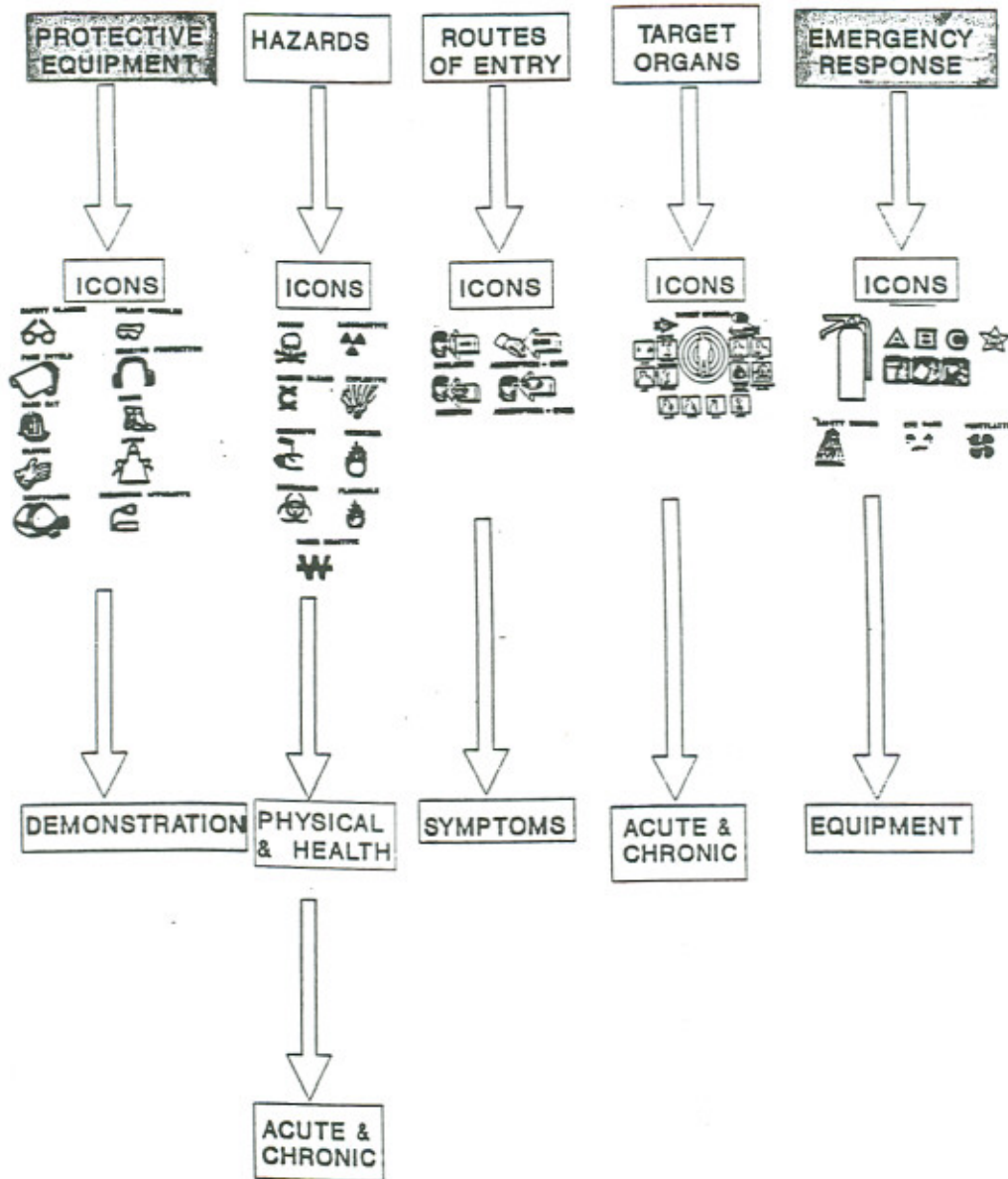


Prepared by Jeff Sandoz, Ph.D.

Assistant Professor
University of Louisiana at Lafayette
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THE TRAINING PROCESS

CONNECTING LABELS WITH THE MSDS



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PREFACE

Teaching developmentally disabled (DD) workers can be a challenging experience. The emotional rewards of seeing an individual making progress can be very satisfying to a teacher, vocational instructor, or residential staff member. In the past century great strides have been made with regard to the normalization process of this particular population. At the present time the developmentally disabled are found in several diverse employment training programs. Many of these individuals have received vocational training and in some cases training by the employees on the work site. Many changes have occurred throughout the work force in the United States in the past few decades. Specifically, with the passage of acts of congress our nation has declared the importance of safety in the American work place.

This book is designed to help train the developmentally disabled in the safe use of hazardous chemicals. The purpose of the book is assist the staff members (job coaches, janitorial crew supervisors, etc.) who will train and work with the (DD) workers in: (1) the safe handling procedures of hazardous chemicals; (2) methods of using protective equipment to prevent exposure in the work place; and (3) to provide information of the approaches designed to decrease the risk of accidents occurring involving potentially dangerous chemicals. This training attempts to meet guidelines set forth by the Occupational Health and Safety Administration (OSHA) of the United States as pertaining to hazardous chemicals in the work place.

As of this date there has been no comprehensive attempt to train the (DD) workers in safe use of hazardous chemicals. Hopefully, the information in this book will serve others not only save lives and prevent injuries, but will prepare a specific population of American workers with their own unique set of needs. With the recent passage of the Americans with Disabilities Act (ADA) there may exist some confusion with regard to providing 'reasonable accommodation' in the area of training for this population of workers. This manual attempts to provide a sensible conformity to that aspect of the ADA promulgation by virtue of its training materials.

Hopefully, this book will provide sufficient background information for both those who train and work with the developmentally disabled client workers. Special consideration has been taken due to certain mental handicaps of developmentally disabled workers, (viz. uniquely adapted training materials have been provided for these individuals.) Although as of this date OSHA has not declared specific regulations concerning developmentally disabled people, it is imperative that this population be provided the same protection as others are assured by law in the work place.

TRAINING THE DEVELOPMENTALLY DISABLED
IN THE SAFE USE OF HAZARDOUS CHEMICALS

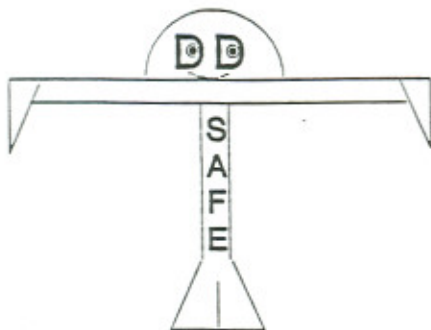
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CHAPTER ONE

INTRODUCTION

In presenting this information this book has three major divisions:

CHAPTER I provides an overview of the training. In this section you will be introduced to the cartoon character who is named DD Safe - T (Developmentally Disabled Safety). DD will provide summaries, helpful hints and memory aids which will help you to remember the most important information. In addition specific instructional methods for the (DD) worker are included.



[DIAGRAM 1.1] DD SAFETY

CHAPTER II offers information which is designed to provide sufficient background information for those who instruct the (DD) worker. (However, instructors and trainers are encouraged to acquire certification with regard to specific types of protective equipment such as respirators if these are to be used at the work site. Similarly, if the use of certain chemicals requires special spill clean up procedures, additional training is suggested. As this book provides a general knowledge it is in no way all encompassing. It should be noted that it is the responsibility of the trainers, instructors and the on-site supervisor to judge the level of competence of each worker and the level of work demands.)

CHAPTER III includes the specific training for the (DD) worker taking into account the specific handicaps of the individual group members.

OVERVIEW OF TRAINING

This section includes the following;

1. OSHA REGULATIONS
2. RISKS, HAZARDS AND EXPOSURE SYMPTOMS
3. LABELING PROCEDURES AND THE NFPA CODE
4. READING LABELS AND ICONS
5. UNDERSTANDING MATERIAL SAFETY DATA SHEETS (MSDS)
6. PERSONAL PROTECTION EQUIPMENT AND EXPOSURE PREVENTION
7. HAZARD DETECTION
8. EXPOSURE VICTIM CARE

Viewed in their entirety these segments comprise a detailed and extensive introduction to the safe use of hazardous chemicals in the work place. Later in the book, the section on the (DD) worker training provides specific training that takes into account the mental handicaps of this group.

TEACHING METHODS

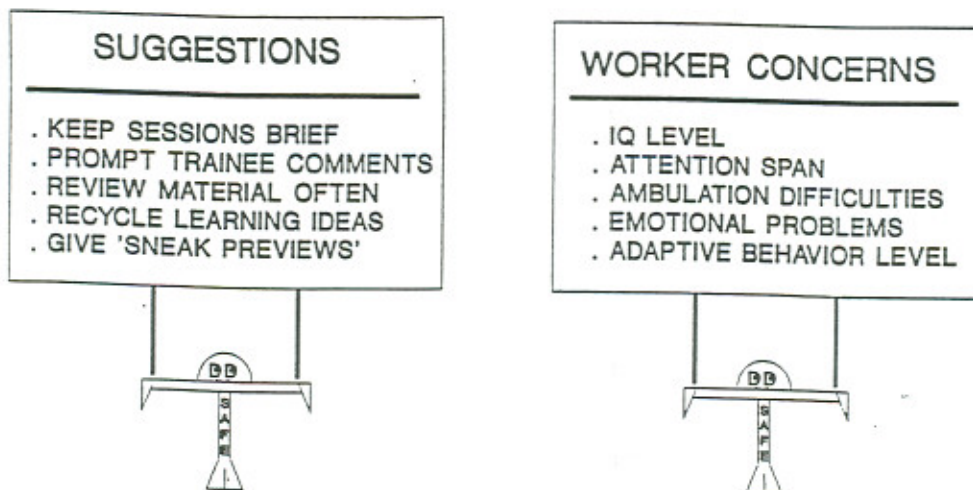
Methods of instruction for the (DD) worker requires specific teaching methods to ensure that the workers actually learn the course content. Familiarity with these teaching techniques will enable the information to be presented in a clear and efficient manner.

Lecture Considerations for the Workers

Much of the training in this book is presented in a visual manner accompanied with brief lecturettes. The rationale for this method is simple; individuals retain more of the learned material through visual recognition. Presentation of the icons in conjunction with the display of the object that the icon represents (when available) or, with the juxtaposed diagrams will enable the trainees to remember the presented information. When one is teaching, it is essential that those doing the actual training present and demonstrate in a manner which is comprehensible to the trainees. Encourage questions, promote active learning, provide time for the learning to take root and flourish. It may be helpful to consult with other professionals

such as psychologists, former teachers and other persons who have worked with these individuals prior to this training. These professionals may be able to offer concrete and practical suggestions which promote the (DD) worker's learning experience. In addition, continual referral to the worker's psychological evaluation (especially with regard to the evaluator's recommendations and level of adaptive behavior) could provide useful information as well as to provide insights into how to relate to the worker interpersonally. It is essential that the level of teaching match the cognitive level and adaptive ability of workers. While there are videotapes which are available, these may be at a level beyond the intellectual grasp of the worker. If videotapes are to be used in conjunction with training a few suggestions are offered;

- 1) Be aware of the cognitive limitations of the viewer.
- 2) Be aware that in addition to being Mentally Retarded some individuals may have a very short attention span, a visual handicap, a hearing impairment, emotional problems and have difficulty with ambulation.
- 3) Keep the training segments brief in order to maintain viewer attention.
- 4) Ask the viewers to share with the class something that was learned.
- 5) Review the specific material that you want the trainees to retain.
- 6) Recycle the newly learned material in subsequent related areas by recalling what was seen on the video.
- 7) Always give the trainees a 'sneak preview' of what you will be showing on the video and to what ideas you specifically want them to pay close attention.



[DIAGRAM 1.2] LECTURE CONSIDERATIONS

Additional Considerations

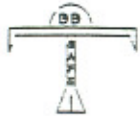
Some of the trainees may also suffer from physical handicaps. Training sites, as well as areas of work can be adapted to accommodate for physical deficiencies. If a worker has an ambulation problem, then "pairing up" with a non-handicapped worker, or a job coach is suggested. Visually, or hearing impaired individuals may require the need for specific highly visible warning cues, or directions in a diagram or "cartoon" format.

Discussion

Discussions enable the newly learned information to flourish. Assist the trainees to branch out the newly presented material and make connections with prior learning. Help clarify any confusion that may exist.

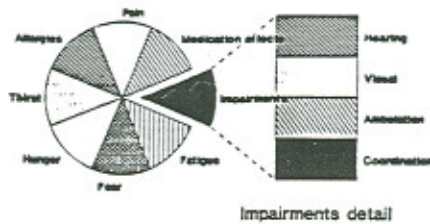
Keep in mind the specific physical, cognitive, emotional and social needs of each individual. If trainers have personal knowledge of the trainees then promoting discussions will be easier.

How can DD promote trainee discussions?
It is as easy as pie
or



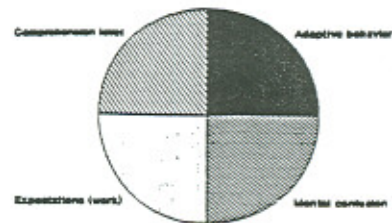
Know the status of the trainees in these areas:

Physical



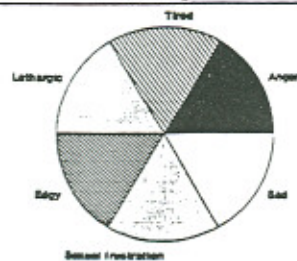
Ask the "PIE" PIE?

Intellectual
(Cognitive)



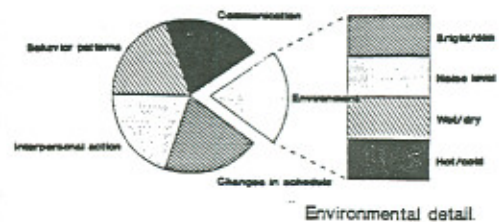
Use a "ICE".

Emotions
(Feelings)



Ask a trainee, remember "SADSEL".

Social



To be able, remember "SO ICE".

[DIAGRAMS 1.3, 1.4, 1.5, 1.6 & 1.7] PIES

Training (DD) workers can be a very challenging endeavor. It is extremely important that the instructors who directly train these workers recall the following;

- (1) The information which is presented is very specific in detail and can be intricate and complex,
- (2) The accompanying diagrams are in a distinctive code which involves a language and vocabulary with which the general population is unacquainted and
- (3) The practical value of this training is the degree to which the worker remembers the information and demonstrates safe working procedures while working on site.

While some discussions may lead the training class away from subject matter, the instructor may be sensitive the need of the trainees to ask questions and share their own experience. Shared learning can be a valuable tool when effectively harnessed. However, time limits should be set whereby the specific daily objectives are to be accomplished within the allotted time. Flexibility is important and can be gauged by trainer style, interpersonal manner and classroom arrangement. If there is a co-trainer available, then a 'team-approach' to teaching could increase both flexibility and effectiveness. Such an arrangement would allow for different methods of trainee participation and discussion such as 'open sharing', subgroup discussion, seated partner sharing and calling on the next person to speak.

One suggestion is to schedule a review at the end of a class session in a 'game show' format where by certain material could be displayed and correct trainee responses tallied for a small reward such as a sticker to be attached on the winner's shirt or a poster board with 'Today's Winner' with the trainee's name on a removable placard.

Trainers can be very creative in devising methods of reinforcing learning experiences. Two rules of thumb may include; (1) The same reward may not work for all trainees who receive it, therefore find a reward that the individual finds motivating and (2) Look at the results of the reward. Simply, be pragmatic! Ask yourself this question: "Does the effect of the reward increase the likelihood of future learning experiences?" If positive results ensue, then maintain the reinforcer.

It is important that those who do not receive recognition as the winner receive ample verbal praise and recognition for their participation. This additional measure may prevent future 'behavior problems' as some individual may feel angry about not winning and damage the display board.

Another suggestion is to have the trainees complete the following; 'One thing that I learned today was' This would allow for an non-competitive atmosphere if the rivalry for attention becomes too intense.

Some methods which can be used to promote discussion are;

1. Promote a classroom atmosphere of fun and learning.
2. Restate what the trainees say.
3. Accept all trainee responses in a positive way.
4. Identify each trainee and call by name.
5. Sincerely compliment trainees on effort.
6. Encourage trainees enthusiastically.

Promote a fun atmosphere.
Restate trainee comments.
Accept all trainee responses positively.
Identify each trainee & call by name.
Sincerely complement.
Enthusiastically encourage trainees.



[DIAGRAM 1.8] METHODS OF PROMOTING DISCUSSION

Questions can be asked which are related to the concepts and ideas involved with actual life experiences.

Some beginning questions may include:

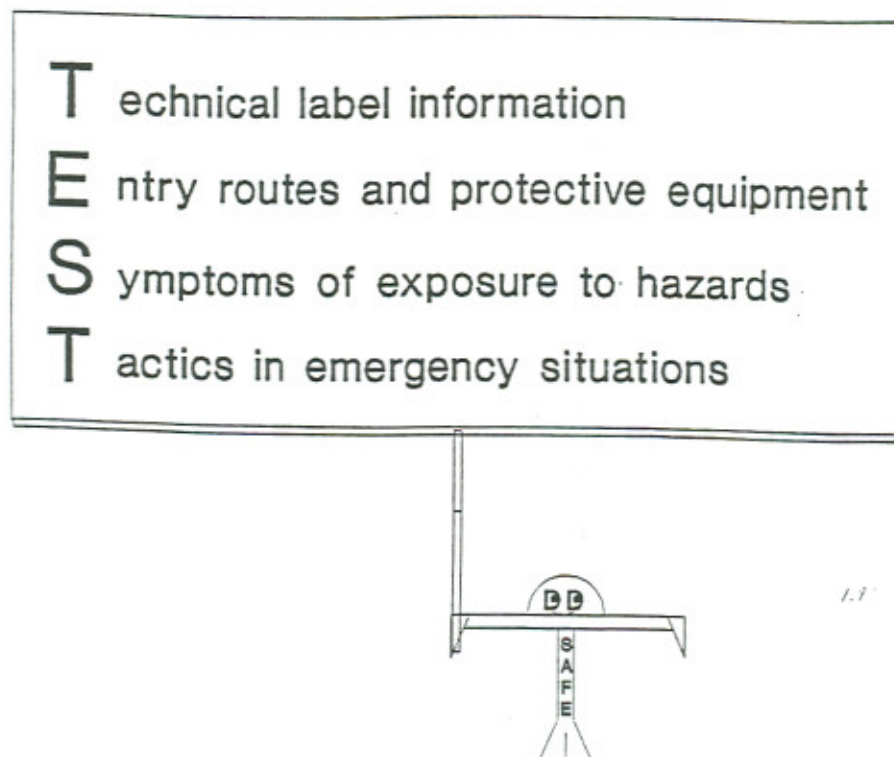
1. "Have you ever had soap in your eyes?"
2. "How many of you ever spilled bleach on your hands while doing laundry?"
3. "Have you ever noticed how some chemicals have strong odors like ammonia? What would happen if you breathed that in for a long time?"
4. "What do think would happen if you were filling the lawn mower with gasoline and someone nearby began to light a cigarette?"
5. "If you were adding chemicals such as acid into a swimming pool and the strong smelling vapors began to burn your nose and throat and you began to cough, what would you do?"

Testing

While there is no testing required by OSHA, some role playing may be necessary in order to demonstrate proficiency of

the course material. Some of this role playing can be done in the classroom, or with actual "hands on" training at the work site after each class session. Included in this book are simulation exercises which are designed to assess the level of working knowledge attained by the training. These role playing drills are designed to demonstrate the trainee's ability to understand the picture information on the MSDS forms such as;

1. NFPA code and the technical label information
2. routes of entry
3. exposure protection equipment to be used
4. symptoms of exposure and risks
5. tactical procedures if an accident occurs



[DIAGRAM 1.9] TESTING

CHAPTER TWO

TRAINER BACKGROUND INFORMATION

NOTE: This chapter provides for the trainer specific background information which is mandated by law for all employees.

I. OSHA REGULATIONS: COMMUNICATING INFORMATION ABOUT THE HAZARDOUS CHEMICALS IN THE WORK PLACE.

Each year in the United States over 30 million workers are exposed to chemical hazards. Despite good intentions and safety procedures thousands of accidents occur involving hazardous chemicals. In an attempt to curb the frequency and degree of damage caused by those accidents, the Occupational Safety and Health Act was enacted by Congress more than 2 decades ago. The OSHA Hazard Communication Standard did not become fully effective until May 23, 1987. This legislation was designed to safeguard workers from accidents by promoting awareness of the specific information:

- 1) chemical exposure hazards,
- 2) physical symptoms of chemical exposure,
- 3) information regarding treatment of exposure,
- 4) safety precautions and protection from exposure.

NOTE: There are many videotapes which present the aforementioned information. In addition, other videotapes can be used to present what employees need to know as promulgated by OSHA. Some of these include;

- 1) An overview of the "Right To Know" standard as provided by the OSHA guidelines.
- 2) A brief history of the law and its intended purpose.
- 3) Compliance requirements and specific training information.
- 4) Explanation of the types of hazards.
- 5) Employee rights.
- 6) Employer responsibilities which include;
 - a) developing a written list of all hazardous chemicals used or stored in the work place,
 - b) determining if any substances used are hazardous,
 - c) developing and implementing a written hazard communication program,
 - d) labeling every container holding hazardous

- substances and providing the identity of the substance as well as target organs effected,
- e) collect, update and have readily available for all employees the MSDS reports of all hazardous substances at the work site.

Trainers must provide information with specific details about the work area:

WHAT type of information may be requested from the workers regarding specifics of the work area,

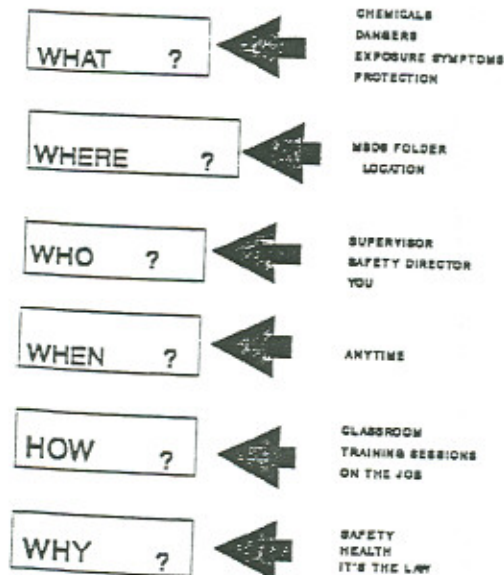
WHERE to go for the information in the work place,

WHO is responsible for providing the information requested by the workers in addition to offering current updates on material,

WHEN workers need the information to be available,

HOW the information is to be presented,

WHY this material is important to know.



(DIAGRAM 2.1) WHAT, WHERE, WHO, WHEN, HOW & WHY

The aforementioned should be included in the OSHA Hazard Communication Written Plan. For practical reasons working with the trainees involves close coordination between job coach and supervisor. This close working relationship will ensure clarification of questions posed by the trainees.

The following checklist is offered to ensure compliance of the 1983 OSHA Hazard Communication rule which was further expanded in 1987;

- 1) Obtain a list of all hazardous chemicals in the work place.
- 2) Develop a file on information pertaining to the hazardous chemicals.
- 3) Acquire MSDS reports for every hazardous chemical in the work place.
- 4) Organize and implement a system of labeling all incoming hazardous chemicals.
- 5) Examine each MSDS for completeness and accuracy.
- 6) Maintain MSDS availability for workers.
- 7) Produce a written hazard communication program.
- 8) Implement a planned program of informing employees of hazards.
- 9) Instruct employees of methods and equipment providing protection against the hazardous chemicals.
- 10) Inform employees of labeling and other methods used to communicate warning.

A. RISKS AND HAZARDS USING HAZARDOUS CHEMICALS

1. Risks

The concept of "risks" and "hazards" include the following points:

- The risk categories of physical and health hazards.
- The classification of physical hazards.
- Categories of health hazards: acute and chronic.
- Routes of entry.
- Symptoms of exposure including types of chemicals and their effects.

Additional risks involve:

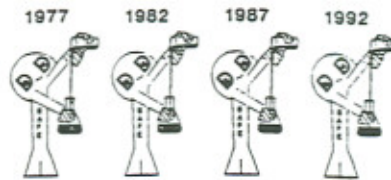
- Using large amounts of chemical substances.
- Using extremely hazardous substances.
- Using hazardous substances in less than ideal situations (e.g. inclement weather, high noise level, extremes in temperature, poor lighting and inadequate ventilation).

- Using a product over an extended period of time.

USING LARGE AMOUNTS



REPEATED USE



POOR WORKING CONDITIONS

USING HAZARDOUS SUBSTANCES



WEATHER



LIGHTING



[DIAGRAM 2.2] ADDITIONAL RISKS

UNDERSTANDING THE TERMINOLOGY

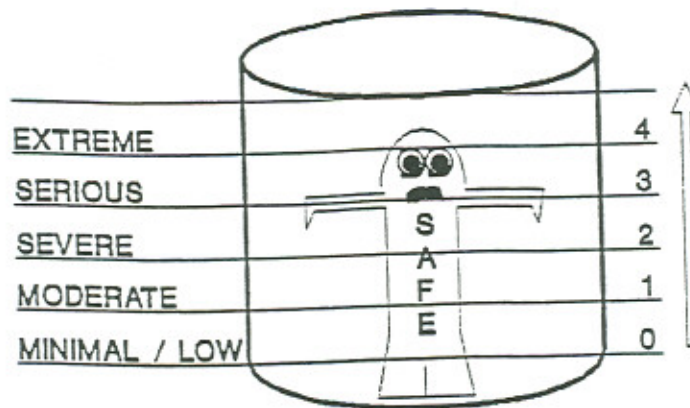
A "risk" is a measure of the probability and severity of harm to the health of individuals and/or the property within that environment. Both of these factors should be considered in relation to the functioning of the safety system.

"Probability" is the degree to which the harm is likely to occur.



[DIAGRAM 2.3]

"Severity" indicates how serious the harm may be.



[DIAGRAM 2.4] IN THE BARREL

Risks involve two categories:

- (1) physical hazards and
- (2) health hazards.

2. Hazards

"Hazard" indicates the possibility that an exposure to a particular substance will cause injury when a specified amount is utilized under certain conditions. Individual susceptibility to a particular substance may vary from person to person depending upon the dose/response.

It might be helpful to recall the PATH of a hazard;

- P = Period of time absorbed
- A = Amount of substance absorbed
- T = Type of substance absorbed
- H = How susceptible the person is to the substance

Some of the ideas relevant to "physical" and "health" hazards, as follows:

- a) PHYSICAL HAZARDS can be classified into the following categories:
 - o Fire Hazards
Examples include; combustible liquids, flammable chemicals in such forms as solids, liquids, gases and aerosol sprays. Others include oxidizers and





Pyrophoric materials.

- o Explosion Hazards
Examples include; compressed gases and explosives



- o Reactive Hazards
Examples include; organic peroxides, unstable reactive materials and water reactive materials. [Note: Specific chemicals when mixed are incompatible when combined. For instance, two household cleansers when mixed produce a poisonous gas; ammonia and chlorine bleach.]

[DIAGRAMS 2.5, 2.6 & 2.7] 3 ICONS; FLAMMABLE, EXPLOSIVE & WATER REACTIVE

Remember: A physical hazard interferes with the smooth functioning of the work place and materials in it. The harmful effects of physical hazards can injure people physically (e.g., cuts, bruises, internal injuries, falls, burns and poisoning.)

- b) HEALTH HAZARDS damage the body by chemical means. The amount of harm depends on:
 - (1) the degree to which the body was exposed (small versus large area;
 - (2) the identity of the substance and its associated properties;
 - (3) the dosage (quantity) of the substance present;
 - (4) the duration of exposure (how long did it last?)
 - (5) the direct contact through specified routes of entry and the form of the substance, (e.g. solid, liquid, gas, and temperature).

D	D	D	D
D	D	D	D
D	D	D	D
D	D	D	D
D	D	D	D
D	D	D	D



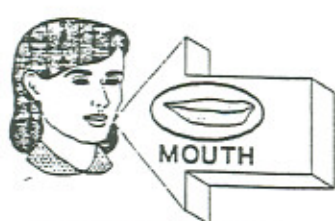
[DIAGRAM 2.8] DID DD TELL YOU ABOUT HEALTH HAZARDS?

ROUTES OF ENTRY

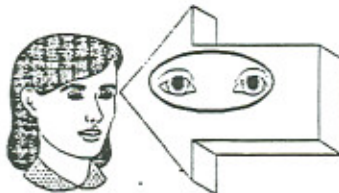
Health hazards occur when chemicals enter the body. In these instances chemical contact is made with exposed, or unprotected areas of the body. The technical term for this physical contact is the routes of entry. There are four routes of entry which include the following;

- Ingestion [Swallowing the chemical substance]
- Inhalation [Breathing in particles, or vapors]
- Absorption through the skin
- Absorption through the eyes

ROUTES OF ENTRY



INGESTION



ABSORPTION - EYES



INHALATION



ABSORPTION - SKIN

[DIAGRAM 2.9] ROUTES OF ENTRY

SYMPTOMS BY ROUTE OF ENTRY

The following is a list of some of the more common symptoms associated with physical contact of a hazardous substance;



INGESTION

CRAMPS
DIARRHEA
NAUSEA



INHALATION

FATIGUE
DIZZYNESS
NAUSEA & VOMITING
DEATH
MUSCLE WEAKNESS
HEADACHES
SLEEPYNESS
MUCOUS MEMBRANE
DAMAGE
UNCONSCIOUSNESS



ABSORPTION - SKIN

BURNING
ITCHING
DRYNESS



ABSORPTION - EYES

IRRITATION
BLINDNESS

Frequent hand washing is suggested to avoid accidental ingestion, or contact with eyes.

EFFECTS OF EXPOSURE

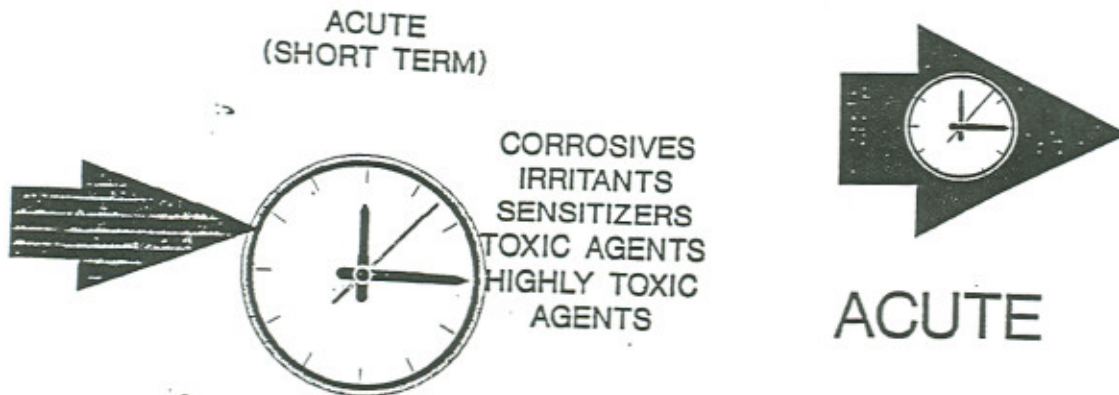
Three factors are to be considered regarding the results of an exposure;

- the extent of the exposure of body areas
- the expanse of the effects (whether limited to the localized area of contact or effecting different bodily systems)
- the time span effects of exposure (e. g. acute or chronic)

After the chemical has entered the body through the routes of entry, certain types of health hazards often develop. These health hazards are categorized as acute and chronic. Note that there are two "levels" of hazards relative to the length of time in which the effects are observed:

1) ACUTE hazards have an effect that is immediate, but short term. Damage can occur in a very short time period, specifically in minutes or hours. If damage occurs where the substance enters the body, then the damage is considered to be local. Some examples of acute hazards include;

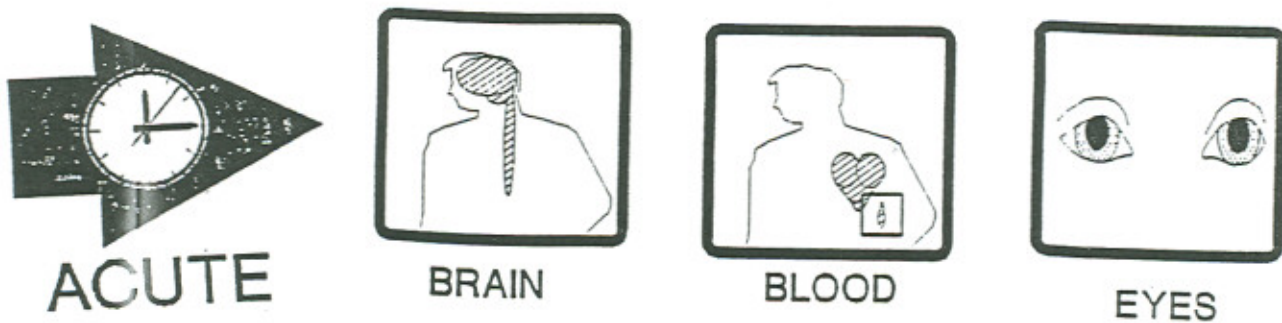
corrosives
irritants
sensitizers
toxic agents
highly toxic agents

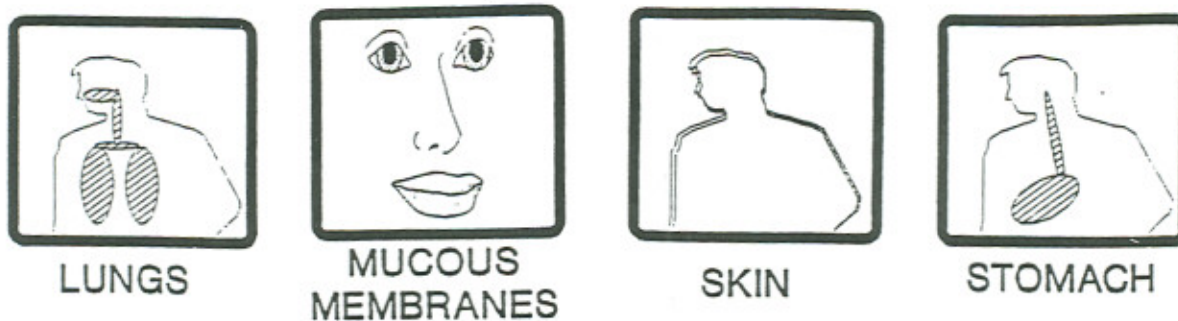


[DIAGRAM 2.10] ACUTE

Acute hazards cause damage to specific areas. The areas effected are called TARGET ORGANS. Some of the target organs are;

blood
brain [central nervous system]
eyes
lungs [respiratory system]
[mucous membranes]
skin
stomach [gastrointestinal system]

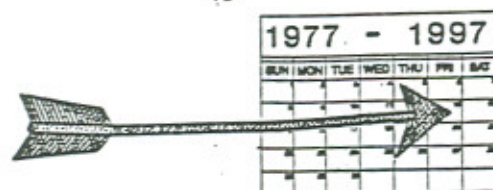




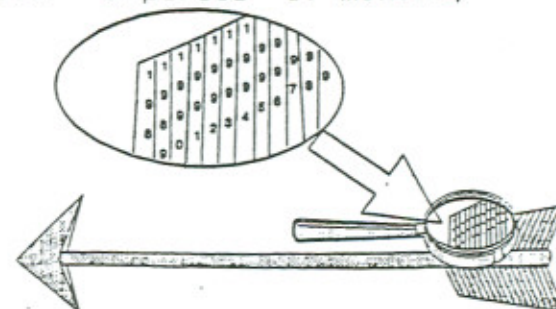
[DIAGRAM 2.11] ACUTE ICON & TARGET ORGANS

2) CHRONIC hazards have delayed, long term effects. The long term exposure could take place over a period of months, years, or over a lifetime.

CHRONIC (LONG TERM)



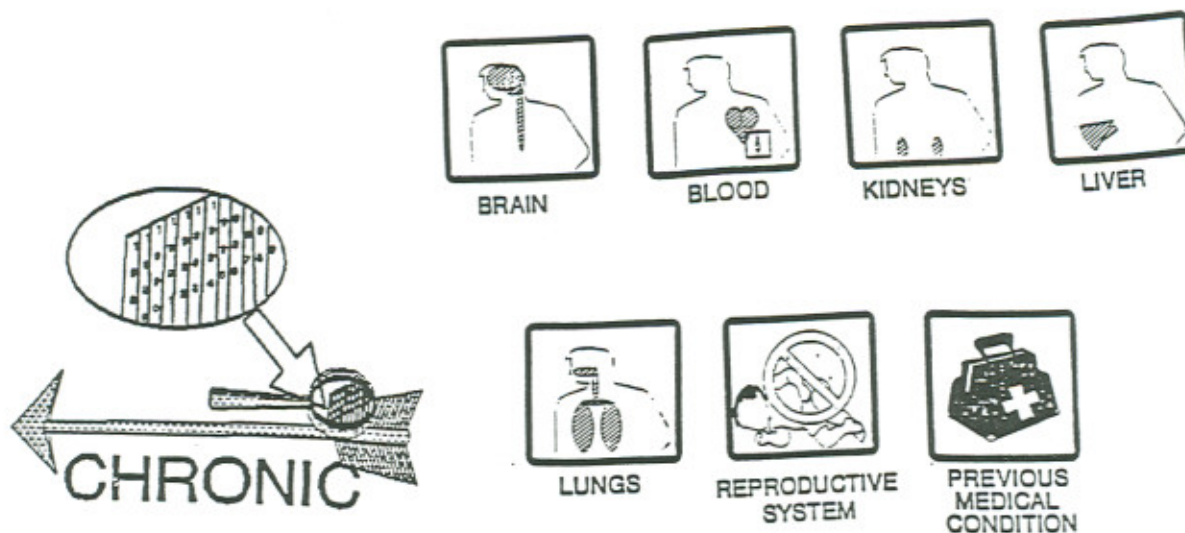
[DIAGRAM 2.12] CHRONIC



CHRONIC

A chemical is often not considered to be harmful until it acts on an organ or specific area within the body. This effect can be referred to as systemic. Some examples of chronic hazards include the following agents affecting target areas such as;

- brain (central nervous system)
 - hematopoietic system (formation of blood and blood cells)
 - kidneys
 - liver
 - lungs (respiratory system)
 - reproductive system
- some medical conditions can be aggravated by exposure.



[DIAGRAM 2.13] CHRONIC ICON & TARGET ICONS

B. SYMPTOMS OF EXPOSURE

The following information relates different types of chemicals and their effects. Note that ACUTE and CHRONIC hazards are associated with the following substances in their respective sections:

1. Substances and Symptoms - ACUTE Hazards:



Corrosive Materials - These affect the area of contact. The effects are immediate, causing destruction to living tissue through the action of the chemical. The damage is non-reversible. Materials in this category include: acids, liquid peroxides and halide compounds (fluorine, chlorine, bromine, iodine, and astatine). Also included in this category are strongly concentrated solutions of bases such as lye. These are more dangerous when heated at a high temperature.

Irritants - Cause reversible inflammation at the site of contact. The skin will turn red, become swollen and feel painful. Examples include ammonia and chlorides. These are more dangerous when exposure occurs when the irritant is heated.

Sensitizers - Cause the skin to redden with repeated contact on a localized area. Rarely life-threatening, but can be seen as similar to an allergic reaction. (While allergic reactions do not occur the first time that a substance is used, reactions can be experienced with subsequent repeated exposures. The range may be from the second to the one hundredth exposure. Examples of sensitizer substances include creosote, epoxy compounds and formaldehyde. Corrosives,

irritants and sensitizers affect skin, eyes, gastrointestinal tract and respiratory tract. Sensitizers often effect the nose and respiratory system. These substances can provide a systemic change which may have a general overall effect on the body.

Toxic Agents - These are basically poisons which affect the proper functioning of a human being and in extreme cases can cause death. Toxicity is the capability of a chemical substance to produce an undesired effect when that substance has reached a particular level of concentration at a specific site in the body. With small exposures there is the possibility of no lingering damage. Toxic agents are defined by their route of entry: ingested, inhaled, or absorbed through the skin and eyes.



[Note: Although Biohazards are not specifically placed in this category, this may be an appropriate time to refer to them. Special care should be taken with regard to disposal of infectious wastes. Workers should be on guard with regard to "sharps" which may be discarded without proper care. These objects may include such contaminated material such as used hypodermic needles, broken glass, disposable medical equipment with sharp edges.]

Highly Toxic Agents are most deadly and more potent than the previous category.



Chemical Agents with Target Organ Effect are hazardous chemicals effecting specific body areas, such as blood, skin, kidneys, eyes, central nervous system, lungs, liver and the reproductive system.

2. Substances and Symptoms - CHRONIC Hazards:

Chronic effects associated with the certain substances produce delayed and long term effects. [Refer to the Material Safety Data Sheet (MSDS) provided for each chemical substance used. The MSDS gives information on specific symptoms which may be experienced after physical contact has been made. It is advisable to review the MSDS for each chemical substance frequently.] Some of the effects of chemical products are provided below:

EFFECTS AND SITES



Blood is affected by carbon monoxide and injures the individual by depriving the body of oxygen.



SKIN

Skin is affected by acetone, chlorides and toluene.



EYES

Eyes are damaged by acids, alcohol, and ammonia.



BRAIN

The CNS (Central Nervous System) is damaged by neurotoxins such as acetylene, ethyl alcohol, and ether.

Sometimes effects of chemicals on body tissue are long-term. These are called "chronic" effects. Some examples follow:



Carcinogens are cancer-causing substances such as asbestos and radon.

In addition to some immediate effects, there are long-term effects observed in certain "target" organs for certain substances, such as the following examples:



KIDNEYS

Nephrotoxins damage the kidneys. These are substances such as lead and mercury compounds.



LIVER

Hepatotoxins target the liver causing enlargement of liver tissues, cirrhosis, and jaundice. Examples of these toxins include; vinyl chloride, chloroform, carbon tetrachloride, and chlorobenzene.



LUNGS

Lungs can be effected by vapor producing substances which irritate respiratory tissues. Cumulative effects can result in a persistent cough, shortness of breath, pneumonia-like symptoms and other respiratory difficulties. Substances which target lungs are chlorine, ammonia and acid vapors, in addition to asbestos and silica.











REPRODUCTIVE SYSTEM

Other substances are known as "reproductive toxins" and cause sterility, infertility, and birth defects. These substances include lead, mercury, paraquat, toluene, and vinyl chloride.

Teratogens are a specific type of reproductive toxin which can cause birth defects. Examples include dioxin, thalidomide and anesthetic gases.

Mutagens are another type of reproductive toxin which cause permanent genetic changes. These include hydrogen peroxides, lead salts and ozone.

ICON	NAME	AREA EFFECTED	SYMPTOMS	CHEMICALS
 LIVER	HEPATOTOXIN	LIVER	JAUNDICE, LIVER ENLARGEMENT	CARBON TETRACHLORIDE, NITROSAMINES
 KIDNEYS	NEPHROTOXIN	KIDNEY	EDEMA, PROTEINURIA	HALOGENATED HYDROCARBONS, URANIUM
 BRAN	NEUROTOXIN	NERVOUS SYSTEM	NARCOSIS, BEHAVIOR CHANGES, DECREASED MOTOR FUNCTIONING	MERCURY, CARBON DISULFIDE
 BLOOD	BLOOD TOXIN	TISSUES DEPRIVED OF OXYGEN, DECREASED HEMAGLOBIN FUNCTION	CYANOSIS, LOSS OF CONSCIOUSNESS	CARBON MONOXIDE, CYANIDES
 LUNGS	AGENTS DAMAGING LUNGS	PULMONARY TISSUE IRRITATION AND DAMAGE	COUGHING, SHORTNESS OF BREATH, TIGHTNESS OF CHEST	SILICA, ASBESTOS
 REPRODUCTIVE SYSTEM	REPRODUCTION TOXINS	CHROMOSOMES [MUTATIONS] FETUS DAMAGE [TERATOGENESIS]	STERILITY, BIRTH DEFECTS	LEAD, DBCP
 SKIN	CUTANEOUS HAZARD	SKIN	RASHES, IRRITATION, DEFATTING OF SKIN	KETONES, CHLORINATED COMPOUNDS
 EYES	EYE HAZARD	EYES, VISUAL CAPACITY	CONJUNCTIVITIS, CORNEAL DAMAGE	ORGANIC SOLVENTS, ACIDS

Information taken from "Hazard Communication: A Compliance Kit"
U.S. Department of Labor 1988 (OSHA 3104)

[TABLE 1 TARGET ORGAN EFFECTS]

II. PREVENTION

A. How to Read Container Labels

The first step in preventing accidents involving hazardous chemicals is to learn how to read product safety labels. This section reviews the format and content of product safety labels. OSHA requires that certain elements be displayed on container labels as follows:

- 1) Substance Identification
 - Name and Address of Manufacturer
 - Chemical Name
 - Common Name
- 2) Hazard Warning
 - graphic code of stickers showing warning of potential hazards

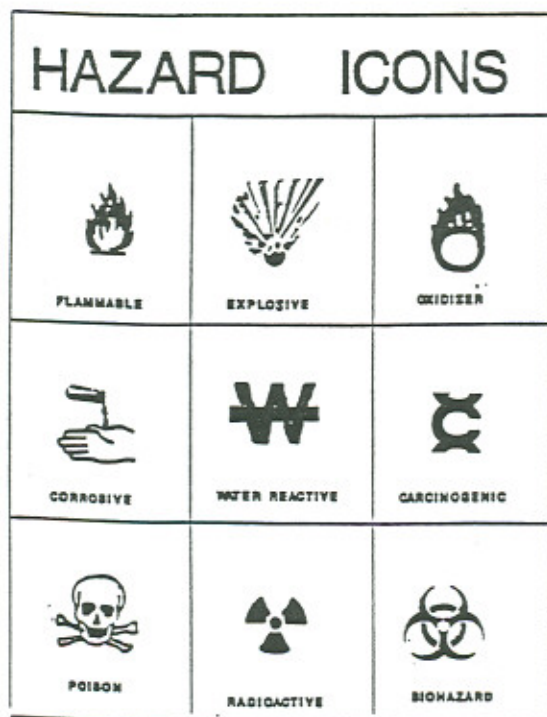


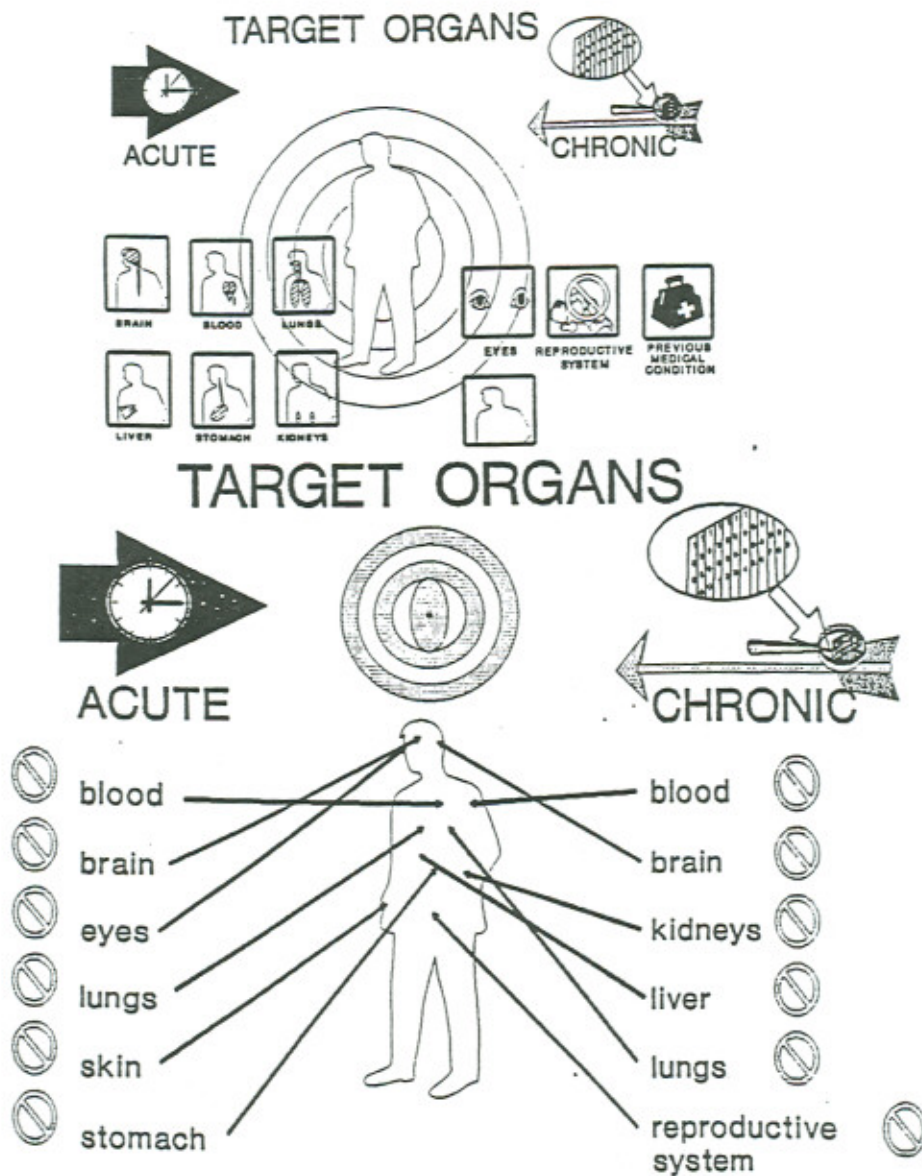
DIAGRAM 2.14] HAZARD WARNING ICONS

- Additional label showing suggested protective equipment

PERSONAL PROTECTIVE EQUIPMENT				
				
SAFETY GLASSES	SPLASH GOGGLES	FACE SHIELD	EYE WASH	HARD HAT
				
GLOVES	BOOTS	APRON	SPLASH SUIT	FULL SUIT
				
VENTILATION	SAFETY SHOWER	RESPIRATOR	BREATHING APPARATUS	HEARING PROTECTION

[DIAGRAM 2.15] PROTECTIVE EQUIPMENT ICONS

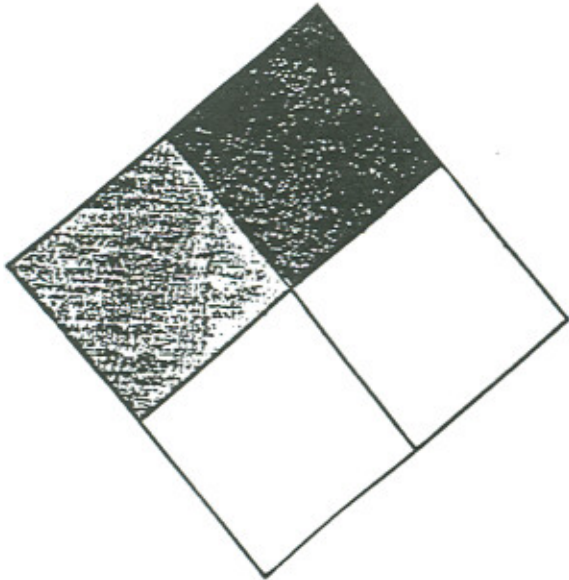
- Some states may require target organ information on the label



[DIAGRAM 2.16] TARGET ORGAN ICONS

NFPA LABELS

1) One type of labeling organization is based upon the National Fire Protection Association (NFPA) Hazard Rating System. This system provides information in a concise manner. The format design includes a diagonal four-box square. This diamond-shaped design system is also called the "square-on-point" label, or the "Fire Diamond".



NFPA LABEL CODE "SQUARE-ON-POINT" LABEL

COLOR SQUARES/NUMBERS	
EXTREME	• 4
SEVERE	• 3
SERIOUS	• 2
MODERATE	• 1
MINIMAL	• 0

WHITE SQUARE/SYMBOLS	
OXIDIZER	• OX
ACID	• ACID
ALKALI	• ALK
CORROSIVE	• COR
WATER-REACTIVE	•
RADIOACTIVE	•

[DIAGRAM 2.17] NFPA CODE

The white square on the bottom is used to designate special hazards by displaying words, letters or graphics. These are indicative of several hazards which include 'OX' [oxidizer], 'ALK' [alkali], 'ACID' [acid], and 'COR' [corrosive]. Graphics include the symbols for "water reactive", and "radioactive".

The other three color boxes are based on a 0 to 4 rating scale. These three segments include:

The blue square on the left indicates the magnitude of Health Hazard. The red square on top signifies the susceptibility for burning of the Flammability Hazard. The yellow square on the right shows the chemical's grade of stability for the Reactivity Hazard.

The rating scale for each of these hazards is as follows:

- 0 = Minimal Hazard
- 1 = Slight Hazard
- 2 = Moderate Hazard
- 3 = Serious Hazard
- 4 = Extreme Hazard

B. Review of the Material Safety Data Sheet (MSDS)

The Material Safety Data Sheet (MSDS) is a comprehensive bulletin prepared by the manufacturer of the chemical. The purpose of the MSDS is to provide information

regarding the chemical properties, potential hazards, routes of entry, precautions, emergency/first aid procedures and control measures.

1. It is the responsibility of each employer maintain a complete, correct MSDS for each hazardous chemical used on site. Incomplete and inaccurate MSDS reports should be replaced by contacting the manufacturer.
2. MSDS reports should be readily available to all workers. If the MSDS report is not available, the department director is to be notified. The MSDS forms are available to for the workers to review. Although supervisory assistance is not required, it is suggested. Clarification should be provided to the workers in case of the information on the MSDS reports is found to be in error, or incomplete.
3. A copy of each MSDS report will be on file and placed in designated binders readily accessible for workers at specific locations. A comprehensive index of all chemicals used throughout the site should be contained within each binder to allow for an easy cross-reference. This index could provide the identified area where the chemical is used and the location of the proper safety equipment. Maintain a work place chemical list that is continually updated. It is suggested that a master file of all hazardous chemicals be placed at strategic locations.
4. It is important that before a new chemical has been brought into the work area, each worker will be informed and trained about the precautions and characteristics of that new chemical.
5. The MSDS must be in English and follows the basic format as outlined below.

SECTIONS OF MSDS

- (1) Chemical Identification
 - name of manufacturer
 - chemical name
 - common name/function
 - identity cross referenced to label
- (2) Hazardous Ingredients Information
 - exposure level, TLV & TWA
 - hazard determination;
 - physical hazards
 - health hazards
 - carcinogenic

MATERIAL SAFETY DATA SHEET

SECTION I. MATERIAL IDENTIFICATION			
MATERIAL NAME:			
DESCRIPTION:			
OTHER DESIGNATIONS:			
MANUFACTURER:			
SECTION II. INGREDIENTS AND HAZARDS			
SECTION III. PHYSICAL DATA			
SECTION IV. FIRE AND EXPLOSION DATA			
Flash Point and Method	Autoignition Temp.	LOWER	UPPER
Flammability Limits in Air	None to boiling point		
SECTION V. REACTIVITY DATA			

SECTION VI. HEALTH HAZARD INFORMATION
FIRST AID: Skin Contact: Eye Contact: Inhalation: Ingestion:
SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES
Notify safety personnel of all PCB spills or leaks.
DISPOSAL:
SECTION VIII. SPECIAL PROTECTION INFORMATION
SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS
APPROVALS: _____ Industrial Hygiene and Safety

[DIAGRAMS 2.18 & 2.19] MSDS BREAKDOWN

- (3) Physical and Chemical Properties
 - boiling and freezing point
 - density and vapor pressure
 - specific gravity, solubility and volatility
 - general appearance and odor
- (4) Fire and Explosion Hazard Data
 - flashpoint and flammability limits
 - conditions conducive to ignition
 - conditions conducive to explosion
 - special firefighter methods
 - fire extinguishing agents
- (5) Reactivity Data
 - chemical incompatibility
 - conditions to avoid
 - decomposition potential
 - environmental precautions
- (6) Health Hazards
 - acute and chronic hazards
 - exposure signs and symptoms
 - medical conditions aggravated by exposure
 - specific health hazards listed;
 - carcinogens, corrosives, irritants,
 - sensitizers, toxins, mutagens,
 - teratogens and effects on specific
 - target organs
 - routes of entry
 - exposure levels
 - emergency and first aid instructions
- (7) Precautions for Safe Handling and Use
 - recommended industrial hygiene practices
 - spill/leak clean-up procedures
 - EPA waste disposal methods
- (8) Control Measures
 - safe handling procedures
 - ventilation
 - protective equipment
 - special handling procedures
- (9) Special Precautions
 - storage information
 - considerations for the work area

C. Preventing Exposure

The following information provides basic concepts of housekeeping.

1) General Safety Habits

- OBSTRUCTIONS; remove objects from traffic areas which can trip workers. Keep areas clear of sharp edges, tools and hardware equipment. Utilize floor stand signs denoting a wet floor, or

other hazards. Flooring tape, or paint can delineate areas to keep clear for heavy traffic areas. Ceiling and corner dome mirrors provide a measure of protection against corridor intersection accidents.

- CARELESSNESS; stay busy, avoid distractions. Be aware of mental states such as boredom and confusion. Do not leave hazardous chemicals unattended. Smoke in designated areas. Display colorful eye catching posters which promote safety awareness.

- FIRE EQUIPMENT; have signs which indicate evacuation routes, extinguisher locations, etc. Test smoke alarms periodically. Instruct trainees on the different types of extinguishers;

A = Ordinary Combustibles

B = Flammables, (e.g. liquids, gases and grease)

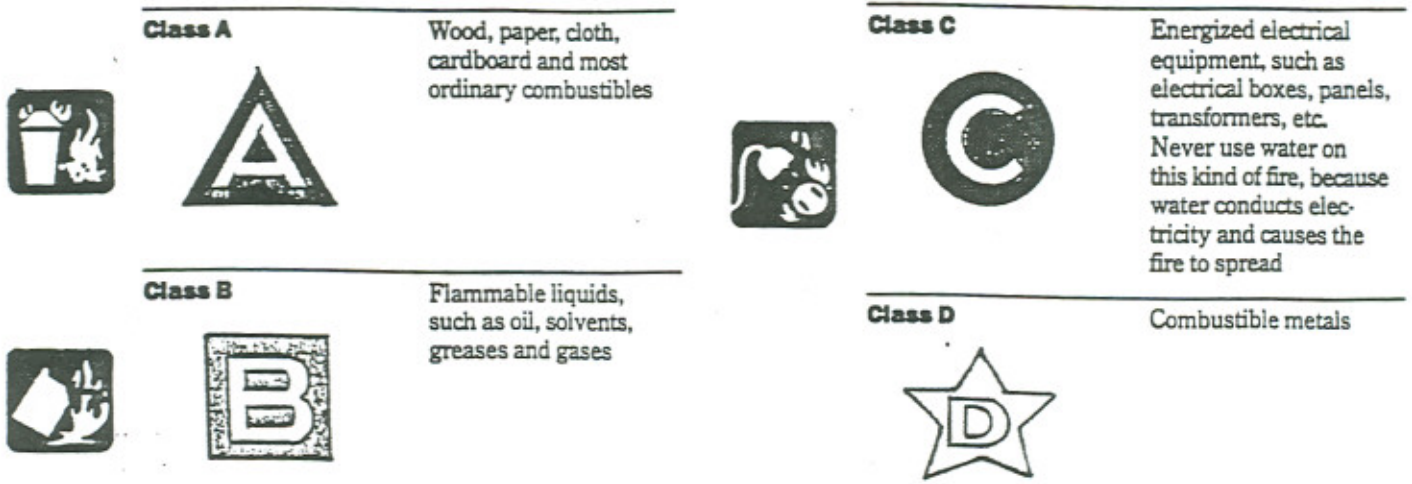
C = Electrical Equipment

D = Combustible Metals

ABC = Dry Chemicals

BC = Carbon Dioxide

*Remember that some burning materials are water-reactive. Review the MSDS for fire extinguishing methods employing foam, carbon dioxide, or halon gas and powders.



[DIAGRAM 2.20 FIRE EXTINGUISHER CLASSIFICATION POSTER]

- CLEARED DRAINS; keep drains clear of debris which may prevent proper drainage.

- FLAG OFF AREAS; delineate areas of chemical spills by traffic cones, floor stand signs, guideline stanchions and chains or barricade tape for roping off hazardous areas. For safety reasons it is best to have these areas delineated to keep others out.

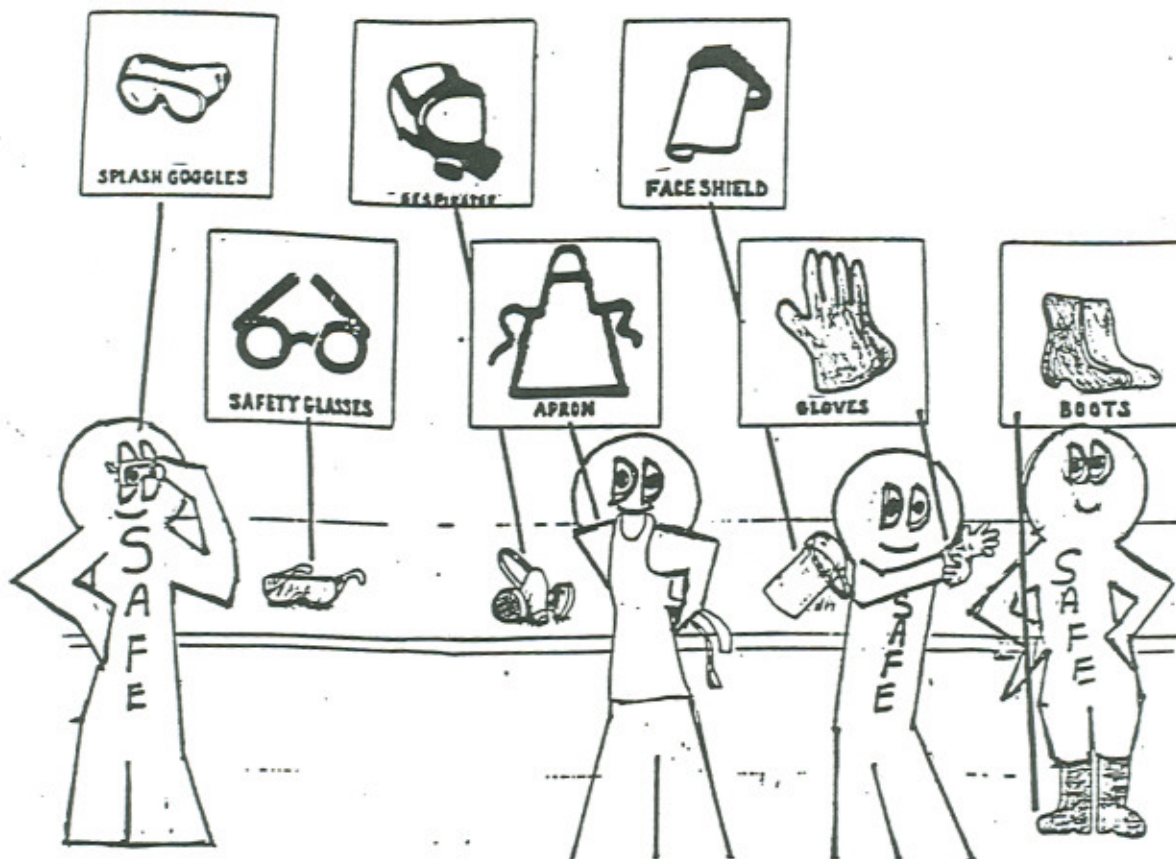
- SAFETY CABINETS; keep cabinet contents neatly organized. Flammable or combustible liquids must be safely housed. OSHA divides liquids into specific classes depending on fire characteristics. Corrosives should also be stored safely. Some cabinets provide an added protection against leaking containers.

- KNOWLEDGE OF THE WORKER; understand the work habits and the capabilities of each worker including job site demands and level of training, promote the 'buddy system' between compatible workers

2) Protective Equipment Devices

There is a very extensive array of personal protective equipment devices. The function of each device is designed to provide protection for a specific area of the body. Within each category of protective device there are many different types which are designed to provide a specific amount and type of protection. Special care should be taken in consideration of the chemical that one will be using, temperature considerations and length of time the device will be used. It is very important to promote the proper and frequent use of the following items:

- safety glasses
- splash/impact goggles
- head/face shield
- hard hats
- ear plugs
- earmuff hearing protectors
- gloves
- apron
- boots
- full protection suit
- respirators
- self-contained air respirator
- ventilation equipment
- safety wash systems; eye/face wash stations, drench hoses and full body drenching safety showers



[DIAGRAM 2.21]

[Note: Before using a respirator the contaminant in the work area must be known. A determination must be made with regard to the level of concentration of the contaminant. In addition the current form of the contaminant must be ascertained (e.g. gas, dust, mist, vapor, particulate, vapors, fumes, smoke, etc.) Similarly, it must be determined how long the worker is to be exposed to the area. Familiarity with the various types of respirators is essential. It must be known under what conditions the respirator will be utilized. Without training on the proper use of protective equipment and the limitation of each device, the protective equipment cannot be used. Additional training should be provided separately. If respirators are to be used, training should meet the requirements as indicated by the OSHA respirator standards such as 29 CFR 1910.134 and 1910.1000 and ANSI Z88.2-1980. Training with respirators should also include information regarding positive and negative pressure fit training and use in a simulated format.

3) Good Safety Habits

The development of conscientious work practices provide an additional dimension of safety control. Such procedures may consist of the following;

- frequent hand washing
- avoiding food, drinking and smoking in chemicals are storage areas
- environmental control
 - ensure adequate levels of lighting and noise control, have strategically placed first aid stations and fire equipment, use anti-fatigue floor matting, provide emergency safety showers, drench hoses and eye/face wash stations, etc. Have proper procedures for the transportation, handling and storage of chemicals [including safety and drip cans] and spill clean up accessories.



[DIAGRAM 2.22] DD LOOKS AT SAFETY SIGNS

4) An Organized and Well Integrated Safety Program Outline

[DIAGRAMS 2.23 TO 2.30] ORGANIZED SAFETY PROGRAM OUTLINE

- a) Trainee Evaluation
 - physically fit and able to work
 - clearance of medical problems
 - appropriate level of adaptive behavior
 - adequate level of cognitive functioning
 - behavioral control
- b) Policies/Procedures and Communication Update
 - monthly/weekly safety committee meetings
 - bulletin board reports and displays
 - safety posters
 - worker/supervisor communication
 - [side effects of prescription medication]
- c) Training and Assessment
 - periodic reviews by supervisor
 - ongoing monitoring of safety control measures



TRAINEE
EVALUATION



POLICIES &
PROCEDURES



TRAINING &
ASSESSMENT



PROTECTIVE
EQUIPMENT



QUALITY
ASSURANCE



EMERGENCY
RESPONSE



PROGRAM
EVALUATION

- monitor hazards and exposure levels
- regulate work flow environment (e.g. design and layout of work area)
- d) Proper Use of Protective Equipment
 - storage
 - functional
 - correct and appropriate utilization
- e) Quality Assurance
 - internal safety inspections
 - safety inspections by outside agencies
 - immediate rectification of unsafe conditions
- f) Emergency Response Situations
 - formalize evacuation plans
 - schedule fire drills on monthly intervals
 - provide refresher courses in fire equipment use
 - inspect fire extinguishing equipment yearly
 - inspect emergency shower, drench hose and eye wash station
 - formalize accident incident reporting system include injury/medical reports, property damage
 - provide training in First Aid and CPR
- g) Program Evaluation and Improvement
 - ongoing assessment identifying training needs
 - effects of environmental changes on work production
 - adjust physical surroundings to suit the human condition ergonomically
 - training revision through analysis of accidents and 'near misses' to prevent future occurrences

5) Controlling Exposure Levels

The following methods provide three ways of controlling exposure when a spill, or leak occurs;

- a) At the Source of the Spill
 - keep extremely dangerous chemicals out of the work area
 - substitute a safer chemical for the more hazardous one
- b) Along the Path of Dispersion
 - use ventilation hoods and exhaust fans
 - prompt clean up of spills and leaks
- c) On the Worker
 - use personal protective equipment as the last line of defense
 - ensure proper training and fitting of equipment
 - perform a 'buddy check' of a good fit and return the safety favor
 - use the proper equipment for the right job

6) Before You Use a Chemical . . . THINK!

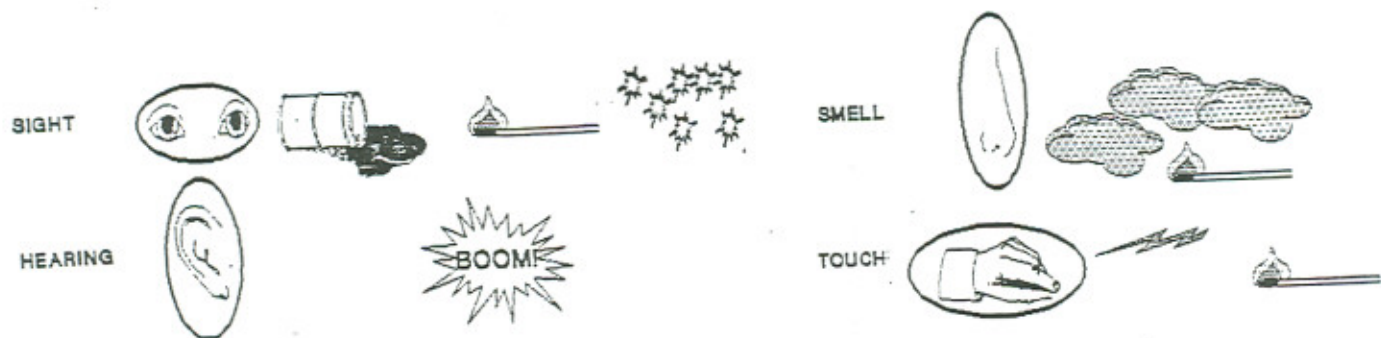
- a) Recognize the Hazard Potential

- read labels and the MSDS
 - be familiar with work area specifics and the work flow movement
 - know the symptoms of exposure before you experience them
- b) Assess Hazard Potential
- know how dangerous the product is
 - know the amount of product in use; concentration and volume
- c) Manner of Use Hazard
- be aware that how the product is used can expand the potential for danger; mixing, heating, spraying, exposure to the air, etc.
- d) Physical Controls Limiting the Effects of Hazard Exposure
- use in a well ventilated area
 - use in a confined area
 - protective equipment in good condition
 - strategically placed safety showers and eye/face wash stations
- e) Ongoing Risk Evaluation
- If the methods of hazard recognition, assessment of hazard potential, manner of use and physical control are in place, then the evaluation should promote low hazard risk

III. DETECTING A HAZARDOUS SITUATION

A. Using the Senses to Detect Hazardous Situations

Generally, the first level of protection is being aware of the built in warning properties of chemical substances such as odors and irritation of the eyes, skin and respiratory system. The following emphasizes the use of the human senses to detect hazardous situations;



CDIAGRAMS 2.31, 2.32, 2.33 & 2.34] SENSES

- 1) SIGHT (observing spills, fire, sparks, etc.)
- 2) HEARING (hearing noises indicating an accident, or a specific reaction -- e.g., explosion, warnings from co-workers, and so forth)
- 3) SMELL (many hazardous situations are easily detected through the sense of smell via specific chemical odors, presence or vapors, smoke, fumes, etc.)
- 4) TOUCH, FEELING
 - External: (many substances produce burning, stinging, wetness, temperature changes - e.g., fire, hot glue, etc.)
 - Internal: (physical symptoms which may include dizziness, lightheadedness, coughing, headaches and confusion of thoughts.)

(Note: Trainers should emphasize that workers should report any and all symptoms immediately even if they are not sure it is related to a chemical exposure. Symptom recognition and prompt attention could prevent serious illnesses related to exposures.)

SOME CHEMICALS HAVE LOW SENSORY DETECTABILITY. THE BEST GUARANTEE OF IDENTIFICATION IS TO HAVE READ AND UNDERSTOOD THE MSDS.

Air Monitors for Detection of Hazards

Air monitoring equipment is utilized in situations that are extremely dangerous and with chemicals that have low detectability. Detector tubes provide immediate detection of harmful gases. Some monitors are in the form of a lapel badge which provide information regarding the worker's level of exposure to vapors. Other monitors are in the form of a beeper which notify workers by both sight and sound if a toxic gas is present. Still other monitors detect for radioactivity.

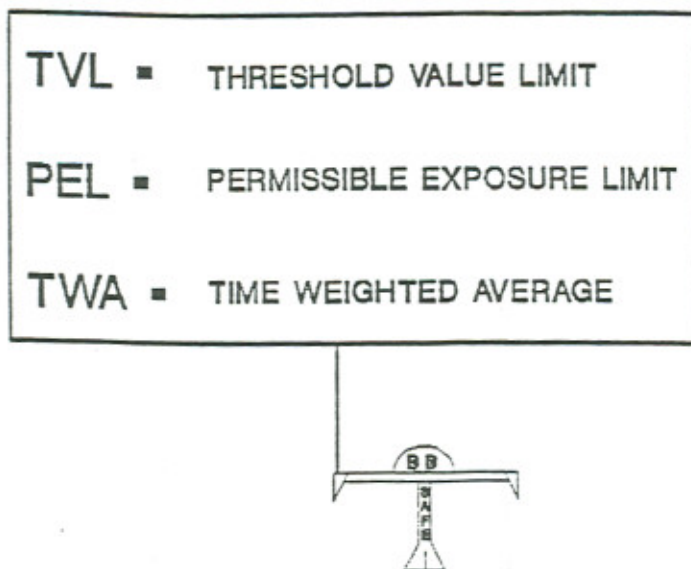
C. Acceptable Levels of Exposure

The accepted airborne exposure criteria is called the Threshold Limit Value (TLV) which includes;

- 1) the short term maximum concentration
- 2) the concentration average over an eight hour day
- 3) the concentration never to be exceeded

The legally enforceable standard for the work environment are called Permissible Exposure Limits (PEL). Another measure of

exposure is called the Time Weighted Average which provides an average over the total exposure time, such as an 8 hour work day.



[DIAGRAM 2.35]

D. If a Hazard Occurs . . .

- 1) Spill/Leak Situation
 - identify the chemical spilled
 - evaluate immediately the level of danger
 - notify the spill response team for clean up
 - use MSDS control, clean up and containment measures
- 2) Emergency Situation
 - notify supervisor
 - evacuate if necessary according to evacuation routes
 - provide proper protection for those exiting the area
 - provide medical treatment [first aid] as needed

IV. CARE FOR THE VICTIM OF EXPOSURE

This section should be linked with additional training such as First Aid and CPR. Specific medical procedures may be prescribed on MSDS sheets. Trainees should become aware of the guidelines involved during an accident, or an emergency situation. Preparation in advance can save lives as well as reduce the degree of harm. This is of extreme importance if a hazardous chemical is involved. Familiarity with the information and prescribed action on the MSDS is strongly advised.

In general, the following items need to be addressed in teaching trainees to handle emergency/accident situations involving hazardous chemicals:

(Note: The OSHA Hazardous Waste Operations and Emergency Response Rule indicates that no employee can respond to an emergency situation unless competency in specific areas can be demonstrated. If workers are expected to contain, or clean-up a spill/leak of a hazardous chemical, they will be required to have at least 4 hours of training beyond Hazard Communication training. Therefore, workers who have not received the emergency response training should in no way assist in clean-up procedures, or to provide treatment of a victim. It is important to emphasize that if one sees a "downed" victim, in entering the area where the victim is located, one may be subject to the same danger of exposure which caused the victim to collapse.)

A) Preliminary information

When an accident occurs it is imperative that observers respond immediately. However, rushing in too quickly without assessing the situation could contribute to further problems. It is important for the would be helper to assess the danger of the immediate environment and determine swiftly what possible dangerous situation one may be entering.

A plan of procedures should be in place whereby contacting an emergency medical team should be automatic. If a hazardous chemical is involved it is urged that pertinent information be communicated to the medical team as soon as possible. The MSDS report provides information on precautions as well as the immediate treatment procedures for the victim of exposure. Familiarity with the MSDS in conjunction with a thorough emergency plan should provide details regarding the following;

- suggested protective equipment
- location and proper use of first aid equipment
- method of contacting emergency medical team
- quick referral to MSDS before help arrives
- how to assist medical team without interfering
- completion of the accident/injury report form
- review of the report in safety committee meeting
- formulate, or adjust plans of prevention

V. ACCIDENT SIMULATION DRILLS

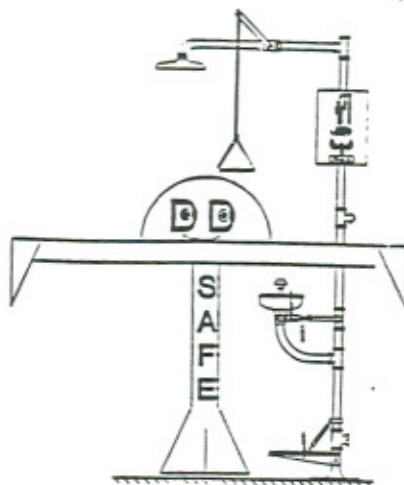
An added measure of prevention includes role playing specific "accident simulation drills". In reviewing the MSDSs trainers can imagine what types of emergencies situations may arise. Trainers may wish to develop a plausible scenario of what types of control measures may break down under various conditions. Some situations may include very common and minor incidents,

while others are comprised of rare and more serious events. The circumstances in each role playing situation case can be established by the trainer along with the selection of volunteers. Videotaping these sessions may provide immediate feedback to each participant and foster discussions by the observers of other response options.

Accident simulation drills help trainees to think on their feet. In addition, role playing allows for the review of specific training material. It is essential that such situational role play drills be preplanned. Correct and incorrectly labeled containers can be presented along with copies of MSDS sheets.

Some of the more important concepts which were emphasized in training can be reexamined during role playing. They may include the following:

- reading labels and comprehension of icons
- interpreting the NFPA "Fire Diamond" system
- MSDS precautions, concerns and data
- general safety issues
- personal protective equipment
- emergency response care for an accident victim
- use of eye wash station/emergency safety shower
- accident/injury reporting
- procedural concerns and issues



[DIAGRAM 2.36] DD IN SAFETY SHOWER

VI. REVIEW/QUESTIONS

Each training session should close with a short review of the information covered by the trainer. In addition, a review provides an opportunity for trainees to ask questions and receive clarification. This need not be a long period. If a question is posed which needs a lengthy explanation, then the trainer may defer answering the question after the remainder of the group has been dismissed.

CHAPTER THREE

TRAINING THE CLIENT WORKER

I. PRELIMINARY INFORMATION

A SPECIAL MESSAGE TO THE INSTRUCTORS AND TRAINERS

This program is not designed to be given in its entirety. It is suggested that only the instructional material (i.e. icons, protective equipment, etc.) which pertain to the specific job activities should be taught. [See appendix A for TRAINEE NEEDS WORKSHEET for details.] The concern is with regard to the most effective use of training time. As the responsibilities associated with the trainee's job expand then additional training is advised. In addition, this form in appendix A provides a record of the trainee's progress and current level of knowledge and training.

Teaching Style

The teaching styles of instructors and trainers can be quite diverse. One suggestion is to experiment in order to find which teaching approach is not only comfortable for the instructor, but also promotes active learning experiences. Perhaps, enthusiasm combined with personal warmth and an understanding acceptance of the trainees could help to promote an atmosphere conducive to learning. In working with a developmentally disabled population, patience, praise and purposeful play may yield beneficial results by promoting positive learning experiences. In addition to the aforementioned, it should be emphasized that by ensuring the dignity of each trainee a climate of mutual respect is enhanced.

Recognition

A certificate of completion is suggested for those individuals who fulfill the objectives and recommended level of performance. (See appendix C for CERTIFICATE OF COMPLETION.) It is important to provide recognition for the efforts of individuals who fall short of the criteria. A certificate of attendance can be offered for those individuals in acknowledgment of personal endeavor. (See appendix D for CERTIFICATE OF ATTENDANCE.)

Post-Class Monitoring

The maintenance of worker skills along with the constant vigilance by staff with regard to worker retention of the learned material are essential in providing for the best working environment. In addition, the routine of maintaining open lines of communication between staff members is urged which can promote further training as needed. Those team members who provide

training, follow up monitoring and assist in evaluating the worker's level of suitability for handling chemical substances are responsible for the worker's health and well being. While the probability of accidents can be reduced by following OSHA's recommendations, the author and publisher of this manual are in no way responsible for accidents, injuries, or other job related difficulties that may ensue before, during or after training.

Individual Assessment

Trainee assessments can be developed by the instructor to 'custom fit' information emphasized in the training. The significance of testing by the instructor could provide a closer and more accurate depiction of the tasks associated with the worker's job. Individual assessments can be administered in order to ascertain the need for a review in specific areas. Presentation of material can be modified by the instructor to meet the worker's needs, level of functioning, etc.

Motivators

Instructors are urged to be creative in presenting icons. TV game shows provide a format which can be emulated. Similarly, rewards (verbal, visual and tactile) can be provided for the following categories; best performance, most improved and recognition of attendance. A picture of the trainee can be placed on the bulletin board under a caption which reads 'best performance of the day', etc. An announcement could be made in the class with regard to praising the level of achievement. 'Stickers' and wall charts indicating current level of mastery could be utilized.

II. PROVIDING A SUPPORT SYSTEM FOR TRAINING

TRAINING OVERVIEW: THE SAFETY GROWTH CYCLE

Concept: The development of a system to support training.

A. Tilling the Soil [Preliminary Actions]

The process of breaking down the initial resistance to training by prior assessment can be fostered with the following suggestions.

1. Know what to assess before coming into training.
2. Meet with the trainees before the training begins.
3. Meet with the trainees on the job-site.
4. Greet them and connect with them. (Be personal!)
5. Listen to their safety concerns and remember!
6. Develop a safety 'needs assessment' of the job-site.
7. Get detailed accident/injury summaries.

8. Ask the trainees what could remedy the problems.
9. Remember the trainees names and faces.
(Call upon them by name!)
10. Know what it is the trainees expect to happen in training.

B. Planting Seeds [Method of Presentation]

DIRECTIONS	MEMORY HANDLE	WHAT TO SAY
1. Present the equipment	Display device	What is it?
2. Explain the function	Inform of use	Why use it?
3. Show associated icon	Associate icon with the device	When do you see it?
4. Demonstrate by wearing, removing	Guidelines for use	How to use it?
5. Practice with partner	Repeated practice	Who uses it?
6. Examine pictures on MSDS & labels	Attention to pictures	Where notified to use it?
7. Note special care instructions	Methods of maintenance	How to care for it?

[Remember: DIAGRAM]

C. Taking Root [Assessment of Learning]

1. Devise role playing situations involving recently learned material.
2. Offer feedback on roleplaying performance and test results.

D. Sprouting [Feedback Evaluations & Expectations]

1. What trainee and supervisory expectations were met?
2. What trainee and supervisory expectations were not met?
3. Is there a need for additional training?

E. Fruits of Labor [Tracking the Accident Record]

1. What are the patterns involved in accidents?
2. What are the patterns involved in injuries?
3. Specifics;
 - a) F = Frequency; How often has this type of accident, or injury occurred?
 - b) I = Intensity; What is the degree of severity of the

- accident/injury?
- c) D = Discrimination; When have the accidents/injuries occurred? (e.g. day of week, time of day, specific shift or activity.)
What is the specific type of accident/injury? (e.g. chemical spill, gas leak, damage to physical plant, detail regarding specifics on the type of injury sustained including symptoms; acute or chronic, severity of injury, area of body damaged, etc.
 - d) D = Duration; What was the length of time involved before the accident/injury was detected and remedied?
 - e) L = Location; Where did the accident/injury occur? where was the physical setting of the event?
 - f) E = Environment; What were the background conditions which may have contributed to the accident/injury? (e.g. Understanding the process of the system operating within the work site. Some of these include aspects of the working surroundings and climate conditions [e.g. noise, temperature, lighting, etc.], group characteristics [e.g. dynamics, team cohesion and interpersonal friction] individual traits and characteristics).

[Remember: FIDDLE]

F. Seeds of Future Growth [Safety Motivation]

1. Rewards of recognition. (Worker of the Month)
2. Rewards which provide incentive for individuals and groups.
3. Develop a sense of pride for the safety record (e.g. "Accident free for ___ days.")
4. Safety posters and displays

III. CONSIDERATIONS FOR THE SPECIAL NEEDS OF THE WORKER

A. GOALS

The goals for the worker training program in the safe use of potentially hazardous substances are the same as for any employee. Specifically the goals are to inform the client worker of:

- (1) hazards and potential dangers in the work place with chemicals,
- (2) symptoms of exposure to hazardous chemicals,
- (3) use of protective/preventive equipment and general safety rules and
- (4) procedures in an emergency.

A. Training Adjustments

The training of workers must take into account the cognitive functioning, level of adaptive behavior and any physical disability. The client's interdisciplinary team should be familiar with the proposed training and match skills with the future work site tasks.

A close examination of the work site is essential. Special care must be taken in order to ensure the suitability of the working environment for the special needs of the worker. Of primary concern are safety features and specially adapted equipment which are designed to enhance the capability of each worker despite the specific areas of disability. For example:

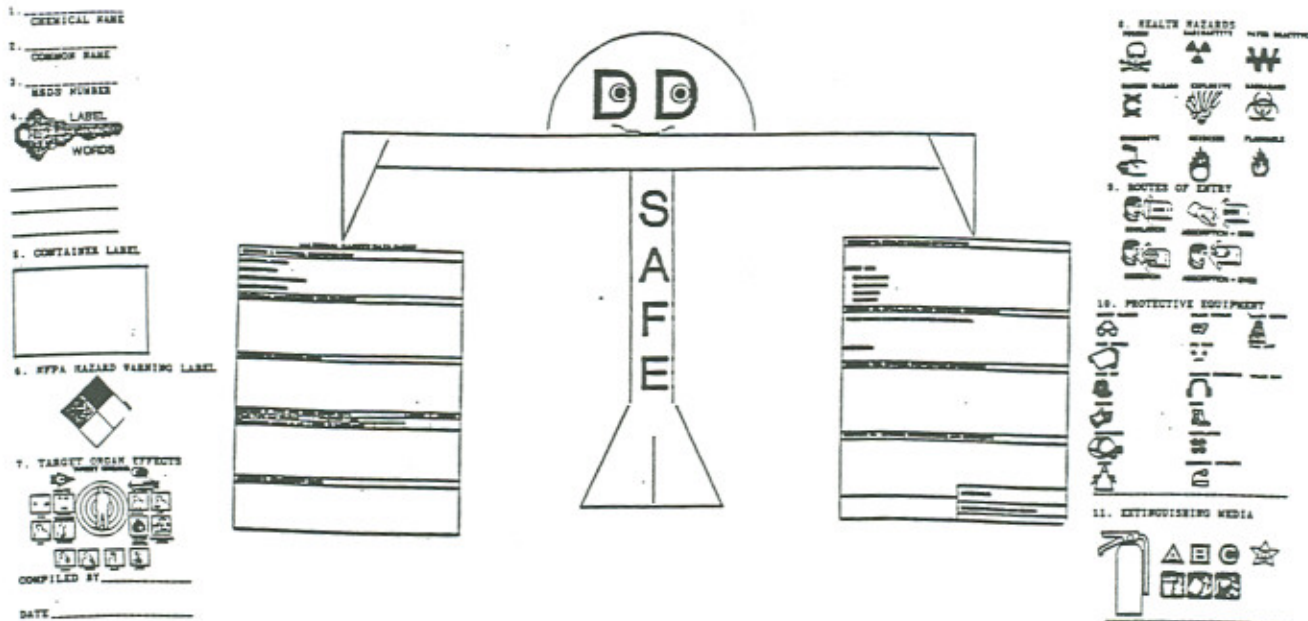
DISABILITY	ADAPTIVE EQUIPMENT/RESPONSE
Visual & Hearing Impairment	Colorful and highly visible signs with enlarged print or magnified pictures Directions in braille Highly audible warning systems
Ambulation Impairment	Utilization of paired worker teams or the 'buddy system' to reduce the effects of being physically challenged Wall mounted hand rails for physical support

B. MSDS Communication Adjustments

An adapted MSDS system for workers should be employed. This visually enhanced pictorial communication program uses printed icons to promote the understanding of the information contained within the MSDS. The resulting printed icon sheets are to be placed in a ring binder which contains all of the MSDSs in the work site location. These ring binders can be designated by a special color (yellow, red, or blue) and may be labeled "Enhanced MSDS Binder". In summary, this adapted form of the MSDS includes graphics images, or icons which include the labeling systems discussed in this manual. The picture format is designed to inform workers of specific hazards associated with the use of chemicals, the protective equipment suggested and additional pertinent safety information. The following format for this enhanced MSDS includes the followings:

- A copy of the manufacturer's MSDS
- A container label
- Key label words
- Pictures and icons including:
 - * NFPA, DOT, or HMIS labeling systems

- * specific routes of entry
- * associated health hazards
- * target organs effected
- * suggested protective equipment
- * suggested fire extinguishing media



[DIAGRAM 3.1]

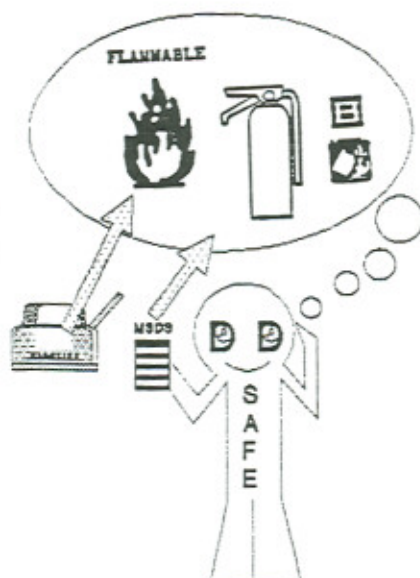
The organized format of these enhanced MSDSs should follow the categories on most MSDS reports. It should be emphasized that before a new chemical has been introduced into the work area, each worker will be provided both information and training thus promoting the worker's right to know.

IV. TRAINING ADJUSTMENTS FOR THE WORKERS

Worker training should be conducted by an individual who is familiar with the worker's skill level, ambulation and cognitive ability. Length and number of training sessions must take into consideration the speed at which learning can occur for these workers. Similarly, the need for follow-up training with periodic reviews should be planned. Some of these considerations should be discussed with the client and the interdisciplinary team. The following outline provide detail in the training of workers in the safe use of potentially hazardous chemicals. Trainers may wish to supplement specific content information which is deemed to be pertinent to worker needs that can be found in Chapter Two.

A) Substance Identification

1. Present to the trainees the label of a container, the pictorially enhanced MSDS report. Review with the trainees the location of the name of the substance on the MSDS report.
2. Direct the workers to match the label of the container with the label appearing on the MSDS.



[DIAGRAM 3.2]

3. Encourage the trainees to point to the matching label on the MSDS report and to vocalize the name of the chemical (or the type of chemical by common name) from the label of the product.

B) Explaining the NFPA labeling system

1. Point out these aspects of the NFPA System:
White Background = Specific Hazard
Blue Background = Health Hazard
Red Background = Flammability Hazard
Yellow Background = Reactivity Hazard
2. Display the icons and the abbreviations used in the Specific Hazard square.

SPECIAL HAZARD

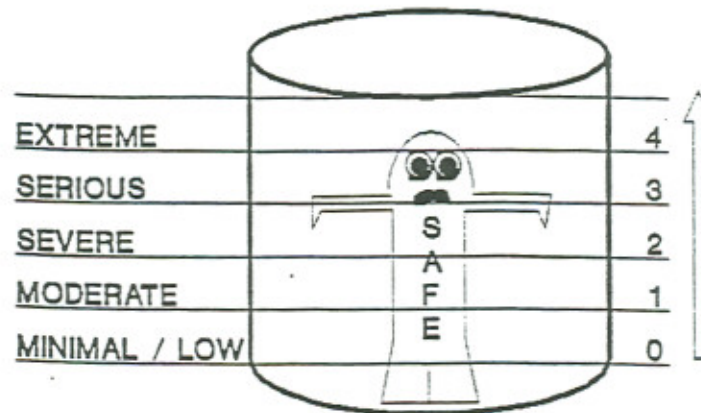


ACID	=	ACID
ALK	=	ALKALI
COR	=	CORROSIVE
OX	=	OXIDIZER
	=	WATER - REACTIVE
	=	RADIOACTIVE

White Background

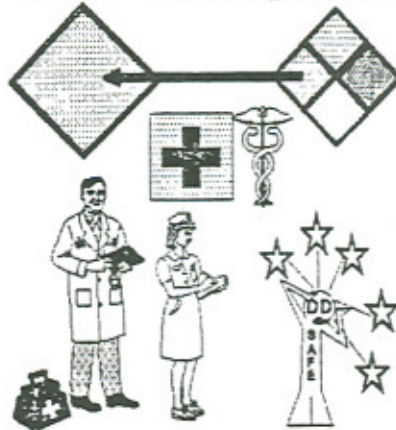
[DIAGRAM 3.3]

3. Elaborate on the number/rating system using the diagrams as noted.



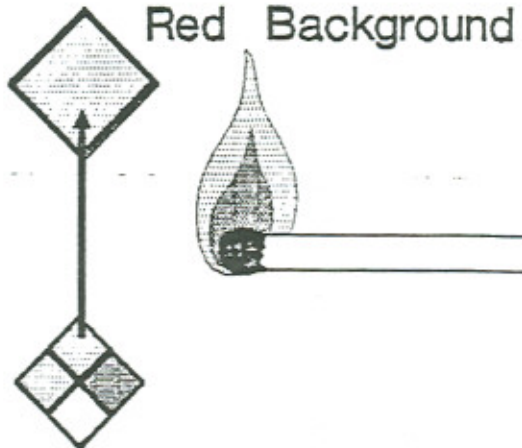
- Numbering System [DIAGRAM 3.4]

HEALTH HAZARD Blue Background



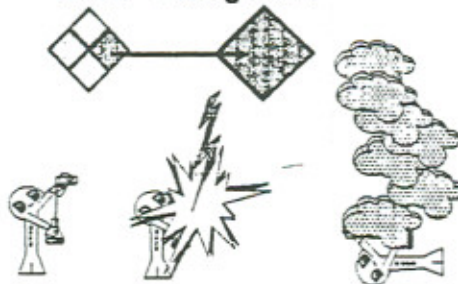
- Health Hazard [DIAGRAM 3.5]

FLAMMABILITY HAZARD Red Background



- Flammability Hazard [DIAGRAM 3.6]

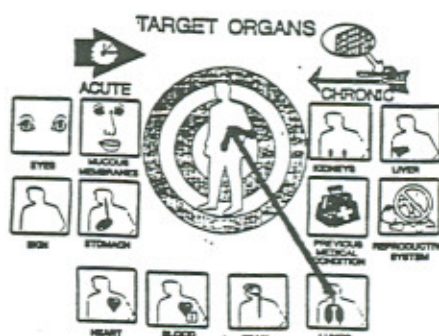
REACTIVITY HAZARD Yellow Background



- Reactivity Hazard [DIAGRAM 3.7]

C. Hazard Icons, Route(s) of Entry & Target Organs

1. Display the 9 icons used to indicate the types of health hazards.
2. Review with the trainees the specific meaning associated with each of the hazard icons. Direct the trainees to match the hazard icon on the container label with the hazard icon located on the MSDS report. Tell the workers that these icons should be identical.
3. Explain to the trainees how the chemical can enter the body. Point out the route of entry icon. Encourage the workers to connect the hazard icon with the routes of entry and the target organs.



[DIAGRAM 3.8]

D. Protective Equipment & Fire Extinguisher Icons

1. Review with the trainees the designated route of entry.
2. Show to the trainees the suggested protective equipment on the label. Point out to the workers that these should match the graphics on the MSDS report.
3. Place a corresponding sticker icon onto the protective device. [It is possible in the future for the manufacturer of the protective equipment

to have a printed icon on the actual device. However, until that becomes an actuality, it may be advisable to place the icon sticker on the actual protective equipment device.] This action is designed to strengthen the association between the icon, label and actual device.

4. Follow the DIAGRAM method as reviewed below

DIRECTIONS	MEMORY HANDLE	WHAT TO SAY
* Present the equipment	Display device	What is it?
* Explain the function	Inform of use	Why use it?
* Show associated icon	Associate icon with the device	When do you see it?
* Demonstrate by wearing, removing	Guidelines for use	How to use it?
* Practice with partner	Repeated practice	Who uses it?
* Examine pictures on MSDS & labels	Attention to pictures	Where notified to use it?
* Note special care instructions	Methods of maintenance	How to care for it?

5. Review the demonstration of techniques of putting equipment on and removal again if necessary. Remind the trainees to report any inconsistencies of labeling and MSDS especially if the icons do not match.

6. Present the fire extinguisher icons and the corresponding letters indicating for what type of fire the extinguisher is to be used.



[DIAGRAM 3.9]

E. Cleaning up chemical spills

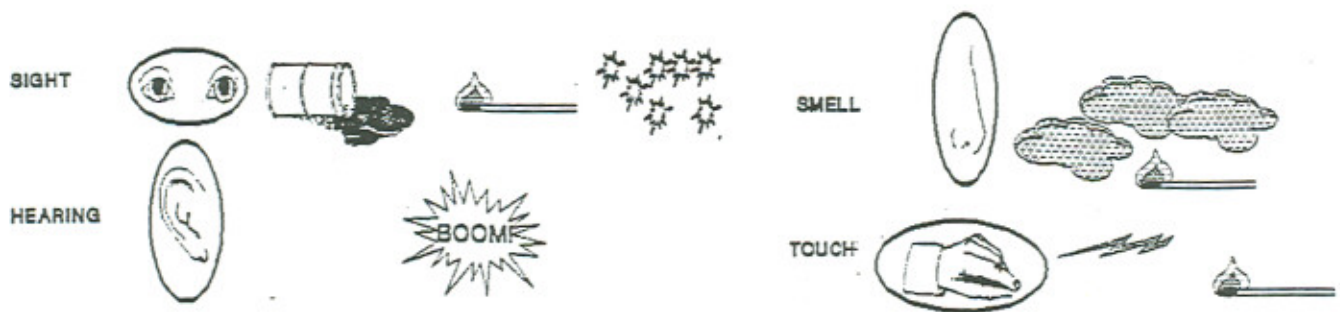
1. Tell the trainees that if a chemical spill, or leak occurs the on-site supervisor should be contacted immediately.
2. Explain to the trainees of the additional risks and dangers associated with spills and that specially trained individuals are responsible to clean up and dispose of the chemicals. Due to the danger workers are encouraged to assist in the clean up only if directed by their staff supervisor.
3. Refer to the clean-up procedures which are outlined in the MSDS report.
4. Emphasize that clean-up procedures and techniques may vary for each chemical and that special attention to the procedures is advised.
5. Remind the trainees that MSDS procedures should be followed closely involving the clean up and the disposal of the contaminated material.

D. Special Protection Information

1. Explain to the trainees the following issues described in the MSDS reports:
 - the type of emergency medical involved
 - when ventilation is needed
 - if special clean-up equipment is needed
 - if additional protective devices are needed
 - how to handle and dispose of chemicals
 - what specific medical conditions may be aggravated by exposure
 - what type of fire extinguishers can be used

E. Detecting Hazards

The trainer may wish to refer to pertinent sections of Chapter Two as to what specific information may be needed to present to the workers. Some of the following diagrams may be helpful in conveying those ideas.



[DIAGRAM 3.10]

Some chemicals have low sensory detectability. Special care should be taken in presenting the warnings for those chemicals. It should be emphasized that often these chemicals cause an injury before detected by the senses.

F. Care of the Victim of Exposure

Trainers should refer to both Chapter Two in this manual as well to view the specific MSDS directions for care of the victim. Unless the level of worker involvement is delineated by the interdisciplinary team prior to the actual training, the care and treatment of accident victims should be designated to specific medical staff members. However, specific procedures regarding notification of the on-site supervisor and possibly the dialing of '911' could be utilized in the training program.



[DIAGRAM 3.11]

G. Refresher Training

From time to time workers may need to be "refreshed" on the course content. The frequency of repeated training can be based on several considerations; a change in the level of functioning of a workers, poor retention of material, the consistent display of a pattern of accidents/injuries in the program, etc. The repeated presentation of specific icons to clients in a periodic fashion may assist in the retention of the learning materials.

Another method training may involve the presentation of NFPA labels, hazard and protective equipment icons, routes of entry, etc. The trainer may wish to use either a game show format or develop specific action sequences by asking the trainees how would they respond in certain situations involving specific chemical with certain labels. These may answered in the manner of a verbal response or through role play situations. The following checklist is offered to emphasize certain key points which may be included in the refresher process.

WORKER CHECKLIST

- 1] Look at the chemical code and suggested protection on the label.
- 2] Review contact prevention and protective devices.
- 3] Know the symptoms and warning signs of exposure by asking, "What can go wrong using this chemical? How can this hurt me?"
- 4] Review the possible treatment methods.
- 5] Know the location of the first aid kit, fire extinguishers and safety showers.
- 6] Review exposure treatment on the MSDS report for the chemical in use, spillage containment and clean up procedure.
- 7] Be familiar with the pre-arranged evacuation plan with possible escape routes and a designated area outside to meet and take roll call.
- 8] Never work alone!
- 9] Wear appropriate clothing. Avoid loose fitting clothes; ties, shirt tails, hanging jewelry, roll up shirt sleeves if required by job activity.

APPENDICES

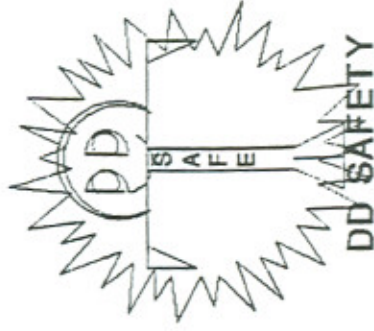
RIGHT ATTITUDE

Let it be known and proclaimed that

has attended and unsatisfactorily completed a course in Right-To-Know Training and must demonstrate greater proficiency before a thorough understanding of the concepts of this safety course are evidenced.

Signed and sealed

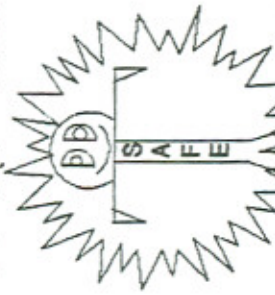
Trainer Date



RR-D-R TRAINING

Let it be known and proclaimed that

has satisfactorily and honorably completed the studies and works of Right-Know Training and has demonstrated a thorough understanding of the concepts of the safety course.



DD SAFETY

Signed and sealed

Trainer

Date

WORKSHEET FOR TRAINEE NEEDS

TRAINEE NAME : _____

Supervisors should review the MSDS for each hazardous substance that the trainees will be using. This worksheet can be used as a checklist that will ensure that specific areas of training are mastered. Supervisors are urged to check each slot which corresponds to applicable information that is found in the MSDS report.

1. ROUTES OF ENTRY

- | | |
|---|--|
| <input type="checkbox"/> Inhalation | <input type="checkbox"/> Ingestion |
| <input type="checkbox"/> Eye Absorption | <input type="checkbox"/> Skin Absorption |

2. ASSOCIATED SYMPTOMS

INHALATION	INGESTION	ABSORPTION
<input type="checkbox"/> Fatigue	<input type="checkbox"/> Cramps	<input type="checkbox"/> [EYE]
<input type="checkbox"/> Dizziness	<input type="checkbox"/> Diarrhea	<input type="checkbox"/> Irritation
<input type="checkbox"/> Nausea	<input type="checkbox"/> Nausea	<input type="checkbox"/> Blindness
<input type="checkbox"/> Death		<input type="checkbox"/> [SKIN]
<input type="checkbox"/> Muscle Weakness		<input type="checkbox"/> Burning
<input type="checkbox"/> Headache		<input type="checkbox"/> Itching
<input type="checkbox"/> Sleepyness		<input type="checkbox"/> Dryness
<input type="checkbox"/> Mucous Membrane Damage		

3. TARGET ORGANS

ACUTE

CHRONIC

- | | |
|--|---|
| <input type="checkbox"/> Blood [Hematopoietic System] | <input type="checkbox"/> Blood [Hematopoietic System] |
| <input type="checkbox"/> Brain
[Central Nervous System] | <input type="checkbox"/> Central Nervous System |
| <input type="checkbox"/> Eyes | <input type="checkbox"/> Kidney |
| <input type="checkbox"/> Lungs
[Respiratory System] | <input type="checkbox"/> Liver |
| <input type="checkbox"/> Skin | <input type="checkbox"/> Lungs |
| <input type="checkbox"/> Stomach
[Digestive System] | <input type="checkbox"/> Reproductive System |
| | <input type="checkbox"/> Medical Conditions Aggravated
By Exposure |

4 . NFPA CODE

- Red Square ---- OX ---- RADIOACTIVE
- Blue Square ---- ACID ---- WATER REACTIVE
- Yellow Square ---- COR
- White Square ---- ALK
- 0 - 4 Numbers

5 . FIRE EXTINGUISHER TYPES

- A ---- B ---- C ---- D

6 . PROTECTIVE EQUIPMENT

- Safety Glasses ---- Boots
- Splash/Impact Goggles ---- Full Protection Suit
- Head/Face Shield ---- Respirators
- Hard Hat ---- Self-Contained Air Respirator
- Ear Plugs ---- Ventilation Equipment
- Ear Muffs ---- Eye/Face Wash Station
- Gloves ---- Drench Hose
- Apron ---- Safety Shower

7 . HAZARD DETECTION

- Sight ---- Air Monitors
- Hearing ---- Detector Tube
- Touch [External] ---- Lapel Badge
- Feeling [Internal] ---- Beeper
- Smell

8 . HAZARD ICONS

- Flammable ---- Corrosive ---- Toxic
- Explosive ---- Radioactive ---- Biohazard
- Oxidizer ---- Water-Reactive ---- Carcinogenic

formed completed by

SIGNATURE

TITLE

DATE