" The DOSH hazard communication ("hazcom") regulations are found in their Core Rules – WAC 296-800-170. We have copies if you wish to see them. It is also called chemical hazard communication."

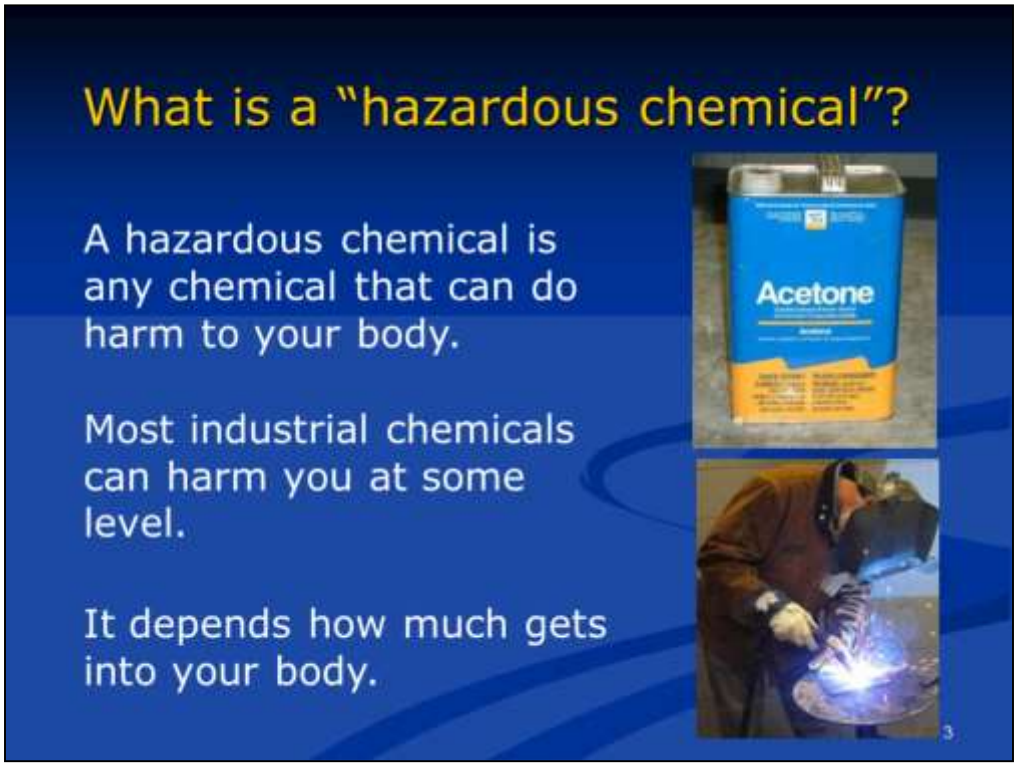
What is hazard communication?

Hazard communication or "hazcom" is our program where we tell you about the hazardous chemicals used in our workplace.

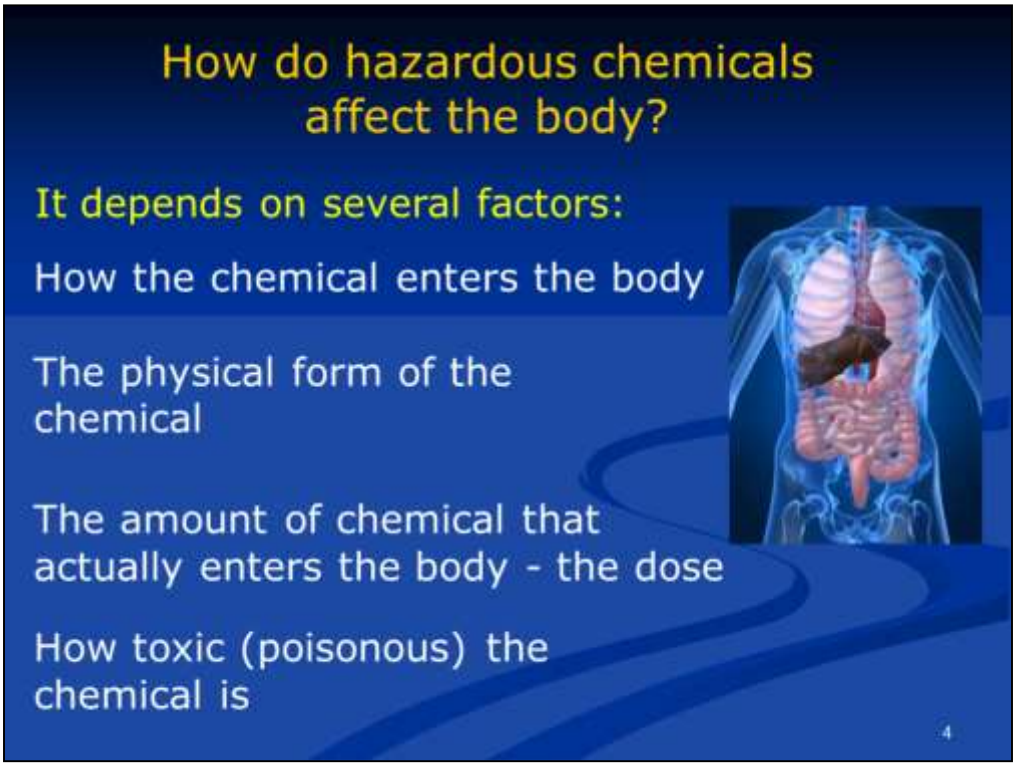
We will also train you on how to protect yourself from the effects of these hazardous chemicals.

2

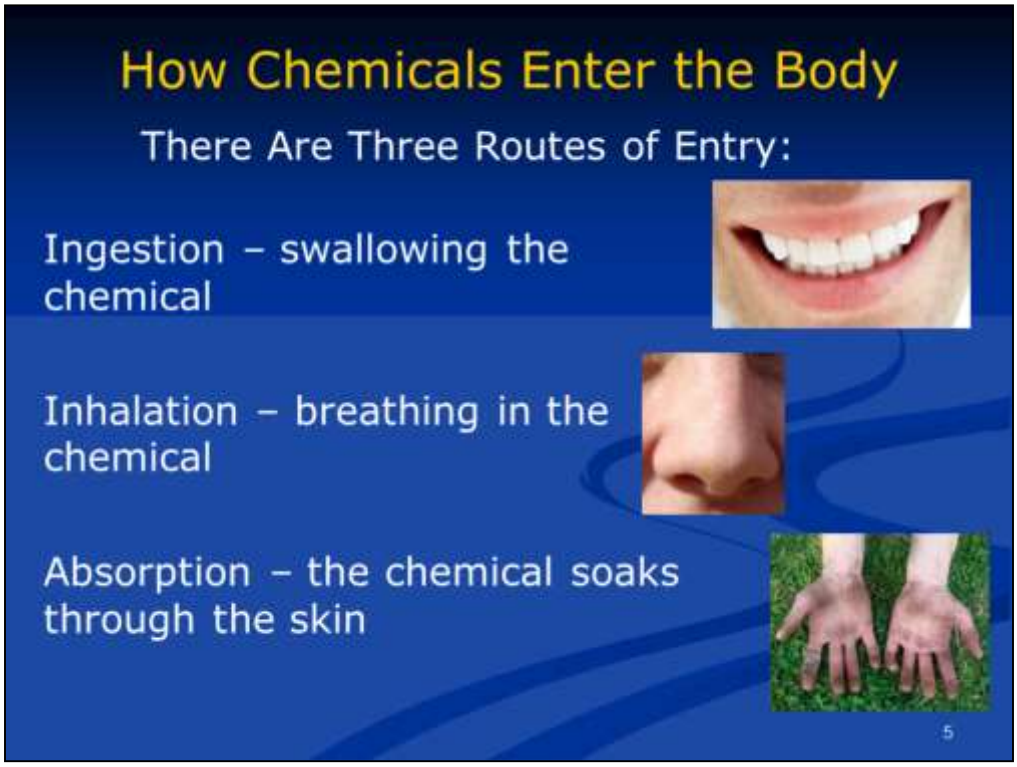
" The DOSH hazard communication ("hazcom") regulations are found in their Core Rules – WAC 296-800-170. We have copies if you wish to see them. It is also called chemical hazard communication."



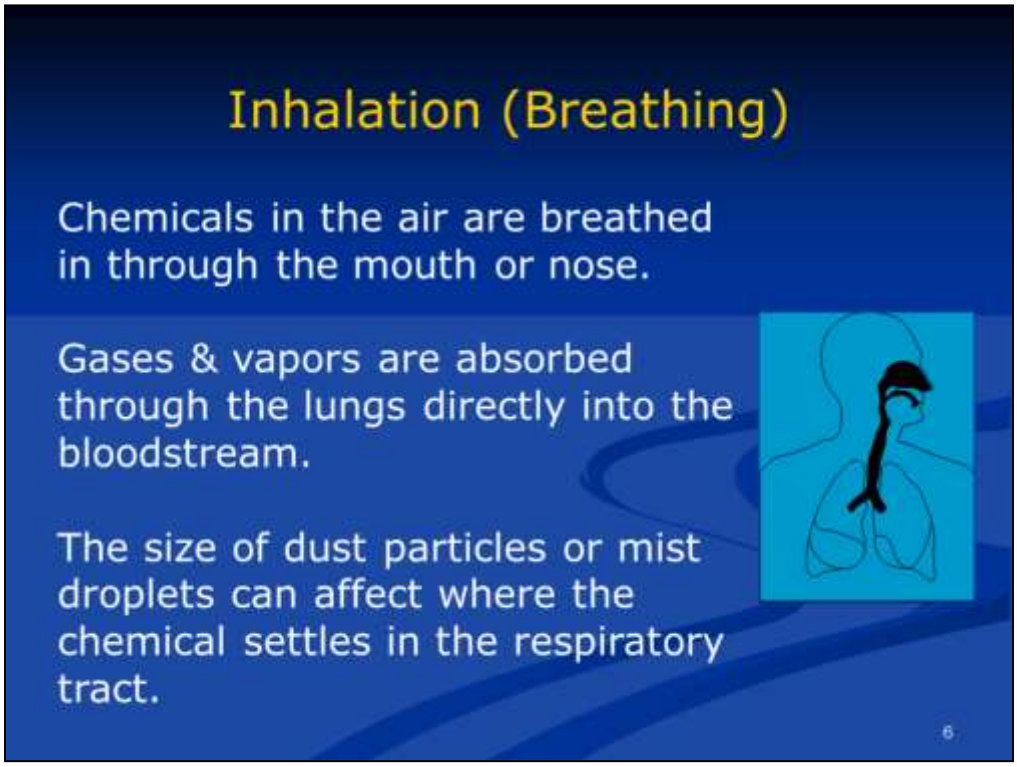
"Some chemicals are more toxic than others. Just a little bit of some chemicals entering your body could harm you. Others are much less toxic and it would take great amounts entering your body to do any harm. This training will also show that exposure to chemicals can come from a variety of sources."



"A poisonous chemical will not do you any harm, obviously, if it does not enter your body."

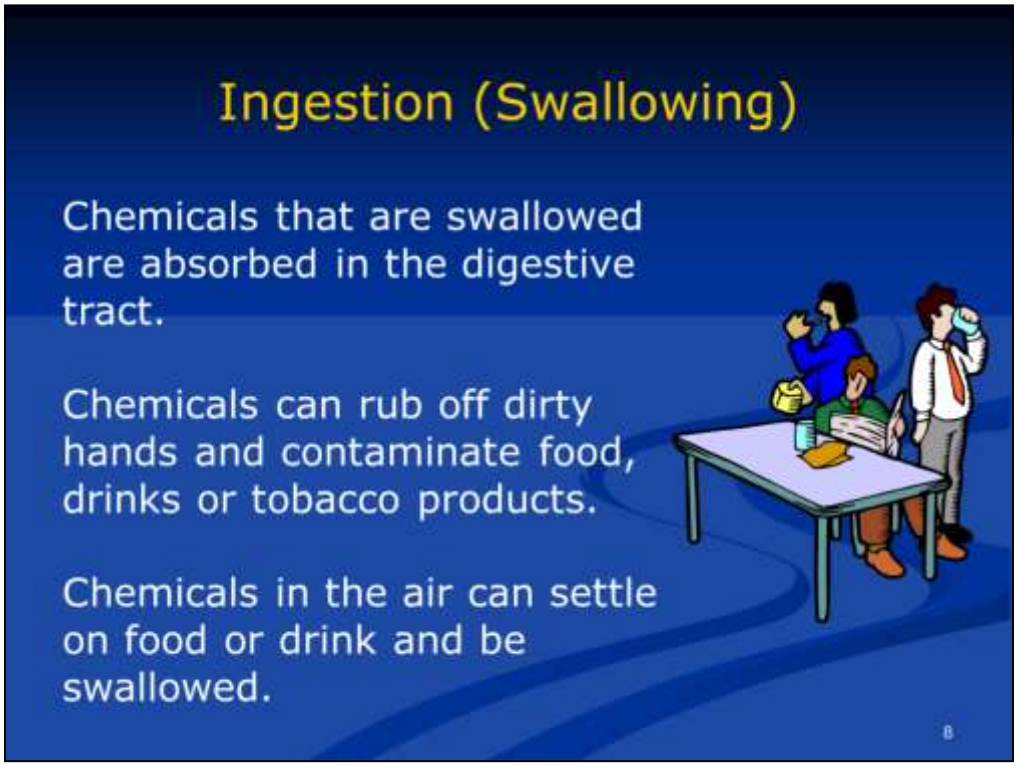


"Inhalation is typically the most common way chemicals can enter the body in a work situation. Skin absorption is less common, but can occur with some solvents and pesticides. Ingestion is usually not a major problem in the workplace except in certain situations."

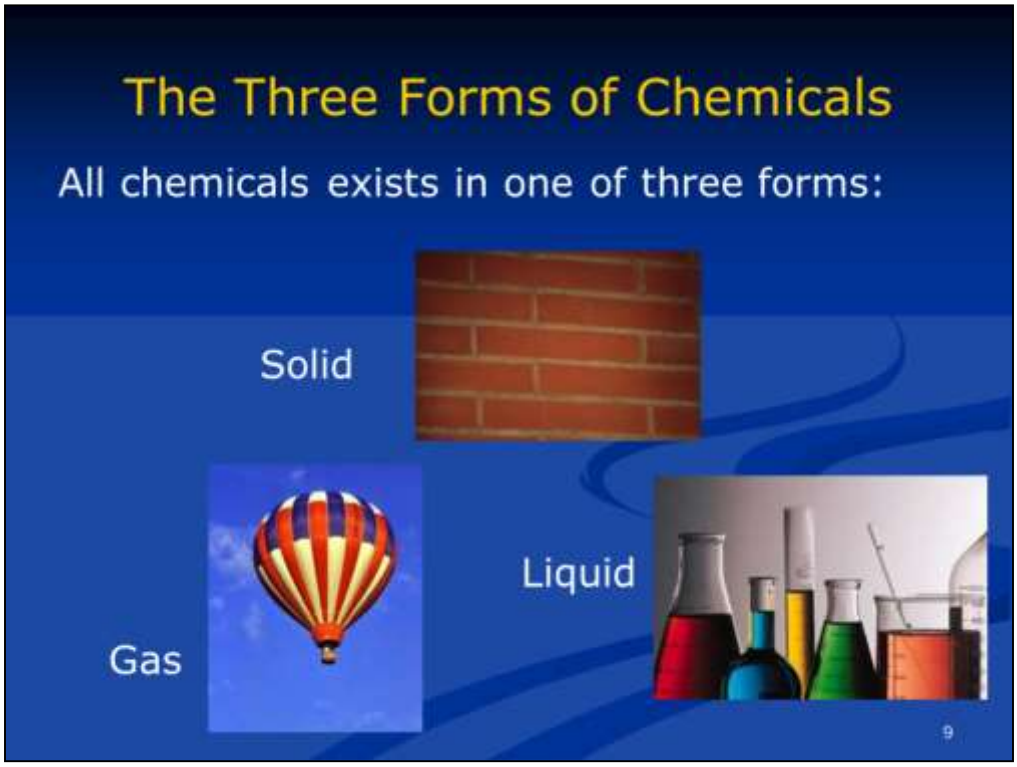


"Where the particles or mist settles in the respiratory tract determines what symptoms or diseases will develop. Some chemicals settle in the nose and throat, some go deeper into the lungs. The chemicals that go deeper in the lungs often cause more damage. Fine dust usually goes deep into the lungs"

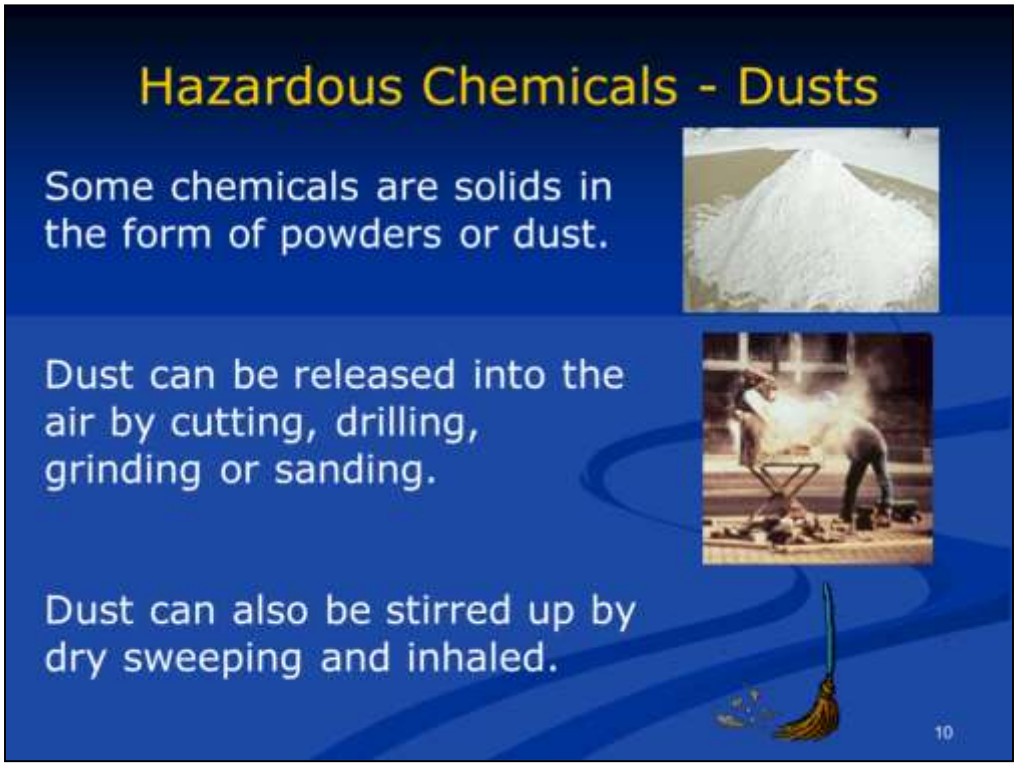
"Some chemicals are absorbed through the skin more easily than others. Many insecticides and some solvents are easily absorbed through the skin. Also, some chemicals will have a direct effect on the skin without being absorbed through the skin. More about that later."



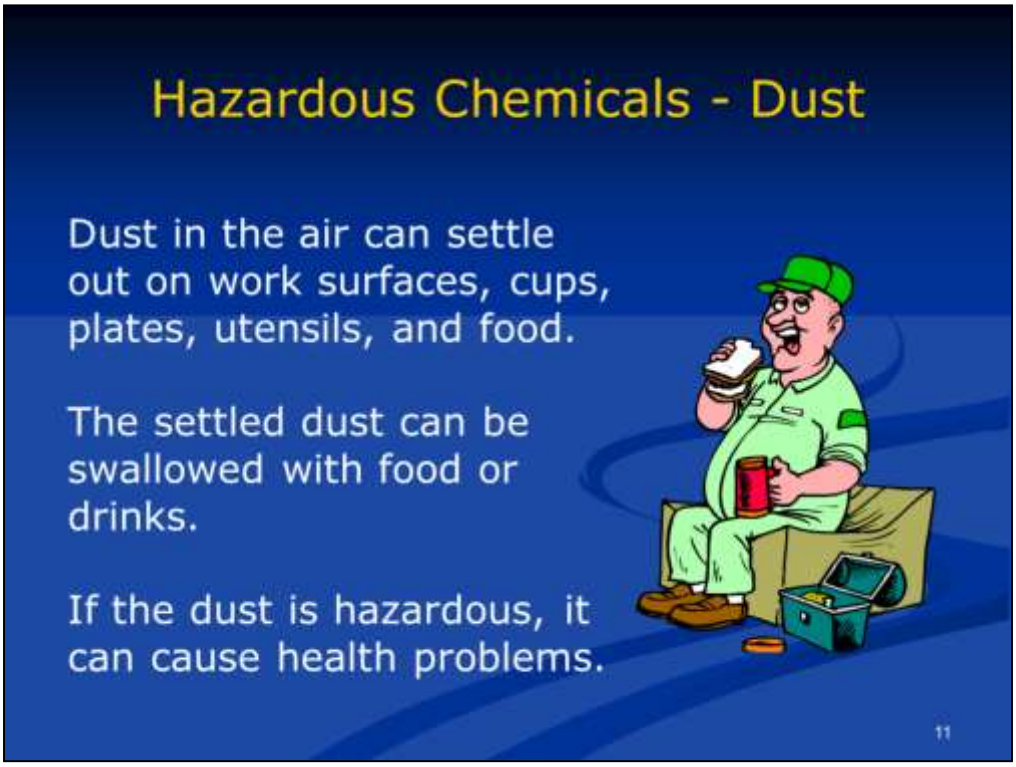
"This is another good reason to wash your hands before eating, drinking or smoking."



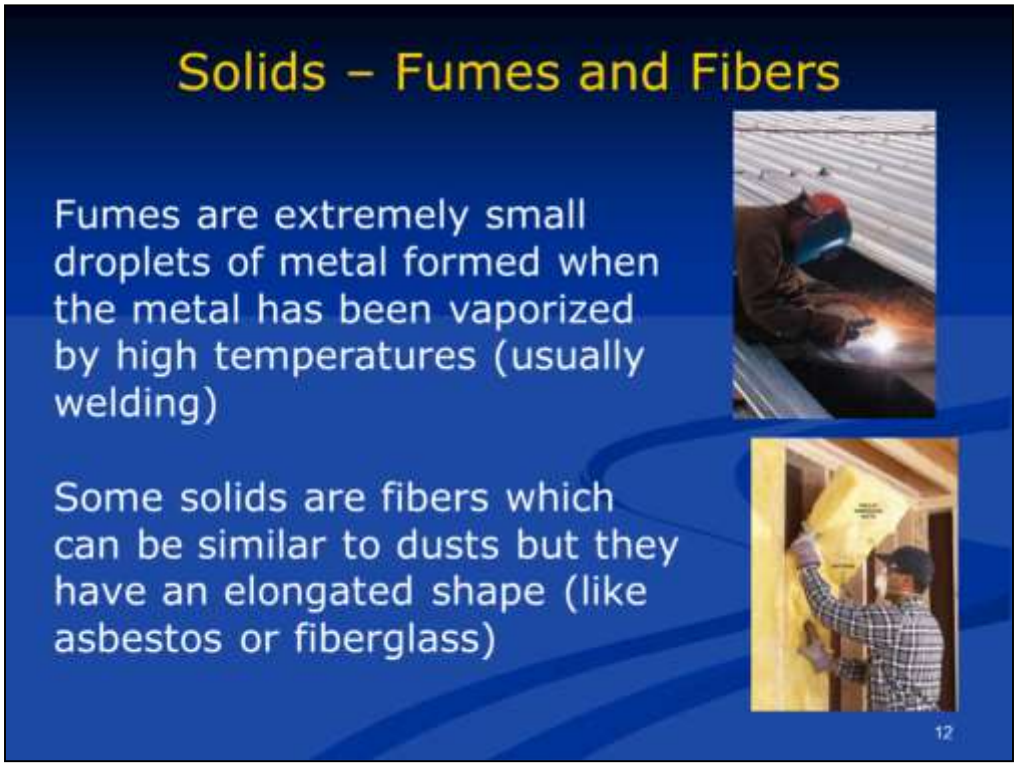
"The physical form of the hazardous chemical can affect how hazardous it is and how it enters the body."



"Dust or powders can be inhaled when they become airborne. For example, cutting brick or cinder block without water can generate lots of airborne dust that contains quartz (silica). Dry sweeping can do the same. If silica dust is inhaled it can scar the lungs and cause breathing problems."

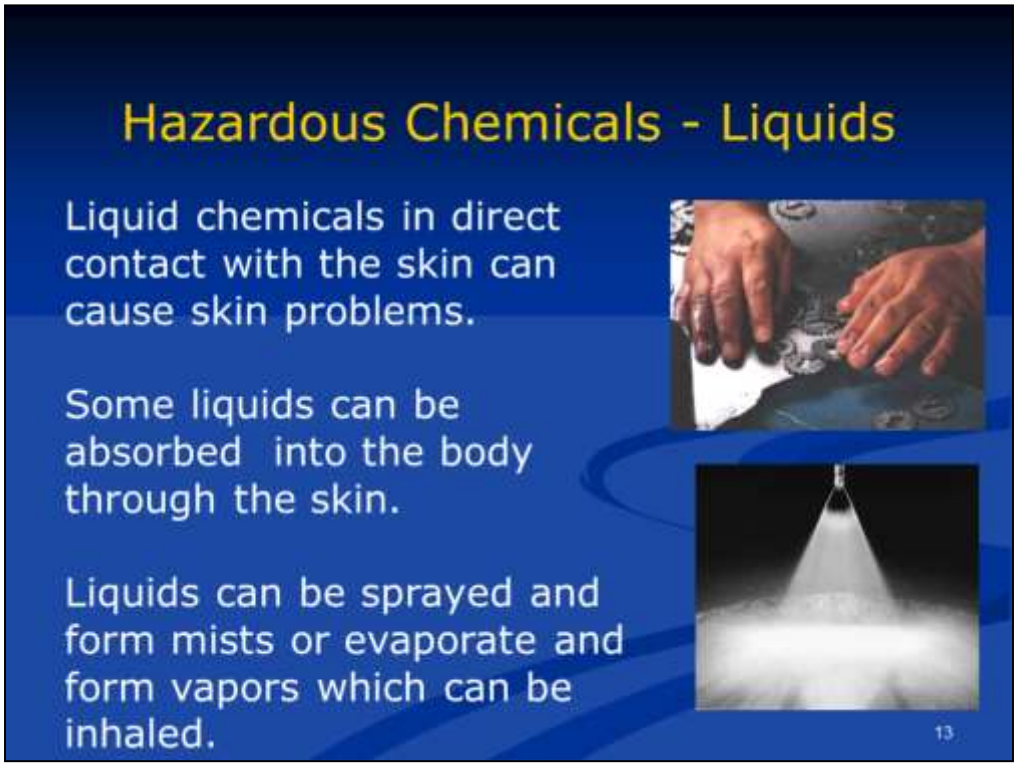


"This is real problem with lead dust."

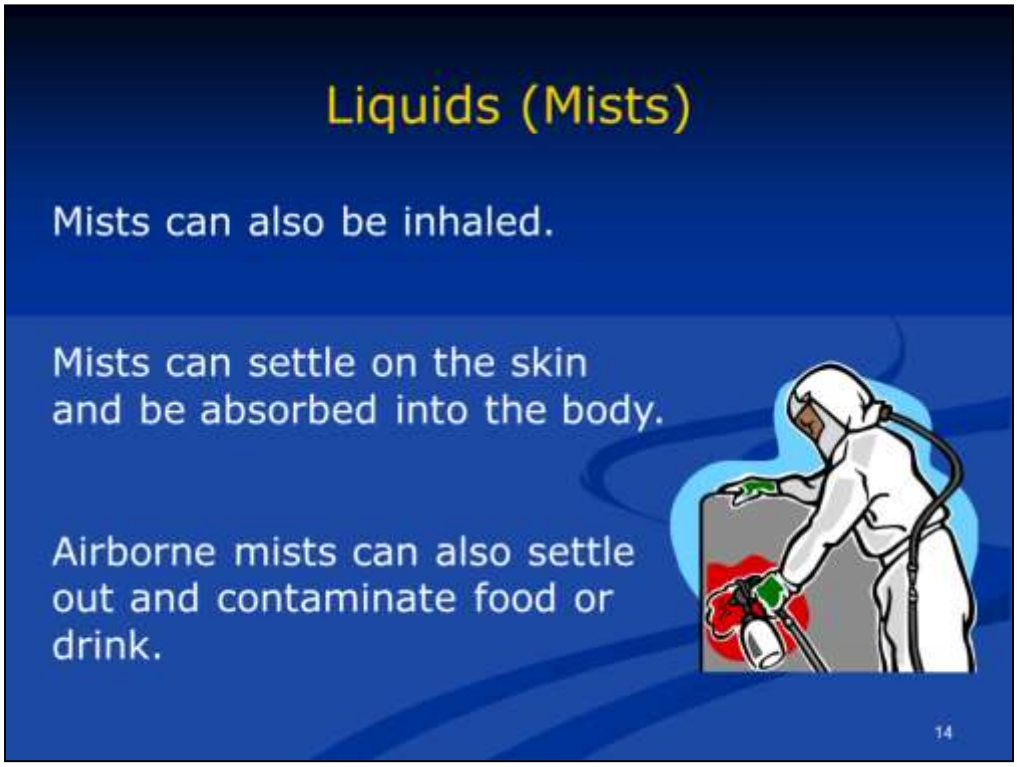


"Metal fumes are formed during welding. Because of their tiny size, they are easily inhaled deep into the lungs and can be absorbed into the blood stream. Sometimes the word "fumes" is used for chemicals gases or smoke in the air, but this is the more accurate definition. "

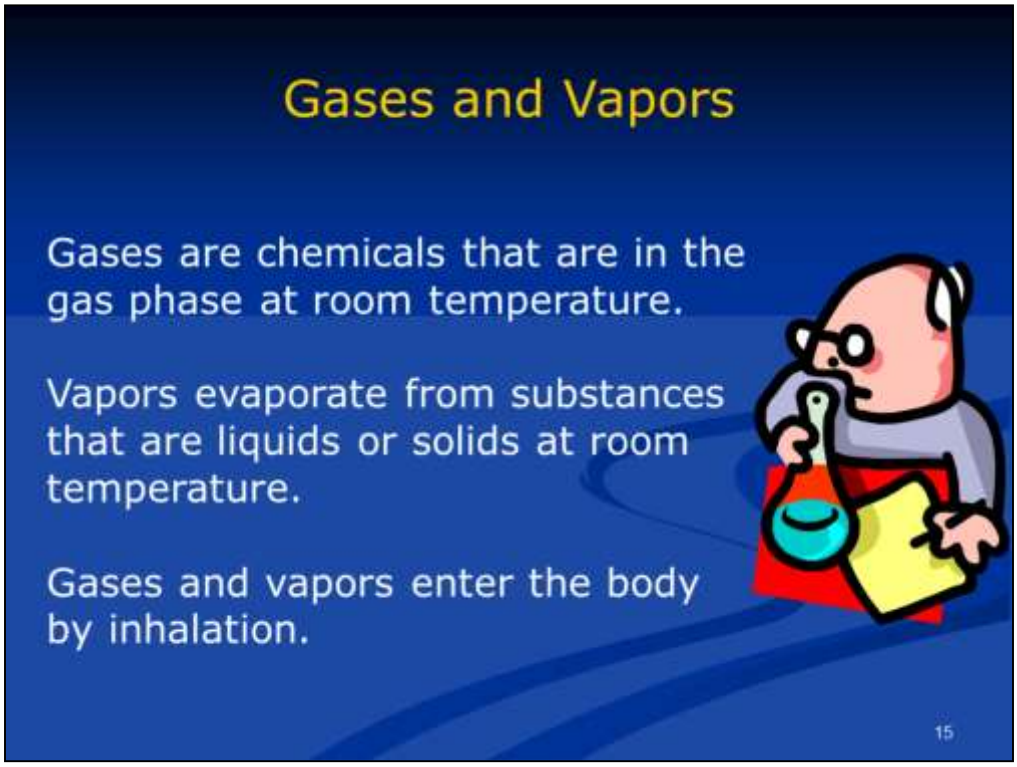
"Asbestos is one of the most hazardous dust in fiber form because of the damage it can do to the lungs. Fiberglass does not damage the lungs, but can be irritating to the nose and throat."



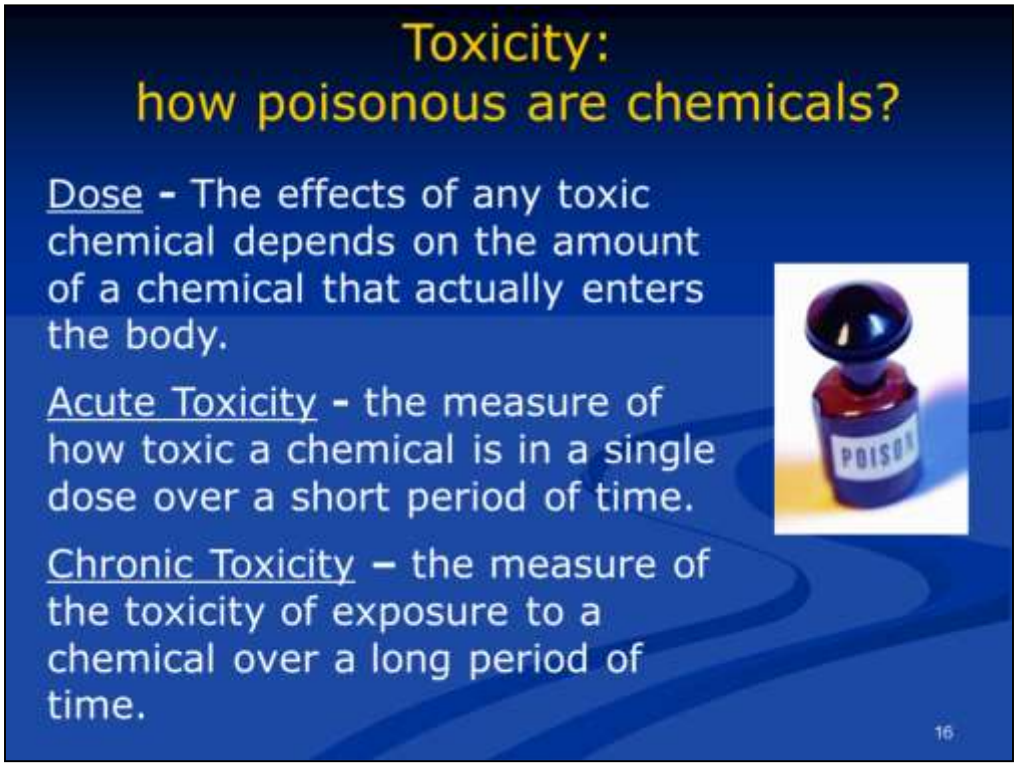
"Typical hazardous liquids are various types of solvents. These chemicals can dry the skin out, cause an allergic reaction or have other direct effects on the skin. Some liquid solvents are flammable and can be a fire hazard as well."



"The most common exposure to mists is from inhalation. A common example of a mist exposure at work is paint overspray."

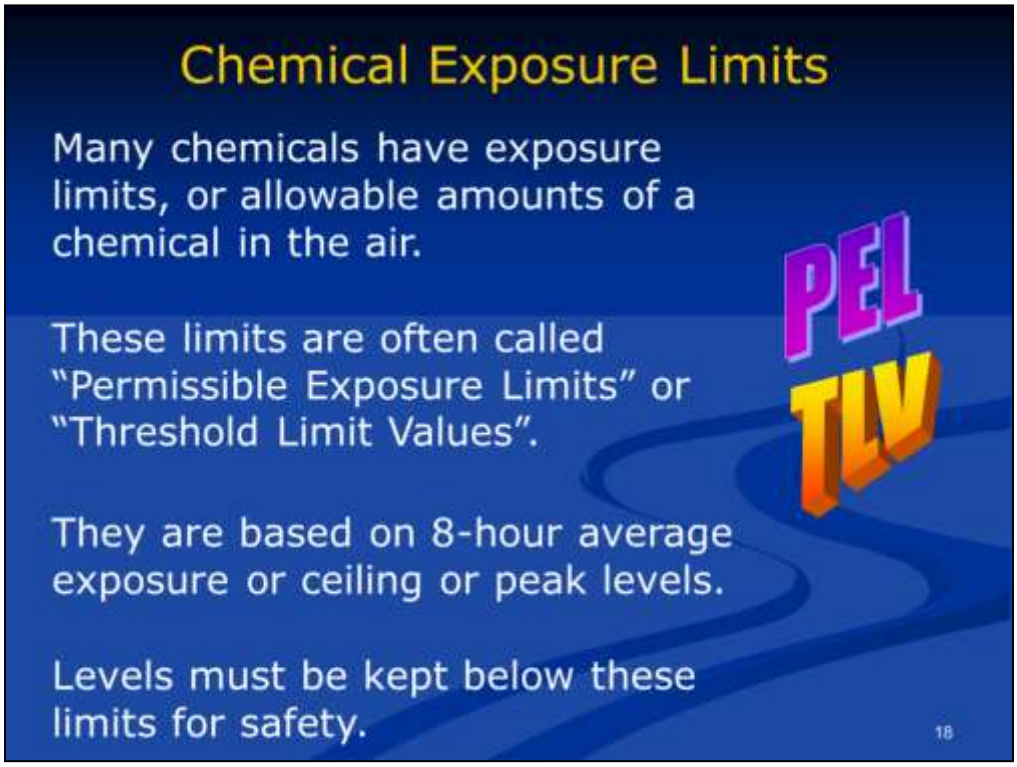


"Chlorine and methane are examples of gases. Most liquid solvents release vapors. Examples are acetone, paint thinner and gasoline. Gases do not normally pass through the skin. "



[Optional slide. These terms are often used in SDSs.] "Some chemicals can cause problems immediately, others may not hurt you until you have been exposed for a long time"

"Ammonia smells terrible and irritates the nose, but doesn't really hurt you except at very high levels where it can burn your lungs. At lower levels, it has no long-term effects. Asbestos has no immediate effects , but over the long-run causes breathing problems or lung cancer. Carbon monoxide can kill you in minutes at a high enough level, but also give you headaches and eventually damage your heart if you breathe it day after day at low levels."



Permissible exposure limits are also called PELs and threshold limit values are called TLVs. DOSH regulations have PELs for about 600 chemicals. Often the SDS will list the OSHA PEL which can be different from the DOSH PEL. The limits are usually expressed as parts per million (ppm) or milligrams per cubic meter (mg/cu. meter). Your exposure to chemicals cannot exceed these limits."

"A manufacturer is required to list any carcinogens in their product even if the amount is as low as 0.1% of the product. The allowable exposure limits for carcinogens are either extremely low or at zero."

Other Groups of Toxic Chemicals

Teratogens

Teratogens are compounds that can harm the developing fetus, causing birth defects or death.

Mutagens

Mutagens cause genetic mutations or changes. These mutations can cause birth defects or other problems in following generations or may lead to cancer in the exposed person.

20

"As an example of a teratogen, some you may remember, the drug Thalidomide taken by pregnant woman in the 1950's that cause babies to be born without arms or legs. Fortunately, there are few chemicals in common use today that are in this group."

"Corrosive chemicals may or may not have an internal effect on the body, but usually affect the skin or eyes, irritating or destroying tissue. This can also happen in the lungs if corrosive chemical vapors are inhaled."

"The longer the corrosive is on your skin, the greater the injury. The more concentrated the corrosive, the greater the damage."

"Goggles are essential to protect the eyes when handling strong corrosives. Eyewashes are required where corrosives are handled. Damage to the eyes can be minimized by quick and thorough rinsing of the eyes. The photo shows an eye severely damaged by a corrosive"

Properties of Flammable Liquids

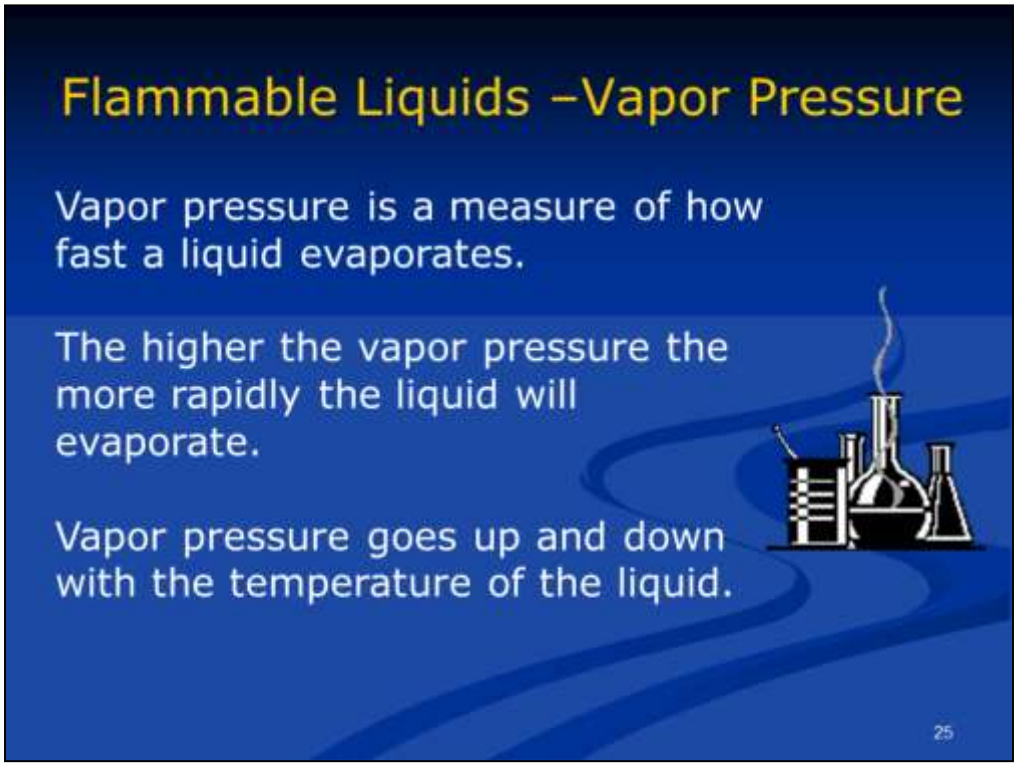
The vapor of a flammable liquid ignites and causes fire or explosion – not the liquid itself.

The flammability of a liquid depends on its physical properties:

- Vapor Pressure
- Flash Point
- Limits of Flammability
- Vapor Density

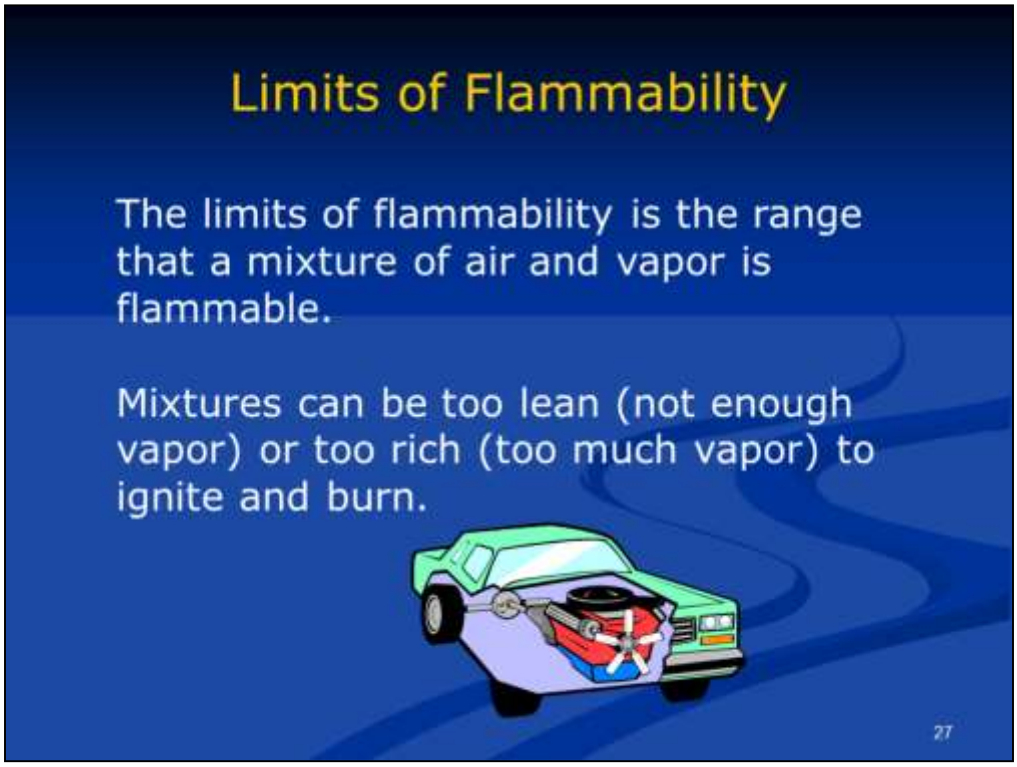
24

"Flammable liquids include fuels like gasoline and various types of solvents."

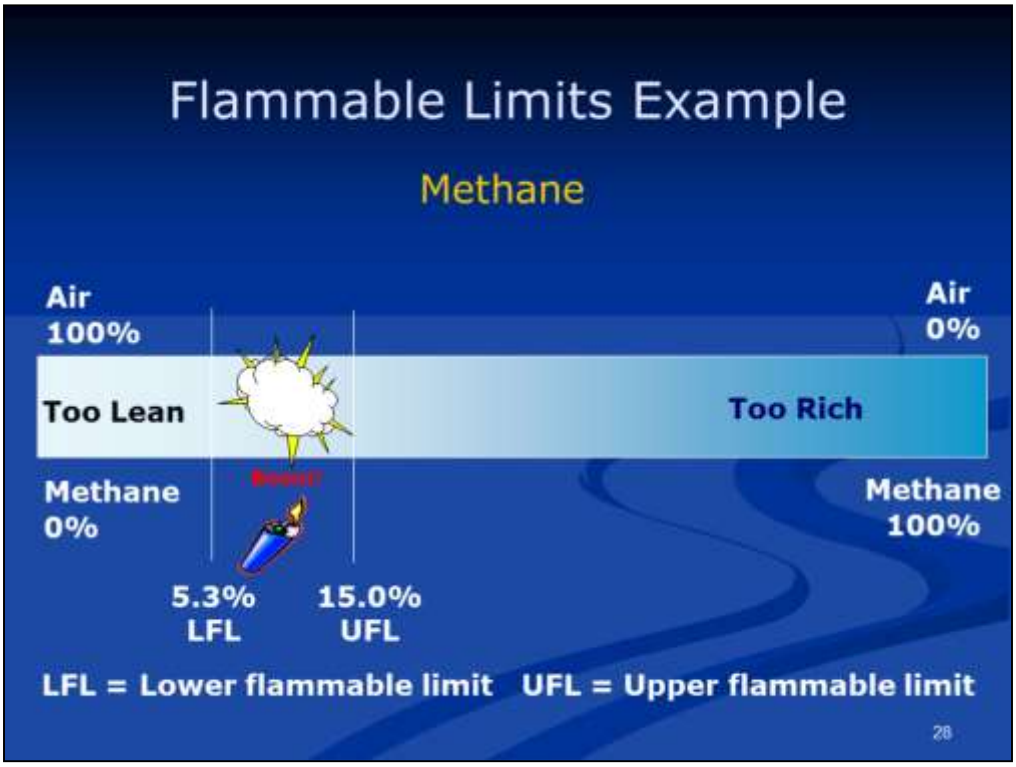


"Usually, the higher the vapor pressure, the more flammable the liquid is. However, some chemicals have high vapor pressure, but don't burn. An example is methylene chloride, a chemical used in many paint strippers."

"For example, gasoline has a much lower flash point than motor oil. The lower the flashpoint, the more easily the liquid will burn or catch fire."



"An example is an automobile engine. Even though gasoline is very flammable, the car won't run if the mixture is too rich (too much gasoline vapor) or too lean in the carburetor or fuel injection system."



An open flame or a spark will cause an explosion when methane amount is between 5.3%, the lower flammable limit (LFL) and 15%, the upper flammable limit (UFL). These are also sometimes called lower explosive limit and upper explosive limit."

Flammable Liquids
Lower Flammable Limit (LFL)

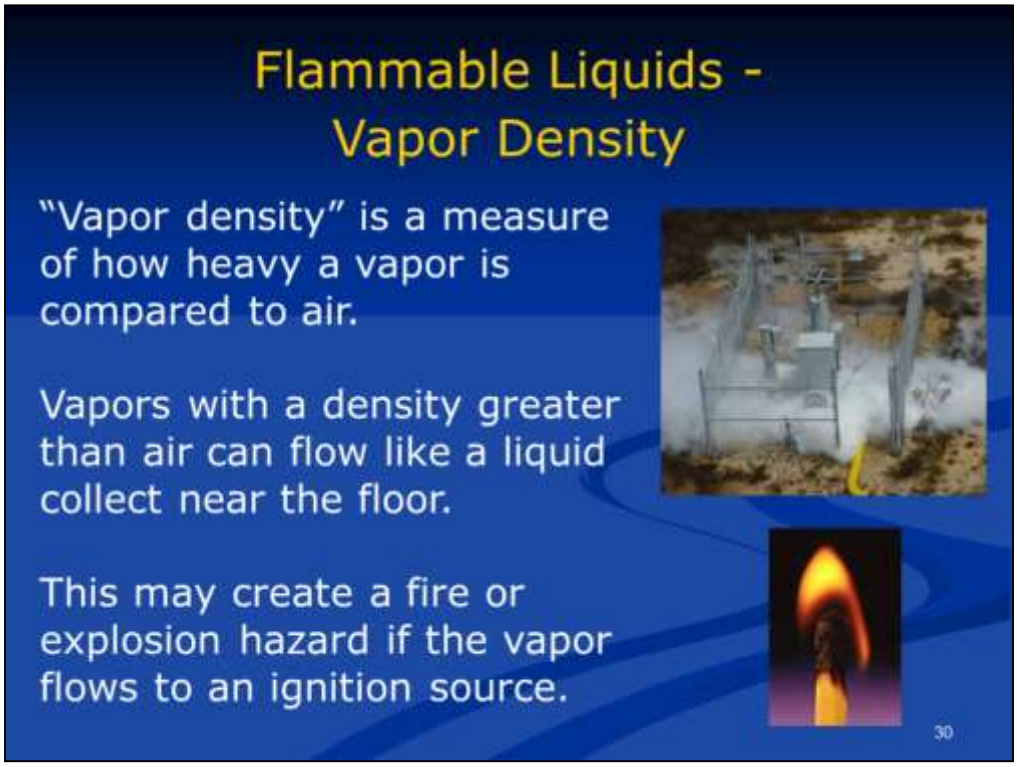
In most work situations, the "lower flammable limit" (LFL) is the main concern.

Vapors from flammable liquids can be found in the workplace, but are often too diluted to catch fire or explode.

However, these vapors can quickly go above the LFL in small room or confined space like a tank.

29

"Vapors that exceed the LFL are usually toxic as well, and lower the amount of oxygen. So if the explosion or fire doesn't harm you, the toxicity or lack of oxygen probably will. LFL is sometimes called LEL – lower explosive limit."



"An example of vapors heavier than air include propane. A leak from a propane tank will often settle in the lowest part of building or ground."

"Metals can present different hazards from poisoning to explosions and fire. Metals can cause health effects such as elevated blood pressure, brain damage, kidney failure and death. Pieces or articles of metal are not usually hazardous, it's when they are found in other products or are welded, cut or grinded, creating dust or fume that can then be inhaled. A few metals can actually burn rapidly and intensely if they are in a powder form. Airborne dusts and filings of some metal such as aluminum, can explode when ignited. Some metals are carcinogenic – ex. chromates found in paints or in metal plating"

"Labels are sketchy and don't have all the information about the hazards of chemicals in a product. SDSs usually provide much more information, although it may not always be easy to understand."

New Requirements Overview

- Rule modifies MSDS requirements, labeling, classifications, and requires retraining of all employees.
- The HazCom/GHS includes the following basic elements:
  - harmonized criteria for classifying substances and mixtures according to their health, environmental and physical hazards; and
  - harmonized hazard communication elements, including requirements for labeling and material safety data sheets.

Overview

- **Hazard classification: Provides specific criteria for classification of health and physical hazards, as well as classification of mixtures.**
- **Labels: Chemical manufacturers and importers will be required to provide a label that includes a harmonized signal word, pictogram, and hazard statement for each hazard class and category.**
- **Precautionary statements must also be provided.**
- **Safety Data Sheets: Will now have a specified 16-section format.**
- **Information and training: The Final HCS will require that workers are trained within two years of the publication of the final rule to facilitate recognition and understanding of the new labels and safety data sheets.**

OSHA – Final Rule

- Effective Dates:
  - 12/1/13: All employees must be trained on new label elements and SDS format
  - 6/1/15: Manufacturers and distributors must comply with all modified provisions except that distributors have until 12/1/15 to provide revised labels for all products shipped.
  - 6/1/16: OSHA enforcement starts: Employers must update all labels and HAZCOM program, provide additional training for workers on newly identified physical or health hazards

OSHA – Final Rule

- System has 16 physical hazard classifications and 10 health hazard classifications, which determine label elements, pictograms, hazard statement, signal words and precautionary statement required.

GHS Hazard Classification

- Physical Hazards (16)
  - Explosives
  - Flammable Gases
  - Flammable Aerosols
  - Oxidizing Gases
  - Gases Under Pressure
  - Flammable Liquids
  - Flammable Solids
  - Self-Reactive Substances
  - Pyrophoric Liquids
  - Pyrophoric Solids
  - Self-Heating Substances
  - Substances which, in contact with water, emit flammable gases
  - Oxidizing Liquids
  - Oxidizing Solids
  - Organic Peroxides
  - Corrosive to Metals

GHS Hazard Classification

- Health Hazards (10)
  - Acute Toxicity
  - Skin Corrosion/Irritation
  - Serous Eye Damage/Eye Irritation
  - Respiratory or Skin Sensitization
  - Germ Cell Mutagenicity
  - Carcinogenicity
  - Reproductive Toxicology
  - Target Organ Systemic Toxicity – Single Exposure
  - Target Organ Systemic Toxicity – Repeated Exposure
  - Aspiration Toxicity

HCS Pictograms and Hazards

Health Hazard

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

Flame

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

Exclamation Mark

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non Mandatory)

Gas Cylinder

- Gases under Pressure

Corrosion

- Skin Corrosion/ burns
- Eye Damage
- Corrosive to Metals

Exploding Bomb

- Explosives
- Self-Reactives
- Organic Peroxides

Flame over Circle

- Oxidizers

Environment (Non Mandatory)

- Aquatic Toxicity

Skull and Crossbones

- Acute Toxicity (fatal or toxic)

Transport Pictograms

Hazard Statements

- A single harmonized hazard statement for each level of hazard within each hazard class
  - Example: Flammable liquids
    - Category 1: Extremely flammable liquid and vapour
    - Category 2: Highly flammable liquid and vapour
    - Category 3: Flammable liquid and vapour
    - Category 4: Combustible liquid

Hazard Statements

- Flammable (and Combustible) Liquid Criteria

Table 2: GHS Flammable (and Combustible) Liquid Criteria

Criteria	GHS Category	Transport Class / Packing Group
Flash point < 73°F(23°C) and initial boiling point ≤ 95°F(35°C)	1	3, I
Flash point < 73°F(23°C) and initial boiling point > 95°F(35°C)	2	3, II
Flash point ≥ 73°F(23°C) and ≤ 140°F(60.5°C)	3	3, III
Flash point > 140°F(60.5°C) and ≤ 199.4°F(93°C)	4	Combustible Liquid, PG III [DOT uses <200°F(93°C)]

GHS Hazard Classification

- Defined criteria are used to assign a hazard classification
  - Physical Hazards
    - 16 categories
  - Health Hazards
    - 10 categories
  - Environmental Hazards
- Mixtures
  - GHS classification guidance for when chemicals are mixed

GHS Hazard Classification

- Hazardous to the Aquatic Environment
  - Acute aquatic toxicity
  - Chronic aquatic toxicity
    - Bioaccumulation potential
    - Rapid degradability

GHS Hazard Communication

- Labels
  - Symbols (hazard pictograms) with red border
    - Examples:

GHS Hazard Communication

- Labels (cont.)
  - Nine symbols
    - Includes "Environment"

Flame over circle  • Oxidizers	Flame  • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self Reactives • Organic Peroxides	Exploding bomb  • Explosives • Self Reactives • Organic Peroxides
Skull and crossbones  • Acute toxicity (severe)	Corrosion  • Corrosives	Gas cylinder  • Gases under pressure
Health Hazard  • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	Environment  • Aquatic Toxicity	Exclamation mark  • Irritant • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic effects • Respiratory Tract Irritation • Hazardous to Ozone Layer

GHS Hazard Communication

- Labels (cont.)
  - Signal Words
    - "Danger" or "Warning"
  - Hazard Statements
    - Example: "Toxic if swallowed"
  - Other
    - Precautions, identification, supplier, supplemental

GHS Hazard Communication

- Labels (cont.)
  - GHS Label Elements for Flammable Liquids

Table 3: GHS Label Elements for Flammable (and Combustible) Liquids

	Category 1	Category 2	Category 3	Category 4
Symbol				No symbol
Signal Word	Danger	Danger	Warning	Warning
Hazard Statement	Extremely flammable liquid and vapor	Highly flammable liquid and vapor	Flammable liquid and vapor	Combustible liquid

GHS label example

ToxiFlam (Contains: XYZ)

Danger! Toxic If Swallowed, Flammable Liquid and Vapor

Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/sparks/open flame. – No smoking. Wear protective gloves and eye/face protection. Ground container and receiving equipment. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Use only non-sparking tools. Store in cool/well-ventilated place.

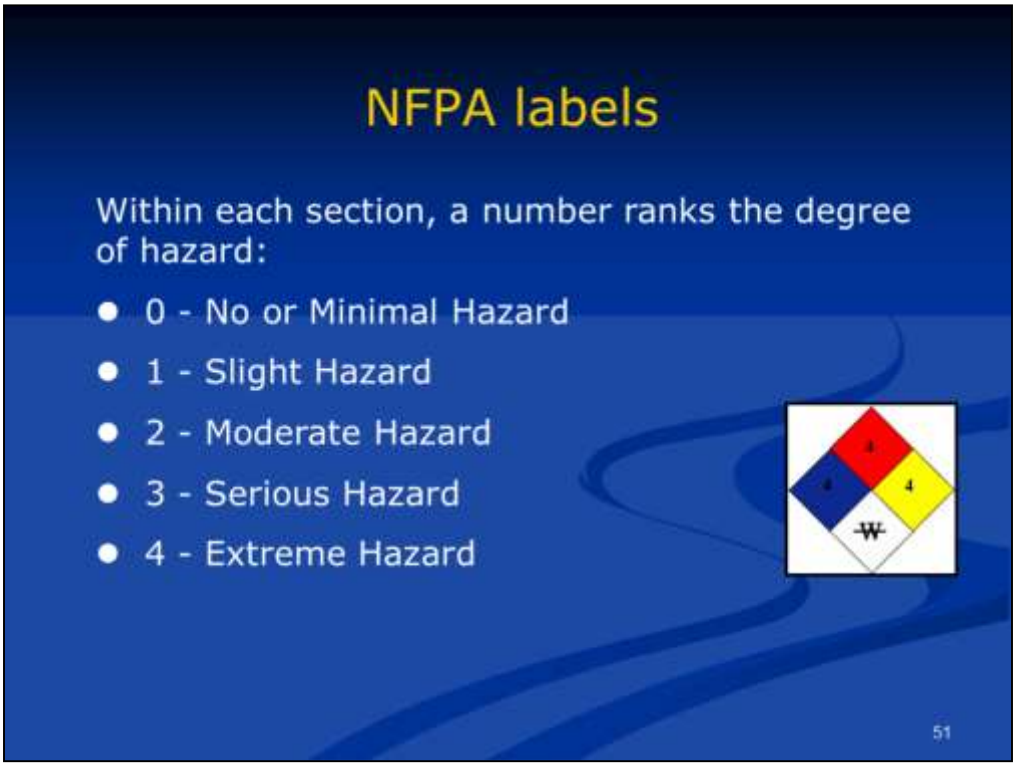
IF SWALLOWED: Immediately call a POISON CONTROL CENTER or doctor/physician. Rinse mouth.

In case of fire, use water fog, dry chemical, CO_2, or "alcohol" foam.

See Material Safety Data Sheet for further details regarding safe use of this product

MyCompany, MyStreet, MyTown, NJ 00000, Tel: 444 999 9999

"A label of course may have lots of other information not related to its hazards – amounts, advertising, directions for use, etc. But the label must include a list of the hazardous ingredients, a hazard warning and name and address of the manufacturer. Sometimes this information is on the back or side of the container."

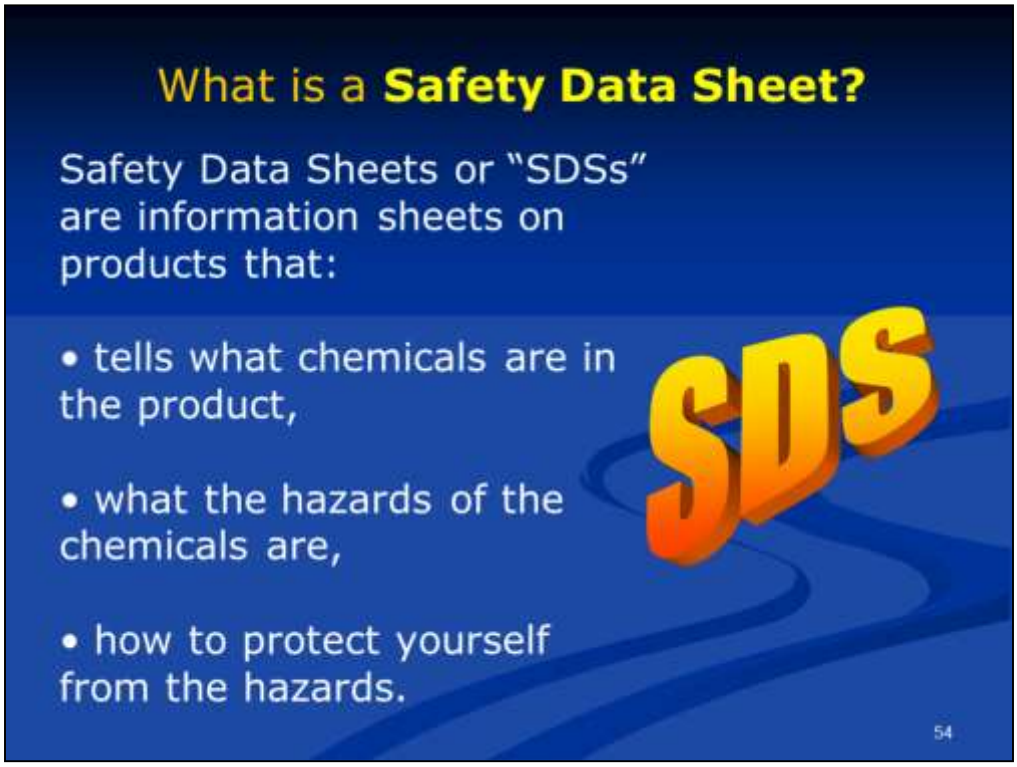


"A label of course may have lots of other information not related to its hazards – amounts, advertising, directions for use, etc. But the label must include a list of the hazardous ingredients, a hazard warning and name and address of the manufacturer. Sometimes this information is on the back or side of the container."

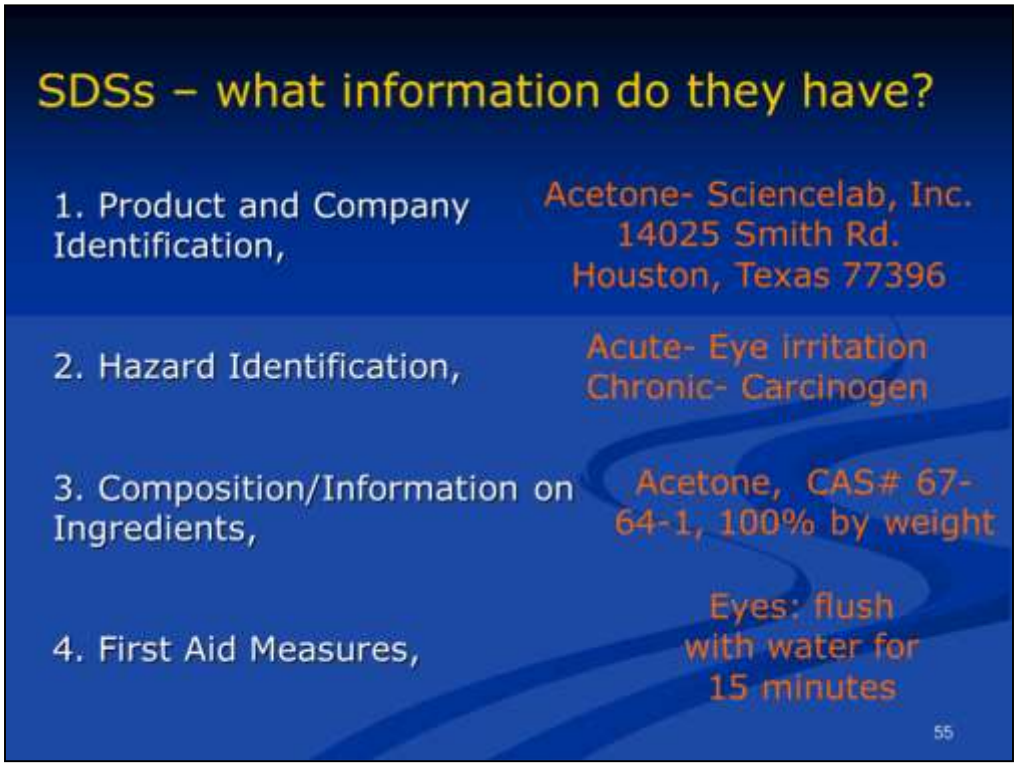
"A label of course may have lots of other information not related to its hazards – amounts, advertising, directions for use, etc. But the label must include a list of the hazardous ingredients, a hazard warning and name and address of the manufacturer. Sometimes this information is on the back or side of the container."

SDS Requirements

1. Identification of the substance or mixture and of the supplier
2. Hazards identification
3. Composition/information on ingredients Substance/Mixture
4. First aid measures
5. Firefighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection.
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological
12. Ecological information (non mandatory)
13 .Disposal considerations (non mandatory)
14. Transport information (non mandatory)
15. Regulatory information (non mandatory)
16. Other information including information on preparation and revision of the SDS



"The chemical hazard communication standard requires that producers and importers of hazardous chemicals develop Safety Data Sheets for their products. These SDSs contain information on the hazardous chemicals in a product and come with every chemical product we use."

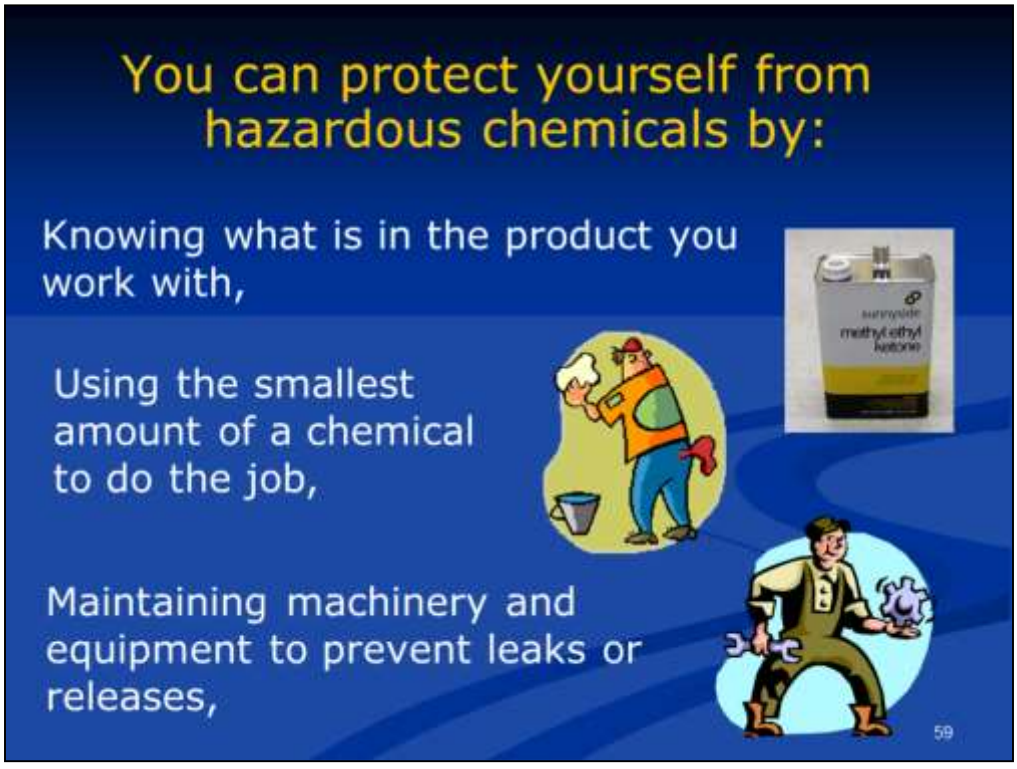


[optional slide – you can print out the previous slide or use your own SDS sheets, and go over it section by section with your employees. The information in red on the right is from the previous SDS slide.]

[optional slide – you can print out the previous slide or use your own SDS sheets, and go over it section by section with your employees. The information in red on the right is from the previous SDS slide.]

[optional slide – you can print out the previous slide or use your own SDS sheets, and go over it section by section with your employees. The information in red on the right is from the previous SDS slide.]

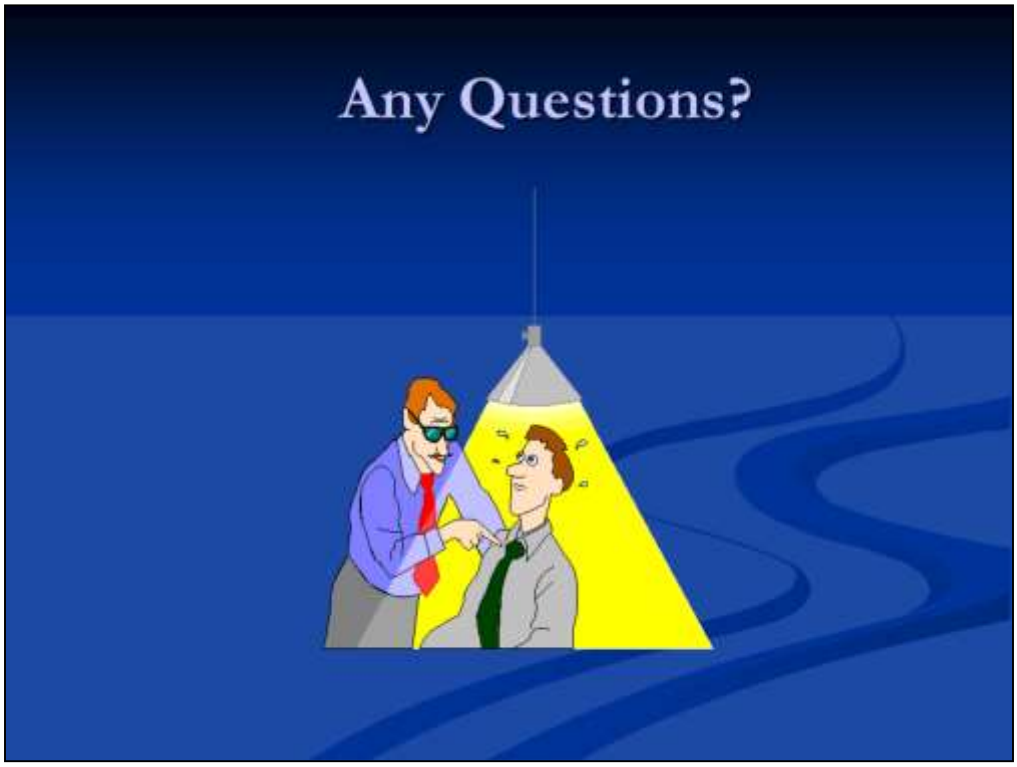
[optional slide]



"When using chemicals, more is not always better. Smaller amounts mean less goes into the air and less is spilled or splashed.

" Equipment needs to be maintained to prevent or minimize leaks or releases of chemicals into the work area"

"Personal protective equipment includes gloves, goggles, safety glasses, aprons, coveralls, Tyvek as well as respirators. PPE is the last resort for protection when there is no other means of reducing chemical exposure.


Any Questions?