

PRESENTER'S GUIDE

"HAZARDOUS MATERIALS LABELS"

Part of the General Safety Series

OUTLINE OF MAJOR PROGRAM POINTS

OUTLINE OF MAJOR PROGRAM POINTS

The following outline summarizes the major points of information presented in the program. The outline can be used to review the program before conducting a classroom session, as well as in preparing to lead a class discussion about the program.

- **What makes a substance hazardous?**
 - Is it the ability to destroy things, by burning them, blowing them up, or eating them away?
 - Or is it the potential for disrupting the normal functions of the human body, causing healthy cells to turn cancerous or toxins to build up in the blood?

- **People who work with hazardous materials labels must be able to get clear, accurate information about these substances quickly and easily.**
 - One of the best ways to provide people with information about a hazardous material is through a container label.

- **This is why OSHA, the Department of Transportation and the Environmental Protection Agency (EPA) have all established labeling requirements for the materials that they regulate.**
 - As the world has changed, many of these requirements have evolved too.

- **One of the most significant changes was OSHA's integration of the Globally Harmonized System for the Classification and Labeling of Chemicals (the "GHS") into the Hazard Communication Standard.**
 - According to the Standard, GHS labels must be used on manufacturers' and distributors' chemical containers, as well as containers that are used for transport.
 - But OSHA doesn't stop there.

- **OSHA also requires companies that use HAZMATs to attach warning labels to the secondary "in-house containers" that hazardous substances are transferred into, such as mixing vats, buckets or spray bottles.**
- **At a minimum, these labels must include:**
 - The name of the hazardous chemical.
 - Warnings about the hazards that are associated with the material.
 - The name, address and telephone number of the manufacturer, importer or distributor of the chemical.
- **While OSHA is concerned about all types of hazardous chemicals, the focus of the Environmental Protection Agency (the EPA) is on hazardous waste.**
 - The agency requires that any containers of HAZMATs that are being disposed of have labels that identify each of the materials in the containers, no matter how thoroughly they are blended together.
 - EPA hazardous waste labels must also include the originating company's name, address and telephone number.
- **As you would expect, the third government agency that requires HAZMATs to be labeled, the Department of Transportation, is concerned about materials that are being "transported".**
 - The DOT's labeling requirements apply not only to the containers of hazardous materials that are being moved from place to place but also the conveyances that move them.
 - Conveyances can include trucks, planes, ships, even pipelines.
- **While the labeling requirements of these three government agencies have some significant differences, they all have some things in common as well.**
 - First, all of the agencies require that labels be firmly attached to their containers.

- **The term "container" is defined fairly broadly by each group, and can include:**
 - Drums.
 - Barrels.
 - Boxes.
 - Bottles.
 - Cylinders.
 - Process vats
 - Tanks.

- **All of the agencies require that hazardous materials labels be displayed prominently, so that they are easily noticed by anyone working with the container.**

- **And the information on labels must be legible, which is especially important if:**
 - The label contains handwritten information.
 - The container is in an environment where the label could be smeared or otherwise damaged.

- **Because hazard information can be shown in a number of ways, over the years several different types of HAZMAT labeling systems have been developed.**
 - Some were created by the agencies themselves, others by private industry, for several different purposes.

- **The systems that are used most often include:**
 - The Globally Harmonized System (GHS).
 - Department of Transportation (DOT) "Hazard Class" labels.
 - Hazardous Materials Identification System (HMIS) labels.
 - National Fire Prevention Association (NFPA) labels.
 - EPA hazardous waste labels.

- **People who handle hazardous materials need to be able to get information about HAZMATs quickly and clearly in order to work with them safely, no matter where those people are or what language they speak.**
 - To accomplish this, the Occupational Safety and Health Administration (OSHA) needed a uniform system for presenting that information on hazardous materials container labels under the HAZCOM Standard.
 - They found it in the Globally Harmonized System of Classification and Labeling of Chemicals, created by the United Nations.

- **The Globally Harmonized System ("GHS") helps people anywhere in the world get accurate information about hazardous materials with just a quick look.**

- **To do this, the system standardizes:**
 - How materials are classified.
 - How their hazards and safety precautions are described.
 - How this information is presented.
 - So that all workers can find the information they need, even under pressure.

- **The GHS begins this process of standardizing HAZMAT information by dividing materials into "hazard classes" that are represented by nine "pictograms".**
 - These images allow a container label to communicate hazard information at a glance.

- **GHS container labels also use text elements to convey five specific types of information about a material, including:**
 - Its Name.
 - A Signal Word.
 - A Hazard Statement.
 - Precautionary information.
 - The name and contact information of its supplier.

- **The Globally Harmonized System also recommends how these elements should be positioned on the label, so a worker always knows just where to look to find the information that they want.**
- **GHS-compliant labels have to be displayed on all HAZMAT containers except those that are used as "in-house" containers, that is secondary containers that will never leave the facility.**
 - While "in-house" labels do not have to follow the GHS format, they do have to display all of the information that is required by the system.
- **Diamond-shaped DOT labels and placards are required for materials that are being transported.**
 - You will see them on all sorts of containers, as well as on the sides of trucks, trains and other conveyances that are used to carry HAZMATs from one place to another.
- **In order to ensure their visibility, DOT labels have strict design requirements.**
 - The labels on chemical containers themselves must never be smaller than 3.9 inches (100mm) on each side.
 - This allows you to identify the labels from ten to fifteen feet away.
- **The placards that are used on trucks and other vehicles must be significantly larger, since they are most often viewed while they are in motion, and from a distance.**
 - The DOT requires placards to measure at least 9.84 inches (250 mm) on each side.
- **All DOT labels and placards display symbols in the top half of their diamonds.**
 - These "pictograms" are the same ones that were created for the U.N.'s Globally Harmonized System of Classification and Labeling of Chemicals to designate various Hazard Classes.

- **What you find underneath these symbols, in the bottom half of DOT labels, is the material's Hazard Class Number.**
 - For quick identification, the DOT has grouped hazardous materials into nine "classes," each representing a specific type of hazard.
 - These classes are identified by number, from 1 to 9.

- **Class 1 is made up of explosives.**
 - This category contains anything that can detonate, from "shock-sensitive" materials to substances that will only explode under specific conditions (such as extreme heat).

- **Class 2 consists of all gases, whether they are flammable, non-flammable, toxic or inert.**

- **Class 3 is comprised of all flammable liquids... specifically those with flashpoints below 141 degrees Fahrenheit (60 degrees Celsius).**
 - The "flashpoint" of a substance is the lowest temperature at which it can readily catch fire.
 - The lower its flashpoint, the more flammable the material.

- **DOT Hazard Class 4 is made up of flammable solids.**
 - These have ignition characteristics similar to the flammable liquids in Class 3.
 - Class 4 also includes "spontaneously-combustible" and "water-reactive" materials.

- **Class 5 covers oxidizers and organic peroxides.**
 - Both of these types of substances can enrich the oxygen content of other substances... making normally safe materials flammable.

- **Class 6 includes all poisonous substances.**
 - The DOT defines "poisonous" very broadly, and includes toxic and infectious materials in this class.

- **Hazard Class 7 encompasses all radioactive materials.**
 - If a substance emits alpha, beta or gamma radiation, it belongs in this category.
- **Class 8 contains corrosives, defined by the DOT as "liquids or solids that cause visible destruction or irreversible alterations to skin tissue."**
- **Class 9 includes any substance that doesn't clearly fit into one of the other eight categories, and as a result is titled "Miscellaneous Hazardous Materials".**
- **In addition to their symbols and numbers, DOT labels also employ a color-coding scheme.**
- **If a label is too far away to be read, color-coding lets emergency responders know which DOT Hazard Class the material belongs to.**
 - **Red** represents "flammables and combustibles"
 - **Orange** stands for "explosives".
 - **Yellow** indicates "oxidizers and oxygen".
 - **Yellow, black and white** on the same label designate "radioactive materials".
 - A **half-black, half-white** diamond identifies "corrosives".
 - **White** signifies "toxins, poisons and infectious substances".
 - **Blue** denotes "water-reactive" chemicals...
 - **Green** indicates "non-flammable substances".
- **When this color-coding is used in conjunction with Hazard Class Numbers and GHS hazard symbols, the result is an easy-to-use, comprehensive labeling system that can identify any sort of substance.**

- **While the DOT labeling system is used primarily in North America, some DOT labels do have one feature that is recognized worldwide, United Nations (UN) Identification Numbers.**
 - Under this international identification system every substance is assigned a unique four-digit number.
 - For example, the UN Number for gasoline is 1203.

- **Because they are reasonably specific, in a hazardous materials incident UN Numbers can be a crucial source of information for first responders, and help HAZMAT crews to get situations under control quickly.**
 - The yellow section of the *North American Emergency Response Guidebook* is arranged according to UN Number.

- **While DOT labels deal with transportation issues, the labels in the Hazardous Materials Identification System address OSHA's "in-house" labeling requirements for the end users of hazardous chemicals.**
 - The goal of HMIS labels is to provide the information that can help to prevent accidents in warehouses, factories, laboratories and other workplaces.

- **HMIS groups hazards into three color-coded categories:**
 - **Blue** for health...
 - **Red** for flammability...
 - **Yellow** for reactivity.

- **Numbers are used within each category to indicate the degree of the hazard. In the "Health" category:**
 - **4** indicates "Deadly"... even the slightest exposure to this substance can be life-threatening.
 - **3** indicates "Extreme Danger"... serious injury would result from exposure to this substance.
 - **2** indicates "Dangerous"... exposure to this substance can be hazardous to your health.
 - **1** indicates "Slight Hazard"... irritation or minor injury would result from exposure to this substance.
 - **0** indicates "No Hazard"... exposure to this substance poses no significant risk to your health.

- **In the "Flammability" category:**
 - **4** identifies materials that have flashpoints below 73° Fahrenheit and boiling points below 100° Fahrenheit (they ignite very easily).
 - **3** identifies substances with flashpoints between 73° Fahrenheit and 100° Fahrenheit (they also ignite fairly easily).
 - **2** identifies chemicals with flashpoints between 100° and 200° Fahrenheit (these materials are harder to burn).
 - **1** identifies materials with flashpoints above 200° Fahrenheit (the materials that are hardest to ignite).
 - **0** identifies substances that will not burn at all.

- **In the "Reactivity" category:**
 - **4** indicates that the substance is capable of exploding at normal temperatures and pressures.
 - **3** indicates that the material can be detonated by a strong "initiating source", such as heat, shock or water.
 - **2** indicates that the substance is capable of violent chemical changes at normal or elevated temperatures and pressures.
 - **1** indicates that the chemical may become unstable at both elevated temperatures and pressures, or when mixed with water.
 - **0** indicates that the substance will not detonate under any conditions.
- **Using this combination of colors and numbers, a good picture of the hazards that are associated with a substance can be formed.**
- **An HMIS label for gasoline would have:**
 - A **"1"** in the blue space, since gasoline is only a slight health hazard...
 - A **"3"** in the red space, because it can ignite at below 100° Fahrenheit and is a flammability hazard...
 - A **"0"** in the yellow space, since it won't detonate.
- **In addition to these hazard numbers, the personal protective equipment (PPE) that should be worn when handling the substance is identified at the bottom of every HMIS label by the capital letters "A" through "K".**
 - By consulting a chart or a wallet card that shows what each letter stands for, it's easy to see what level of protection is needed.
- **For instance, the capital letter "C" indicates that safety glasses, gloves and a synthetic apron should be worn when working with the material.**

- **If the "personal protection" column is marked with an "X", special handling is required, in which case you will need to get additional information from the material's SDS or your supervisor.**
- **Some variations of the HMIS system use pictograms instead of letters to show what PPE should be worn, which makes it even easier to determine what you need.**
- **Certain hazardous substances may also require "target organ" information that indicates which organs can be affected by the substance.**
 - In the HMIS system this is provided through images of the organs themselves.
- **An asterisk in the "health hazard" section of an HMIS label indicates that:**
 - The substance is a chronic health hazard.
 - Repeated exposure to it could cause health problems.
- **If you encounter labels that contain any of these special warnings, consult the material's SDS for more information, or ask your supervisor for instructions as to how to work with the substance safely.**
- **NFPA labels are another system that is frequently used where chemicals are worked with or stored.**
 - NFPA labels differ from other types in that their focus is specifically on information that is important when a chemical is involved in a fire, such as whether it reacts with water.
- **NFPA labels are diamond-shaped and use four color-coded sections to convey their hazard information.**
 - The colors, red, yellow, blue, and white, each represent a specific type of hazard.

- **NFPA labels use the numbers zero through four to indicate the severity of the hazards in each color category.**
 - Zero indicates that a material is not hazardous, while four warns that the material is extremely hazardous.
- **The four colored sections within the NFPA diamond are diamond-shaped as well.**
 - The **red** area at the top of the label shows a material's degree of flammability, of particular interest for a fire-control agency such as the NFPA.
 - The **yellow** section on the right indicates how stable a substance is.
 - The **blue** quadrant on the left tells you how likely a substance is to cause health problems.
 - The **white** area at the bottom of the NFPA label will display icons to indicate whether any special hazards are associated with a substance.
- **Three of the most frequently seen "special-hazard" icons are for:**
 - Radioactive materials, indicated by the international symbol for radioactivity.
 - Water-reactive materials, identified by the capital letter "W" with a line drawn through it.
 - Oxidizers, designated by the capital letters "OX".
- **Water-reactive chemicals and oxidizers present particular fire-control issues.**
 - If a water-reactive chemical comes into contact with water, it will actually cause a fire or explosion.
 - Oxidizing chemicals release oxygen into the atmosphere, making everything in the area more flammable than normal.

- **By including information about these substances on their labels, the NFPA makes workers and firefighters aware that these materials pose special fire hazards, so that they can be approached cautiously and be handled appropriately.**
- **Under federal law, EPA-approved hazardous waste labels must be attached to all containers of discarded chemicals that are harmful to human health or the environment.**
 - The labels must identify the contents of the waste containers, and include the originating company's name, address and telephone number.
- **An EPA "waste identification number" must be obtained for each discarded substance.**
 - These are assigned by the EPA based on the types of materials in the container, the facility it is coming from and the date it is being shipped.
 - This identifier must then be entered on the label, along with the waste's DOT Proper Shipping Name and its UN Number (if it has one).
- **To prevent confusion, all other labels must be removed from a container before a hazardous waste label is attached.**
- **If a container holds a mixture of two or more discarded chemicals, a workplace accumulation label must also be attached.**
 - These accumulation labels must list the individual materials that make up the waste.
- **If a container is leaking and has to be placed into an over-pack drum, a hazardous waste label must be placed on that drum, as well.**

- **Some states use their own hazardous waste labels instead of the federal labels.**
 - You may need to check with your state's Department of Environmental Resources to determine if you should use a state label.
- **You should never put any HAZMAT waste label on a container that does not hold waste.**
- **If you find a chemical container that is unlabeled, you must treat it as if it contains hazardous materials or waste until it is determined otherwise.**
 - This means that everyone should stay away from the container.
 - Your supervisor or Safety Manager should be informed immediately.

*** * * SUMMARY * * ***

- **Always look for warning labels on any containers you encounter.**
- **Read all labels carefully and pay attention to the information they contain.**
- **When a label recommends wearing personal protective equipment, do it!**
- **If you're not sure what a label means, ask your supervisor.**
- **If you are responsible for labeling containers, make sure that it's done correctly.**
- **Now that you understand what information hazardous labels contain, and how to read them, you can help to make sure that HAZMATs are handled safely in your workplace... every day!**