

HAZARD COMMUNICATION **IN INDUSTRIAL ENVIRONMENTS**

COURSE OUTLINE

- **The Hazard Communication Standard was established by the Occupational Safety and Health Administration (OSHA) in 1983.**
 - Also known as the "HAZCOM Standard", this regulation gave employees a legal "right-to-know" about any hazardous materials (HAZMATs) that they could encounter in their workplace.
- **It has been updated several times over the years to clear up areas of confusion, expand its protections and stay up to date with developments in the industry.**
 - The most recent update, in 2024, was the "Final Rule".
- **The Standard requires employers and HAZMAT suppliers to provide the people who handle hazardous chemicals with complete information on how to work with them safely.**
- **To do this, the Standard established three main sources of HAZMAT information...**
 - Safety Data Sheets.
 - HAZMAT container labels.
 - A company's written Hazard Communication Program.
- **Safety Data Sheets ("SDSs") are provided by HAZMAT suppliers for each of the hazardous materials they produce. They tell you the ...**
 - Material's names and quantities.
 - Company that manufactured it.
 - Hazards that are associated with it.
 - Precautions you should take when handling it.
- **SDS's should also discuss...**
 - The first aid that should be given to someone who has been exposed to the material.
 - How to respond to a spill.
- **Your facility keeps its SDSs in a central location.**
 - This way, you can refer to them whenever you need information on the HAZMATs you work with.

- **Both the information on SDSs as well as how it is presented are standardized according to the U.N.'s Globally Harmonized System of Classification and Labeling of Chemicals, or "GHS".**
- **The second source of information about a HAZMAT is its container label.**
 - Under HAZCOM, hazardous materials' labels must follow the GHS Standards.
- **A company's "in-house" generated HAZMAT labels do not have to follow the GHS format.**
 - But they do have to display all the information that the system requires.
- **The third source of information about hazardous chemicals is a company's Hazard Communication Program.**
 - This document is a "blueprint" for how a workplace complies with OSHA's Hazard Communication Standard.
- **A Hazard Communication Program will describe...**
 - What HAZMATs are present on-site.
 - Where they are located.
 - How they are labeled.
 - Where their SDSs are kept.
 - How employees will be trained in HAZMAT safety.
- **In spite of all the precautions that we take to handle hazardous materials safely, accidents can still happen.**
 - A HAZMAT "spill" or "unplanned release" could result in people being exposed to a very dangerous substance.
- **To understand how this could affect you, it helps to know a little more about how exposure "works".**
 - Any health effects that result from a HAZMAT spill or leak will depend largely on the "dose" and "duration" of the exposure.
- **"Dose" is the amount of the substance you're exposed to.**
 - As a rule of thumb, the larger the dose, the more serious your reaction will be.

- **"Duration" is the period of time that you're exposed to the substance.**
 - In most cases, a "short-term" exposure won't cause serious health problems, although some materials can cause sudden or "acute" effects, such as a rash or a burn.
 - On the other hand, long-term exposure to a hazardous material is likely to cause long-term health effects.
- **So how can you prevent exposure to hazardous materials?**
 - First, it's important to understand how a substance can get into your body.
- **These are called "routes of entry", and there are three of them.**
 - Skin contact.
 - Inhalation.
 - Ingestion.
- **While all materials can be absorbed through skin contact to some extent, liquids are absorbed most easily.**
- • **"Inhalation" occurs when you breathe in hazardous...**
 - Dusts.
 - Mists.
 - Fumes.
 - Vapors.
 - Gases.
- **"Ingestion" occurs when you swallow a substance. While it may seem unlikely to happen by mistake, remember...**
 - You could accidentally transfer a hazardous material that is on your hands, arms or face to your mouth.
 - You could eat food that has been contaminated as well.
- **If you are exposed to a HAZMAT, there are procedures that you can follow to reduce its severity and possibly prevent injury.**
 - If the material gets onto your skin or into your eyes, it should immediately be flushed with running water for at least fifteen minutes.
- **Many workplaces are equipped with safety showers and eye wash stations for just this purpose.**
 - So make sure you know where they are located in your facility and how to use them.

- **If you begin to cough or have difficulty breathing while working with a HAZMAT, get away from the material and into fresh air immediately.**
- **If you swallow a HAZMAT, it's important to consult the material's SDS before taking any action.**
 - Doing the wrong thing, even with the best of intentions, could make the situation much worse.
 - For instance, some materials' SDSs will tell you to "dilute" the HAZMAT by drinking a lot of water, but this may just intensify the effect of other materials.
- **In general, you should always check a HAZMAT's SDS before you start to work with it, to determine...**
 - What the material's hazards are.
 - How you should respond to an exposure.
 - Whether emergency medical assistance will be required if you are exposed.
- **To help you work with hazardous materials safely, OSHA's Hazard Communication Standard groups HAZMATs into categories.**
 - These are based on the types of hazards that are associated with the materials and the precautions that you should take when working with them.
- **Three of these groups that can be found in many workplaces are...**
 - Toxins.
 - Corrosives.
 - Irritants.
- **"Toxic substances" affect the tissues and organs of the body and disrupt important physical processes.**
 - People who are exposed to them can be injured, get sick... even die.
- **Toxic chemicals that are used in a number of industrial processes include...**
 - Formaldehyde.
 - Ethylbenzene.
 - Hydrogen sulfide.
- **Some of the pigments and solvents contained in the paints that are applied to manufactured goods can be toxic as well.**
 - So is the turpentine that's often used for cleanup afterward.

- **Respirable crystalline silica is a toxic material that is used for sandblasting and in making glass, ceramics and asphalt shingles.**
 - Silica dust can also be created when stone, cement or concrete is cut or polished during construction or remodeling activities.
- **Another toxin that you could encounter in your workplace is asbestos.**
 - It isn't used in many situations today.
 - But it was used in many older buildings before its hazards were fully understood.
 - It can be found in insulation, wallboard, pipe coverings and even some flooring products.
- **Two other groups of HAZMATs that you can find in many environments are...**
 - Corrosives.
 - Irritants.
- **"Corrosives" can cause serious, even permanent damage if they come into contact with your skin or your eyes.**
 - Some acids and bases that can be used in industrial processes are corrosive, including nitric and sulfuric acid, caustic potash and caustic soda.
 - Bleach (sodium hypochlorite) and the solvent toluene are corrosive as well.
- **Symptoms of exposure to corrosives can include...**
 - Redness and swelling of the skin.
 - Burns.
 - Blisters.
- **Irritants that you might encounter in your workplace include...**
 - Acetone, a thinner and solvent.
 - Ethylene oxide, a reagent used in some chemical processes.
 - Methylene chloride, also known as dichloromethane or "DCM", which is often used for cleaning, degreasing and stripping.
- **Exposure to any of these types of irritants can cause temporary inflammation of the skin, as well as swelling at the point of contact.**

- **Some substances can be especially hazardous because the first symptoms of exposure might not appear until long after the exposure occurs.**
 - By that time the damage has already been done.
 - Carcinogens and radioactive materials both fall into that category.
- **"Carcinogens" are substances that are known or thought to cause cancer. Industrial carcinogens can include...**
 - Ethylene oxide.
 - Methylene chloride.
 - Dichloromethane (DCM).
 - These are also irritants, which can sometimes provide an "early warning" of exposure.
- **Used in sandblasting and the manufacture of certain masonry products, respirable crystalline silica is another common carcinogen, which can also be toxic.**
 - This hazardous silica dust can also be created by cutting, grinding or polishing materials such as stone, concrete or cement during manufacturing operations, or when construction or remodeling activities are taking place.
- **The asbestos that was used in the construction of many older buildings is also a carcinogen as well as a toxin.**
- **Radioactive materials are another group of substances that can cause serious health problems.**
 - They emit rays and particles that can damage the cells and tissues of living things, which can result in cancer.
- **These substances may seem exotic, but they are used in some industrial settings.**
 - For example, industrial radiography is a process that uses X-rays and gamma rays to locate flaws in some manufactured materials.
 - And Iridium-192 and cobalt-60 are two radioactive substances that are often used to generate these rays.
- **The presence of radioactive materials is unusual in most facilities.**
 - But if they do exist where you work OSHA's HAZCOM Standard requires your company's Hazard Communication Program to provide you with complete information on how to handle them safely.

- **Many of the substances that are covered by OSHA's Hazard Communication Standard are hazardous because they can injure or cause illness in people who are exposed to them directly.**
 - But with flammables, combustibles and explosives the danger chiefly lies in their potential “secondary” effects... fires and explosions.
- **Flammables and combustibles are both materials that can burn.**
 - What makes them different from each other is their flashpoint, the temperature at which a substance releases vapors that can ignite.
- **“Flammables”, like gasoline, have a flashpoint of less than 100 degrees Fahrenheit.**
- **“Combustibles”, like kerosene, have a flashpoint between 100 and 200 degrees Fahrenheit.**
 - In general, combustibles are safer than flammables because they normally have to be heated up before they can burn.
- **Industrial chemicals such as formaldehyde, ethylbenzene, ethylene oxide and hydrogen sulfide are all flammable.**
 - So are solvents such as toluene and turpentine, and gases such as hydrogen, propane and acetylene.
- **Combustibles such as fuel oil, grease and other petroleum products can often be encountered in many work environments as well.**
 - Many paints, adhesives, waxes and polishes can contain combustible ingredients too.
- **“Flammable gases”, such as hydrogen, propane, and acetylene come with their own unique sets of hazards.**
 - They are easily ignited under normal conditions and can cause explosions.
 - Even if they don’t catch fire, like many gases they can drive oxygen out of confined spaces, making it difficult to breathe.
- **Explosives are another group of HAZMATs that presents an imminent danger.**
 - OSHA describes them as any “chemical compound, mixture or device that is primarily intended to function by exploding.”

- **Types of explosives can include...**
 - Dynamite.
 - Pellet Powders.
 - Blasting caps.
 - Fuse lighters.
- **Explosives release gas, pressure and heat.**
 - This typically occurs when they are exposed to shock, pressure or high temperatures.
 - So it's important to know when the materials you're dealing with are sensitive to certain conditions, as well as know how to keep them contained.
- **You should also make sure that you understand how to properly handle and store any explosives that you will be working with before you use them.**
 - For example, picric acid is a chemical sometimes used in the production of electric batteries and is considered a dangerous explosive when it's dry.
 - So you need to store it wet.
 - You should also keep it in a cool, dry and well-ventilated area, away from any sources of heat, as well.
- **When discussing fire and explosion hazards, it's also important to mention "oxidizers".**
 - Unlike flammables and combustibles, oxidizers don't really burn.
- **But they do make it easier for other things to burn. Common oxidizers include...**
 - Nitric acid.
 - Perchloric acid.
 - Hydrogen peroxide.
- **Materials like these will also make fires burn more intensely and can even cause some materials to ignite spontaneously.**
- **OSHA's Hazard Communication Standard and its "Final Rule" update spell out the...**
 - Information you are entitled to about the precautions that you should take to handle hazardous materials safely.
 - What you may need to do to understand that information.

- **In many cases, this will involve...**
 - Wearing some type of personal protective equipment ("PPE").
 - Making sure that any hazardous materials in your facility are stored properly.
- **What PPE you should wear depends on...**
 - The material that you're working with.
 - The likely routes of entry that it can take into your body.
- **Before handling any HAZMAT, you should check its SDS or your company's written Hazard Communication Program.**
 - To find out what type of protective equipment, if any, you should put on to work with it.
- **You generally don't want to get any hazardous material on you.**
 - So some type of PPE is usually required to prevent a HAZMAT from coming into contact with your skin.
 - Depending on the material that you're handling, this could range from gloves to an apron or even a full body "chem suit".
- **Since our eyes are particularly vulnerable to exposure from chemical splashes, eye protection should always be worn when handling liquid HAZMATs.**
 - Remember, safety glasses cannot adequately guard against splashes.
- **Instead, you should wear "goggles".**
 - They create a tight seal against your face that helps to keep hazardous liquids out.
 - For especially hazardous chemicals you may need to wear a face-shield over your goggles as well.
- **When you're working with hazardous gases and other HAZMATs that give off fumes, vapors or dusts, the primary route of entry will be inhalation.**
 - That is breathing the material into your lungs.
 - In these situations, you should wear a respirator.
- **There are several types of respirators and different "cartridges" that can be used with them as well.**
 - Check the chemical's SDS to find the right respirator for the job that you're doing.

- **How a HAZMAT is stored is also very important.**
 - First, you need to pay attention to the conditions in the storage area itself.
 - If they are not set up for the chemical you are using it can lead to spills, exposures and possibly much worse.
- **Some materials, such as combustibles and flammables are sensitive to temperature.**
 - So if they are stored where it's hot, they could catch fire or even explode.
- **Flammables or combustibles should also be stored separately from oxidizers, which can make it easier for these materials to ignite and make fires burn more intensely.**
- **Compressed gas cylinders and materials that can emit hazardous vapors or fumes should be stored in areas that are...**
 - Well-ventilated.
 - Away from excessive heat, which can cause the cylinders to pop their valves or even burst.
- **Some HAZMATs can even react with water, others are sensitive to light, others to shock.**
 - So if you ever have questions about how to store a HAZMAT safely, consult its Safety Data Sheet and your company's written Hazard Communication Program.
- **When you're handling hazardous materials, using the appropriate PPE as well as following safe work practices can go a long way in preventing problems.**
 - But if things do go wrong, it's important to be prepared for them.
- **First and foremost, you should report any signs of an incident to your company's Security Department or Crisis Management Team, who will make sure that...**
 - Emergency response personnel are notified.
 - The area around the spill is evacuated if necessary.
 - Anyone who has been exposed to the substance or otherwise injured is given first aid.
- **Different materials can require different types of emergency procedures and precautions.**
 - So it's very important to identify what material has been released as soon as possible.

- **It's also important to contain the spill and minimize contamination of the area.**
 - This can involve placing absorbent "socks" or flexible barriers of urethane or PVC around the spill.
- **HAZMATs should always be prevented from escaping into storm drains or sewers.**
 - This can result in the material not only contaminating the surrounding area but being carried into the local watershed as well.
- **Once a spill has been contained, the material will usually be soaked up using...**
 - "Sorbents".
 - "Blankets"
 - These help neutralize the material.
- **But some substances can require special cleanup precautions.**
 - For example, to prevent a fire, only non-sparking tools should be used when cleaning up substances that are flammable.
- **Arrangements also have to be made to dispose of any cleanup residue properly.**
 - Remember, hazardous chemicals are classified as "regulated waste".
 - So they must be removed by licensed waste-handling companies for special processing and disposal.

*** * * SUMMARY * * ***

- **OSHA's HAZCOM Standard discusses what employees have the “right-to-know” about hazardous materials they can encounter in their workplace and how to work with them safely.**
- **OSHA’s 2024 addition of the “Final Rule” to the Standard gives you the “right-to-better-understand” the hazardous materials that you could encounter, and what your rights to protection are.**
- **Every workplace with hazardous materials must have a Hazard Communication Program in place that provides employees with information about working with the hazardous substances in their facilities.**
- **One thing that HAZCOM programs discuss is the Personal Protective Equipment that workers should wear when they are handling or working near hazardous materials.**
- **It is also important for employees to know the proper storage practices and emergency response procedures for the HAZMATs they can encounter in their environment.**
- **Safety Data Sheets and container labels are both vital sources of information about the chemicals that you work with.**
- **When you know about the hazardous substances that you can encounter in your workplace and understand the correct, and safe, ways to handle them, you can help ensure that you, your coworkers and the surrounding community are kept safe from HAZMATs... every day!**