

PERSONAL PROTECTIVE EQUIPMENT

COURSE OUTLINE

- **Most jobs are impossible without the proper tools.**
 - A carpenter can't drive nails with his bare hands.
 - A groundskeeper can't cut a lawn with a pair of scissors.
 - And you can't work with hazardous materials in your street clothes.
 - You need personal protective equipment to stay safe.
- **"Personal protective equipment" (PPE) is a blanket term for any item you wear that protects you from:**
 - Contamination by hazardous materials.
 - Physical injuries.
- **This includes:**
 - Chemical protective clothing (CPC).
 - Respirators.
 - Hard hats.
 - Face shields.
 - Work boots.
- **OSHA's HAZWOPER regulation groups PPE into four categories... Levels A, B, C and D.**
 - Level A PPE is used where you face the greatest dangers.
 - Level D PPE is for areas that are relatively safe.
- **Level A PPE gives you the greatest level of skin, respiratory and eye protection. It is used:**
 - In places where uncovered skin is at the mercy of caustic or toxic fumes and liquids.
 - Where breathing the air might kill you.
- **In toxic environments, respirators are highly important.**
 - Level A respirators must have a full facepiece to protect your eyes, as well as your mouth, nose and lungs.

- **These respirators must also provide a "positive pressure" supply of pure air.**
 - "Positive pressure" means that whether you are breathing in, or out, the respirator is always pushing fresh air into your facepiece.
 - This positive pressure air flow prevents any contaminated air from seeping in, by keeping the air that moves through your respirator in constant circulation.
- **There are two types of positive pressure air-supplying respirators:**
 - Self-contained breathing apparatus (SCBAs).
 - Supplied-air respirators (SARs).
- **SCBAs use a portable air tank, which is strapped onto your back.**
- **SARs supply air by means of a long hose, from a source located some distance away.**
- **Each type of respirator has its own advantages and disadvantages. For example:**
 - It is easier for you to move around with an SCBA tank on your back than it is when you are trailing a long SAR hose behind you.
 - The weakness of an SCBA is that your air supply is restricted to the amount that you can carry with you.
- **SARs restrict your movements more than SCBAs.**
 - But they free you from having to lug around a cumbersome air tank.
 - Since an assistant can switch your air tanks while you work, you can wear a SAR for a much longer time than you can an SCBA.
- **Level A PPE also provides the highest degree of protection for your skin.**
 - That is why it includes totally-encapsulating chemical protective clothing ("TECPC suits").
 - These suits provide the maximum possible protection against contamination by keeping you isolated from the outside air.
 - They cover you from head to toe and provide an airtight seal against gases and liquids.

- **For best results, a totally-encapsulating suit must be used with chemical resistant outer and inner gloves.**
 - Chemical-resistant boots with steel toes and shanks are also a necessity.
 - This is because your hands and feet are the parts of your body most likely to come into contact with contaminated surfaces.
 - You may have to touch contaminated objects by hand.
 - You may be walking on ground that might contain hazardous materials.
- **While Level A PPE is used wherever your respiratory system or skin might suffer immediate, irreversible harm, you would wear Level B PPE where skin hazards are not as severe.**
 - As with Level A, Level B includes the air-supplying respirators SCBAs or SARs.
- **But unlike Level A, Level B does not include totally-encapsulating suits.**
 - The main function of Level B chemical protective clothing is to protect you from skin irritation and splashes... not lethal doses of gases or vapors.
- **Specifically, Level B CPC consists of:**
 - A one or two-piece chemical splash suit with a hood.
 - Chemical resistant outer and inner gloves.
 - Chemical resistant boots with steel toes and shanks.
- **Levels A and B PPE allow you to work in places where the air is dangerous to breathe.**
 - By contrast, Level C PPE is used where you can breathe the air... provided you have a little help.
- **Level C equipment is used when you know:**
 - What kinds of airborne contaminants are on site.
 - That the contaminants are not "immediately dangerous to life or health" (IDLH).
 - How much there is of each contaminant.
 - That the contaminants do not exist in concentrations above your respirator's ability to filter them out.
- **The major difference between Level C and the higher levels of PPE involves the use of air-purifying respirators (APRs)... rather than air-supplying respirators.**
 - APRs filter out contaminants before you can inhale them.
 - This type of respirator does not have its own air supply.

- **Air-supplying respirators keep air constantly moving, which creates positive pressure.**
 - By contrast, the power of your own breathing is what moves air through an air-purifying respirator.
 - As a result, the pressure inside of your facepiece is less than that of the outside air.
 - This is called "negative pressure."
- **An air-purifying respirator should never be used in any environment where an air-supplying respirator is required.**
 - The filters in the APR could be overwhelmed by the contaminate levels in the air.
 - Not having a tank of clean pure air when you need one can be fatal.
- **While Level A, B, and C PPE environments require some sort of respiratory protection, Level D is only used in areas where the air is safe to breathe.**
 - Level D PPE should never be used on any site where respiratory or skin hazards exist.
 - This level protects you from "nuisance contamination" only, such as materials that might stain your clothes.
- **Typically, Level D PPE includes:**
 - Coveralls.
 - Chemical-resistant boots or shoes, with steel toes and shanks.
 - Safety glasses or chemical splash goggles.
 - Work gloves.
- **Optional equipment for use with all levels of PPE includes:**
 - Coveralls.
 - A hard hat.
 - Long underwear (because it absorbs perspiration and helps to keep you cool).
- **No matter where you work, or what you do, one of the four levels of PPE will be suitable for your job.**
 - For more information, consult your supervisor.
- **While it would be impossible to work around hazardous materials without personal protective equipment, PPE can also cause its own problems.**

- **One of these is "heat stress."**
 - This occurs when PPE interferes with your body's ability to cool itself.
 - When you are hot, you sweat.
 - Normally, your sweat will evaporate.
 - This is what cools you down.
- **But when you are sealed up in chemical protective clothing, your sweat can't evaporate.**
 - The longer your sweat is prevented from evaporating, the higher your body temperature will rise.
 - Eventually you will develop heat stress.
 - Heat stress causes disabilities that range from mild to fatal.
- **The least dangerous of these is "heat rash", also known as "prickly heat".**
 - This is an inflammation that becomes worse as the temperature around you gets higher.
- **Sometimes, heat stress takes the form of painful spasms in your arms, legs or abdomen.**
 - These are "heat cramps."
- **"Heat exhaustion" is a more dangerous condition, and is caused by overexerting yourself in a hot environment.**
 - You sweat profusely and your skin becomes cool and moist.
 - If left untreated, heat exhaustion can lead to the worst kind of heat stress... "heat stroke."
- **Heat stroke occurs when the body can no longer cool itself. Left untreated, heat stroke can kill. symptoms include:**
 - Dizziness.
 - Nausea.
 - Severe headache.
 - Hot or dry skin.
 - A body temperature of 106 degrees or higher.
- **Of course, the best way to "treat" heat stress is to prevent it from happening in the first place. Your employer can help by:**
 - Alternating your work and rest periods.
 - Allowing you to do your work during cooler times of the day.

- **You can help yourself by drinking lots of water or special beverages which replace the fluids and electrolytes that you sweat away.**
 - Electrolytes are chemicals that help your nerves to conduct electrical impulses.
 - Losing electrolytes through perspiration can cause a number of serious health problems.
- **Check the safety procedures for your site to learn more about how to avoid heat stress when you are wearing chemical protective clothing or other PPE.**
- **Because it is often heavy and cumbersome, chemical protective clothing can cause other problems as well.**
 - Most CPC can actually decrease your ability to grasp and handle things.
 - It can also decrease your freedom of movement.
- **Wearing CPC can also make it more difficult for you to see and hear what is around you.**
 - For example, when you are wearing a totally-encapsulating chemical protective suit, you see the world through two sheets of plastic... the facepieces of your respirator and the suit itself.
 - Both of these facepieces can easily get fogged or scratched.
- **Your ears are also covered by both your inner and outer suits.**
 - Since we rely on our eyes and ears to provide us with the information that we need to keep us out of danger, wearing CPC can increase the potential for some types of accidents.
- **To cut down on your chances of having an accident, you must to be fully trained in how to use your PPE, and be comfortable wearing it.**
- **Alternating work and rest periods can help you to stay safe as well.**
 - This keeps you from becoming fatigued.
 - The less fatigued you are, the less likely you are to be adversely affected by the bulk of your PPE.
- **So whenever you wear personal protective equipment:**
 - Always make sure that you have the proper training.
 - Take time to get comfortable with your PPE.
 - Don't work for an extended period without a break.

- **When combined with your mandatory medical surveillance examinations, these measures will ensure that you stay healthy on the job for a long time to come.**

*** * *SUMMARY* * ***

- **There is a wide range of personal protective equipment available to help you to stay safe when working with hazardous chemicals:**
 - Chemical protective clothing.
 - Respirators.
 - Hard hats.
 - Work boots.
- **PPE is grouped into four levels... "A" through "D"... based upon the degree of protection provided.**
 - Level A provides the most protection, Level D the least.
- **Make sure that you are using the right level of PPE for the job that you are doing.**
- **Be mindful of the problems that PPE can cause, such as:**
 - Restricted freedom of movement.
 - Heat stress
 - Difficulties in seeing and hearing what is going on around you.
- **Make sure that you have received all of the necessary training so that you know exactly how to work with PPE safely.**
- **Practice wearing PPE that is bulky or cumbersome, so that you get used to it.**
- **Avoid heat stress by drinking plenty of fluids, and by alternating work and rest periods whenever possible.**
- **For a carpenter or a groundskeeper, not having the right tools can be inefficient.**
 - But in your job, not having the tools you need can be a matter of life and death.
- **So play it safe. Find out what PPE you need for the job... learn everything that you can about it... and use it!**