

RESPIRATORY PROTECTION

COURSE OUTLINE

- **While HAZWOPER covers a lot of ground, one of the most important messages that it has for us is that you are only as safe as the air you breathe!**
 - Most of us don't think twice about breathing... but it's the last thing that you can take for granted when you work with hazardous substances.
- **Contaminated air can:**
 - Burn your throat and lungs.
 - Damage your brain, liver, kidneys or other organs.
 - Even smother you to death.
- **OSHA's HAZWOPER Standard requires workers to use proper respiratory protection to prevent tragedies like these.**
- **How can you know what respiratory hazards you'll face where you work?**
 - Answering this can be difficult because hazardous materials come in many forms and some of them cause health problems that are not immediately obvious.
 - To detect dangerous airborne contaminants, your safety department will run various tests on your work area.
- **If hazardous conditions are found, your company may be able to do several things to address them, such as:**
 - Installing processing systems to filter the air.
 - Setting up emergency respirator stations to protect workers if an accident releases pollutants into the atmosphere.
- **Engineering controls, like pressurized cabs, can also often be used to keep employees isolated from airborne contaminants.**
- **Environmental controls can also reduce airborne contaminants.**
 - For instance, spraying water on dry, dusty surfaces will limit the number of particles that float through the air.
 - But even with defenses like these in place, you and your coworkers may need respirators to work safely.

- **Wearing a respirator is such a critical safety issue that you must be fully trained and authorized by your company before you are allowed to use one.**
 - In fact, if you suffer from a heart condition or asthma, you should not work in areas where respirators are necessary, unless you have proper medical clearance.
- **Once a licensed healthcare professional clears you for respirator use, you will need to select one that is right for the work you will be doing. Respirators are available in three basic types:**
 - Ones that filter the air you breathe.
 - Those that purify air through chemical means.
 - Ones that provide their own sources of clean, breathable air.
- **OSHA's "Assigned Protection Factors" (APFs) will help your employer determine what respirator should be used in your work environment.**
 - APFs indicate how much protection various types of respirators provide.
 - In most situations, an air-filtering respirator is what will be called for.
- **In areas where low levels of dust are the primary respiratory problem, a disposable mask is usually the way to go.**
 - Here, fibers in the mask trap and hold particles.
 - To get a proper fit, adjust the metal strip to conform with the bridge of your nose.
 - Make sure the straps are not tangled, and that they are placed correctly around your head... one below your ears, the other above them (this creates an even tension on the mask, and provides the best seal).
 - When your mask becomes clogged with dust, throw it away and get a new one.
- **In areas where hazardous chemicals are present, more protection is required.**
 - In many situations, air-filtering respirators will be necessary.
- **The National Institute for Occupational Safety and Health (NIOSH) has created a classification system for respirator filters that helps you to determine which type is best for your situation.**

- **NIOSH designates three filter classes, based on whether there are oil-aerosols present on the work site.**
 - Oil-aerosols can be particularly damaging to respirators, because it can easily clog a filter and not let air through.
 - If the material in the air does contain oil-aerosols, you must use a filter that is coded P, for "oil-proof", or R, for "oil-resistant".
 - If no oil-aerosols are present you can use an N-coded filter for "not oil-proof".
- **Whatever type of filter you are using, make sure that you follow the manufacturer's recommendations for the length of time you are permitted to breathe through the filter, and replace it with a fresh one as needed.**
- **After your employer has determined whether you should use P, R or N-series filters, you will need to decide what filter efficiency rating to use.**
 - Ratings following the P, R, and N designations on filters tell you their efficiency in percentages.
 - These are listed as 95, 99 and 99.7 % (which is referred to as 100%).
- **The higher the number, the greater the efficiency.**
 - However, it is more difficult to breathe through higher-efficiency filters, so don't use a filter that is more efficient than you need.
 - Talk to your supervisor to see which filter strength you should use.
- **If you are working in dusty areas, you may want to add a pre-filter, which traps particles before they clog the cartridge filter.**
- **In areas where hazards could also affect your eyes or skin, using a full-face mask respirator will increase your protection by covering your entire face.**
- **Sometimes, when the atmosphere is so contaminated that it cannot be filtered, air-purifying respirators don't offer enough protection.**
 - In these cases, respirators that supply their own air are necessary.
- **These come in two types:**
 - "Supplied air respirators" (SARs), which are attached to a compressor that provides air through a long hose.
 - "Self-contained breathing apparatuses" (SCBAs), which allow you to carry an air supply with you, in a tank on your back.
 - They each have advantages and disadvantages.

- **When you use an SAR, you are tethered to a compressor that supplies fresh, breathable air.**
 - This limits your mobility, but allows you to do jobs that take extended lengths of time... because the air an SAR supplies can be replenished indefinitely.
 - When your SAR air tank runs low, the attendant monitoring your compressor can switch you over to a full tank... with no interruption in the air flowing to you.
- **SARs are often used by support personnel at HAZMAT sites.**
 - If you were on a decontamination crew in a Contamination Reduction Corridor (CRC), you would probably use an SAR.
 - This is because you might be performing decontamination activities for over an hour at a time.
- **SCBAs, on the other hand, are used in places where you need a maximum amount of mobility... and have a job to do that will probably not take much longer than half an hour.**
 - An SCBA's air supply is limited to what you can carry with you.
 - SCBAs are often used by crews surveying HAZMAT sites for the first time.
 - When characterizing a site, you need the freedom to climb, crawl, and travel hundreds of feet, if necessary.
 - You would probably not remain in one area for very long, because you usually have a lot of ground to cover.
- **However, because of their weight (which can exceed 30 pounds) and the limited amount of air they allow you to carry, SCBAs can also be more difficult to use than SARs.**

- **Let's look at some of the problems that using SCBAs can cause.**
 - Many SCBAs only have 30 minutes of air (although newer designs allow for significantly longer periods).
 - More importantly, how long your tank will actually last depends upon your weight... and how hard you are working.
 - The more you weigh, the greater the energy you exert to do a physical task.
 - You will use your air supply more quickly than someone doing the same job who weighs less than you do.
 - Before you put on an SCBA, check your air supply gauges to make sure your tank is fully charged.
 - If your SCBA tank gets low, a warning alarm will sound, signaling you that it is time to leave the area.
 - Later, if you need to re-enter the work site, you will have to put on a fresh tank.
- **Running out of air is not the only difficulty that you might face with an SCBA.**
 - The weight and bulkiness of the equipment can also cause problems.
 - SCBAs can weigh 30 pounds or more.
 - Carrying this weight around can quickly tire you out.
 - In extreme situations, you might even be overwhelmed by fatigue.
 - To prevent overexertion, be sure that you have been properly trained and are fully acclimated to using an SCBA before you wear one in a "live" work situation.
- **After you know which type of respirator you should wear, you need to select one that is sized to fit your face.**
 - You will have at least three different sizes to choose from.
 - To get the right one, first make sure that the mask conforms comfortably to your face.
 - Your employer will show you how to correctly position the mask... and how to adjust the straps to maintain a good seal.
- **To prevent yourself from inhaling harmful gases, before you begin to work you must always make sure that there are no gaps between the respirator and your face.**
 - The first "check" is to look at yourself in the mirror with the respirator on.
 - Turn your face left and right, up and down, looking for areas where there is a space between the facepiece and your skin.
 - If you find a gap, make sure that you can eliminate it by adjusting the mask.
 - If this doesn't work, see your supervisor before you go to your work site.

- **But to really make sure that you have a good seal, OSHA requires that you undergo a formal fit test before you wear a respirator in your work environment.**
 - Fit-testing ensures that the respirator really does fit tightly against your face.
- **There are two types of fit tests:**
 - Qualitative.
 - Quantitative.
- **Qualitative testing uses scented chemicals or smoke.**
 - These are sprayed into the air to see if you can smell them through your respirator.
 - If you can't, then you probably have a good fit.
 - The problem with qualitative testing is that it is subjective, since it relies on each person's sense of smell.
- **In contrast, a quantitative testing machine can measure the exact amount of contaminant that could leak into your respirator.**
 - Quantitative testing is usually done by spraying particles through a respirator cartridge to measure the amount of material that the filter lets through.
- **Even after the initial fit tests have been done, you must still test your respirator's fit each time you wear it.**
 - This can be done by performing a user seal check.
 - Both positive and negative pressure are used to make sure the seal between your face and your respirator is intact.
- **For the positive test, place the palm of your hand over the exhalation valve of the respirator, then gently breathe out.**
 - If you feel a build-up of pressure within the mask... and see the sides of the facepiece bulge out slightly... then you have a good fit.
- **The negative test is performed by placing both hands over the inhalation valves and breathing in gently.**
 - The facepiece should collapse slightly against your nose.
 - Hold your breath for 10 seconds.
 - If the mask stays collapsed, you have a good fit.
- **It is crucial to perform a user seal check every time you wear your respirator... to insure that nothing has happened to change the way it seals to your face.**

- **There are several types of problems that could affect the seal.**
 - The most common is damage to the respirator's facepiece.
- **But even changes to your face can often affect how your respirator fits.**
 - For instance, facial hair (including long sideburns) can interfere with the mask's ability to form a good seal.
 - Dentures, scars and other facial irregularities can also jeopardize the integrity of facepiece seals.
- **Eyeglasses may cause problems, too.**
 - If you need to wear glasses while you work, you must get a NIOSH-approved respirator modification kit.
 - Talk to your supervisor about the use of eyewear with a respirator.
- **No matter what the problem, be sure to talk to your supervisor or your medical department if you have trouble getting a comfortable fit.... your safety depends on it.**
- **Proper cleaning and maintenance of your respirator are also essential to respiratory safety.**
- **Respirators worn by only one person should be cleaned only on an "as needed" basis.**
 - Shared respirators (those used by two or more people) should be cleaned and disinfected after each use.
- **Always check every part of your respirator before you use it, as well.**
 - Be on the lookout for any signs of wear or damage.
 - Look for holes where substances could leak in.
 - Make certain that all connections are tight.
 - Examine the straps, and the seal of the facepiece, to make sure that there has been no deterioration.
 - If you find any problems, report them to you supervisor immediately.
- **Make sure that the damaged respirator is put aside for repair in a place where no one will use it by accident.**
 - Also attach a "do not use" tag.
- **Above all, never use a defective respirator in a contaminated area!**
 - Your life could be in danger if you do.

- **Respiratory hazards exist all around us, so make sure you do your part to combat them!**

*** * *SUMMARY* * ***

- **Be aware of possible respiratory problems in your work environment.**
- **Read material safety data sheets, and be on the lookout for other indications of respiratory hazards.**
- **Before you use a respirator, get fit-tested.**
- **Always wear the proper type of respirator for the job you are doing... and follow the NIOSH regulations regarding filter use.**
- **It's easy to take breathing for granted. You've done it every moment since the day you were born.**
 - But, in the world of hazardous materials, the things we normally do become more complex... and sometimes, more dangerous.
 - Here, taking things for granted can be fatal.
- **By following established procedures... and always using the correct respirator for the job... you can do your job safely, and keep breathing for years to come!**