

RESPIRATORY PROTECTION **AND SAFETY**

COURSE OUTLINE

- **Each year, tens of thousands of U.S. workers are exposed to harmful airborne contaminants.**
 - Some of them can cause irritation or poisoning as soon as they are inhaled.
 - Some can affect your mind and coordination, which can cause other types of workplace accidents to occur.
 - Some can force the good air out of a space, creating an "oxygen-deficient atmosphere" that can cause a loss of consciousness, sometimes even death, in minutes.
- **Exposure to other airborne contaminants can eventually lead to lung damage, cancer or other diseases.**
- **To address these risks, the Occupational Safety and Health Administration (OSHA) created its Respiratory Protection Standard.**
- **The Standard requires your employer to determine what respiratory hazards, if any, you are exposed to as part of your job.**
- **Then your company must try to reduce or eliminate any risks the hazards may cause by:**
 - Physically isolating hazardous processes.
 - Ventilating the areas where respiratory hazards exist.
 - Replacing toxic substances with less harmful ones whenever possible.
- **But even when they're effective, these controls take time to set up, and sometimes they still can't reduce respiratory hazards to safe levels.**
 - That's when you need extra protection from airborne contaminants and should use a "respirator".
- **In the U.S. alone, an estimated 5 million employees wear respirators on the job.**

- **The OSHA Respiratory Standard requires your employer to develop a written Respiratory Protection Program that:**
 - Identifies the respiratory hazards in their facilities.
 - Describes just how respirators will be used to keep you safe on the job.
- **To help you become familiar with the respirators that are available to you, and how to use them, your Respiratory Protection Program will also provide you with training on:**
 - Why you need to wear respirators in your job.
 - How they work.
 - How to adjust a respirator properly.
 - How to inspect and maintain the equipment.
 - And more.
- **The program also establishes that the company will provide any respiratory protection that you need at no cost to you.**
- **While respirators do provide important protection from airborne contaminants, the equipment itself can place significant physical demands on those who wear it.**
 - Your Respiratory Protection Program also provides you with a free medical evaluation to determine whether you can work safely while wearing a respirator.
- **A respirator is defined as "any type of personal protective equipment designed to protect you from respiratory hazards". There are a couple of types to choose from.**
 - "Half-mask" respirators cover your mouth and nose.
 - "Full-face" types cover your face from your hairline to below your chin, so they protect your skin and eyes from contaminants that might irritate them.
- **Half-mask and full-face models are called "tight-fitting" respirators, because they depend on an airtight seal against your face to prevent airborne contaminants from getting to where you can breathe them.**

- **Respirators also fall into two categories based on the method they use to provide breathable air to the user:**
 - "Air-purifying respirators" (APRs) remove the contaminants from the air by using mechanical or chemical filters.
 - While "atmosphere-supplying respirators" (ASRs) provide clean air from a pressure tank or powered air compressor.
- **The simplest type of air-purifying respirator is the "disposable mask".**
 - These trap airborne particles in the fibers of a porous "facepiece" before they can get into your nose and lungs.
 - You usually secure a disposable mask to your face by stretching elastic loops or tying straps around the back of your head.
 - The upper edge of the facepiece also has a thin metal strip that you can bend over the bridge of your nose to get a closer fit.
- **Disposable masks are often worn where a lot of nuisance dust is generated, such as when doing woodworking or landscaping.**
 - When they get clogged with dust, you simply throw them away.
- **Disposable masks are marked with a code that indicates the "strength" or "efficiency" of their facepiece filters.**
 - For example, a mask that can filter out 95% of the particles in the air that passes through it will be marked "N95".
 - Filter efficiency can be especially important for the disposable masks that are used in healthcare environments, where they must trap different sized germs generated by specific diseases.
- **When there are a lot of contaminants in the air or they are particularly hazardous, disposable masks can't provide you with enough protection.**
 - These conditions require air-purifying respirators that use separate filters or filter cartridges to clean the air you inhale.
- **There are three types of these APRs.**
 - Particulate respirators.
 - Gas and vapor respirators.
 - "Combination" respirators.
- **Each one protects against specific types of airborne hazards.**

- **Half-mask "particulate respirators" are like heavy-duty versions of the disposable masks that we discussed earlier.**
 - They use removable filters to protect against dust, mists and fumes that are circulating in the air.
 - As these "particulates" build up in the filter, the mask becomes more difficult to breathe through.
 - That's when you should throw the removable filter away and install a fresh one.
- **As you might expect, "gas and vapor respirators" are designed to protect you from hazardous gases and vapors.**
 - The filters for these respirators contain chemicals called "sorbents" that absorb the hazardous gases and vapors out of the air.
 - Just as a particulate filter "fills up" with use, a chemical filter eventually "fills up" as well.
 - When it can no longer do its job, the cartridge must be replaced.
- **A filter's "service life", that is how long it will last in use, is marked on the cartridge.**
 - You should pay careful attention to this information.
 - Your protection from harmful gases and vapors lasts only as long as the sorbent does.
- **For protection from both particulates as well as gases and vapors, you should wear a "combination respirator".**
 - Its cartridges combine the capabilities of porous filters and chemical "sorbents" to remove both types of contaminants.
- **Knowing your "filter types" is very important.**
 - The type of filter that is used with an air-purifying respirator determines what substances it will protect you from.
 - There are many filter types to choose from, because each one is engineered to capture a specific contaminant, or "family" of contaminants.
- **When you wear an APR, you must make absolutely sure it is equipped with filter cartridges that will protect you from the specific hazards that you are exposed to.**

- **To make selecting the correct cartridge as easy as possible, all filters are color coded and marked with standardized labels.**
 - If you're ever in doubt about what cartridge to use in your APR ask your supervisor, before you enter a hazard zone.
 - Remember, using the incorrect filter in your respirator can be the same as wearing no filter at all.
- **As good as they are, APRs will not protect you in atmospheres that don't contain enough oxygen or are full of toxic gases.**
 - That's when you need an "atmosphere-supplying respirator", an ASR.
- **There are two basic types of ASRs:**
 - "Supplied-air respirators" (SARs).
 - "Self-contained breathing apparatus" (SCBAs).
- **While these abbreviations might be a little confusing, it's not complicated if you focus on how the equipment works.**
- **With a supplied-air respirator, fresh air is provided by means of a long hose or "air line", that is connected to pressurized gas cylinders or an air compressor that is typically located some distance away.**
 - This allows the wearer to work for extended periods of time in a hazardous environment.
 - But the long hoses of an SAR can limit a worker's mobility.
- **SARs are most often used in atmospheres that are not "immediately dangerous to life and health" and don't have the potential to require a quick evacuation.**
- **A self-contained breathing apparatus or SCBA, on the other hand, is used most often for brief tasks in atmospheres that either are or may be "immediately dangerous to life and health".**
 - This type of respirator carries fresh air in a portable air tank, which is strapped to the user's back.
- **While SCBA's have no long hoses to interfere with mobility they are bulky, and can be difficult and sometimes dangerous to use in confined spaces.**
 - The air supply is also limited to what you can carry on your back.

- **Some SCBAs only provide for 30 to 60 minutes of safe breathing.**
 - You should always check the gauges on the air tank of a self-contained breathing apparatus before you put it on.
 - Don't use it unless it's fully charged.
- **Wearing either type of atmosphere-supplying respirator while you're working can tire you out quickly, and even bring on heat exhaustion.**
 - If you begin to feel ill or overtired when wearing one, leave the hazard zone immediately, so that you can remove the respirator and give your body a rest.
- **If an air-purifying or air-supplying respirator doesn't create an airtight seal against your face, it can let airborne contaminants inside where you can inhale them.**
 - This means that wearing a respirator that doesn't fit can injure or even kill you.
- **Everyone's face is different, and various types and brands of respirators fit differently as well.**
 - Before you wear a respirator into a hazard zone, it must be "fit tested" to ensure there aren't any leaks.
- **There are two types of fit testing.**
- **"Qualitative testing" releases scented chemicals or smoke in the air around your face while you're wearing your respirator.**
 - If you can't smell them, you probably have a good fit.
 - Since it relies on your sense of smell, qualitative testing can be inexact.
- **"Quantitative testing" is more accurate.**
 - It uses machines to measure whether any contaminants can leak into your respirator.
- **Initial fit-testing will ensure that your respirator fits correctly, but to work safely in hazardous atmospheres you need to know how to check that fit yourself, every time you put your respirator on.**

- **You do that by performing what's called a "user seal check". First, check the seal using positive pressure.**
 - Place the palm of your hand over the exhalation valve of the respirator and gently breathe out.
 - If you feel a buildup of pressure within the mask, and see the sides of the facepiece bulge out slightly, you have a good seal.
- **Next, check the seal using negative pressure:**
 - Place both hands over the inhalation valves and breathe in gently.
 - The facepiece should collapse slightly against your nose.
 - Now hold your breath for ten seconds.
 - If the mask stays collapsed, you have a safe, airtight seal.
- **By performing a user seal check every time you put on your mask, you can find problems before they hurt you.**
- **There are several things other than the shape of your face that can affect a respirator's seal.**
 - Leaks can also result from a damaged mask, or faulty adjustment.
- **The "characteristics" of your face affect the seal as well.**
 - Facial hair, such as a beard or long sideburns, can prevent a tight seal.
 - So can dentures, scars and other physical features.
- **The OSHA Standard does not allow tight-fitting respirators to be worn by employees whose facial characteristics will interfere with a safe face-to-facepiece seal.**
- **Glasses can interfere with the fit of a respirator too.**
 - If you wear glasses and use a full-face respirator, an approved eyeglass modification kit should be installed in the mask to ensure it can make an airtight seal.
- **If you have questions or concerns about the fit of your respirator, speak to your supervisor.**
- **Until you get used to wearing it, your respirator may feel bulky and awkward.**
 - You can become accustomed to it more quickly if you "practice" inspecting and wearing the respirator for a few minutes every day.

- **Learn to check your respirator over thoroughly every time you use it, before you put it on.**
 - Test the valve assembly, filters, air hoses and other fittings for loose connections.
 - Check the facepiece, headband and all flexible materials for holes, cracks or tears as well.
- **If you find problems, get them fixed or have the equipment replaced, but never wear a damaged respirator.**
- **Another thing that you will receive training on is how to adjust your respirator correctly.**
 - The straps do not have to be uncomfortably tight to keep the mask in place or to create a good seal.
 - You can perform a user seal check to make sure the mask is functioning as it should.
- **After you've practiced with your respirator for a while, you can move on to the real thing.**
 - When you're inside a hazardous environment, be sure to follow safe work practices.
- **Do not pull your respirator aside to speak to a coworker or otherwise alter or reposition it.**
 - That will just expose you to the respiratory hazards that the mask is intended to protect you from.
 - So leave the hazard zone first if you need to make adjustments to your respirator, or want to speak to someone "face-to-face".
- **Knowing how to use a respirator is only part of the respiratory safety process.**
- **If you don't take care of your respirator, it can't take care of you.**
 - When a respirator fails for any reason, it no longer protects you from the airborne contaminants it was designed to keep out.
 - Exposure can mean illness, injury, even death.
- **You need to take good care of your equipment by maintaining it regularly.**
 - Respirators that are used by two or more people for training purposes or for emergencies should be cleaned after every use.
 - Those that are worn by only one person have to be cleaned "as needed".

- **OSHA's approved cleaning procedure begins by taking the mask apart.**
 - Wash the parts in warm water, using the detergent that is recommended by the mask's manufacturer.
 - This is also a good time to check the parts for signs of wear or damage.
- **To remove dirt or other buildup, use a stiff plastic or natural bristle brush.**
 - Don't use a wire brush, it could seriously damage the respirator.
- **After soaping and scrubbing, rinse all the parts with warm, running water.**
 - Be sure to remove all detergent residue.
- **Dry the parts by hand, with a lint-free cloth and reassemble the respirator.**
 - Then put it on and perform a user seal check.
- **If the mask functions correctly, take it off, put it in its case and store it in a clean, dry place, out of direct sunlight.**
- **Respirators that are used to protect against lead and asbestos require specialized cleanup procedures.**
 - Ask your supervisor about them if you are working with these contaminants.

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- **OSHA created its Respiratory Protection Standard to protect employees from exposure to harmful airborne contaminants in the workplace.**
- **The Standard requires employers to identify any respiratory hazards in their facilities, and take steps to reduce or eliminate them.**
- **When airborne contaminants cannot be reduced to safe levels, employers must develop a written Respiratory Protection Program.**
- **The program ensures that:**
 - You are provided with a respirator that is appropriate for the airborne contaminants associated with your job.
 - You receive training on how to use and maintain your respirator so it will give you the most complete protection.
- **The Respiratory Protection Program also includes free medical examinations to ensure that you can wear a respirator safely.**
- **Respiratory hazards can be difficult to "see"... but now that you understand the policies and procedures that have been put in place, and the equipment that is available to you, you can protect yourself and "breathe easy" every day!**