



NCPWB Toolbox Safety Talks



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NCPWB Toolbox Safety Talks

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Training Documentation for Safety Talk # _____

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Talk # 1 – Welding Hazards

- There are a significant number of occupational injuries from welding operations each year.
- Hazards from welding include electrocutions, eye damage, burns, toxic inhalants, and fire. If you are welding or working around welding operations be aware of these hazards.
- One of the worst hazards from welding is the potential for electrocution. Be sure to insulate yourself from the work, the electrode, and the electrode holder. Avoid becoming grounded.
- To protect your eyes from ultraviolet and infrared radiation burns, put on proper eye protection before looking at an arc even for an instant.
- Different shades of filter plates can be attached to welding helmets. The shade needed depends on the type of welding, size of the electrode, and the amount of electrical current. Check with your electrode supplier for the appropriate shade needed. If you are in doubt, use a #10 shade.
- If possible, isolate your work area to keep other workers from looking at the arc. Use a flame resistant welding screen whenever possible.
- Wear flash goggles with side shields under your helmet to protect your eyes from slag fragments and other flying particles.
- Wear clothing that will protect your body from hot sparks such as flame resistant coveralls, welding gloves, flame resistant leggings, and leather high top boots. Choose clothes that don't have pockets or cuffs in the legs or sleeves.
- Make sure your work area is well ventilated to protect you from inhalation hazards. If your work area can't be properly ventilated, you may need respiratory protection. Check with your supervisor before proceeding.
- Keep at least one Class ABC fire extinguisher readily accessible.
- Stop work at least $\frac{1}{2}$ hour before leaving the site and check the welding area for smoldering materials.



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Talk # 2 – Hazards from Electric Arc Welding

- The biggest hazard in arc welding is not from heat, sparks, fumes or intense infrared radiation but from electrical current (electrocution).
- On most manual arc welding operations, the electric current ranges from 10 amps to 600 amps. Remember that it only takes 70 to 100 millamps to kill most people and 70 millamps is only a fraction of one single amp.
- Your best protection is to keep from becoming grounded.
- Make sure you are always insulated from the work itself because it is probably grounded. For example, if you are welding one pipe to another pipe that is already in place, the new pipe also becomes grounded. If you are not insulated from it you too will become grounded.
- Inspect the stinger leads for damage. There can be no damage in the first 10 feet of active stinger lead. Minimal lead damage elsewhere can be repaired by a qualified person with vulcanizing or heat shrinking kits.
- Always keep yourself insulated from the electrode and electrode holder, especially if you are wet from sweat or some other source. Use well insulated electrode holders and welding cables.
- Keep your clothes and hands as dry as possible. Use insulation between your body and the ground such as a welding mat, where possible.
- Cover or otherwise arrange the cables in a way that will prevent falling sparks from burning through the insulation.
- Avoid changing electrodes with bare hands or wet gloves.
- Ground the welding unit according to the National Fire Protection Association's National Electrical Code (NFPA 70).



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Talk # 3 – Shielded Metal Arc Welding Hazards

- There are several hazards associated with shielded metal arc welding, including radiation from the arc, molten metal, welding fumes, and electrical current.
- Wear approved flame resistant clothing and work boots. Shirts should have long sleeves and should not have pockets. Also, wear long pants without cuffs and use appropriate welding gloves.
- Make sure you have a welding helmet with the proper shade of lens and use a welding screen to shield the eyes of others. In general, recommended shades for lenses based on welding current are:
 - Shade #10 – 75 A to 200 A
 - Shade #12 – 200 A to 400 A and
 - Shade #14 – Over 400 A
- Always wear safety glasses under your welding helmet.
- Make sure you have plenty of ventilation in your work area. Point-of-operation ventilation is ideal, but local ventilation works well too.
- Clear the area of any flammable/combustible substances and materials.
- Make sure you have a fully charged, recently inspected Class ABC fire extinguisher in your immediate work area.
- Carefully inspect your welding leads each time before you start work. Look over the full length of the leads, checking the insulation for cuts, abrasions, or any other type of damage.
- Also, inspect the electrode holder. Make sure there is no visible damage and ensure that the jaws are properly insulated.
- If you find damage to any of the welding equipment, don't use it. Immediately follow your company's procedures for taking defective equipment out of service.



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Talk # 4 – Oxy-Fuel Welding/Cutting Flashback

- Flashback is extremely rapid burning in the torch, hose, and/or regulator of an oxy-fuel cutting/welding rig. If a flashback occurs, it could cause personal injury and equipment damage. Here are some things that you should know about flashbacks and flashback prevention:
- There are several causes of flashbacks, including loose connections, hose leaks, incorrect pressures, operator error, and gas starvation at the preheat flame.
 - Flashbacks usually start with a popping sound, which sometimes turns into a whistling sound if the gases are not shut off immediately. Flashbacks sometimes occur without warning.
 - When flashbacks start, the gases are burning inside the torch. If the gases aren't shut off immediately, the torch could melt or the flame could travel back beyond the mixer and cause an explosion in the hoses or regulators.
 - If you believe a flashback is occurring, shut off oxygen and fuel valves as quickly as you can. Then remove the hoses and have the torch and equipment inspected by someone qualified to do so.
 - The best way to prevent flashbacks is to use a torch equipped with a flashback arrestor. If your torch does not have an arrestor, you can easily attach one.
 - Flashback arrestors are designed to stop the flame from backing up into the system.
 - Check valves can also be installed to help with flashback protection, but should not be used as substitutes for flashback arrestors. Check valves allow gas to flow one way, so there won't be a reverse flow. However, some flashbacks occur so quickly that check valves can't stop them.
 - Always inspect the equipment before you start work. Don't use damaged or excessively worn parts.
 - Be sure not to exceed the recommended pressure settings.
 - Don't hold the torch tip too close to the work.



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Talk # 5 – Compressed Gas Cylinder Hazards

- Compressed gas cylinders present several potential hazards to welders. The main hazards are fire, explosion, and cylinders propelled by escaping gas when valves are broken (a cylinder can be propelled like a rocket).
- Whether you are using, transporting or storing cylinders, always keep them secured in their upright position with chains, strong wire, or straps.
- Keep them away from all sources of electricity, sparks, flames, and other sources of heat. Avoid subjecting them to heat over 125 degrees Fahrenheit. When they are not being used, always protect the valves by replacing the valve protection caps.
- Store oxygen cylinders separately from acetylene or other gas fuel cylinders. Separate them by at least 20 feet or a ½-hour rated noncombustible barrier at least 5 feet high.
- Never take cylinders into confined spaces.
- Inspect all cylinders, hoses, valves, and torches before using them. Take all defective parts out of service immediately and replace them with good ones. Clean out torch tips before use. Also, before connecting a regulator to a cylinder valve, clean out the valve by standing to one side and quickly open and close the valve.
- Inspect hoses and torch valves for leaks after opening the cylinder valve. If there are any leaks, turn the cylinder valves off immediately. Take the hoses and torch assembly out of service.
- Use only friction lighters to light torches. Never light a torch with a match, cigarette, or any other source.
- Before removing a regulator, close the cylinder valve and bleed the gas lines.
- Be sure to leave the wrench on the stem of the cylinder valve so it can be turned off quickly in an emergency.



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Talk # 6 – Hot Metal Hazards

- Welders are frequently exposed to hot metals. There are several hazards to be aware of while you are working.
- The main hazards are inhalation of fumes, skin burns, eye hazards, and fires. Welders are most frequently exposed when welding, cutting, and soldering.
- Protect yourself from exposure to harmful concentrations of metal fumes. Potentially harmful fumes include, but are not limited to hexavalent chromium, cadmium, nickel, zinc, and manganese.
- Overexposure to metal fumes can result in many kinds of health issues, depending on the type of fumes and the degree of overexposure. Examples of some of the potential health issues are kidney damage, reproductive defects, birth defects, and cancer.
- Make sure the area you are working in is well ventilated. If it is not, stop work and report the problem to your supervisor.
- Keep molten metal away from moisture and protect your skin by wearing fire resistant clothing.
- Always wear the proper eye protection. When working around molten metal, use flame resistant cup goggles and a face shield. If there is exposure to ultraviolet radiation, infrared radiation or visible glare, make sure you wear eye protection with appropriate shaded lenses. If you are not sure about what to wear, ask your supervisor before you start work.
- Be aware of the fire hazards when working around hot metals. Hot metals are an ignition source, so keep the area clear of combustible materials such as trash, grease, oily rags, etc.
- Keep hot metals away from gas cylinders and flammable and combustible liquids like gasoline or solvents.



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Talk # 7 – Shaded Lenses

- Shaded lenses are vital to welders because they filter out harmful ultraviolet and infrared radiation as well as visible glare.
- Shaded lenses are provided for welding helmets and certain types of safety goggles.
- Choosing the appropriate shade of lens or lenses is as important as choosing the right type of safety eyewear.
- Failure to use the appropriate lenses can result in inflammation of the cornea (welder's flash) or damage to the eyes' lenses and/or retinas.
- The American National Standards Institute (ANSI) has established a numbering system to help us identify the different shades of lenses and select the shade that is most appropriate for each specific task.
 - For torch soldering, use safety goggles with #2 shaded lenses.
 - For torch brazing, use safety goggles with #3 or #4 shaded lenses.
 - For cutting with oxy-acetylene, use safety goggles with #5 shaded lenses.
 - For electric arc welding, the shade of lens you need to attach to your welding helmet depends on the size of the electrode and the amount of electrical current being generated. Check with your supervisor to find out whether you need a #10, #12, or #14 shaded lens for each specific electric arc welding application.
 - For gas metal arc welding, the shade of the lens you will need to attach to your welding helmet depends only on the amount of arc current being generated. Check with your supervisor to find out whether you need a #11, #12, or #14 shaded lens for each specific gas metal arc welding application.



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Talk # 8 – Welding Radiation

- Electric arcs and gas flames from welding and cutting produce ultraviolet and infrared radiation. With repeated exposure, mechanical workers can become overexposed and suffer damage to their eyes and skin.
- Ultraviolet radiation can cause the equivalent of a sunburn to the surface of the eye. The injury is painful and disabling, but it is usually temporary.
- Ultraviolet radiation also can cause the equivalent of severe sunburn to exposed skin.
- Infrared radiation heats exposed skin tissue, but isn't harmful unless it's hot enough to cause a thermal burn.
- However, infrared radiation can cause permanent eye damage if the welder or others nearby stare directly into the arc without eye protection.
- Protect your skin by wearing long sleeve shirts and full-length pants made from a flame resistant material (no synthetic fabrics). Be sure that there are no pockets in the shirt or cuffs in the pants.
- Always use a welding hood with the appropriate shaded lens. You will need a #10, #12, or #14 shaded lens for electric arc welding depending on the size of the electrode and the amount of current being generated.
- For gas metal arc welding you will need a #11, #12, or #14 shaded lens depending on the amount of current being generated.
- Check with your supervisor before you start to weld to ensure that you have the appropriate shaded lens.
- Be sure to wear a pair of safety glasses or safety goggles under your welding hood.
- Never look at a welding arc, even for an instant, without proper eye protection.
- Use welding screens around your welding area to protect others who may look at the arc without protection.



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Talk # 9 – Jobsite Fire Watch

- Considering all of the hot work we do on a daily basis it's remarkable that there are not more jobsite fires. However, there are still too many jobsite fires each year. Some of them are caused, at least in part, by what we do for a living.
- There are several things you should always do to help prevent fires:
 - Maintaining good housekeeping practices in your work areas, and take steps to contain your welding sparks and other ignition sources such as sparks generated from grinding and pipe cutting.
 - The last line of defense against jobsite fires is fire watch.
 - Be sure to stop all hot work at least 30 minutes before leaving the jobsite.
 - If you are not the designated fire watch, find that person before you leave and let him know that you are finished for the day.
 - If you are the fire watch that day, check around the hot work areas for signs of fire such as smoke or smoldering materials.
 - Use the 30-minute period to finish other job tasks, clean up the area, and put tools and equipment away for the day.
 - Go back to the hot work areas at the end of the 30-minute period and check them again for signs of fire.
 - If the welding was done on an upper floor where sparks could drift to a lower level, make sure you check the lower floors for signs of fire too.
 - Pay special attention to areas where combustible materials such as paper, cardboard, wood scraps, and sawdust have accumulated.
 - Don't forget to look for fire signs in areas where grinding, pipe cutting, and other spark-generating tasks were performed that day.



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Talk # 10 – Fire Extinguishers

- Fire extinguishers are required on all job sites and are especially necessary in hot work areas for operations like welding and torch cutting.
- Not all fires and not all fire extinguishers are alike.
- Fire extinguishers are rated for use based on the class of fire they are designed to extinguish.
- The three basic types of fires that welders need to consider are classified as A, B, or C fires.
- Class A Fires – These fires are made up of ordinary combustible materials such as paper, rags, scrap lumber, etc. They require a cooling agent for extinguishment. The fire extinguishers recommended for Class A fires are water and soda-acid.
- Class B Fires – These fires are made up of flammable liquids, oils, and grease. They require smothering for effective extinguishment. The recommended fire extinguishers are carbon dioxide, dry chemical, and foam.
- Class C Fires – These fires are made up of electrical equipment. They require a non-conductive fire extinguishing agent. The recommended fire extinguishers are carbon dioxide and dry chemical.
- Look at the fire extinguishers on your jobsite to determine what class or classes of fires they are designed to extinguish. The class or classes of fires will be clearly marked on each extinguisher.
- The best fire extinguishers for the jobsite are the ones that will effectively extinguish all three of the basic classes of fires.
- If you use a fire extinguisher or see one with a gauge that indicates it isn't fully charged, let your supervisor know immediately.
- Extinguishers that have been used and those that are defective should be inspected and recharged or replaced right away.



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Talk # 11 – Safe Use of Grinders

- Several types of electric powered grinders such as angle grinders, straight grinders, tuck point grinders and sometimes bench grinders are used by welders for various applications.
- Each type of grinder has its own unique function, but the characteristics that make grinders potentially hazardous are the same.
- The grinders you will be using need to be properly grounded. Make sure the ground prong on the grinder is in place and in good condition, and that the power receptacle you will be using is properly wired.
- Inspect the rest of the grinder.
- Look for cuts or tears in the cord, cracks in the housing, chips in the grinding wheel, and missing or broken guards.
- If any part of the grinder is not in good condition, don't use it.
- When you have to replace the grinding wheel use only the proper size and type of replacement wheel.
- Ensure that the replacement wheel fits freely on the spindle and doesn't have to be forced on.
- Be sure not to over tighten the spindle nut, but be sure to snug it up enough to hold the wheel in place.
- Never use a grinder without a guard properly secured in place.
- The guard should cover the spindle end, nut, and flange projections.
- Make sure the work is properly secured before you start work on it. Use a vice or clamps to hold the work in place.
- Floor and bench-mount grinders should have protection hoods over the grinding wheels and work rests should be attached not more than $\frac{1}{8}$ of an inch from the grinding wheel.



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Talk # 12 – Portable Abrasive Grinding Wheels

- Welders use grinders often enough that it isn't hard to forget about the potential hazards that go along with using them.
- Abrasive wheels move at such a high rate of speed that they can remove flesh and launch potentially deadly wheel fragments when they break up.
- There are other hazards, too. Sparks are potential ignition sources and can cause eye injuries. Flying fragments or particles from a broken wheel can cause eye injuries as well.
- Before you start work, check the wheel to make sure it is properly and securely attached to the grinder.
- Make sure that the guard is in place and attached securely. It should cover at least half the grinding wheel.
- Don't use a grinder without a guard. Even though the abrasive wheel technology is better today than it was in the past, some wheels can still break. When they do, fragments can fly off the wheel at the speed of a bullet.
- Check to make sure that the size of the grinder wheel is compatible with the motor speed of the grinder. Doing so will prevent over-speed of the wheel, which is harmful to the grinder and could result in an injury.
- Make sure that there are no flammable materials around the area.
- Wear safety glasses and a face shield whenever you use a grinder.
- Make sure the grinder is running smoothly without vibration. If you sense a problem, take it out of service immediately and attach a "Danger—Do Not Use" tag to it so that no one else will use it. Ask your supervisor where to take it so that it can later be evaluated for replacement or repair.
- Keep a firm grip and apply pressure firmly, but don't apply so much pressure that the motor starts to lag and lower the RPM.
- It's best not to use the constant ON switch. That way if there is a problem, the wheel will slow to a stop as soon as you take your finger off the switch.



NCPWB Toolbox Safety Talks

Talk # 13 – Shielded Metal Arc Leads

- The current generated by shielded metal arc welding is the greatest hazard with this type of welding.
- Exposure to the current could lead to electric shock, severe burns, or electrocution. That's why welding leads must be in excellent condition before they can be used safely.
- Shielded metal arc welding machines usually produce 75A to more than 400A depending on the type of welding, but it only takes between 70A and 100 millamps to kill a human.
- Select high quality leads/electrodes. The electrodes should not heat up too quickly and should be properly insulated.
- Carefully inspect the leads each time before you use them. Look for any damage to the insulation such as burns from hot slag, cuts, abrasions or any other damage.
- There can be no damage anywhere in the first 10 feet of active stinger leads. However, a properly qualified person can repair damage anywhere other than the first 10 feet. Repairs must be made with the appropriate vulcanizing or heat shrinking equipment.
- Carefully inspect the electrode holders too. Make sure the jaws are properly insulated. Any uninsulated part of a jaw that contacts the work bench can cause an arc if the welding machine is running.
- If you find damage to the leads/electrode holders, don't use them. Immediately follow your company's procedures for taking defective equipment out of service.
- Make sure you keep yourself insulated from the electrode and the electrode holder, especially if you are wet.
- Remember not to change electrodes with your bare hands or wet gloves. You don't ever want to become the easiest path for electricity to get to ground.



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Talk # 14 – Grounding Welding Machines & Generators

- The use of welding machines and portable generators can be hazardous when they are not properly grounded.
- These machines, which are powered by gasoline or propane, generate a tremendous amount of electricity.
- The amount of current generated is much more than what's necessary to kill a human.
- Electricity always follows the path of least resistance to ground (earth).
- That path can be right through a human body, which can result in death or severe injuries including 3rd degree burns.
- When using welding machines or portable generators, be sure that they are properly grounded before you start the machine.
- Grounding involves running a ground wire from the machine to an appropriate grounded source, such as a grounding rod driven several feet into the ground.
- The ground wire can also be attached from the machine to the main steel structure of a building or a building's established electrical ground system.
- Become familiar with the manufacturer's recommendations for grounding each type of machine that you will use. Follow the manufacturer's recommendations carefully.
- If you're not sure what to do, check with your supervisor before you start work.
- Take the time to learn how to properly ground welding machines and portable generators.
- Implementing what you learn before you start the machine will help keep you from becoming electricity's easiest path to ground.



NCPWB Toolbox Safety Talks

Talk # 15 – Metals

- Metals in their natural state are not generally hazardous. However, in the mechanical industry we frequently change metals from their natural state when welding, cutting, soldering, or brazing.
- The most significant hazard is overexposure to metal fumes from inhalation. Here is what to watch out for whenever you work around metals:
 - Some of the more common and potentially hazardous metals that we could be exposed to include hexavalent chromium, zinc, manganese, and lead.
 - Welding and cutting stainless steel pipe may result in exposure to hexavalent chromium, which is carcinogenic in humans.
 - Welding and cutting on galvanized metal generates zinc fumes, which could result in metal fume fever.
 - Certain types of welding rods generate manganese fumes, which can affect the nervous system.
- Older pipes used in construction often contain lead. Some may be painted with a lead based paint. Hot work on these pipes can result in lead exposure because the fumes become airborne and can easily be inhaled. Overexposure to lead can result in lead poisoning.
- Before you start work, determine which metal or metals you'll be working with and whether there are hazards associated with those metals.
- Determine what you have to do to keep from becoming overexposed.
- Whenever you are welding, cutting, brazing, or soldering, make absolutely sure that the ventilation in your work area is adequate for the task.
- If the ventilation is poor, respiratory protection may be required.
- Check with your supervisor before using a respirator. There are specific respirator programs, training, selection, and fit test requirements that must be met before you use respiratory protection.



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Talk # 16 – Fumes

- Fumes are formed when a metal is heated above its boiling point and the vapors condense into fine particles.
- Welding fumes are lighter than air. They appear in the form of smoke and can be inhaled by welders if they do not take appropriate precautions.
- Some fumes are merely irritants, while others can cause more severe health problems.
- Examples of some fumes that welders have to be concerned about include hexavalent chromium, zinc (zinc fume fever), and manganese.
- Keep the work area as well ventilated as possible. Local exhaust systems will help reduce your exposure to fumes.
- When local exhaust systems are not available, keep doors and windows open and use large fans.
- Use point-of-operation ventilation systems whenever possible to suck up the fumes and trap the harmful particles at the source.
- When welding, keep your welding hood down and position your body, including your chin, so that the fumes cannot get up underneath the hood and into your breathing zone.
- If necessary, use a respirator, but be sure you are properly trained on respiratory protection before you proceed.
- Be sure not to use equipment powered by internal combustion engines inside buildings or in other enclosed work areas.
- Internal combustion engines generate fumes, which include carbon monoxide.



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Talk # 17 – Cr(VI)

- Cr(VI) (Chromium Six) is another name for hexavalent chromium, which is generated when steel that contains chromium is heated above its boiling point.
- We are most likely to be exposed to Cr(VI) when performing hot work on stainless steel.
- Cr(VI) is a known carcinogen.
- Overexposure to Cr(VI) over a period of time can lead to lung cancer.
- The composition of stainless steel pipe and other stainless steel materials includes chromium for its anti-corrosive characteristics.
- Some stainless steel materials contain more chromium than others.
- Materials with higher concentrations of chromium typically generate more exposure.
- To prevent overexposure, implement protective measures to keep from inhaling the fumes while performing hot work on stainless steel.
- Keep the work area as well ventilated as possible.
- Local exhaust systems will help reduce your exposure, but when they are not available, keep doors and windows open and use large fans to move the fumes away from your breathing zone.
- Use point-of-operation ventilation systems whenever possible to suck up the fumes and trap Cr(VI) at the source.
- Keep your welding hood down and position your body, especially your chin, so that the fumes cannot get up underneath the hood into your breathing zone.
- If necessary, use a respirator, but be sure you receive the proper training on respiratory protection before you proceed.



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Talk # 18 – Hexavalent Chromium

- Hexavalent chromium is a heavy metal substance that may cause lung cancer and possibly other health problems over time, if inhaled in significant concentrations. The primary exposure to welders occurs when hot work is performed on stainless steel.
- In much of the work we do there is no overexposure.
- The amount of exposure depends on the type of hot work being performed, the concentration of chromium in the steel, the type of ventilation system, and the type of work environment.
- Some hot work methods produce fewer fumes than others. For example, TIG welding produces a fraction of the fumes that stick welding or arc gouging produce.
- Some types of steel have more chromium than others. The higher the concentration of chromium, the higher the potential for overexposure to hexavalent chromium once it gets heated to its boiling point.
- Adequate ventilation makes a big difference with regard to exposure. Point-of-operation ventilation systems are the best in terms of exposure reduction.
- The work environment makes a big difference too. For example, exposure would likely be considerably higher in a confined space than it would be in a new building under construction or a pre-fabrication shop.
- Always make sure you have adequate ventilation in your work area.
- Be sure to position your welding helmet so that the fumes can't get up underneath it.
- If your employer's hexavalent chromium exposure assessment shows that you could be overexposed, you'll have to wear a respirator. Make sure you have the proper respiratory protection training before using a respirator.



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Talk # 19 – Zinc

- When you perform hot work on galvanized metals, fumes are created when the metal reaches its boiling point.
- The fumes contain zinc oxide, which can be harmful if inhaled in large enough concentrations.
- Most welders are aware of zinc fume fever, which is caused by inhaling zinc oxide.
- Good ventilation is critical when performing hot work on galvanized metals. Zinc oxide is a heavy metal that is present in the fumes. It can cause acute (short term) illness if inhaled.
- The illness is commonly referred to as zinc fume fever or metal fume fever.
- The symptoms are very similar to those that you would exhibit if you had the flu.
- The symptoms may include a fever, which rarely goes over 102 degrees Fahrenheit, chills, nausea, dryness in the throat, cough, fatigue, aching in the head, and sometimes aching throughout the rest of the body.
- If you get fresh air immediately the symptoms rarely last more than 24 hours. However, that 24-hour period can be miserable.
- To prevent overexposure to zinc oxide, make sure your work area has plenty of ventilation when you are working with galvanized metals.
- Local ventilation systems are great when they are in place and working properly, but on the jobsite you are more likely to need a good-size fan or a point-of-operation ventilation system, such as a smoke sucker.
- If the ventilation is inadequate, you may need a respirator. Make sure you have the proper training before using any type of respirator.



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Talk # 20 – Manganese

- Manganese is a metal that is used in many welding rods. Although carbon steel rods have higher concentrations than stainless steel rods, there isn't a lot of manganese in either type of rod.
- Overexposure to manganese usually takes place in poorly ventilated areas where there are several welding operations going on simultaneously. Fumes created by welding can generate airborne concentrations of manganese, which can be harmful.
- Overexposure to manganese can severely affect the nervous system and result in symptoms that are similar to Parkinson's disease such as tremors, loss of balance, poor memory, slurred speech, lack of facial expression, and sleep disorders.
- If you're not sure whether the welding rods you are using contain manganese, check the manufacturer's Safety Data Sheet (SDS) for that specific rod. Look for the section that lists the ingredients, which is Section #3 in Globally Harmonized System compliant SDSs.
- If you find that the welding rod contains manganese, you need to make sure that you don't end up working in an enclosed area where several welding operations are taking place.
- Ventilation is the key to protecting yourself from overexposure.
- Make sure that your work area is well ventilated. If it's not, try to improve the ventilation by opening doors and windows, if applicable, and/or incorporating portable blowers or fans.
- If you are in a situation where you can't establish adequate ventilation, you will probably need to wear a respirator.
- Meet with your supervisor before using a respirator. There are several specific requirements that must be met before respirators can be used such as establishing a company respirator program, user training, proper respirator selection, and respirator fit testing.



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Talk # 21 – General Respiratory Protection

- In the mechanical construction industry most of our respiratory hazards involve hot work fumes. It's rare that we need respiratory protection, but when we do, air purifying respirators are usually all that's needed. Here are some guidelines for using air purifying respirators:
- Never use a respirator until you have received proper training. Training covers your company's written respiratory protection program, including but not limited to hazard identification, respirator selection, fit testing, seal checks, use, maintenance and storage.
 - Check with your supervisor about the hazardous substance exposure assessment. The assessment lets your company know what type of respirator you will need.
 - Be prepared to go through a fit testing process. The process ensures that the respirator seals properly to your face. Make sure you are clean shaven wherever the respirator will contact your face.
 - Inspect your respirator each time before using it. If you find any damage or defects, don't use it. Immediately follow your company's procedure for taking defective equipment out of service.
 - Conduct a seal check each time before using your respirator. A seal check is a process to determine if the respirator is properly sealed to your face. You'll learn and practice the procedure in training.
 - Replace the cartridges/filters as soon as you smell or taste any substance through the respirator.
 - Air purifying respirator cartridges/filters used for gases and vapors should have end of service life (ESLI) indicators letting you know when to change them. When conditions don't allow for ESLI, a change schedule should be established.
 - Be sure to keep your respirator clean, and keep it in a sealed bag or container when you're not using it. Store it in a cool, dry place.



NCPWB Toolbox Safety Talks

Talk # 22 – Air-Purifying Respirators

- When harmful concentrations of gases, vapors, or particulates are present, it's best to remove them by improving ventilation in the work area.
- However, there are situations where breathing air can't be made safe through engineering controls. When this happens, workers may have to wear respirators to protect themselves from airborne hazards.
- Read your company's respiratory protection program.
- Make sure the atmosphere in your work area has been tested before you use a respirator.
- The tests will determine how much oxygen is present and identify any respiratory hazards, both of which are critical to proper respirator selection. For example, if the oxygen content is too low, then air-purifying respirators can't be used safely.
- Make sure you receive proper training before you attempt to use a respirator.
- Choose a respirator that provides suitable protection against the identified hazards.
- Don't wear facial hair where the respirator will be in contact with your face.
- Make sure you successfully complete the fit test process to ensure that the respirator you use has an effective seal against your face.
- Keep your respirator clean and in good condition.
- Only use cartridges, canisters, and filters designed to work effectively against the specified respiratory hazards.
- Replace the filters as soon as you can smell or taste any substance while breathing through the respirator or when there is a change in breathing resistance.
- Make sure that you store your respirator in a sealed bag or container so that it will stay clean and prolong the effectiveness of the filters. Store it in a cool, dry place.



NCPWB Toolbox Safety Talks

Talk # 23 – Air-Purifying Respirator Selection

- Air-purifying respirators are designed to filter out harmful gases, vapors, and particulates that become airborne on jobsites. Not all respirators are the same. There are a variety of respirators, cartridges, canisters, and filters to choose from, each designed for specific applications.
- Your company will conduct exposure monitoring to help you with the respirator selection process.
- Familiarize yourself with your company's respiratory protection program, which will cover specific details about respirator selection for mechanical industry applications.
- There must be an adequate concentration of oxygen in the air to use an air-purifying respirator safely.
- Atmospheric contaminants must be identified and quantified before you can select the appropriate respirator.
- Respirators must be certified by the National Institute for Occupational Safety and Health. Look for "NIOSH" on the respirator.
- Once you know what type of respirator is appropriate, you should try on several different models and sizes to ensure that you get a tight seal and comfortable fit.
- Be sure to successfully complete the fit test process. The process will fit you to a specific brand and model respirator, which creates a good seal with your face and is as comfortable as possible.
- Air-purifying respirators for gases and vapors should have end of service life indicators (ESLI). These indicators will let you know when you should change the cartridges or canisters. If the conditions don't allow for ESLI, a change schedule for cartridges and canisters must be established.
- Air-purifying respirators for particulates must be equipped with filters that have been approved by NIOSH. Remember that the type of respirator, cartridges, canisters, or filters you will need depend on the type of airborne hazards and the amount of each present in the jobsite's atmosphere. Make sure you check with your supervisor before using any respirator.



NCPWB Toolbox Safety Talks

Talk # 24 – Air-Purifying Respirator Fit Testing

- A properly fitted respirator is critical to protecting yourself from harmful airborne gases, vapors, and particulates.
- There are several ways that proper fit testing can be done for air-purifying respirators. Here is what you can expect from the fit test process:
 - Fit testing is performed to ensure that there is a good seal between your face and the respirator you choose to wear.
 - There are two types of fit tests, quantitative and qualitative. A quantitative fit test is done with electronic equipment that actually measures the amount of leakage in the respirator. The qualitative fit test doesn't measure the amount of leakage, but indicates whether or not there is discernable leakage.
 - Regardless of the type of fit test you will perform, you will be asked to wear the respirator while the tester exposes you to a harmless test substance such as banana oil, saccharin, irritant smoke, or a commercial aerosol designed for fit testing.
 - Depending upon the type of fit test and the test substance being used, you may have to enter a test chamber or use a test enclosure that covers your head and face.
 - You will be asked to perform a variety of exercises that simulate the movements, positions, and facial expressions that you experience while working including: normal breathing, deep breathing, turning your head from side to side, moving your head up and down, talking, grimacing, bending over, and again normal breathing.
 - If you don't smell or sense the test substance throughout the process or if the test instruments indicate no leakage then you have a good fit.
 - If the respirator fails, you will have to go through the fit testing process again with a different model and/or size respirator.
- Be sure to cooperate fully with the tester so that the respirator you end up using on the job will afford you adequate protection. Always check with your supervisor before using any respirator.



NCPWB Toolbox Safety Talks

Talk # 25 – Air-Purifying Respirator Use

- Once you have received the proper training, selected the appropriate respirator, and completed the fit testing process you will be ready to use your respirator.
- Using it properly is just as important as everything else required in a safe respiratory protection process.
- You won't get a good seal if you wear facial hair anywhere that the respirator comes in contact with your face. Keep that part of your face clean-shaven.
- If you have a condition that prohibits a good seal don't wear a respirator, but don't expose yourself to the hazards either. Ask for reassignment to another task or another jobsite.
- Make sure that your glasses or personal protective equipment doesn't interfere with the seal.
- Always conduct a "user seal check" each time you put on your respirator. If you're not sure how to do it, check with your supervisor.
- Always leave the exposure area before you remove your respirator for any reason.
- Leave the exposure area immediately when you detect gas or vapor breakthrough.
- Leave the exposure area immediately whenever changes in breathing resistance occur.
- If you detect leakage in the seal or if any of the respirator's components are not working properly, leave the exposure area immediately.
- Be sure to replace cartridges, canisters, and filters with the correct replacements. They are color coded and labeled for ease of use.
- Make sure that your respirator is working properly before returning to the exposure area.



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