Health & Safety Newsletter

Recognition, Evaluation & Control

1st Quarter 2013

In this issue:

Produced by:
Erik Goplin- CIH, CSP
QBE Regional Insurance
608-825-5644
Erik.Goplin@us.qbe.com

If you would like to subscribe to this newsletter send a request to:
Erik.Goplin@us.qbe.com

Attractive Nuisance Hazards

Does your company have a retention pond, yard with equipment or a dirt pile? If so, you have an attractive nuisance hazard that should be controlled to limit the company's potential liability.

The attractive nuisance doctrine had its roots in the late 19th century with railroads due to cases of children getting injured while playing in rail yards. Up until these cases, owners of land were not held liable for harm to trespassers. The doctrine was that the possessor of land did not have the burden of watching for and protecting trespassers. In 1873 the U.S. Supreme Court deemed that a railroad turntable was so attractive to children that its presence was equivalent to an express invitation for children to enter the site and therefore the railroad had a responsibility of protecting children from the site hazards.

Trespassers are those who enter the land of another. A child may be a trespasser by definition but the courts have recognized that children, due to their age and inexperience, may not recognize property boundaries or appreciate the dangers of trespassing. Children may not be able to read or understand "no trespassing" signs. At first, cases were limited to attractive nuisances that could be seen from outside the property but the doctrine has been liberalized and now includes cases where:

- The landowner knows or should know that children are likely to trespass.
- The landowner knows or should know that there is a potential for death or serious harm to children
- The children, because of their youth, do not discover the condition or realize the risk
- The burden of eliminating the danger is minimal as compared with the risk of children involved
- The landowner fails to take reasonable measures to eliminate the danger

As a general rule, ponds and natural bodies of water are not considered attractive nuisances unless there is some sort of hidden danger. Courts have also ruled in favor of youths as old as 17 in some cases. Each situation in evaluated on a case by case basis to determine whether the individual qualifies as a child and whether they are able to understand the nature of the hazard.

There are a number of common attractive nuisance hazards that should be controlled. They include but are not limited to:

- Railroads & rail yards
- Swimming pools
- Construction sites
- Power lines and high-voltage towers
- Manmade ponds, lakes and fountains
- Discarded appliances
- Abandoned automobiles
- Farm equipment
- Holes and excavations
- Dirt or sand piles
- Abandoned buildings
- Trampolines, jungle gyms and tree houses

If you have any of these on your property there is potential liability. The degree of risk is also significantly higher if the property is near schools, parks and residential areas since there are more children in these areas. Other questions to ask include:

- Have there been problems with trespassers in the past?
- Have children been seen on the property before?
- Are there indications that children have been playing on the property?
- Are there signs of vandalism?

Keep in mind that children may be more apt to trespass during the evening or on weekends when company personnel may not be present.

Posting a "No Trespassing" sign does not mitigate liability. Property owners need to take active measures to control the hazard. This includes:

- Installing fences to limit access
- Filling in holes and excavations
- Having a program for securing construction sites
- Removing old equipment from back lots
- Securing vehicles and equipment
- Securing abandoned buildings

If children are found on the property warn them of the hazards and have them leave immediately. Their parents should also be contacted.

Courts have generally ruled that children old enough to scale a fence are old enough to understand the potential dangers and are therefore not covered by the attractive nuisance law.

Welding Hazards

Welding is a very common operation in many industries and is also done routinely by maintenance employees even where it's not a part of a manufacturing process. Welding poses a number of health and safety hazards that employers should be aware of these hazards to ensure employees are adequately protected.

Hazards associated with welding include:

- Metal fumes
- Hazardous gases
- Radiant energy and heat
- Noise
- Compressed gases
- Electrical hazards
- Fire/explosion

Metal Fumes

Welding uses intense heat to join pieces of metal. Depending on the type of welding that is conducted, the base metal, and makeup of the welding electrode welders may be exposed to a wide variety of metal fumes. These include:

- Aluminum
- Iron oxide
- Manganese
- Copper
- Zinc
- Chromium
- Nickel
- Lead
- Cadmium

Metal fumes are created when metal is vaporized then condenses to very small particles. Fume particles are very small (0.001 to 1.0 microns) in size. Consequently, they are not filtered out by the upper respiratory system and go to the air exchange region deep in the lungs.

There are four main types of welding. These include:

- Shielded metal arc welding (stick welding)
- Gas metal arc welding also known as metal inert gas (MIG)
- Gas tungsten arc welding also known as tungsten inert gas (TIG)
- Flux core welding

Stick welding is the most common type of welding that is performed. Heat is generated by an electric arc between the base metal and an electrode. The electrode is melted by the heat and bonds to the base metal surface which is also melted. A shielding atmosphere is created around the puddle by a flux coating on the electrode. The voltage and amperage are adjusted by the welder depending on the thickness of the base metal and type of electrode used.

MIG welding employs a separate shielding gas and the electrode is the filler metal which is provided to the welding point as wire from a spool. As the welder pulls a trigger on the welding gun, an arc is struck and a motor pushes wire to the welding pool. Argon, helium and carbon dioxide are used as shielding gases.

In TIG welding the electrode is not consumed. The electrode is tungsten and is used to control the arc. Argon, helium and mixtures of the two gases are used as the gas shield. The filler metal is added by the welder holding the filler wire. The arc melts the base metal and the filler wire is melted into the pool.

Flux core welding is similar to MIG welding in that a spool of filler wire is driven by a gun manipulated by the welder. A flux in used to create an

inert atmosphere around the welding point like in stick welding. The difference is that the flux is contained within the core of the filler wire rather than on the exterior of the electrode. Shielded gas is often used in addition. High levels of fume are potentially generated by the decomposition of the flux.

As the electrode is consumed some of it is converted to metal fumes in the arc. A small proportion of the total fume is due to the base metal but most of the fume comes from the electrode. The employees with the highest fume exposures are almost always the employees that consume the most welding rod or wire during the shift.

When welding on mild steel the predominant metal fumes produced are iron oxide and manganese. When stainless steel is welded, elevated levels of chromium and nickel fume can be a problem. Flux core welding usually produces the most fumes followed by stick welding, MIG welding then TIG welding. The type of metal welded is also important in risk assessment because even though TIG welding usually produces the least amount of total fume, if stainless steel is TIG welded for example, the higher toxicity of chromium and nickel may still be an exposure problem.

Galvanized metal contains a zinc coating and welding on galvanized metal can release zinc fumes that can cause a condition known as Metal Fume Fever. This results in flu-like symptoms when welders start welding at the beginning of each week or after returning from a leave of absence or vacation. After a couple of days on the job the condition disappears until after a weekend, vacation or other leave of absence when the condition is triggered again.

Hazardous Gases

Certain gases are produced due to the high intensity UV (ultraviolet) radiation in the welding arc. These include ozone and nitrogen dioxide. If welding is done in areas near degreasers using chlorinated solvents like trichloroethylene or perchloroethylene, the intense radiation can cause these solvents to thermally decompose into phosgene and chlorine which are severe respiratory hazards.

Effective control of welding fumes and gases involves collection at the source before it impacts the welder's breathing zone. Electrostatic precipitators can be stationed near welding benches and a collection hood can be stationed over the welding point. Fume collection systems can also be vented through the outside wall or roof of the shop directly. Welding guns can incorporate fume collection systems in the gun itself. The fumes are collected by the gun and then are vented to a collector or are directed outside the facility.

Welding in confined spaces and areas with limited natural ventilation increases the concentrations of metal fumes and hazardous gases. Confined space entry procedures and additional ventilation are required to control exposures in these situations.

Respiratory protection is an effective control method where fume collection systems are impractical. The best type of welding respirator is a powered air purifying respirator that is built into the welding helmet. The air is drawn through filters by a battery powered pump worn on the belt. Fresh air is then blown over the top of the helmet into the welder's breathing zone. The constant supply of clean air creates a positive pressure in the helmet that keeps welding fumes out of the helmet and the supply of air helps keep the welder cool and more comfortable. Other types of cartridge type air purifying respirators can also be worn but they have to be able to fit under the welding helmet. This can be a problem.

Radiant Energy and Heat

The intense UV radiation from the arc poses a significant hazard to the skin and the eyes. The amount of UV radiation is a function of the diameter of the welding rod and the current. More current results in more UV radiation and electrode consumption.

Eye protection from flying particles as well as from the UV light is required. The American Welding Society recommends that welding helmets have glass filters with a shading rating of 8 to 10 for light manual electrode welding to 14 for plasma welding. Eye protection should also be provided to other employees working in welding areas. New welding helmets are also available that have automatic darkening lenses. These helmets allow the welder to see through the lens during set-up but darken immediately once an arc is struck. To protect other workers in welding areas, welding curtains should be stationed around welding booths.

Thermal burns are also a concern due to the heating of the metal during welding. Spatter and grinding associated with welding pose a risk for eye injuries. Dermal protection from spatter and hot metal is also

required. Personal protective equipment should include:

- Safety glasses
- Flame resistant gloves
- Flame resistant apron
- Arm gauntlets
- High top safety boots

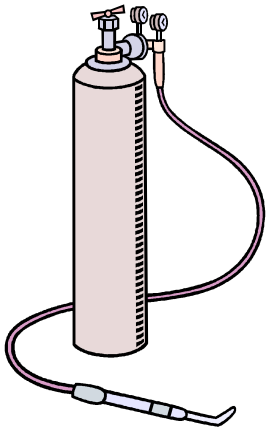
For overhead work, shoulder covers or welding coats are required. Hard hats should also be worn whenever there is a potential for falling overhead objects.

Noise

Noise exposures during welding operations include noise from the welding arc as well as from using chipping hammers to remove slag from the welds. Welders may also use grinders and other power tools. Hearing protection is usually required in most welding operations due to these exposures.

Compressed Gases

Compressed gas cylinders are used in welding operations and special precautions are required to ensure they are adequately protected.



Cylinders should be secured so they are not damaged or leak. They should be secured by chain or clamp in an upright position. Cylinder caps should be kept in place when not in use to protect the valve. Extra cylinders should be stored in a well-ventilated area. Oxygen and fuel cylinders should be stored separately when not in use and be separated by at least 20 feet unless there is a fire resistant barrier between them. Store away from heat, open flames or other ignition sources. Keep away from chemicals and agents that are corrosive to the cylinders. Empty cylinders should be stored separately and be clearly marked.

Electrical Hazards

Both AC and DC current can be used in welding operations. Although voltages may not be high when compared to other electrical equipment, it can still pose a significant threat for electrocution. Parts that are welded are grounded and unless sufficient care is exercised, the welder can easily become the ground. Welders should be trained in proper set up of the welder and welding equipment to ensure a proper ground. Cables should be protected from falling sparks and damage from fork trucks and other equipment. Cables that are damaged should be replaced immediately. Electrodes should never be changed with bare hands or wet gloves. Welders should be particularly careful not to stand in water or on wet floors.

Fire Hazards

Welding operations create special fire hazards. Welding should be conducted away from flammable materials whenever possible. Flammable objects should be moved to a safe location. If objects can't be moved, fire blankets and shields should be used to protect the objects from arcs, flames, sparks, spatter or heat. Fire extinguishers should be on hand and may have to be manned in certain instances while the welding operation is conducted. Where combustibles are within 35 feet of the welding operation or there are openings such as concealed spaces in walls and floors with combustible materials, a fire watch should be posted. Fire watchers watch for fires in areas not readily observable to the welder and implement emergency procedures in case of a fire.

Care must be taken to prevent mixtures of fuel gas and air to accumulate. Leakage of acetylene or hydrogen can form explosive atmospheres especially in confined spaced. Consequently, gas cylinders must always be kept out of confined spaces when welding operations are conducted. Welding should never be done on tanks, drums, barrels and other containers without ensuring the contents have been removed and the containers have been thoroughly cleaned to prevent fire and explosion. Written hot work permits should be issued by qualified persons before welding or cutting operations are conducted on these types of containers.