# Hot Work Welding Stats & Facts



## DID YOU KNOW?

**Hot work** is any work that produces fire or sparks. This includes riveting, flame cutting, soldering, and brazing, but the most common type of **hot work** is **arc welding**. According to the Bureau of Labor Statistics, more than 500,000 employees are injured in welding accidents each year. **Hot work** can pose a serious health hazard to workers, but facilities can help avoid accidents with training and safe work practices.

**What are the Hazards Associated with Hot Work**

**Hot work** produces electrical arcs or flames that can reach up to 10,000 °F. Fires and explosions are a serious and potentially deadly concern. High temperatures, sparks and slag, which can contribute to heat stress, heat stroke and burns. Hot work equipment, such as arc welding circuits, can cause serious or fatal electrocution. **Arc welding** produces intense UV light that can damage welders' retinas.

Many of the substances commonly found in welding smoke, such as arsenic, nickel, asbestos, silica, cadmium, fluorine and more, can be extremely toxic. Different components in welding smoke can affect the welder's lungs, heart, kidneys and central nervous system. Long-term exposure to welding smoke can cause chronic respiratory problems, decreased lung capacity, heart disease, skin disease, hearing loss, kidney damage, reproductive harm, and other diseases.

Welders have the highest-risk occupation in all of the construction industry, an industry already known for its hazards and high fatality rate. Welders face hazards like electrical shock, full-thickness burns, loss of vision, and brain damage. As a result, managers are responsible for ensuring their workers are aware of workplace hazards and for maintaining minimum safety standards set by OSHA.

Industrial Safety & Hygiene News, using figures from OSHA studies, reports that 1 in 250 construction workers will die from a welding injury. With over half a million American welders working today, we can conservatively expect 2,000 welding fatalities in our lifetime. That's not even mentioning the many more permanent injuries that welders will incur.

In today's blog, we take a look at what makes welding so dangerous, as well as the uniquely hazardous jobs welders do in different industries.

### Underwater Welding Accidents

Without a doubt, underwater welding is the most dangerous subcategory of welding occupations. Most underwater welding takes place with the aid of robots or temporary

dry chambers these days, but that doesn't make the job any less hazardous. Divers will still do what's called "wet welding," or welding while submerged. In either case, underwater welders have to do an already-dangerous job while subjected to incredible pressures and limited access to support.

One of the worst dangers underwater welders face is called "Delta P," or "differential pressure." Any two bodies of water with different volumes will have a difference in pressure; this difference is what creates flow from one body of water to another. When underwater welders are caught in this flow, it can leave them stuck underwater without help or hope of rescue. Experienced and highly-skilled divers have been killed by differences in pressure, which can subject divers to thousands of pounds of suction force.

Common high-risk areas for Delta P accidents include dams, drains, and other 'gateways' for water.

## Arc Welding Accidents

Because arc welding uses electrical current to join metal together, it comes with unique hazards. One of the most common problems arc welders face is the risk of electric shock. That's why federal regulations require all outdoor work sites employing arc welders to waterproof workpieces.

Arc welders should be trained to check their equipment for correct installation on every job, report defects to supervisors, and make sure external connections are clean and tight. Workplaces should also have safety protocols in place to ensure no welders are within reach of each other if they're working on the same piece, that no welders wear jewelry on site, and that arc welders are checking their external connections on a daily basis.

The safety bulletin provides summaries of the hot work incidents examined by the CSB and identifies seven key lessons aimed at preventing worker deaths during hot work in and around storage tanks containing flammable materials which include:

1. **Use Alternatives–** Whenever possible, avoid hot work and consider alternative methods.
2. **Analyze the Hazards–** Prior to the initiation of hot work, perform a hazard assessment that identifies the scope of the work, potential hazards, and methods of hazard control.
3. **Monitor the Atmosphere–** Conduct effective gas monitoring in the work area using a properly calibrated combustible gas detector prior to and during hot work activities, even in areas where a flammable atmosphere is not anticipated.
4. **Test the Area–** In work areas where flammable liquids and gases are stored or handled, drain and/or purge all equipment and piping before hot work is conducted. When welding on or in the vicinity of storage tanks and other containers, properly test and if necessary continuously monitor all surrounding tanks or adjacent spaces (not just the tank or container being worked on) for the presence of flammables and eliminate potential sources of flammables.
5. **Use Written Permits–** Ensure that qualified personnel familiar with the specific site hazards review and authorize all hot work and issue permits specifically identifying the work to be conducted and the required precautions.
6. **Train Thoroughly–** Train personnel on hot work policies/procedures, proper use and calibration of combustible gas detectors, safety equipment, and job specific hazards and controls in a language understood by the workforce.
7. **Supervise Contractors–** Provide safety supervision for outside contractors conducting hot work. Inform contractors about site-specific hazards including the presence of flammable materials.

This report also includes descriptions of hot work fires previously published by NFPA, summaries from the Department of Labor's Occupational Safety and Health Administration's database of worker fatality and catastrophe investigations, and

brief descriptions from hot work injuries seen at hospital emergency departments and reported to the Consumer Product Safety Commission's National Electronic Injury Surveillance System.

Report highlights

- U.S. fire departments responded to an average of 4,630 structure fires involving hot work per year in 2013-2017. These fires caused an average of 15 civilian deaths, 198 civilian injuries and $355 million in direct property damage per year.
- Forty-three percent of the fires involving hot work in 2013-2017 occurred in or on homes, including one or two-family homes and apartments or other multi-family homes, while 57 percent occurred in or on non-home properties.
- Welding torches ranked first among the type of hot work equipment involved in fires with 36 percent of the fires.  The leading types of hot work equipment involved in structure fires were different in homes than in non-home properties.
- The peak areas for home fires involving hot work were wall assemblies or concealed spaces (16 percent), and bathrooms or lavatories (13 percent). Exterior roof surfaces (12 percent) and processing or manufacturing areas (11 percent) were peak areas for non-home fires.
- From 2001-2018, five firefighters were fatally injured in four unintentional fires started by torches.