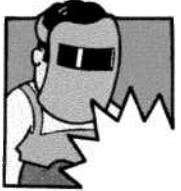


	Current Number of Workers 2006	Projected Number of Workers 2016	% Change to 2016	Average Annual Openings	 Welders, Cutters, Solderers, Brazers SOC # 51-4121	
Regional	550	650	18.20%	20		
Texas	52,750	65,750	24.60%	2415		
Education/ Training Time	Is License Required?	Wage Rate \$/Hr. 2008 Regionally	Percent Female	Average Age	Job Turnover	Why Most Job Openings Occur
< 1 year	No	\$15.17	2.3%	39.5	Average	Equal Growth/ Replacement

JOB DESCRIPTION

Use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

WHERE DO WORKERS FIND JOBS?

Architectural and Structural Metals Manufacturing
 Agriculture, Construction, and Mining Machinery Manufacturing
 Commercial and Industrial Machinery and Equipment Repair and Maintenance
 Nonresidential Building Construction
 Boiler, Tank, and Shipping Container Manufacturing
 Foundation, Structure, and Building Exterior Contractors
 Ship and Boat Building
 Machinery, Equipment, and Supplies Merchant Wholesalers
 Motor Vehicle Body and Trailer Manufacturing
 Support Activities for Mining
 Other General Purpose Machinery Manufacturing
 Other Fabricated Metal Product Manufacturing
 Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing

RELATED COLLEGE PROGRAMS

CIP 480508 Welding Technology/Welder

IMPORTANT KNOWLEDGE

ARTS AND HUMANITIES

* English Language

ENGINEERING AND TECHNOLOGY

* Design

* Mechanical

MANUFACTURING AND PRODUCTION

* Production and Processing

MATHEMATICS AND SCIENCE

* Mathematics

IMPORTANT SKILLS

CONTENT

* Active Listening

* Reading Comprehension

PROCESS

* Learning Strategies

* Monitoring

RESOURCE MANAGEMENT SKILLS

* Time Management

TECHNICAL SKILLS

* Quality Control Analysis

IMPORTANT ABILITIES

CONTROL MOVEMENT ABILITIES

* Control Precision

* Arm-Hand Steadiness

* Finger Dexterity

* Manual Dexterity

VISUAL ABILITIES

* Near Vision

NATURE OF THE WORK: Welders, Cutters, Solderers, Brazers

Welding is the most common way of permanently joining metal parts. In this process, heat is applied to metal pieces, melting and fusing them to form a permanent bond. Because of its strength, welding is used in shipbuilding, automobile manufacturing and repair, aerospace applications, and thousands of other manufacturing activities. Welding also is used to join beams when constructing buildings, bridges, and other structures, and to join pipes in pipelines, power plants, and refineries.

Welders use many types of welding equipment set up in a variety of positions, such as flat, vertical, horizontal, and overhead. They may perform manual welding, in which the work is entirely controlled by the welder, or semiautomatic welding, in which the welder uses machinery, such as a wire feeder, to perform welding tasks.

There are about 100 different types of welding. Arc welding is the most common type. Standard arc welding involves two large metal alligator clips that carry a strong electrical current. One clip is attached to any part of the workpiece being welded. The second clip is connected to a thin welding rod. When the rod touches the workpiece, a powerful electrical circuit is created. The massive heat created by the electrical current causes both the workpiece and the steel core of the rod to melt together, cooling quickly to form a solid bond. During welding, the flux that surrounds the rod's core vaporizes, forming an inert gas that serves to protect the weld from atmospheric elements that might weaken it. Welding speed is important. Variations in speed can change the amount of flux applied, weakening the weld, or weakening the surrounding metal by increasing heat exposure.

Two common but advanced types of arc welding are Tungsten Inert Gas (TIG) and Metal Inert Gas (MIG) welding. TIG welding often is used with stainless steel or aluminum. While TIG uses welding rods, MIG uses a spool of continuously fed wire, which allows the welder to join longer stretches of metal without stopping to replace the rod. In TIG welding, the welder holds the welding rod in one hand and an electric torch in the other hand. The torch is used to simultaneously melt the rod and the workpiece. In MIG welding, the welder holds the wire feeder, which functions like the alligator clip in arc welding. Instead of using gas flux surrounding the rod, TIG and MIG protect the initial weld from the environment by blowing inert gas onto the weld.

Like arc welding, soldering and brazing use molten metal to join two pieces of metal. However, the metal added during the process has a melting point lower than that of the workpiece, so only the added metal is melted, not the workpiece. Soldering uses metals with a melting point below 800 degrees Fahrenheit; brazing uses metals with a higher melting point. Because soldering and brazing do not melt the workpiece, these processes normally do not create the distortions or weaknesses in the workpiece that can occur with welding. Soldering commonly is used to join electrical, electronic, and other small metal parts. Brazing produces a stronger joint than does soldering, and often is used to join metals other than steel, such as brass. Brazing can also be used to apply coatings to parts to reduce wear and protect against corrosion.

Skilled welding, soldering, and brazing workers generally plan work from drawings or specifications or use their knowledge of fluxes and base metals to analyze the parts to be joined. These workers then select and set up welding equipment, execute the planned welds, and examine welds to ensure that they meet standards or specifications. They are even examining the weld while they're welding. By observing problems with the weld, they compensate by adjusting the speed, voltage, amperage, or feed of the rod. Highly skilled welders often are trained to work with a wide variety of materials in addition to steel, such as titanium, aluminum, or plastics. Some welders have more limited duties, however. They perform routine jobs that already have been planned and laid out and do not require extensive knowledge of welding techniques.

Automated welding is used in an increasing number of production processes. In these instances, a machine or robot performs the welding tasks while monitored by a welding machine operator. Welding, soldering, and brazing machine setters, operators, and tenders follow specified layouts, work orders, or blueprints. Operators must load parts correctly and constantly monitor the machine to ensure that it produces the desired bond.

The work of arc, plasma, and oxy-gas cutters is closely related to that of welders. However, instead of joining metals, cutters use the heat from an electric arc, a stream of ionized gas (plasma), or burning gases to cut and trim metal objects to specific dimensions. Cutters also dismantle large objects. Plasma cutting has been increasing in popularity because it can cut a wide variety of metals, including stainless steel, aluminum, and titanium.