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# WELDER OCCUPATION

## REPORT FOR SANTA ANA COLLEGE

NOVEMBER 2008



**CENTER OF EXCELLENCE,  
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## Introduction

This report explores the welder, cutter, solderer, and brazer occupation in Orange County, California. It includes analysis of major industries within the occupation, their size by employment, geographical concentration and growth potential. The reports is aimed at assisting Santa Ana College administration in decision-making regarding future educational and training programs that would be appropriate and timely considering industry composition and employment projections.

This report contains information that was compiled from the InfoUSA employer listings and analyzed with the help of Environmental System Research Institute's (ESRI) GIS software application. Occupational projections data was provided by Economic Modeling Specialists Inc. (EMSI), Career One Stop, and O\*Net Online.

All data comes from secondary sources. No primary research (interviews or surveys) was conducted nor was any industry validation performed to compile the data herein.

### About the Centers of Excellence

The Centers of Excellence (COE) are part of the Business and Workforce Performance Improvement (BWPI) initiative within the California Community College's Economic and Workforce Development Network. The regional COEs are focused on building the capacity of the community colleges in the area of economic and workforce development to enhance their ability to deliver education and training services to businesses and workers in high growth industries, new technologies, and other clusters of opportunities. Centers provide market intelligence regarding workforce trends, increasing awareness and visibility about the colleges economic and workforce development programs and services, and strategically develop partnerships with business and industry. More information about the Centers is available online at [www.coecc.net](http://www.coecc.net).

### Important Disclaimer

All representations included in this report have been produced from a secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings. However, neither the Business and Workforce Performance Improvement, Centers of Excellence, COE host District or California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon this study including components or recommendations.

## **Report Scope**

This Occupational Profile Report provides basic occupational information, projections, wages, and skills needed for welders, cutters, solderers, and brazers.

This report includes data for Santa Ana College's service area, which covers Orange County, CA. In addition, occupation projections (in particular, 2007 wages and percentage change of employment between 2007 and 2014) data was extracted for the State of California and the U.S.

## Job Description and Primary Tasks<sup>1</sup>

The standard job description for welders, cutters, solderers, and brazers (SOC 51-4121) is to:

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. Braze or solder together components to assemble fabricated metal parts, using soldering iron, torch, or welding machine and flux.

Sample of reported job titles:

Welder, Welder-Fitter, Fabricator, Maintenance Welder, Mig Welder, Sub Arc Operator, Brazer, Solderer, Electronic Assembler, Wirer, Assembly Line Brazer, Connector, Electronic Technician, Fabricator, Production Technician, and Electrical Assembler.

Primary Tasks for welders, cutters, solderers, and brazers include:

The required knowledge to become a successful welder, cutter, solderer, and brazer includes:

- Operate safety equipment and use safe work habits.
- Weld components in flat, vertical, or overhead positions.
- Ignite torches or start power supplies and strike arcs by touching electrodes to metals being welded, completing electrical circuits.
- Clamp, hold, tack-weld, heat-bend, grind or bolt component parts to obtain required configurations and positions for welding.
- Detect faulty operation of equipment or defective materials and notify supervisors.
- Operate manual or semi-automatic welding equipment to fuse metal segments, using processes such as gas tungsten arc, gas metal arc, flux-cored arc, plasma arc, shielded metal arc, resistance welding, and submerged arc welding.
- Monitor the fitting, burning, and welding processes to avoid overheating of parts or warping, shrinking, distortion, or expansion of material.
- Examine workpieces for defects and measure workpieces with straightedges or templates to ensure conformance with specifications.
- Recognize, set up, and operate hand and power tools common to the welding trade, such as shielded metal arc and gas metal arc welding equipment.
- Lay out, position, align, and secure parts and assemblies prior to assembly, using straightedges, combination squares, calipers, and rulers.

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<sup>1</sup> Source for entire section: O\*Net Online (<http://online.onetcenter.org>)

- Melt and apply solder along adjoining edges of workpieces to solder joints, using soldering irons, gas torches, or electric-ultrasonic equipment.
- Heat soldering irons or workpieces to specified temperatures for soldering, using gas flames or electric current.
- Examine seams for defects, and rework defective joints or broken parts.
- Melt and separate brazed or soldered joints to remove and straighten damaged or misaligned components, using hand torches, irons or furnaces.
- Melt and apply solder to fill holes, indentations, and seams of fabricated metal products, using soldering equipment.
- Clean workpieces to remove dirt and excess acid, using chemical solutions, files, wire brushes, or grinders.
- Guide torches and rods along joints of workpieces to heat them to brazing temperature, melt braze alloys, and bond workpieces together.
- Adjust electric current and timing cycles of resistance welding machines to heat metals to bonding temperature.
- Clean equipment parts, such as tips of soldering irons, using chemical solutions or cleaning compounds.
- Turn valves to start flow of gases, and light flames and adjust valves to obtain desired colors and sizes of flames.

## Required Knowledge Skills and Abilities<sup>2</sup>

The required knowledge to become a successful welder, cutter, solderer, and brazer includes:

- **Mechanical** — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- **Design** — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

The required skill sets include:

- **Active Listening** — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- **Mathematics** — Using mathematics to solve problems.
- **Equipment Selection** — Determining the kind of tools and equipment needed to do a job.
- **Time Management** — Managing one's own time and the time of others.

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<sup>2</sup> Source for entire section: O\*Net Online (<http://online.onetcenter.org>)

- **Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- **Reading Comprehension** — Understanding written sentences and paragraphs in work related documents.
- **Equipment Maintenance** — Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
- **Equipment Selection** — Determining the kind of tools and equipment needed to do a job.
- **Speaking** — Talking to others to convey information effectively.
- **Quality Control Analysis** — Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
- **Learning Strategies** — Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.
- **Monitoring** — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
- **Instructing** — Teaching others how to do something.
- **Coordination** — Adjusting actions in relation to others' actions.

The most important abilities are:

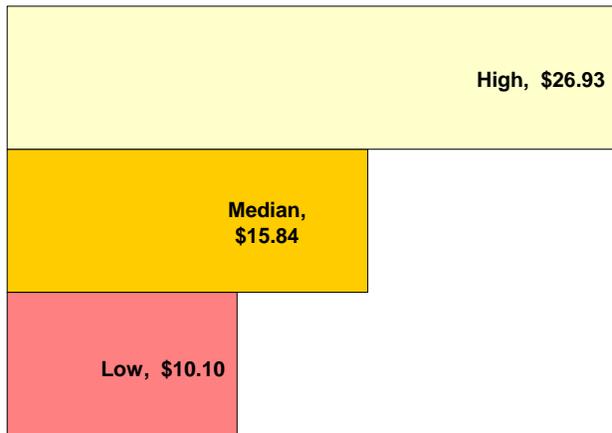
- **Arm-Hand Steadiness** — The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.
- **Near Vision** — The ability to see details at close range (within a few feet of the observer).
- **Control Precision** — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.
- **Manual Dexterity** — The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.
- **Finger Dexterity** — The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.
- **Multilimb Coordination** — The ability to coordinate two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.
- **Oral Expression** — The ability to communicate information and ideas in speaking so others will understand.
- **Problem Sensitivity** — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

- **Oral Comprehension** — The ability to listen to and understand information and ideas presented through spoken words and sentences.
- **Selective Attention** — The ability to concentrate on a task over a period of time without being distracted.
- **Control Precision** — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.
- **Information Ordering** — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

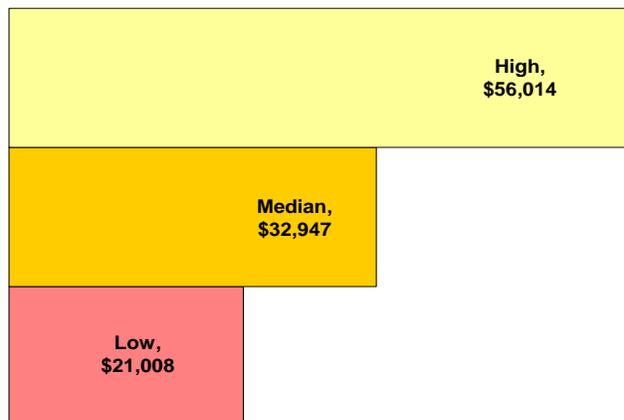
## Occupational Earnings

In 2007, hourly and annual<sup>3</sup> wages for full-time welders, cutters, solderers, and brazers in Orange County were:

### Hourly



### Annually



<sup>3</sup> Since EMSI ([www.economicmodeling.com](http://www.economicmodeling.com)) did not provide annual wages, annual pay for welders, cutters, solderers, and brazers in Orange County was calculated using the following logic: hourly pay \* 260 paid days a year \* 8 hours a day.

Except in the lowest (10%) stage, where nationally the numbers are a bit higher, wages in Orange County exceed those at the state and national level. The following is a comparison of Orange County wages versus state and national wages:

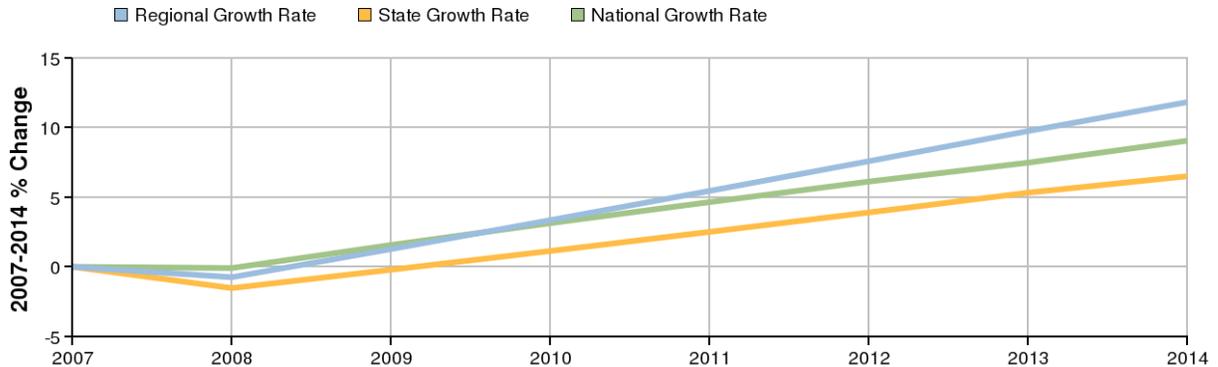
### U.S., California, and Orange County Wages

Location	Pay Period	2007				
		10%	25%	Median	75%	90%
United States <sup>4</sup>	Hourly	\$10.42	\$12.69	\$15.51	\$19.00	\$23.56
	Yearly	\$21,700	\$26,400	\$32,300	\$39,500	\$49,000
California	Hourly	\$9.89	\$12.31	\$15.59	\$20.26	\$25.12
	Yearly	\$20,600	\$25,600	\$32,400	\$42,100	\$52,200
Orange County	Hourly	\$10.10	\$12.78	\$15.84	\$20.57	\$26.93
	Yearly	\$21,008	\$26,582	\$32,947	\$42,786	\$56,014

### Occupational Information<sup>5</sup>

Between 2007-2014, the Orange County area can expect a 12% increase in jobs for welders, cutters, solderers, and brazers through 2014, which is above the average growth rate for this occupation in the state (7%) and nationally (9%). This growth in the region equates to 421 new jobs over the 7-year period.

### Occupational Change Summary



Region	2007 Jobs	2014 Jobs	Change	% Change
Orange County Total	3,558	3,979	421	12%
State Total	30,981	32,997	2,016	7%
National Total	412,173	449,503	37,330	9%

Nevertheless, these numbers could potentially be higher. In her article titled *Thinking Outside the Box to Find Skilled Welder: A Short Welding Course Puts a Dancer on a Welding Job*, Clare Goldsberry emphasized that “The U.S. Bureau of Labor reported the average welder in the workforce today is 54 years old, and many of them will be retiring

<sup>4</sup> Source for United States and California hourly and yearly wages was Career One Stop ([www.careeronestop.org](http://www.careeronestop.org)).

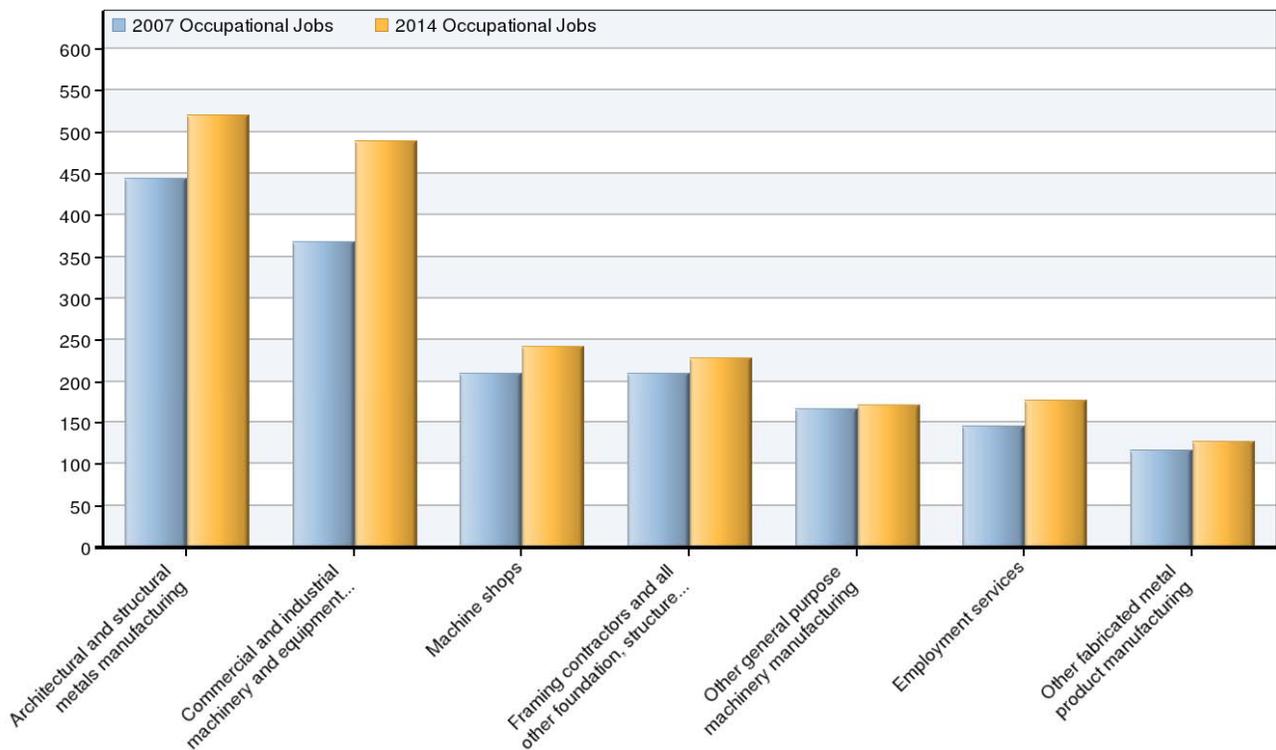
<sup>5</sup> Source for entire section: EMSI ([www.economicmodeling.com](http://www.economicmodeling.com))

in the next few years. By 2010, there will be a shortage of 250,000 welding professionals.”<sup>6</sup>

### Top Industries for Welders, Cutters, Solderers, and Brazers<sup>7</sup>

As classified by the North American Industry Classification System (NAICS) codes, the following illustrate the top seven industries that employ welders, cutters, solderers, and brazers within the Orange County area. Architectural and structural metals manufacturing organizations (NAICS 332300) and the commercial and industrial machinery and equipment industry (NAICS 93000 and 92000) employ the most welders, cutters, solderers, and brazers.

**Top Industries for Welders, Cutters, Solderers, & Brazers**



NAICS Code	Name	2007 Jobs	2014 Jobs	Change	% Change
332300	Architectural and structural metals manufacturing	444	521	77	17%
811300	Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance	368	490	122	33%
332710	Machine shops	210	242	32	15%
2381XX	Framing contractors and all other foundation, structure, and building exterior contractors	210	229	19	9%

<sup>6</sup> Goldsberry, C. (July 2008). The Welder Shortage: What We’ve Done and What We Can Do. *Welding Magazine* (www.weldingmag.com)

<sup>7</sup> Source for entire section: EMSI (www.economicmodeling.com)

333900	Other general purpose machinery manufacturing	166	171	5	3%
561300	Employment services	145	177	32	22%
332900	Other fabricated metal product manufacturing	116	126	10	9%

### Education and Training<sup>8</sup>

Welders, cutters, solderers, and brazers occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. Furthermore, employees in these occupations need anywhere from a few months to one year of working with experienced employees.

### Orange County Employers<sup>9</sup>

Appendix A displays the number of firms in the top three industries that employ welders, cutters, solderers, and brazers, located in Orange County. The top three industries are: (1) architectural and structural metals manufacturing; (2) commercial and industrial machinery and equipment; and (3) machine shops.

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<sup>8</sup> Source for entire section: O\*Net Online (<http://online.onetcenter.org>)

<sup>9</sup> Source for entire section: O\*Net Online (<http://online.onetcenter.org>)

# APPENDIX A: GIS Map of Orange County Firms

Firms that Employ Welders, Cutters, Solderers, and Brazers in Orange County, 2008

