



Shielded Metal Arc Welding (SMAW) and Advanced Arc Welding (SMAW and FCAW)

May 2018

Prepared by the Los Angeles/Orange County Center of Excellence for Labor Market Research

Research Summary

The Los Angeles/Orange County Center of Excellence (COE) compiled this report to provide regional labor market supply and demand data related to **Shielded Metal Arc Welding (SMAW) and Advanced Arc Welding [Shielded Metal Arc Welding (SMAW) and Flux-Cored Arc Welding (FCAW)]**.

The following list summarizes key findings from this brief for SMAW and FCAW:

- The number of jobs for SMAW and FCAW-related occupations is expected to grow by 8% through 2022, resulting in nearly 1,800 annual job openings.
- All occupations in this report have entry-level hourly earnings **above** the MIT Living Wage¹ estimate for the region – \$13.54, per hour.
- Between 31% and 34% of the current workforce has some postsecondary coursework training.
- In 2017, there were **nearly 180 ads** for jobs related to SMAW and FCAW
- The majority of job postings in 2017 with specified education requirements listed high school or vocational training.
- Between 2014 and 2017, community colleges in the county conferred an average of 165 awards (associate degrees and certificates) in programs training students for occupations of interest.

¹ MIT Living Wage Calculator. <http://livingwage.mit.edu/>

Occupation Codes and Descriptions

Currently, there are two occupations in the standard occupational classification (SOC) system and one new and emerging O*NET occupation² related to shielded metal arc welding (SMAW) and flux-cored arc welding (FCAW). The occupation titles, descriptions, and reported job titles are below in Exhibit 1.

Exhibit 1 – Occupations, description, and sample job titles

O*NET/SOC Code	Title	Description	Sample of Reported Job Titles
47-2152.01	Pipe Fitters and Steamfitters	Lay out, assemble, install, or maintain pipe systems, pipe supports, or related hydraulic or pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, or industrial production or processing systems.	Equipment Service Associate (ESA), Fire Sprinkler Service Technician, Journeyman Pipe Fitter, Journeyman Pipefitter, Machine Repairman, Pipe Fitter, Pipe Welder, Pipefitter, Sprinkler Fitter, Steamfitter
47-2211	Sheet Metal Workers	Fabricate, assemble, install, and repair sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes sheet metal duct installers who install prefabricated sheet metal ducts used for heating, air conditioning, or other purposes.	Field Installer; HVAC Sheet Metal Installer (Heating, Ventilation, and Air Conditioning Sheet Metal Installer); Journeyman Sheet Metal Worker; Sheet Metal Apprentice; Sheet Metal Fabricator; Sheet Metal Foreman; Sheet Metal Installer; Sheet Metal Layout Mechanic; Sheet Metal Mechanic; Sheet Metal Worker

² New and emerging occupations (N&E) are incorporated into the O*NET-SOC classification system based on the evolving nature of workforce requirements stemming from changes in technology, society, law, and business practices. Incorporating N&E occupations into the O*NET system makes O*NET information more beneficial and responsive.

47-2221	Structural Iron and Steel Workers	Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings.	Fitter, Fitter / Welder, Iron Worker, Iron Worker Foreman, Ironworker, Rigger, Steel Fabricator, Steel Worker, Structural Steel Erector, Tower Hand
---------	-----------------------------------	---	---

Source: O*NET Online

Current and Future Employment

In Los Angeles County, the number of jobs for occupations related to SMAW and FCAW is expected to increase by 8% over the next five years. More than 1,760 job opportunities will be available annually for this occupation group through 2022 due to new job growth and replacement need (e.g., retirements). Exhibit 2 contains detailed employment projections data for this occupation group.

Exhibit 2 – Five-year projections for SMAW and FCAW-related occupations

SOC	Occupation	2017 Jobs	2022 Jobs	2017-2022 Change	2017-2022 % Change	Annual Openings
47-2152.01	Pipe Fitters and Steamfitters*	11,088	11,983	895	8%	1,366
47-2211	Sheet Metal Workers	2,217	2,373	156	7%	267
47-2221	Structural Iron and Steel Workers	1,118	1,167	49	4%	130
TOTAL		14,423	15,523	1,100	8%	1,763

Source: EMSI 2018.2– QCEW, non-QCEW, Self-Employed

***The data presented for this occupation is based on the broader 6-digit occupation code for plumbers, pipefitters, and steamfitters (47-2152)**

Earnings

In Los Angeles County, the entry-level average wages for the FCAW and SMAW occupations is between \$14.48 and \$15.77 per hour, which is above the MIT Living Wage estimate of \$13.54 per hour for a single adult. The average annual earnings for these occupations in the region is between \$53,000 and \$67,000 per year, assuming full-time employment.

Exhibit 3 contains hourly wages and annual average earnings for the occupation group studied in this report. Entry-level hourly earnings is represented by the 10th percentile of wages, median hourly earnings is represented by the 50th percentile of wages, and experienced hourly earnings is represented by the 90th percentile of wages, demonstrating various levels of employment.

Exhibit 3 – Earnings for SMAW and FCAW-related occupations

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings	Average Annual Earnings
47-2152.01	Pipe Fitters and Steamfitters*	\$14.48	\$22.40	\$43.17	\$53,000
47-2211	Sheet Metal Workers	\$14.51	\$24.94	\$47.31	\$59,000
47-2221	Structural Iron and Steel Workers	\$15.77	\$29.60	\$63.72	\$67,000

Source: EMSI 2018.2 – QCEW, non-QCEW, Self-Employed

****The data presented for this occupation is based on the broader 6-digit occupation code for plumbers, pipefitters, and steamfitters (47-2152)***

Employer Job Postings

In this research brief, real-time labor market information is used to provide a more nuanced view of the current job market, as it captures job advertisements for occupations relevant to the field of study. Employer job postings are consulted to understand who is employing workers in the SMAW and FCAW field, and what they are looking for in potential candidates. To identify job postings related to these program offerings, the following keywords/search terms were used:

- O*NET/SOC occupation codes for three target occupations (listed in Exhibit 1)

Top Occupations

In 2017, there were 179 employer postings in Los Angeles County for occupations related to SMAW and FCAW. More than half of the postings (61%) were for sheet metal workers (109 job postings).

Exhibit 4 – Top occupations in job postings (n=179)

O*NET/SOC Code	Occupation	Job Postings, Full Year 2017
47-2211	Sheet Metal Workers	109
47-2152.01	Pipe Fitters and Steamfitters	53
47-2221	Structural Iron and Steel Workers	17

Source: Labor Insight/Jobs (Burning Glass)

Top Titles

The most common titles for jobs related to SMAW and FCAW are listed in Exhibit 5. Pipefitter was mentioned in 14% of all relevant job postings (25 postings).

Exhibit 5 –Job titles (n=179)

Title	Job Postings, Full Year 2017
Pipefitter	25
Sheet Metal Worker	22
Sheet Metal Mechanic	18
Sheet Metal Technician	18
Fabricator	15
Fire Sprinkler Installer/Technician	14
Iron Worker	12
Fire Sprinkler Fitter	10
Sheet Metal Fabricator	10

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 6 lists the major employers hiring professionals in fields related to SMAW and FCAW. Top employers postings job ads included Jacobs Engineering Group Incorporated and Johnson Controls Incorporated. The top worksite cities in the region for these occupations include Los Angeles, Long Beach, Santa Fe Springs, Torrance, and Carson.

Exhibit 6 – Top employers (n=179)

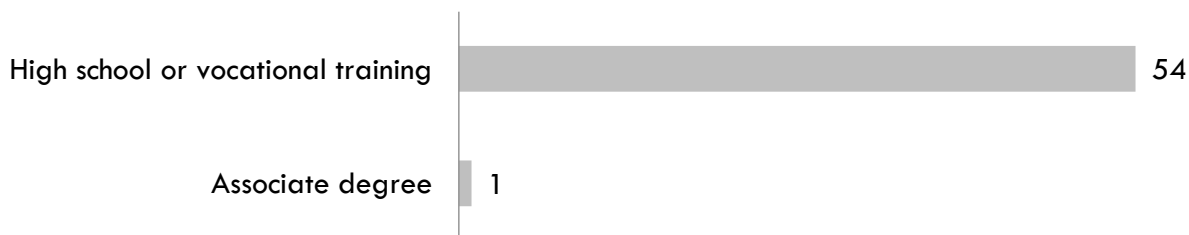
Employer	Job Postings, Full Year 2017
Jacobs Engineering Group Incorporated	11
Johnson Controls Incorporated	10
Gulfstream Aerospace	7
General Dynamics	6
Tyco Integrated Security	6
Oldcastle Precast Incorporated	5
Amtrak	4
GDKN Corporation	4
SpaceX	4
University California	4

Source: Labor Insight/Jobs (Burning Glass)

Advertised Education Levels

Exhibit 7 displays the education level requested by employers in online job ads. The majority of employers were looking for a candidate with high school or vocational training. Approximately 69% of job postings did not specify a level of education.

Exhibit 7 – Advertised education requirements for welding occupations (n=55)



Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 8 shows the typical entry-level education requirement for the occupations of interest, along with the typical on-the-job training, and percentage of workers in the field who hold a community college award or have completed some postsecondary courses. Between 31% and 34% of the workforce in all three occupations has completed some community college education as their highest level of education.

Exhibit 8 – Education and training requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training	% of Community College Award Holders or Some Postsecondary Coursework
47-2152	Plumbers, Pipefitters, and Steamfitters	HS diploma or equivalent	Apprenticeship	31%
47-2211	Sheet Metal Workers	HS diploma or equivalent	Apprenticeship	34%
47-2221	Structural Iron and Steel Workers	HS diploma or equivalent	Apprenticeship	31%

Source: EMSI, Bureau of Labor Statistics Employment Projections (Educational Attainment)

In Los Angeles County, nine community colleges have conferred awards in welding programs. Between 2014 and 2017, there was an average of 165 community college awards conferred annually across one program: Welding Technology (0956.60). It is important to note that an award is not equivalent to a single person in search of a job opening, since a student may earn more than one award (e.g. an associate degree and a certificate).

Exhibit 9 – CCC Student Awards (by TOP and College)

TOP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
0956.50	Welding Technology	Cerritos	90	71	108	90
		Compton	3	5	4	4
		El Camino	7	8	16	10
		Glendale	1	5	3	3
		LA Trade	22	25	23	23
		Long Beach	1	1	3	2
		Mt San Antonio	10	26	11	16
		Pasadena	11	6	4	7
		Rio Hondo	-	8	22	15
TOTAL			145	155	194	165

Source: California Community Colleges Chancellor's Office MIS Data Mart

Student Outcomes

The CTE LaunchBoard provides student outcome data on the effectiveness of CTE programs. The following student outcome information was collected from exiters of the Welding Technology Taxonomy of Program (TOP) code (0956.60) in Los Angeles County for the 2015-16 academic year.

- The median annual wage after program completion is \$26,652
- 49% of students are earning a living wage
- 71% of students are employed within six months after completing a program

Source: CTE LaunchBoard

Sources

O*Net Online, Labor Insight/Jobs (Burning Glass), Economic Modeling Specialists International (EMSI), MIT Living Wage Calculator, Bureau of Labor Statistics (BLS) Education Attainment, California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, CTE LaunchBoard, and Statewide CTE Outcomes Survey

Notes

Data included in this analysis represents the labor market demand for positions most closely related to SMAW and FCAW. Standard occupational classification (SOC) codes were chosen based on the national education level required for employment (associate degree and postsecondary certificate) as well as the proportion of current workers who hold a community college award or have had some community college training. This selection process narrows the labor market analysis to the most relevant employment opportunities for students with community college education and/or training.

Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study and should not be used to establish current job openings, because the numbers may include duplicate job postings or postings intended to gather a pool of applicants. Real-time labor market information can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions.