

OCTOBER 2019

# LABOR MARKET ANALYSIS

## Construction Crafts Technology



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# SUMMARY

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for occupations related to construction crafts technology for Fresno City College. Five occupations were identified:

- Carpenters (SOC 47-2031)
- First-Line Supervisors of Construction Trades and Extraction Workers (SOC 47-1011)
- Construction Managers (SOC 11-9021)
- Construction and Building Inspectors (SOC 47-4011)
- Civil Engineering Technicians (SOC 17-3022)

## KEY FINDINGS:

- **Occupational demand** — Nearly 13,572 workers were employed in jobs related to construction crafts technology in 2018 in the South Central Valley/Southern Mother Lode subregion. The largest occupation is carpenters with 5,944 workers in 2018, a projected growth rate of 5% over the next five years, and 625 annual openings.
- **Wages** — The entry-level wages for all of the occupations exceed the average self-sufficiency wage and living wage for a single adult in the region. The occupation earning the highest median wages is construction and building inspectors, \$33.73/hour in the subregion and \$34.79/hour in the region.
- **Employers** — Top employers in the region are Lennar Corporation, City of Fresno, and Quiring General.
- **Job titles** — The most common occupational title and job title is construction manager.
- **Skills and certifications** — The top baseline skill is communication, the top specialized skill is project management, and the top software skill is Microsoft Office. The most in-demand certification is a driver's license.
- **Education** — The typical education required for three of the occupations is a high school diploma. An associate degree is typically required for civil engineering technicians. Construction managers usually have a bachelor's degree.
- **Supply** — Analysis of postsecondary completions in the region shows that on average nine awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 1,181 trained workers in the subregion and 1,949 workers in the region. The Center of Excellence recommends that Fresno City College work with the regional energy, construction and utilities director, the college's advisory board, and local industry in the expansion or development of programs to address the shortage of construction crafts technology workers in the region.

# INTRODUCTION

The Central Valley/Mother Lode Center of Excellence was asked by Fresno City College to provide labor market information for construction crafts technology. Review of the Taxonomy of Programs revealed the following program is appropriate for this analysis:

- 095200 - Construction Crafts Technology

The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use. Analysis of the program and occupational data related to construction crafts technology resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System titles and codes used in this study are:

- Carpenters (SOC 47-2031)
- First-Line Supervisors of Construction Trades and Extraction Workers (SOC 47-1011)
- Construction Managers (SOC 11-9021)
- Construction and Building Inspectors (SOC 47-4011)
- Civil Engineering Technicians (SOC 17-3022)

The SOC codes, occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O\*NET OnLine are shown in Exhibit 1. O\*NET data was not available for Carpenters (SOC 47-2031).

## EXHIBIT 1. SOC titles, job descriptions, sample job titles, and knowledge and skills for construction crafts technology

SOC TITLE & CODE	DESCRIPTION	SAMPLE JOB TITLES	KNOWLEDGE & SKILLS
First-Line Supervisors of Construction Trades and Extraction Workers (SOC 47-1011)	Directly supervise and coordinate activities of construction or extraction workers.	Construction Foreman, Construction Superintendent, Construction Supervisor, Field Supervisor, Foreman, Job Superintendent, Project Superintendent, Site Superintendent, Superintendent, Supervisor	<b>Knowledge</b> Production and Processing Building and Construction Customer and Personal Service Administration and Management Mechanical <b>Skills</b> Active Listening Coordination Critical Thinking Speaking Management of Personnel Resources
	Plan, direct, or coordinate, usually through subordinate	Concrete Foreman, Construction Area	<b>Knowledge</b> Building and Construction

SOC TITLE & CODE	DESCRIPTION	SAMPLE JOB TITLES	KNOWLEDGE & SKILLS
<b>Construction Managers (SOC 11-9021)</b>	supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, budgeting, and implementation. Includes managers in specialized construction fields, such as carpentry or plumbing.	Manager, Construction Foreman, Construction Manager, Construction Superintendent, General Contractor, Job Superintendent, Project Executive, Project Manager, Project Superintendent	English Language Administration and Management Engineering and Technology Design <b>Skills</b> Active Listening Critical Thinking Speaking Complex Problem Solving Coordination
<b>Construction and Building Inspectors (SOC 47-4011)</b>	Inspect structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing.	Building Code Administrator, Building Inspection Engineer, Building Inspector, Building Official, Combination Building Inspector, Construction Inspector, Construction Materials Testing Technician, Elevator Inspector, Inspector, Plumbing Inspector	<b>Knowledge</b> Building and Construction English Language Customer and Personal Service Engineering and Technology Law and Government <b>Skills</b> Active Listening Reading Comprehension Critical Thinking Speaking Complex Problem Solving
<b>Civil Engineering Technicians (SOC 17-3022)</b>	Apply theory and principles of civil engineering in planning, designing, and overseeing construction and maintenance of structures and facilities under the direction of engineering staff or physical scientists.	Civil Designer, Civil Engineering Assistant, Civil Engineering Designer, Civil Engineering Technician, Design Technician, Engineer Technician, Engineering Assistant, Engineering Specialist, Engineering Technician, Transportation Engineering Technician	<b>Knowledge</b> Engineering and Technology Mathematics Building and Construction Design Clerical <b>Skills</b> Critical Thinking Reading Comprehension Mathematics Speaking

The average self-sufficiency wage for a single adult in the South Central Valley/Southern Mother Lode (SCV/SML) subregion is \$10.30/hour, and the current average living wage for a single adult is \$12.05/hour. Self-sufficiency and living wage data by county and the overall seven-county average are shown in Exhibit 2. In the wages sections of this report, Pct. 25 hourly denotes entry-level wages, and median represents experienced wages.

**EXHIBIT 2. Self-sufficiency and living wages in the SCV/SML subregion**



# OCCUPATIONAL DEMAND

The South Central Valley/Southern Mother Lode region employed nearly 13,572 workers in construction crafts technology occupations in 2018 (Exhibit 3). The largest occupation is carpenters with 5,944 workers in 2018. This occupation is projected to grow by 5% over the next five years and has the greatest number of projected annual openings, 625.

**EXHIBIT 3. Construction crafts technology employment and occupational projections in the SCV/SML subregion**

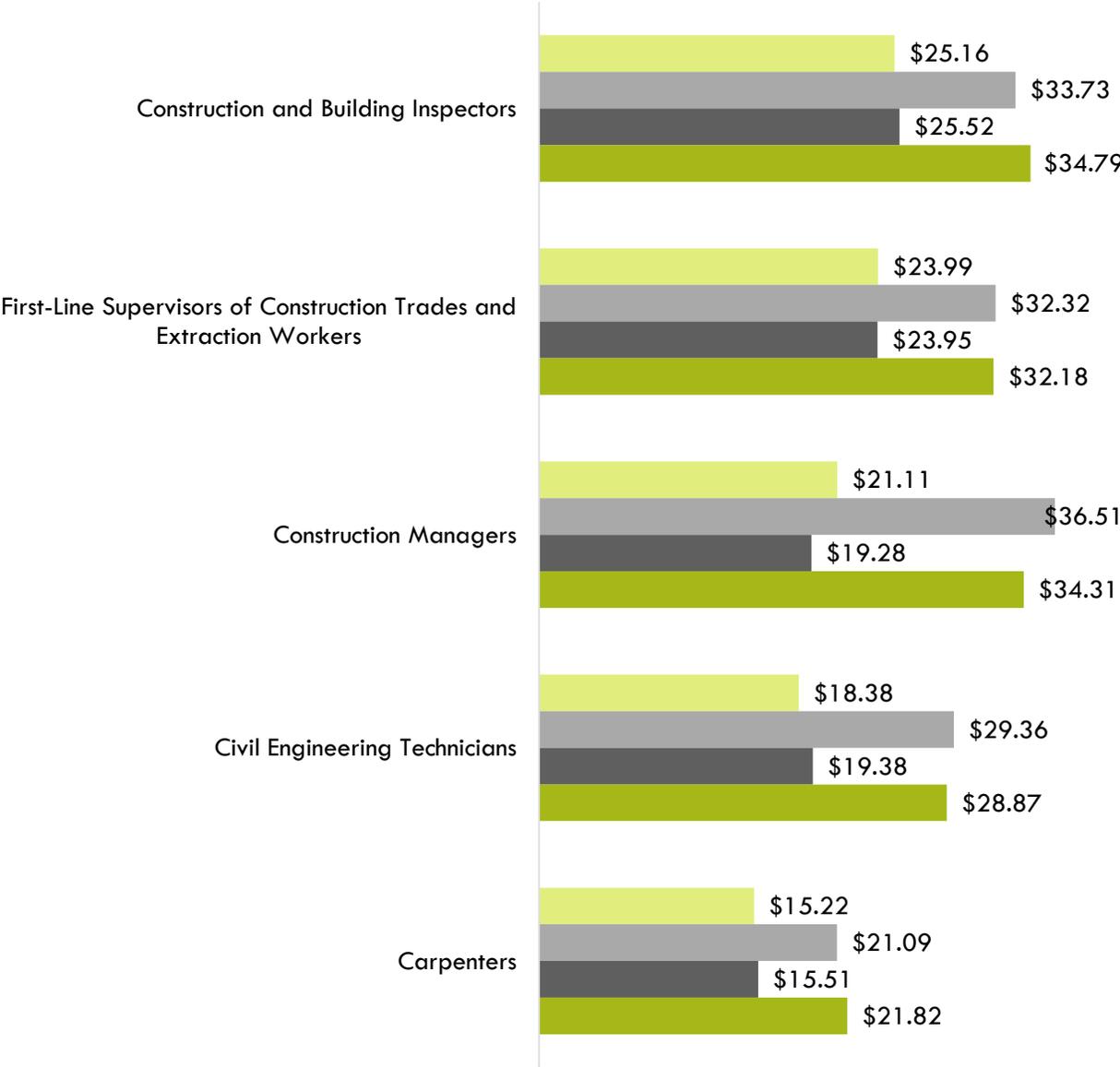
OCCUPATION	2018 JOBS	2023 JOBS	2018-2023 CHANGE	5-YEAR % CHANGE	5-YEAR CHANGE	ANNUAL OPENINGS
Carpenters	5,944	6,245	301	5%	3,127	625
First-Line Supervisors of Construction Trades and Extraction Workers	4,159	4,350	191	5%	2,273	455
Construction Managers	2,548	2,632	84	3%	979	196
Construction and Building Inspectors	584	620	36	6%	358	72
Civil Engineering Technicians	338	374	36	11%	188	38
<b>TOTAL</b>	<b>13,572</b>	<b>14,221</b>	<b>649</b>	<b>5%</b>	<b>6,925</b>	<b>1,385</b>



# WAGES

Exhibit 4 compares the entry-level and experienced wages of the construction crafts technology occupations. The entry-level wages for all five occupations exceed the region’s living wage and self-sufficiency wage for one adult. The occupation earning the highest median wages is construction and building inspectors, \$33.73/hour in the subregion and \$34.79/hour in the region.

**EXHIBIT 4. Entry-level and experienced wage comparison for construction crafts technology in the subregion and region**



■ SCV/SML Pct. 25 Hourly Wages   
 ■ SCV/SML Median Hourly Wages  
■ CVML Pct. 25 Hourly Wages   
 ■ CVML Median Hourly Wages

# JOB POSTINGS

There were 1,865 job postings for the five targeted occupations in the South Central Valley/Southern Mother Lode region from September 2018 through August 2019. The top employers advertising these job postings are listed in Exhibit 5.

**EXHIBIT 5. Top employers of construction crafts technology workers by number of job postings**

EMPLOYER	JOB POSTINGS
Lennar Corporation	23
City of Fresno	22
Quiring General	16
The Kleinfelder Group, Inc	16
Vanir Construction Management Incorporated	14
American Modular Systems Incorporated	13
Flatiron Construction	12
Top Notch Talent Management	12
State of California	12
Michaels Arts and Crafts	11

## JOB TITLES

Exhibit 6 shows how job postings for the five targeted occupations in the subregion are distributed across seven O\*NET OnLine occupations. The majority of job postings, 1,054 in total, use the occupational title construction managers, followed by first-line supervisors of construction trades and extraction workers, 328 job postings.

**EXHIBIT 6. Top occupational titles in job postings for construction crafts technology**

OCCUPATIONAL TITLE	JOB POSTINGS
Construction Managers	1,054
First-Line Supervisors of Construction Trades and Extraction Workers	328
Construction and Building Inspectors	152
Rough Carpenters	142
Civil Engineering Technicians	113
Construction Carpenters	61
Solar Energy Installation Managers	15

Analysis of the 1,865 advertised job titles for the targeted occupations reveals the top title is construction manager, occurring in 423 job postings, followed by construction superintendent, 118 job postings (Exhibit 7).

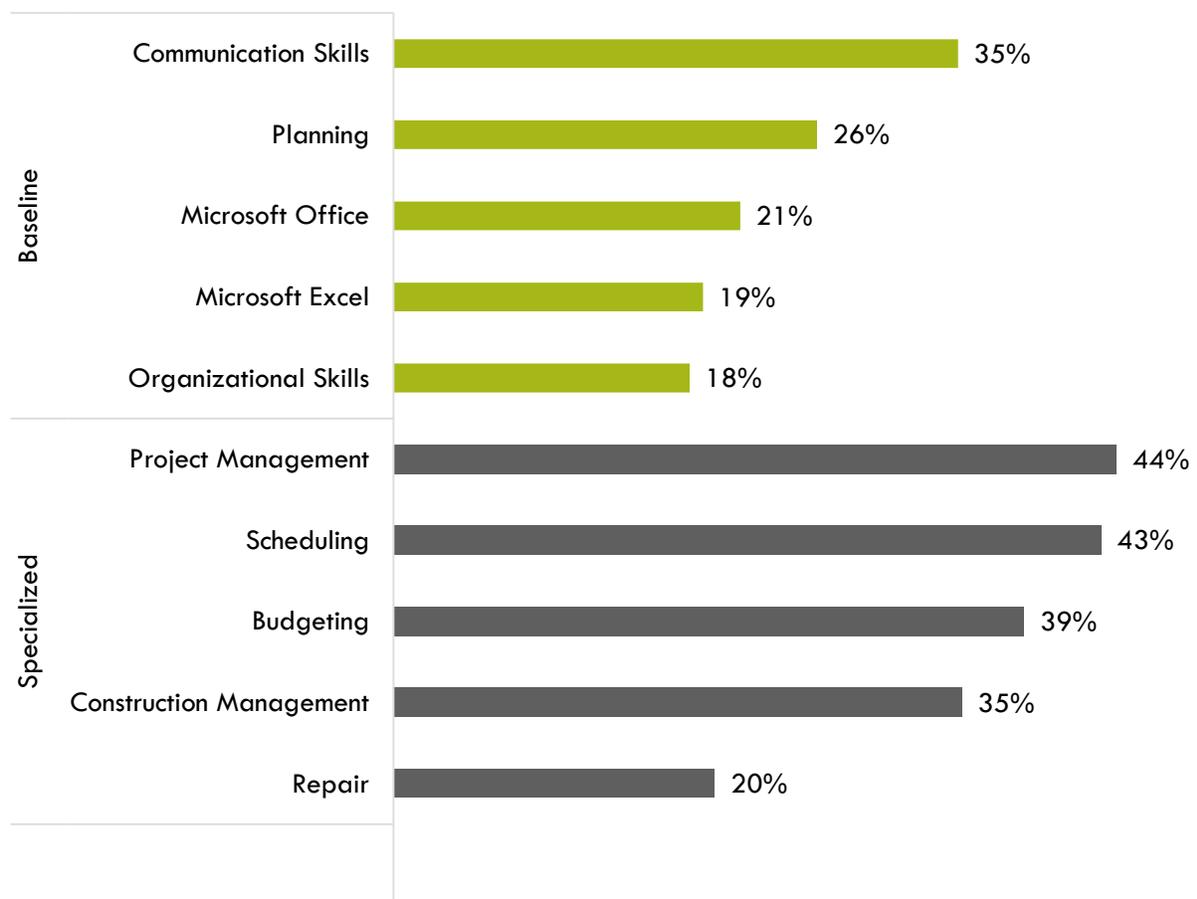
**EXHIBIT 7. Top job titles by number of job postings for construction crafts technology**

JOB TITLE	JOB POSTINGS
Construction Manager	423
Construction Superintendent	118
Carpenter	95
Superintendent	86
Project Manager	75
Engineering Technician	67
Foreman	52
Construction Inspector	48

**SKILLS**

Exhibit 8 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are communication, 35% of job postings, planning, 26%, and Microsoft Office, 21%. The top three specialized skills are project management, 44% of job postings, scheduling, 43%, and budgeting, 39%.

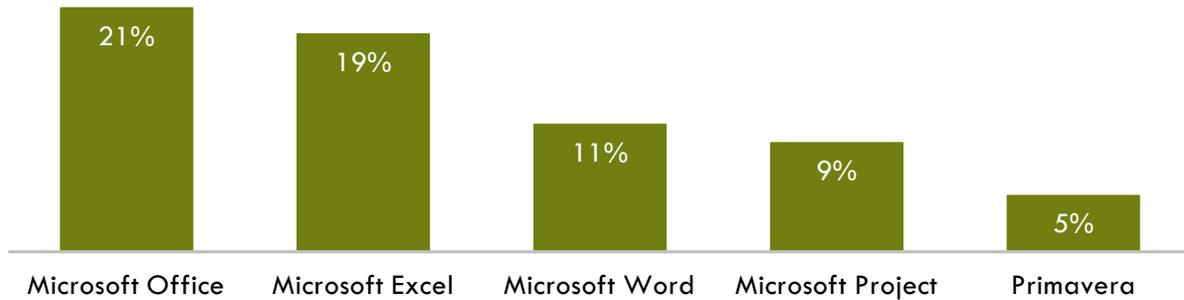
**EXHIBIT 8. In-demand construction crafts technology baseline and specialized skills**



## SOFTWARE SKILLS

Analysis also included the software skills most in demand by employers. Microsoft Office and Excel rank first and second (Exhibit 9).

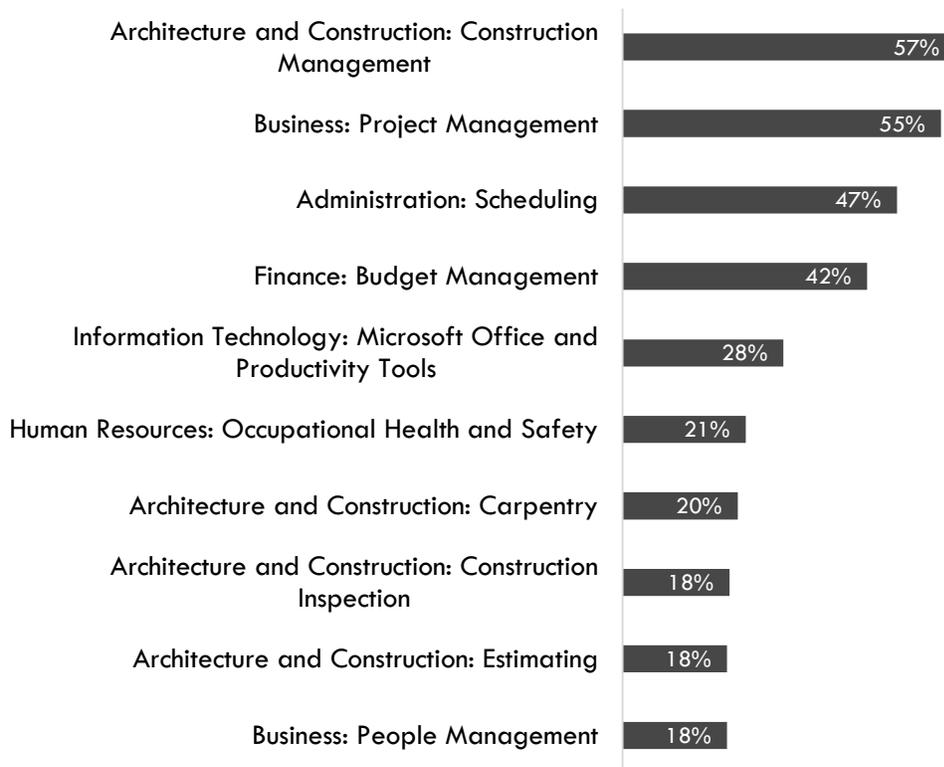
**EXHIBIT 9. In-demand construction crafts technology software skills**



## SKILL CLUSTER PROJECTIONS

Of the job postings, 1,453 postings contained skill projections. An evaluation of the skill clusters that will have the greatest gains in level of importance shows that the top areas are architecture and construction: construction management (57%); business: project management (55%); and administration: scheduling (47%) (Exhibit 10).

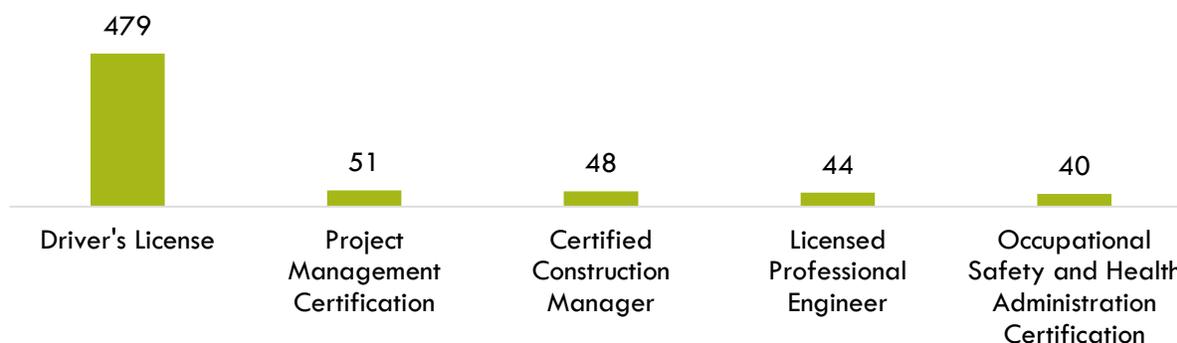
**EXHIBIT 10. Skill cluster projections for construction crafts technology**



## CERTIFICATIONS

Of the job postings, 479 indicated a need for a driver's license. The next top certifications are Project Management Certification and Certified Construction Manager (Exhibit 11).

**EXHIBIT 11. Top construction crafts technology certifications requested in job postings**



## EDUCATION, WORK EXPERIENCE AND TRAINING

All five occupations are middle-skill occupations and are relevant to community college education (Exhibit 12). A high school diploma is typically required for first-line supervisors of construction trades and extraction workers, carpenters, and construction and building inspectors. An associate degree is typically required for civil engineering technicians. Construction managers usually have bachelor's degree, but more than a third of workers in this occupation have less than a bachelor's degree making this a middle-skill occupation.

**EXHIBIT 12. Education, work experience, training and Current Population Survey results for construction crafts technology occupations<sup>1</sup>**

OCCUPATION	TYPICAL ENTRY-LEVEL EDUCATION	WORK EXPERIENCE REQUIRED	TYPICAL ON-THE-JOB TRAINING	CPS
Construction Managers	Bachelor's degree	None	Moderate-term	32.9%
Civil Engineering Technicians	Associate degree	None	None	53.6%
First-Line Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent	5 years or more	None	32.4%
Carpenters	High school diploma or equivalent	None	Apprenticeship	24.9%
Construction and Building Inspectors	High school diploma or equivalent	5 years or more	Moderate-term	45.9%

<sup>1</sup> "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

# SUPPLY

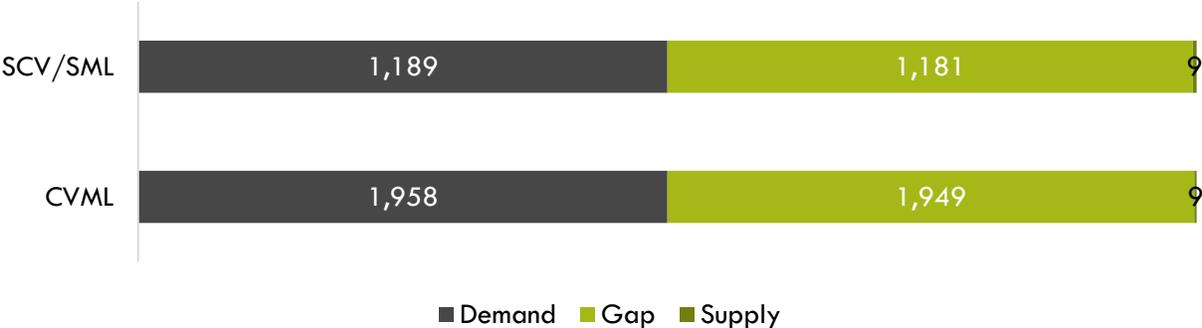
Analysis of program data from the California Community Colleges Chancellor’s Office Data Mart included one TOP code: 095200 - Construction Crafts Technology. Analysis of the last three years of TOP code data shows that, on average, nine awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 13).

**EXHIBIT 13. Postsecondary supply for construction crafts technology occupations in the region**

COLLEGES	DEGREES	CERTIFICATES	SUBTOTAL
Bakersfield	1	1	2
Fresno City	1	1	2
Sequoias	1	5	5
<b>TOTAL</b>	<b>3</b>	<b>4</b>	<b>9</b>

An undersupply of construction crafts technology appears to exist in the subregion and region. In the subregion, there is a shortage of 1,181 trained workers. In the region, the shortage is 1,949 trained workers (Exhibit 14).

**EXHIBIT 14. Construction crafts technology workforce annual demand and supply in the SCV/SML subregion and region**



# STUDENT OUTCOMES

Exhibit 15 summarizes employment and wage outcomes from the California Community College Chancellor’s Cal-PASS Plus LaunchBoard for the TOP code related to construction crafts technology. Across the region, 80 students received a degree or certificate, and 18 students transferred. Nearly 70% of students were employed in the second fiscal quarter after exit, and 61% reported a median change in earnings.

**EXHIBIT 15. Regional metrics for the TOP code related to construction crafts technology**

MERTICS	095200 - CONSTRUCTION CRAFTS TECHNOLOGY
Students Who Got a Degree or Certificate	80
Number of Students Who Transferred	18
Employed in the Second Fiscal Quarter after Exit	69% (n=251)
Median Change in Earnings	61% (n=120)
Attained a Living Wage	61% (n=175)
Job Closely Related to Field of Study	*
* denotes data not available.	

## CONCLUSION

The entry-level wages of the five targeted construction crafts technology occupations exceed the SCV/SML subregion’s self-sufficiency and living wages for one adult. There were 1,865 job postings in the past 12 months for occupations related to construction crafts technology in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is communication, and the top specialized skill is project management.
- The top software skill is Microsoft Office.
- The top certification is a driver’s license.

There is an undersupply of trained workers, a shortage of 1,181 in the subregion and 1,949 in the region.

## RECOMMENDATION

Based on these findings, it is recommended that Fresno City College work with the regional energy, construction and utilities director, the college’s advisory board and local industry in the expansion or development of programs to address the shortage of construction crafts technology in the region.

# APPENDIX A: METHODOLOGY & DATA SOURCES

## DATA SOURCES

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

DATA TYPE	SOURCE
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: <a href="http://economicmodeling.com">economicmodeling.com</a> .
Living Wage	A living wage calculator that estimates the cost of living in a specific community or region: <a href="http://livingwage.mit.edu">livingwage.mit.edu</a> .
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: <a href="http://www.bls.gov/emp/ep_education_tech.htm">www.bls.gov/emp/ep_education_tech.htm</a> .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division, <a href="http://labormarketinfo.edd.ca.gov">labormarketinfo.edd.ca.gov</a>
Job Posting and Skills Data	Burning Glass, <a href="http://www.burning-glass.com/">http://www.burning-glass.com/</a>
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: <a href="http://www.onetonline.org">www.onetonline.org</a>

## Key Terms and Concepts

**Annual Job Openings:** Annual openings are calculated by dividing the number of years in the projection period by total job openings.

**Education Attainment Level:** The highest education attainment level of workers age 25 years or older.

**Employment Estimate:** The total number of workers currently employed.

**Employment Projections:** Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

**Living Wage:** The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

**Occupation:** An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

**Percent Change:** Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

**Replacements:** Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

**Total Job Openings (New + Replacements):** Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

**Typical Education Requirement:** represents the typical education level most workers need to enter an occupation.

**Typical On-The-Job Training:** indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.

**Wages Family Compositions:** The living wage calculator estimates the living wage needed to support families. For single adult families, the adult is assumed to be employed full time. For two adult families where both adults are in the labor force, both adults are assumed to be employed full time. For two adult families where one adult is not in the labor force, one of the adults is assumed to be employed full time while the other non-wage-earning adult provides full-time child care for the family's children. Full-time work is assumed to be year-round, 40 hours per week for 52 weeks, per adult. Families with one child are assumed to have a 'young child' (4 years old). Families with two children are assumed to have a 'young child' and a 'child' (9 years old). Families with three children are assumed to have a 'young child,' a 'child,' and a 'teenager' (15 years old).