

Manufacturing and Industrial Technology

Advanced Manufacturing Technology

July 2018

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 **advanced manufacturing technology**.

The following list summarizes key findings from this data brief:

- The number of jobs for manufacturing technology-related occupations is expected to decrease by 7% through 2022. However, there will be approximately 2,201 annual job openings due to replacement need (e.g. retirements).
- The entry-level hourly wage for all of the occupations in this report is **below** the MIT Living Wage¹ estimate for the county – \$ 13.54 per hour for a single adult.
- In 2017, there were **799 employer job ads** for manufacturing technology-related occupations.
- Of the job postings that posted a minimum education requirement, the majority listed a high school diploma or vocational training. Between 24% and 39% of the current workforce has some postsecondary coursework and/or training.
- Between 2014 and 2017, community colleges in the county conferred an average of 131 awards (associate degrees and certificates) in a related training program.

Occupation Codes and Descriptions

Currently, there are six occupations in the standard occupational classification (SOC) system related to manufacturing technology. The occupation titles, descriptions, and reported job titles are included in Exhibit 1.

Exhibit 1 – Occupations, description, and sample job titles

SOC Code	Title	Description	Sample of Reported Job Titles
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend machines to saw, cut, shear, slit, punch, crimp, notch, bend, or straighten metal or plastic material.	Die Setter, Fabrication Operator, Machine Operator, Machine Setter, Operator, Press Operator, Punch Press Operator, Saw Operator, Set-Up Operator, Slitter Operator

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

51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend drilling machines to drill, bore, ream, mill, or countersink metal or plastic work pieces.	Bore Mill Operator, Computer Numerical Control Drilling Operator (CNC Drilling Operator), Drill Operator, Drill Press Operator, Drill Setup Operator, Driller, Machine Operator, Machinist, Punch Operator, Radial Drill Operator
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend grinding and related tools that remove excess material or burrs from surfaces, sharpen edges or corners, or buff, hone, or polish metal or plastic work pieces.	Cell Operator, Centerless Grinder Operator, CNC Operator (Computer Numerically Controlled Operator), Deburrer, Die Maintenance Technician, Finisher, Grinder, Grinder Operator, Grinding Machine Operator, Process Equipment Operator
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend lathe and turning machines to turn, bore, thread, form, or face metal or plastic materials, such as wire, rod, or bar stock.	Computer Numerical Control Lathe Operator (CNC Lathe Operator), Computer Numerical Control Operator (CNC Operator), Lathe Operator, Lathe Set Up Person, Machine Operator, Numerical Control Operator (NC Operator), Screw Machine Operator, Screw Machine Tool Setter, Set Up / Operator, Turn Operator
51-4035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend milling or planing machines to mill, plane, shape, groove, or profile metal or plastic work pieces.	CNC Machine Operator (Computerized Numerical Control Machine Operator), CNC Mill Operator (Computerized Numerical Control Mill Operator), CNC Mill Set Up Operator (Computerized Numerical Control Mill Set Up Operator), CNC Operator (Computerized Numerical Control Operator), CNC Programmer (Computerized Numerical Control Programmer), Machine Operator, Mill Operator, Miller, Milling Operator, Set Up Person

51-4041	Machinists	Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.	Gear Machinist, Journeyman Machinist, Machine Operator, Machine Repair Person, Machinist, Maintenance Machinist, Maintenance Specialist, Production Machinist, Set-Up Machinist, Tool Room Machinist
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Source: O*NET Online

Current and Future Employment

In Los Angeles County, the number of jobs for occupations related to manufacturing technology is expected to decrease by 7% over the next five years. Approximately 2,201 job opportunities will be available annually for this occupation group through 2022 due to replacement need (e.g., retirements). Exhibit 2 contains detailed employment projections data for this occupation group.

Exhibit 2 – Five-year projections for manufacturing technology-related occupations

SOC	Occupation	2017 Jobs	2022 Jobs	2017-2022 Change	2017-2022 % Change	Annual Openings
51-4041	Machinists	11,861	11,700	(161)	(1%)	1,180
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	4,623	4,000	(623)	(13%)	487
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2,776	2,377	(399)	(14%)	274
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	1,437	1,260	(177)	(12%)	133
51-4035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	867	728	(139)	(16%)	85
51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	421	363	(58)	(14%)	42
Total		21,985	20,428	(1,557)	(7%)	2,201

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

Earnings

In Los Angeles County, the entry-level average wage for manufacturing technology-related occupations is between \$10.39 and \$12.23 per hour, which is below 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 \$31,915 and \$44,590 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 manufacturing technology-related occupations

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings	Average Annual Earnings
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	\$12.23	\$17.32	\$26.91	\$38,265
51-4035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	\$11.85	\$20.91	\$32.88	\$44,590
51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	\$11.05	\$16.05	\$29.45	\$38,517
51-4041	Machinists	\$10.78	\$17.99	\$29.17	\$39,436
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	\$10.57	\$14.76	\$24.45	\$33,495
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	\$10.39	\$13.70	\$23.52	\$31,915

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

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, and what they are looking for in potential candidates. To identify job postings related to manufacturing technology, the SOC codes in Exhibit 1 were used.

Top Titles

The most common job titles for manufacturing technology-related jobs are listed in Exhibit 4. Machinist was mentioned in 65% of all relevant job postings (522 out of 799 postings).

Exhibit 4 –Job titles (n=799)

Title	Job Postings, Full Year 2017
Machinist	522
Brake Press Operator	57
Grinder	47
Press Operator	35
CNC Lathe Machinist	25
Operator	12

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 5 lists the major employers hiring manufacturing workers. Top employers postings job ads included SpaceX, Arconic Inc., and LSI Aerospace. The top worksite cities in the region for these jobs were: Los Angeles, Torrance, Hawthorne, Santa Clarita, and City of Industry.

Exhibit 5 – Top employers (n=365)

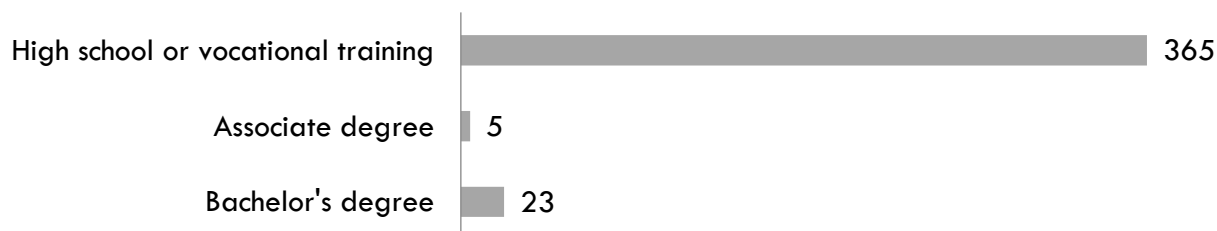
Employer	Job Postings, Full Year 2017
SpaceX	31
Arconic Inc	26
LSI Aerospace	21
Butler Aerospace & Defense	18
Precision Castparts	18
Moog Incorporated	13
Esterline Technologies Corporation	9
Lockheed Martin Corporation	9
Northrop Grumman	8
Triumph Group Incorporated	8
Aerojet	7

Source: Labor Insight/Jobs (Burning Glass)

Advertised Education Levels

Exhibit 6 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 51% of job postings did not specify a level of education.

Exhibit 6 – Advertised education requirements for manufacturing technology-related occupations (n=393)



Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 7 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 24% and 39% of the workforce has completed some community college education as their highest level of education.

Exhibit 7 – Education and training requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training	% of Community College Award Holders or Some Postsecondary Coursework
51-4041	Machinists	HS diploma/equivalent	Long-term	39%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	HS diploma/equivalent	Moderate-term	24%
51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	HS diploma/equivalent	Moderate-term	24%
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	HS diploma/equivalent	Moderate-term	24%

51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	HS diploma/equivalent	Moderate-term	24%
51-4035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	HS diploma/equivalent	Moderate-term	24%

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

In Los Angeles County, nine community colleges have conferred awards in programs that train students for the occupations studied in the report. Between 2014 and 2017, there was an average of 131 community college awards conferred annually across two programs: manufacturing and industrial technology (0956.00) and machining and machine tools (0956.30).

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 8 – CCC Student Awards (by TOP and College)

TOP Code	Program	College	2014-15 Awards	2015-16 Awards	2016-2017 Awards	3-Year Award Average
0956.00	Manufacturing and Industrial Technology	Cerritos	21	4	3	9
		El Camino	2	1	3	2
		LA Valley	9	3	4	5
		Mt San Antonio	18	12	19	16
Subtotal/Average			50	20	29	33
0956.30	Machining and Machine Tools	Cerritos	16	10	22	16
		Compton	2	5	3	3
		El Camino	19	53	39	37
		Glendale	6	8	2	5
		LA Pierce	4	1	9	5
		LA Trade	27	19	18	21
		LA Valley	3	16	7	9
		Pasadena	1	5	N/A	3
Subtotal/Average			78	117	100	98
Total			128	137	129	131

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 Manufacturing and Industrial Technology Taxonomy of Program (TOP) code (0956.00) in Los Angeles County for the 2015-16 academic year.

- Median earnings in the second fiscal quarter after program completion is \$8,000
- 54% of students are earning a living wage
- 72% of students are employed within six months after completing a program

Machining and Machine Tools Taxonomy of Program (TOP) code (0956.30)

- Median earnings in the second fiscal quarter after program completion is \$10,387
- 64% of students are earning a living wage
- 73% 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 manufacturing technology. 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.