** Manufacturing Occupations**

**Labor Market Information Report**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

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# Recommendation

Based on all available data, there appears to be an undersupply of Manufacturing workers compared to the demand for this cluster of occupations in the Bay region and the Santa Cruz-Monterey sub-region (Monterey, San Benito and Santa Cruz Counties). The annual gap between demand and supply is 435 in the region and 24 in the SC-Monterey sub-region.

This report also provides student outcomes data on employment and earnings for Manufacturing and Industrial Technology programs (TOP 0956.00) in the state, region and sub-region. It is recommended that this data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to outcomes for students across all CTE TOP codes in the region and state.

# Introduction

This report profiles Manufacturing occupations in the 12 county Bay region and the SC-Monterey sub-region (Monterey, San Benito and Santa Cruz counties) for a proposed new Manufacturing program at Hartnell College. Two occupations (SOC codes) for Computer-Controlled Machine Tool Programmers and Operators were added to Industrial Engineering Technicians (the only SOC code listed in the LMI application submitted by Hartnell College) based on the description of the proposed program: “Engineering principles and technical skills for the manufacture of products and related industrial processes. Includes shaping and forming operations, materials handling, instrumentation and controls, and quality control. Includes Computer Aided Manufacturing and robotics. Also includes optimization theory, industrial and manufacturing planning, and related management skills.”

* **Industrial Engineering Technician (SOC 17-3026)**: Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.

*Entry-Level Educational Requirement:* *Associate Degree*

*Training Requirement:* *None*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:* 54%

* **Computer-Controlled Machine Tool Operators, Metal and Plastic (SOC 51-4011)**: Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.

*Entry-Level Educational Requirement:* *High school diploma or equivalent*

*Training Requirement:* *Moderate-term on-the-job training*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:* 45%

* **Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic (SOC 51-4012)**: Develop programs to control machining or processing of metal or plastic parts by automatic machine tools, equipment, or systems.

*Entry-Level Educational Requirement:* *Postsecondary non-degree award*

*Training Requirement:* *Moderate-term on-the-job training*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:* 45%

# Occupational Demand

**Table 1. Employment Outlook for Manufacturing Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-year Open-ings | Annual Open-ings | 10% Hrly Wage | Median Hrly Wage |
| Industrial Engineering Technicians | 1,343 | 1,427 | 84 | 6% | 677 | 135 | $19.56 | $30.70 |
| Computer-Controlled Machine Tool Operators, Metal & Plastic | 1,824 | 2,077 | 253 | 14% | 1,218 | 244 | $11.72 | $19.20 |
| Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic | 611 | 673 | 62 | 10% | 376 | 75 | $19.84 | $32.28 |
| **Total** | **3,777** | **4,177** | **400** | **11%** | **2,270** | **454** | **$15.82** | **$25.41** |

*Source: EMSI 2018.1*

**Bay Region** includes Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

**Table 2. Employment Outlook for Manufacturing Occupations in SC-Monterey Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-year Open-ings | Annual Open-ings | 10% Hrly Wage | Median Hrly Wage |
| Industrial Engineering Technicians | 34 | 40 | 5 | 15% | 21 | 4 | $17.74 | $28.28 |
| Computer-Controlled Machine Tool Operators, Metal & Plastic | 107 | 130 | 22 | 21% | 80 | 16 | $10.00 | $11.15 |
| Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic | 24 | 28 | 4 | 19% | 17 | 3 | $15.48 | $24.59 |
| **Total** | **166** | **198** | **32** | **19%** | **118** | **24** | **$12.40** | **$16.64** |

*Source: EMSI 2018.1*

**SC-Monterey Sub-Region** includes Monterey, San Benito, and Santa Cruz Counties

### Job Postings in Bay Region and Santa Cruz-Monterey Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (March 2017 – February 2018)**

|  |  |  |
| --- | --- | --- |
| Occupation at 8 Digit SOC Code Level | Bay | SC-Monterey |
| Computer-Controlled Machine Tool Operators, Metal & Plastic (51-4011.00) | 149 | 3 |
| Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic (51-4012.00) | 115 | 7 |
| Industrial Engineering Technicians (17-3026.00) | 52 | 0 |
| **Total** | **316** | **10** |

*Source: Burning Glass*

**Table 4. Top Job Titles for Manufacturing Occupations for latest 12 months (March 2017 – February 2018)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Common Title | Bay | SC-Monterey |  | Common Title | Bay | SC-Monterey |
| CNC Programmer | 90 | 6 |  | Industrial Technician | 11 | 0 |
| CNC Operator | 76 | 0 |  | Cnc Service Engineer | 10 | 0 |
| Engineering Technician | 19 | 0 |  | CNC Lathe Operator | 6 | 0 |
| CNC Machine Operator | 16 | 1 |  | CNC Machinist | 6 | 1 |
| Angular Js | 11 | 0 |  | Machine Operator | 6 | 0 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Manufacturing Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Industry – 3 Digit NAICS (No. American Industry Classification) Codes** | **Jobs in Industry (2017)** | **Jobs in Industry (2022)** | **% Change (2017-22)** | **% in Industry (2017)** |
| Computer and Electronic Product Manufacturing (334) | 1,051 | 1,063 | 1% | 27.8% |
| Fabricated Metal Product Manufacturing (332) | 1,010 | 1,166 | 15% | 26.8% |
| Machinery Manufacturing (333) | 475 | 547 | 15% | 12.6% |
| Miscellaneous Manufacturing (339) | 194 | 204 | 5% | 5.1% |
| Professional, Scientific, and Technical Services (541) | 185 | 222 | 20% | 4.9% |
| Transportation Equipment Manufacturing (336) | 172 | 182 | 6% | 4.5% |
| Chemical Manufacturing (325) | 140 | 173 | 24% | 3.7% |
| Electrical Equipment, Appliance, and Component Manufacturing (335) | 88 | 109 | 24% | 2.3% |
| Administrative and Support Services (561) | 68 | 82 | 21% | 1.8% |
| Primary Metal Manufacturing (331) | 59 | 55 | (7%) | 1.6% |
| Plastics and Rubber Products Manufacturing (326) | 55 | 59 | 7% | 1.4% |
| Unclassified Industry (999) | 43 | 62 | 44% | 1.1% |
| Food Manufacturing (311) | 39 | 44 | 13% | 1.0% |

*Source: EMSI 2018.1*

**Table 6. Top Employers Posting Manufacturing Occupations in Bay Region and SC-Monterey Sub-Region for latest 12 months (March 2017 – February 2018)**

Note: 50% to 59% of records have been excluded because they do not include an employer. As a result, the chart below may not be representative of the full sample.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Employer** | **Bay** | **Employer** | **Bay** | **Employer** | **SC-Monterey** |
| Benchmark Electronics | 13 | Sti Incorporated | 5 |  |  |
| Ametek Incorporated | 6 | Fox Factory Inc | 5 | Fox Factory Inc | 5 |

*Source: Burning Glass*

# Educational Supply

On the supply side, for Manufacturing and Industrial Technology (TOP 0956.00), there are two community college in the Bay region issuing 16 awards annually and one other postsecondary institution issuing three awards annually for a total of 19 awards annually. There are no community colleges in the Santa Cruz-Monterey sub-region issuing awards on this TOP code.

**Table 7. Manufacturing and Industrial Technology Programs (TOP 0956.00) and Product Design (CIP 50.0404) in the Bay Region**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| College | Sub-Region | CC Headcount | Associate Degrees | Certificates or Other Credit Awards | Total Awards |
| Chabot Hayward | East Bay | 433 | 0 | 0 | 0 |
| DeAnza | Silicon Valley | 336 | 4 | 11 | 15 |
| Diablo Valley | East Bay | 43 | 0 | 0 | 0 |
| San Francisco | Mid-Peninsula | n<10 | 0 | 1 | 1 |
| San Jose | Silicon Valley | 96 | 0 | 0 | 0 |
| Santa Rosa | North Bay | 246 | 0 | 0 | 0 |
| Solano | North Bay | 57 | 0 | 0 | 0 |
| Academy of Art University | Mid-Peninsula | n/a | 3 | 0 | 3 |
| **Total Bay Region** | | **1,210** | **7** | **12** | **19** |
| **Total SC-Monterey Sub-Region** | | **0** | **0** | **0** | **0** |

# *Sources: IPEDS, Data Mart and Launchboard*

NOTE: For Community Colleges, the annual average for Associate Degrees and Certificates is 2014-17. Headcount is for 2016-17. For the other educational postsecondary institute, the annual average for awards is 2013-16 from IPEDS.

# Gap Analysis

The labor market gap is significant in the Bay region for this cluster of occupation with total annual openings of 454 and annual supply of 19 awards. This represents an annual undersupply of 435 students. In the SC-Monterey sub-region, there is also a gap with total annual openings of 24 and no awards on this TOP code in the sub-region.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0956.00 – Manufacturing and Industrial Technology**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **2014-15** | **Bay Region (All CTE Programs)** | **Hartnell**  **(All CTE Programs)** | **State (0956.00)** | **Bay Region (0956.00)** | **Top Colleges on TOP 0956.00 in Bay Region** | |
| % Employed Four Quarters After Exit | 74% | 81% | 75% | 76% | San Jose City | 89%  (27 students) |
| Median Earnings Two Quarters After Exit | $10,310 | $24,415 | $10,020 | $11,655 | Diablo Valley | $18,730  (3 students) |
| Median % Change in Earnings | 46% | 20% | 54% | 50% | Chabot | 71%  (n/a but could be up to 48 students ) |
| % of Students Earning a Living Wage | 63% | 79% | 67% | 75% | San Jose City | 94%  (18 students) |

*Source: Launchboard (version available on 3/20/18)*

# Skills, Certifications and Education

**Table 9. Top Skills for Manufacturing Occupations in Bay Region (March 2017 – February 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Skill** | **Postings** | **Skill** | **Postings** | **Skill** | **Postings** |
| Computer Numerical Control (CNC) | 217 | Machine Tools | 43 | Microsoft Office | 21 |
| Machining | 138 | Machinery | 40 | Siemens Nixdorf Hardware | 20 |
| Inspection | 77 | Micrometers | 40 | G-Code | 19 |
| Repair | 61 | Calipers | 39 | CAD/CAM | 18 |
| Lathes | 59 | Scheduling | 38 | Computer Aided Manufacturing (CAM) | 18 |
| Microsoft Excel | 47 | Machine Operation | 33 | Microsoft Word | 18 |
| Computer Aided Drafting/Design (CAD) | 45 | Computerized Numerical Control Lathes | 24 | CNC Machine | 17 |

*Source: Burning Glass*

**Table 10. Top Certifications for Manufacturing Occupations in Bay Region**

Note: 91% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

|  |  |
| --- | --- |
| **Certification** | **Postings** |
| First Aid Cpr Aed | 6 |
| Machinist Certification | 5 |
| Hazardous Materials Certification | 4 |

*Source: Burning Glass*

**Table 11. Education Requirements for Advanced Manufacturing Occupations in Bay Region**

Note: 56% of records have been excluded because they do not include a degree level. As a result, the chart below may not be representative of the full sample.

|  |  |
| --- | --- |
| **Education (minimum advertised)** | **Latest 12 Mos. Postings** |
| High school or vocational training | 83 (60%) |
| Associate Degree | 25 (18%) |
| Bachelor’s Degree or Higher | 31 (22%) |

*Source: Burning Glass*

# Methodology

Occupations for this report were identified by use of skills listed in O\*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCO Data Mart.

# Sources

O\*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard [www.calpassplus.org/Launchboard/](http://www.calpassplus.org/Launchboard/)

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor’s Office MIS system

# Contacts

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