JOB OPPORTUNITIES IN ADVANCED MANUFACTURING

CONTRA COSTA COUNTY

JUNE 2013

WORKFORCE Development Board Contra Costa County
Building Futures

Job Opportunities in Advanced Manufacturing

Contra Costa County
June 2013

Workforce Development Board of Contra Costa County

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Priority Occupations

Employer Hiring Needs

A key question in the workforce needs assessment survey of advanced manufacturing firms asked employers about jobs for which they have "significant difficulty finding qualified applicants." This question identifies the workforce needs of employers and indicates the relationship between occupational supply and demand. When carefully analyzed, the result is a list of *Priority Occupations* that often reflect the presence of skilled labor shortages, skill gaps, or training program deficiencies. For the job seeker, these occupations represent employment opportunities.

Occupational employment projections, in contrast, only show the employment demand (estimated jobs and job openings) and does not indicate the relationship between occupational supply and demand. For example, employment demand in the local area may indicate 1,000 job openings for the fastest growing occupation (over a given outlook period). But what if all the training programs for that occupation (and that outlook period) were preparing twice as many trainees as is needed to meet the demand? ? Oversupplying an occupation can result in serious labor market problems including unemployment, underemployment, and inefficient use of training resources. It's also extremely discouraging to job seekers to complete a training program and then find that you can't get a job related to the training program. Or that it could take years to get a training-related job.

Another method sometimes used to assess occupational supply and demand is to compare numbers from occupational employment projections with numbers from education/training program statistics. This method can be useful at times, but it can also offer an incomplete picture of supply and demand due to unreliable statistics and incomplete labor supply data. For example, employers often prefer to hire job seekers with previous experience rather than hire recent graduates or program completers, and there are no numbers to tell us about this portion of the supply population.

Employers that are having significant difficulty finding qualified applicants is a key labor market indicator and a relatively reliable assessment of occupational supply and demand. The survey responses to this question, therefore, not only indicate the workforce needs of employers in each subsector, but also serve as a tool to help us determine a list of the "Top Priority Occupations" for advanced manufacturing employers in Contra Costa County.

Top Priority Occupations at a Glance

(grouped by general skill level, sorted by earnings)

HIGHER SKILL JOBS	2013 Jobs	2018 Jobs	% Change	Net New Jobs	Replace-ments	Total Openings	Median Earnings
Chemical Engineers	84	85	1%	1	14	15	$68.34
Industrial Production Managers	340	346	2%	6	41	47	$58.89
Electrical Engineers	443	464	5%	21	54	75	$49.55
Industrial Engineers	386	390	1%	4	44	48	$48.85
Mechanical Engineers	388	410	6%	22	62	84	$43.88
Software Developers, Applications	1,629	1,649	1%	20	97	117	$43.68
Electronics Engineers (Except Computer)	411	434	6%	23	50	73	$43.53
Cost Estimators	593	646	9%	53	56	109	$34.63
MIDDLE SKILL JOBS	**2013 Jobs**	**2018 Jobs**	**% Change**	**Net New Jobs**	**Replace-ments**	**Total Openings**	**Median Earnings**
Electricians	1,231	1,329	8%	98	166	264	$38.48
Industrial Machinery Mechanics	454	516	14%	62	43	105	$35.76
Millwrights	99	98	-1%	-1	11	10	$31.70
Electrical and Electronics Repairers, Commercial and Industrial Equipment	118	121	3%	3	15	18	$31.03
Chemical Plant and System Operators	48	43	-10%	-5	13	8	$27.71
Machinists	320	317	-1%	-3	35	32	$23.99
Heavy and Tractor-Trailer Truck Drivers	1,565	1,564	0%	-1	187	186	$21.53
Prepress Technicians and Workers	104	90	-13%	-14	27	13	$18.14
LOWER SKILL JOBS	**2013 Jobs**	**2018 Jobs**	**% Change**	**Net New Jobs**	**Replace-ments**	**Total Openings**	**Median Earnings**
Maintenance Workers, Machinery	116	117	1%	1	11	12	$29.33
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	23	23	0%	0	3	3	$20.74
Maintenance and Repair Workers, General	2,498	2,619	5%	121	229	350	$20.37
Printing Press Operators	177	178	1%	1	19	20	$17.27
Computer-Controlled Machine Tool Operators, Metal and Plastic	57	64	12%	7	5	12	$17.09
Light Truck or Delivery Services Drivers	1,950	2,068	6%	118	193	311	$14.75
Print Binding and Finishing Workers	39	39	0%	0	7	7	$14.63
Team Assemblers	759	719	-5%	-40	118	78	$13.44
Laborers and Freight, Stock, and Material Movers, Hand	3,636	3,730	3%	94	602	696	$12.42
Driver/Sales Workers	779	868	11%	89	75	164	$11.30

Data for Contra Costa County

Method for Determining the "Top Priority Occupations"

Based on the responses to our supply/demand survey question, the first step was to convert the raw survey job titles to comparable (sortable) titles. The titles were then sorted by sub-sector and included the overall number of workers reported by each employer.

The second step involved analyzing job titles and employment data to filter out titles that represent very few jobs or employment opportunities. We looked for titles that were reported by at least three employers in the survey or, if less than three, that represented a significant number of job opportunities. We also considered the employer's reasons given for why they had significant difficulty finding qualified applicants for those jobs.

The third step was to validate the occupations on the refined list with occupational employment projections to ensure that they had a good number of job opportunities across all industry sectors for that occupation. The data was cross-checked between survey responses and occupational employment projections.

Finally, the list was sorted and filtered for the Priority Occupations based on the number of projected job openings that were identified in the workforce needs assessment survey by the employers. These important occupations are listed in the previous table (grouped by high, middle and low skill jobs), and are also profiled in detail in the section entitled Priority Occupation Profiles. The detailed profiles include descriptions, qualifications and skill requirements, training options, and career pathways.

Middle-skill occupations include jobs that generally require at least one year of skills development beyond high school but less than a bachelor's degree. The postsecondary skills development may include education or training, or on-the-job training, or apprenticeship training, or occupations that generally require one year or more of previous work experience.

Definitions Used in the Top Priority Occupations Table

Middle Skill Jobs	There has been much discussion in recent years about the importance of "middle skill jobs," with the common definition of "more than high school but less than a bachelor's degree." Middle-skill occupations are defined here as including jobs that generally require at least one year of skills development beyond high school but less than a bachelor's degree. The postsecondary skills development may include education or training, or on-the-job training, or apprenticeship training, or occupations that generally require one year or more of previous work experience.
2013 Jobs	Estimated employment in Contra Costa County for the 2013 base year.
2018 Jobs	Projected employment in Contra Costa County for the year 2018.
% Change	Growth rate in Contra Costa County over the 5 year projections period. Divide this number by 5 to get an annual growth rate, although keep in mind that employers don't usually grow at a constant yearly rate.
Net New Jobs	The difference between the estimated 2013 employment and the projected 2018 employment.
Replacements	Replacement jobs are the result of workers leaving the occupation or labor force and, as a result, creating an opportunity for someone new to work in the occupation. Turnover includes replacements, but also includes jobs that need to be filled due to workers who simply move from one employer to another – without leaving the same occupation.
Total Openings	Combined new jobs and replacement jobs in Contra Costa County (but doesn't include the kind of turnover where people change jobs without also changing occupations).
Median Earnings	The median wage in Contra Costa County divides the earnings distribution into two equal parts: one-half of the cases falling below the median and one-half above the median.
EMSI	Economic Modeling Specialists Intl. is a firm that provides high-quality employment data and economic analysis. www.economicmodeling.com/Share

Other Occupations In-Demand But Not Identified As Priority Occupations

(grouped by general skill level, sorted by earnings)

HIGHER SKILL JOBS	2013 Jobs	2018 Jobs	% Change	Net New Jobs	Replace-ments	Total Openings	Median Earnings
Architectural and Engineering Managers	187	168	-12%	-23	43	20	$76.01
Civil Engineers	15	17	21%	3	0	3	$48.01
Aerospace Engineers	92	65	-34%	-33	46	13	$46.16
Financial Analysts	188	175	-7%	-14	40	26	$44.55
Chemists	172	152	-13%	-22	48	26	$36.37
MIDDLE SKILL JOBS	**2013 Jobs**	**2018 Jobs**	**% Change**	**Net New Jobs**	**Replace-ments**	**Total Openings**	**Median Earnings**
General and Operations Managers	319	290	-11%	-36	65	29	$51.43
Geological and Petroleum Technicians	324	332	4%	13	42	55	$38.40
Petroleum Pump System Operators, Refinery Operators, and Gaugers	1,176	1,094	-8%	-92	275	183	$35.62
Crane and Tower Operators	26	34	36%	9	-6	3	$35.47
First-Line Supervisors of Production and Operating Workers	508	505	-1%	-7	48	41	$33.83
Carpenters	25	28	17%	4	-1	3	$30.24
Chemical Technicians	167	143	-16%	-28	39	11	$24.68
LOWER SKILL JOBS	**2013 Jobs**	**2018 Jobs**	**% Change**	**Net New Jobs**	**Replace-ments**	**Total Openings**	**Median Earnings**
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	217	222	3%	6	36	42	$30.63
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	102	112	10%	10	11	21	$27.30
Mixing and Blending Machine Setters, Operators, and Tenders	347	326	-7%	-23	73	50	$20.76
Industrial Truck and Tractor Operators	253	258	1%	2	37	39	$20.23
Metal-Refining Furnace Operators and Tenders	25	42	83%	19	0	19	$19.83
Inspectors, Testers, Sorters, Samplers, and Weighers	365	367	0%	-1	43	42	$19.55
Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	17	22	38%	6	8	14	$19.31
Customer Service Representatives	182	172	-7%	-13	49	36	$18.79
Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	94	139	60%	52	4	56	$17.62
Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	13	16	23%	3	0	3	$15.52
Shipping, Receiving, and Traffic Clerks	248	231	-9%	-24	56	32	$14.18
Food Batchmakers	92	109	6%	6	24	30	$14.08
Pourers and Casters, Metal	38	47	27%	10	4	14	$13.09

Helpers--Production Workers	334	342	0%	1	28	29	$13.08
Packaging and Filling Machine Operators and Tenders	384	415	6%	22	28	50	$12.28
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	61	77	28%	17	0	17	$11.34
Driver/Sales Workers	34	44	42%	13	-5	8	$11.30
Bakers	107	116	9%	10	15	25	$10.98
Cleaners of Vehicles and Equipment	25	29	16%	4	1	5	$10.19
Cooling and Freezing Equipment Operators and Tenders	11	14	40%	4	0	4	$9.81
Packers and Packagers, Hand	161	171	0%	0	27	27	$9.53
Food Preparation Workers	12	14	17%	2	2	4	$9.15

Data for Contra Costa County

Priority Occupation Profiles

Index of Priority Occupation Profiles

Priority Occupation Profile for

Chemical Engineers

What They Do

Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering.

AKA: Absorption/Adsorption Engineer; Biochemical Engineer; Chemical Engineer; Explosives Engineer; Fuels Engineer; Gas Combustion Engineer; Lubricating Engineer; Plastics Engineer; Process Engineer; Sand Analyst; Supplier Quality Engineer (SQE); Validation Engineer

Common Tasks:

- Evaluate chemical equipment and processes to identify ways to optimize performance or to ensure compliance with safety and environmental regulations.
- Troubleshoot problems with chemical manufacturing processes.
- Develop processes to separate components of liquids or gases or generate electrical currents using controlled chemical processes.
- Develop safety procedures to be employed by workers operating equipment or working in close proximity to on-going chemical reactions.
- Determine most effective arrangement of operations such as mixing, crushing, heat transfer, distillation, and drying.
- Perform laboratory studies of steps in manufacture of new product and test proposed process in small scale operation such as a pilot plant.
- Conduct research to develop new and improved chemical manufacturing processes.
- Design and plan layout of equipment.
- Prepare estimate of production costs and production progress reports for management.
- Direct activities of workers who operate or who are engaged in constructing and improving absorption, evaporation, or electromagnetic equipment.
- Design measurement and control systems for chemical plants based on data collected in laboratory experiments and in pilot plant operations.

O*NET Link: http://www.onetonline.org/link/details/17-2041.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Entry-level engineers usually begin their careers as junior engineers, working under the supervision of experienced engineers. As they gain experience and knowledge, they generally advance to positions of greater responsibility. For engineers, advancement can lead to senior engineer, project manager, research & development manager, and vice president for engineering. Some become consultants or start their own engineering firms. Those with a graduate degree can also become college and university professors.

Career Pathway Group: Science, Technology, Engineering and Mathematics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$36.06	$45.60	$68.34	$79.01	$96.29
Alameda Co:	$29.21	$36.94	$55.36	$64.00	$77.99
East Bay Region:	$31.99	$40.46	$60.64	$70.10	$85.43
California:	$31.07	$37.86	$46.03	$62.55	$79.17
United States:	$28.55	$35.12	$44.68	$55.98	$70.50

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace -ments***	***Total Openings***
Contra Costa Co:	84	85	1%	1	14	15
Alameda Co:	128	147	15%	19	20	39
East Bay Region:	211	232	10%	21	33	54
California:	2,068	2,266	10%	198	330	528
United States:	28,821	30,098	4%	1,277	5,248	6,525

Key Industries

National Employment Matrix	% of jobs
Research and development in the physical, engineering, and life sciences	12
Basic chemical manufacturing	11.6
Resin, synthetic rubber, and artificial synthetic fibers and filaments mfg.	7
Pharmaceutical and medicine manufacturing	5.4
Petroleum and coal products manufacturing	4.6
Federal government, excluding postal service	4.3
Oil and gas extraction	3
Colleges, universities, and professional schools; State	2.7
Other chemical product and preparation manufacturing	2.3
Management of companies and enterprises	2.1
Chemical and allied products merchant wholesalers	2

Most Important Knowledge, Skills & Abilities

- Engineering or Technology Knowledge
- Making Decisions and Solving Problems (by evaluating information)
  - resolve engineering or science problems
  - use intuitive judgment for engineering analyses
- Chemistry Knowledge
- Getting Information (from all relevant sources)
  - collect scientific or technical data
  - read technical drawings
- Analyzing Data or Information
  - analyze chemical experimental, test, or analysis data or findings
  - analyze engineering design problems
  - analyze engineering test data
  - analyze project proposal to determine feasibility, cost, or time
  - analyze scientific research data or investigative findings
  - analyze technical data, designs, or preliminary specifications
  - analyze test data
  - conduct laboratory research or experiments
  - conduct standardized qualitative laboratory analyses
  - conduct standardized quantitative laboratory analyses
  - evaluate costs of engineering projects
  - evaluate engineering data
  - evaluate manufacturing or processing systems
  - provide analytical assessment of engineering data
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
  - develop or maintain databases
  - use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
  - use computers to enter, access or retrieve data
  - use relational database software
  - use spreadsheet software
  - use word processing or desktop publishing software
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
  - confer with engineering, technical or manufacturing personnel
  - confer with research personnel
- Mathematics Knowledge
- Science Skills
- Updating and Using Relevant Knowledge
- Organizing, Planning, and Prioritizing Your Work
- Problem Sensitivity (ability to tell when something is wrong or is likely to go wrong)
- Information Ordering (ability to arrange things or actions in a certain order or pattern)
- Complex Problem Solving Skills
- Critical Thinking Skills
- Processing Information
- Physics Knowledge
- Mathematical Reasoning Abilities (choosing the right mathematical methods or formulas to solve a problem)
- Thinking Creatively

Local Programs University of California-Berkeley - http://www.berkeley.edu/

Priority Occupation Profile for

Cost Estimators

What They Do

Prepare cost estimates for product manufacturing, construction projects, or services to aid management in bidding on or determining price of product or service. May specialize according to particular service performed or type of product manufactured.

AKA: Production Cost Estimator; Construction Estimator; Crating/Moving Estimator; Electrical Estimator

Common Tasks:

- Confer with engineers, architects, owners, contractors and subcontractors on changes and adjustments to cost estimates.
- Consult with clients, vendors, personnel in other departments or construction foremen to discuss and formulate estimates and resolve issues.
- Prepare estimates used by management for purposes such as planning, organizing, and scheduling work.
- Prepare estimates for use in selecting vendors or subcontractors.
- Analyze blueprints and other documentation to prepare time, cost, materials, and labor estimates.
- Conduct special studies to develop and establish standard hour and related cost data or to effect cost reduction.

O*NET Link: http://www.onetonline.org/link/details/13-1051.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Estimator-in-training is the usual starting position for the occupation. For most estimators, advancement takes the form of higher pay and prestige. In larger firms, advancement to chief estimator may be possible. Others move into management positions, such as project manager for a construction firm or manager of the industrial engineering department for a manufacturer. Others may go into business for themselves as consultants, providing estimating services for a fee to government agencies, construction companies, or manufacturing firms. The best way to advance is through successful work and by gaining a reputation for accuracy and integrity.

Career Pathway Group: Varies (depending on the industry)

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$19.85	$25.70	$34.63	$44.14	$54.65
Alameda Co:	$20.37	$26.37	$35.53	$45.28	$56.07
East Bay Region:	$20.19	$26.14	$35.22	$44.89	$55.58
California:	$17.73	$23.83	$31.89	$41.95	$52.88
United States:	$16.59	$21.33	$28.10	$36.71	$46.13

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace -ments***	***Total Openings***
Contra Costa Co:	593	646	9%	53	56	109
Alameda Co:	1,152	1,323	15%	171	109	280
East Bay Region:	1,745	1,968	13%	223	166	389
California:	22,505	25,237	12%	2,732	2,168	4,900
United States:	191,756	216,406	13%	24,650	18,643	43,293

Key Industries

National Employment Matrix	**% of jobs**
Nonresidential building construction	9.8
Plumbing, heating, and air-conditioning contractors	7.3
Electrical contractors and other wiring installation contractors	7.2
Residential building construction	6
Other specialty trade contractors	4.9
Automotive body, paint, interior, and glass repair	4.6
Roofing contractors	3.1
Highway, street, and bridge construction	2.7
Architectural and structural metals manufacturing	2.6
Drywall and insulation contractors	2.5
Printing and related support activities	2.3

Most Important Knowledge, Skills & Abilities

- Getting Information (from all relevant sources)
  - read blueprints
  - read specifications
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
  - use computers to enter, access and retrieve financial data
  - use spreadsheet software
- Estimating the Quantifiable Characteristics of Products, Events, or Information
  - bid engineering, construction or extraction projects
  - compute cost estimates of construction or engineering projects
  - convert design specifications to cost estimates
  - estimate cost for engineering projects
  - estimate materials or labor requirements
  - estimate production costs
  - estimate time needed for project
  - estimate time or cost for installation, repair, or construction projects
  - prepare cost estimates
- Analyzing Data or Information
  - analyze budgets
  - analyze financial data
  - analyze technical data, designs, or preliminary specifications
  - evaluate material specifications
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Mathematics Knowledge
- Processing Information
  - compile data for financial reports
  - compute financial data
- Updating and Using Relevant Knowledge
  - use cost benefit analysis techniques
  - use statistical cost estimation methods
- Documenting/Recording Information
- Number Facility (ability to add, subtract, multiply, or divide quickly and correctly)
- Making Decisions and Solving Problems (by evaluating information)
- Mathematical Reasoning Abilities (choosing the right mathematical methods or formulas to solve a problem)

Local Programs

Cost estimators generally need a bachelor's degree in an industry-related field, such as construction management or engineering. Some employers prefer an educational background in a physical science, or mathematics, or a business-related discipline such as accounting, finance, business, or economics. Virtually every college and university offers multiple programs that are appropriate preparation for this profession.

Priority Occupation Profile for

Electrical Engineers

What They Do

Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.

AKA: Cable Engineer; Controls Engineer; Distribution Engineer; Electrical Design Engineer; Electrical Engineer; Electrical Systems Engineer; Electrolysis Engineer; Lighting Engineer; Power Generation Engineer; Relay Engineer; Solar Engineer; Supplier Quality Engineer (SQE); Traffic Routing Engineer; Validation Engineer

Common Tasks:

- Confer with engineers, customers, or others to discuss existing or potential engineering projects or products.
- Prepare technical drawings, specifications of electrical systems, or topographical maps to ensure that installation and operations conform to standards and customer requirements.
- Prepare specifications for purchases of materials or equipment.
- Operate computer-assisted engineering or design software or equipment to perform engineering tasks.
- Oversee project production efforts to assure projects are completed on time and within budget.
- Direct or coordinate manufacturing, construction, installation, maintenance, support, documentation, or testing activities to ensure compliance with specifications, codes, or customer requirements.

O*NET Link: http://www.onetonline.org/link/details/17-2071.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Entry-level engineers usually begin their careers as junior engineers, working under the supervision of experienced engineers. As they gain experience and knowledge, they generally advance to positions of greater responsibility. For engineers, advancement can lead to senior engineer, project manager, research & development manager, and vice president for engineering. Some become consultants or start their own engineering firms. Those with a graduate degree can also become college and university professors.

Career Pathway Group: Science, Technology, Engineering and Mathematics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$33.29	$40.28	$49.55	$59.83	$69.84
Alameda Co:	$34.64	$41.90	$51.55	$62.24	$72.65
East Bay Region:	$34.31	$41.51	$51.07	$61.66	$71.97
California:	$29.80	$37.91	$48.50	$60.65	$71.32
United States:	$26.30	$32.70	$41.31	$51.87	$63.30

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	443	464	5%	21	54	75
Alameda Co:	1,399	1,477	6%	78	168	246
East Bay Region:	1,842	1,942	5%	100	220	320
California:	20,512	21,476	5%	964	2,654	3,618
United States:	158,003	165,632	5%	7,629	21,319	28,948

Key Industries

National Employment Matrix	**% of jobs**
Navigational, measuring, electromedical, and control instruments	10
Electric power generation, transmission and distribution	9.7
Semiconductor and other electronic component manufacturing	6.9
Research and development in the physical, engineering, and life sciences	5
Aerospace product and parts manufacturing	3.7
Federal government, excluding postal service	3.1
Management of companies and enterprises	2.8
Communications equipment manufacturing	2.8
Computer systems design and related services	2.4
Electrical equipment manufacturing	2.3

Most Important Knowledge, Skills & Abilities

- Engineering or Technology Knowledge
- Making Decisions and Solving Problems (by evaluating information)
  - resolve engineering or science problems
  - use intuitive judgment for engineering analyses
- Design Knowledge
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
  - develop or maintain databases
  - use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
  - use computer graphics design software
  - use computers to enter, access or retrieve data
  - use relational database software
  - use spreadsheet software
  - use word processing or desktop publishing software
- Getting Information (from all relevant sources)
  - collect scientific or technical data
  - read blueprints
  - read schematics
  - read technical drawings
- Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment
  - calculate engineering specifications
  - draw prototypes, plans, or maps to scale
  - write product performance requirements
- Computers or Electronics Knowledge
- Mathematics Knowledge
- Problem Sensitivity (ability to tell when something is wrong or is likely to go wrong)
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Analyzing Data or Information
- Updating and Using Relevant Knowledge
- Deductive Reasoning Abilities
- Oral Comprehension Abilities
- Oral Expression Abilities
- Critical Thinking Skills
- Reading Comprehension Skills
- Written Comprehension Abilities

Local Programs

University of California-Berkeley - http://www.berkeley.edu/

Northwestern Polytechnic University (Fremont) - http://www.npu.edu/

In addition, many community colleges have engineering degree transfer programs where a student can take their first two years of lower division (and general education) courses and then transfer to a 4-year college or university to complete their degree.

Priority Occupation Profile for

Electronics Engineers (Except Computer)

What They Do

Research, design, develop, or test electronic components and systems for commercial, industrial, military, or scientific use employing knowledge of electronic theory and materials properties. Design electronic circuits and components for use in fields such as telecommunications, aerospace guidance and propulsion control, acoustics, or instruments and controls.

AKA: Broadcast Engineer; Circuit Design Engineer; Communications Engineer; Design Engineer; Electronic System Engineer; Electronics Engineer; Electrophonic Engineer; Microwave Engineer; Product Engineer; Radar Engineer; Supplier Quality Engineer (SQE); Validation Engineer

Common Tasks:

- Analyze system requirements, capacity, cost, and customer needs to determine feasibility of project and develop system plan.
- Confer with engineers, customers, vendors or others to discuss existing and potential engineering projects or products.
- Evaluate operational systems, prototypes and proposals and recommend repair or design modifications, based on factors such as environment, service, cost, and system capabilities.
- Develop or perform operational, maintenance, or testing procedures for electronic products, components, equipment, or systems.
- Provide technical support and instruction to staff or customers regarding equipment standards, assisting with specific, difficult in-service engineering.
- Prepare, review, or maintain maintenance schedules, design documentation, or operational reports or charts.
- Determine material and equipment needs and order supplies.
- Prepare documentation containing information such as confidential descriptions or specifications of proprietary hardware or software, product development or introduction schedules, product costs, or information about product performance weaknesses.

O*NET Link: http://www.onetonline.org/link/details/17-2072.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Beginning engineering graduates usually work under the supervision of experienced engineers and, in large companies, also may receive formal classroom or seminar-type training. As new engineers gain knowledge and experience, they are assigned more difficult projects with greater independence to develop designs, solve problems, and make decisions. Engineers may advance to become technical specialists or to supervise a staff or team of engineers and technicians. Some may eventually become engineering managers or enter other managerial or sales jobs.

Career Pathway Group: Science, Technology, Engineering and Mathematics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$28.54	$34.58	$43.53	$53.81	$64.62
Alameda Co:	$29.90	$36.23	$45.60	$56.37	$67.70
East Bay Region:	$29.56	$35.82	$45.09	$55.74	$66.94
California:	$31.84	$39.54	$50.41	$62.67	$75.24
United States:	$28.30	$34.86	$43.99	$54.93	$67.07

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	411	434	6%	23	50	73
Alameda Co:	1,251	1,276	2%	25	155	180
East Bay Region:	1,662	1,709	3%	47	206	253
California:	29,171	29,931	3%	760	3,936	4,696
United States:	139,458	145,494	4%	6,036	18,702	24,738

Key Industries

National Employment Matrix	% of jobs
Federal government, excluding postal service	14.4
Wired telecommunications carriers	11.4
Semiconductor and other electronic component manufacturing	10.6
Navigational, measuring, electromedical, and control instruments	7.7
Research and development in the physical, engineering, and life sciences	5
Wireless telecommunications carriers (except satellite)	5
Computer systems design and related services	3.7
Communications equipment manufacturing	3.1
Aerospace product and parts manufacturing	2.9
Electrical and electronic goods merchant wholesalers	2.7
Management, scientific, and technical consulting services	2

Most Important Knowledge, Skills & Abilities

- Engineering or Technology Knowledge
- Design Knowledge
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
    - develop or maintain databases
    - use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
    - use computers to enter, access or retrieve data
    - use relational database software
    - use spreadsheet software
    - use word processing or desktop publishing software
- Computers or Electronics Knowledge
- Making Decisions and Solving Problems (by evaluating information)
    - resolve engineering or science problems
    - use intuitive judgment for engineering analyses
- Thinking Creatively
    - create mathematical or statistical diagrams or charts
    - design control systems
    - design electro-mechanical equipment
    - design electronic equipment
    - design engineered systems
    - design manufacturing processes or methods
    - design telecommunication equipment
    - design transmission equipment
    - design waste recovery methods
    - determine specifications
    - improve test devices or techniques in manufacturing, industrial or engineering setting
- Updating and Using Relevant Knowledge
    - follow confidentiality procedures
    - follow manufacturing methods or techniques
    - follow safe waste disposal procedures
    - follow statistical process control procedures
    - use drafting or mechanical drawing techniques
    - use government regulations
    - use hazardous materials information
    - use knowledge of investigation techniques
    - use knowledge of laser technology
    - use library or online Internet research techniques
    - use long or short term production planning techniques
    - use machining operations with semiconductor chip forming technology
    - use mathematical or statistical methods to identify or analyze problems
    - use pollution control techniques
    - use project management techniques
    - use quality assurance techniques
    - use quantitative research methods
    - use research methodology procedures within manufacturing or commerce
    - use robotics systems technology
    - use scientific research methodology
    - use technical information in manufacturing or industrial activities
    - use technical regulations for engineering problems
- Getting Information (from all relevant sources)
    - collect scientific or technical data
    - read blueprints
    - read manufacturing outlines for electronic products
    - read schematics
    - read technical drawings
- Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment
    - calculate engineering specifications

    - draw prototypes, plans, or maps to scale
    - write product performance requirements
- Documenting/Recording Information
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
    - confer with engineering, technical or manufacturing personnel
    - confer with research personnel
- Scheduling Work and Activities
- Organizing, Planning, and Prioritizing Your Work
- Processing Information
- Mathematics Knowledge
- Monitor Processes, Materials, or Surroundings (to detect or assess problems)
- Reading Comprehension Skills
- Written Comprehension Abilities

Local Programs

University of California-Berkeley - http://www.berkeley.edu/

Northwestern Polytechnic University (Fremont) - http://www.npu.edu/

In addition, many community colleges have engineering degree transfer programs where a student can take their first two years of lower division (and general education) courses and then transfer to a 4-year college or university to complete their degree.

Priority Occupation Profile for

Industrial Engineers

What They Do

Design, develop, test, and evaluate integrated systems for managing industrial production processes, including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination.

AKA: Efficiency Engineer; Engineering Inspector; Factory Engineer; Factory Lay Out Engineer; Human Factors Engineer; Industrial Engineer; Logistical Engineer; Manufacturing Engineer; Operations Engineer; Packaging Engineer; Process Engineer; Quality Control Engineer; Salvage Engineer; Supplier Quality Engineer (SQE); Supply Chain Analyst; Time Study Engineer

Common Tasks:

- Communicate with management and user personnel to develop production and design standards.
- Review production schedules, engineering specifications, orders, and related information to obtain knowledge of manufacturing methods, procedures, and activities.
- Estimate production costs, cost saving methods, and the effects of product design changes on expenditures for management review, action, and control.
- Draft and design layout of equipment, materials, and workspace to illustrate maximum efficiency using drafting tools and computer.
- Confer with clients, vendors, staff, and management personnel regarding purchases, product and production specifications, manufacturing capabilities, or project status.
- Plan and establish sequence of operations to fabricate and assemble parts or products and to promote efficient utilization.

O*NET Link: http://www.onetonline.org/link/details/17-2112.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Entry-level engineers usually begin their careers as junior engineers, working under the supervision of experienced engineers. As they gain experience and knowledge, they generally advance to positions of greater responsibility. For engineers, advancement can lead to senior engineer, project manager, research & development manager, and vice president for engineering. Some become consultants or start their own engineering firms. Those with a graduate degree can also become college and university professors.

Career Pathway Group: Science, Technology, Engineering and Mathematics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$32.87	$39.51	$48.85	$59.70	$71.74
Alameda Co:	$30.33	$36.46	$45.08	$55.10	$66.21
East Bay Region:	$30.88	$37.12	$45.89	$56.09	$67.40
California:	$29.47	$35.63	$44.03	$54.76	$67.15
United States:	$24.20	$30.03	$37.13	$45.19	$55.45

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	386	390	1%	4	44	48
Alameda Co:	1,407	1,470	4%	63	154	217
East Bay Region:	1,793	1,860	4%	67	198	265
California:	20,200	21,043	4%	843	2,443	3,286
United States:	217,510	223,714	3%	6,204	29,694	35,898

Key Industries

National Employment Matrix	**% of jobs**
Aerospace product and parts manufacturing	7.2
Management of companies and enterprises	5.7
Navigational, measuring, electromedical, and control instruments	5.6
Motor vehicle parts manufacturing	4.8
Research and development in the physical, engineering, and life sciences	3.8
Medical equipment and supplies manufacturing	2.8
Plastics product manufacturing	2.6

Most Important Knowledge, Skills & Abilities

- Engineering or Technology Knowledge
- Production or Processing Knowledge
- Making Decisions and Solving Problems (by evaluating information)
  - resolve engineering or science problems
- Getting Information (from all relevant sources)
  - read blueprints
  - read production layouts
  - read technical drawings
  - study time, motion, or work methods of workers
- Identifying Objects, Actions, and Events
  - understand engineering data or reports
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Written Comprehension Abilities
- Oral Comprehension Abilities
- Mathematics Knowledge
- Monitor Processes, Materials, or Surroundings (to detect or assess problems)
- Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment
- Organizing, Planning, and Prioritizing Your Work
- Problem Sensitivity (ability to tell when something is wrong or is likely to go wrong)
- Oral Expression Abilities
- Reading Comprehension Skills
- Establishing and Maintaining Interpersonal Relationships (and maintaining them over time)

Local Programs

University of California-Berkeley - http://www.berkeley.edu/ (see Manufacturing Engineering)

In addition, many community colleges have engineering degree transfer programs where a student can take their first two years of lower division (and general education) courses and then transfer to a 4-year college or university to complete their degree.

Priority Occupation Profile for

Industrial Production Managers

What They Do

Plan, direct, or coordinate the work activities and resources necessary for manufacturing products in accordance with cost, quality, and quantity specifications.

AKA: Factory Manager; Industrial Production Manager; Manufacturing Director; Operations Manager; Plant Manager; Production Manager; Quality Assurance (QA) Manager; Quality Control Manager

Common Tasks:

- Review operations and confer with technical or administrative staff to resolve production or processing problems.
- Review processing schedules or production orders to make decisions concerning inventory requirements, staffing requirements, work procedures, or duty assignments, considering budgetary limitations and time constraints.
- Hire, train, evaluate, or discharge staff or resolve personnel grievances.
- Coordinate or recommend procedures for facility or equipment maintenance or modification, including the replacement of machines.
- Direct or coordinate production, processing, distribution, or marketing activities of industrial organizations.
- Prepare and maintain production reports or personnel records.

O*NET Link: http://www.onetonline.org/link/details/11-3051.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Jobs typically require 1-5 years of previous experience.

Career Path

Some industrial production managers have worked their way up through the ranks of manufacturing/production jobs. Others start their careers as engineers. Advancement for industrial production managers may lead to plant manager or vice president for manufacturing. For others, advancement means transferring to, or getting a job with, a larger manufacturing facility. Some take courses to become certified in various quality and management systems. Some industrial production managers may become consultants or start their own business.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$36.58	$45.11	$58.89	$79.19	$105.07
Alameda Co:	$30.97	$38.19	$49.86	$67.04	$88.96
East Bay Region:	$32.32	$39.86	$52.04	$69.98	$92.85
California:	$26.84	$34.58	$45.00	$59.83	$79.39
United States:	$25.54	$32.72	$42.40	$55.38	$71.48

Employment Projections

	2013 Jobs	*2018 Jobs*	*% Change*	*New Jobs*	*Replace-ments*	*Total Openings*
Contra Costa Co:	340	346	2%	6	41	47
Alameda Co:	1,059	1,082	2%	23	133	156
East Bay Region:	1,398	1,428	2%	30	173	203
California:	16,997	17,409	2%	412	2,398	2,810
United States:	154,824	160,164	3%	5,340	22,190	27,530

Key Industries

National Employment Matrix	**% of jobs**
Management of companies and enterprises	4.1
Plastics product manufacturing	4
Aerospace product and parts manufacturing	3.1
Printing and related support activities	3.1
Pharmaceutical and medicine manufacturing	3
Motor vehicle parts manufacturing	2.9
Navigational, measuring, electromedical, and control instruments	2.9
Semiconductor and other electronic component manufacturing	2.7
Architectural and structural metals manufacturing	2.2
Converted paper product manufacturing	2.2
Machine shops	2

Most Important Knowledge, Skills & Abilities

- Production or Processing Knowledge
- Getting Information (from all relevant sources)
  - read technical drawings
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
  - conduct or attend staff meetings
- Coordinating the Work and Activities of Others
  - coordinate production maintenance activities
  - coordinate production materials, activities or processes
  - direct and coordinate activities of workers or staff
  - manage industrial projects
  - oversee execution of organizational or program policies
- Guiding, Directing, and Motivating Subordinates (supervising)
  - assign work to staff or employees
  - conduct meetings with staff to ensure production objectives are met
  - supervise production workers
  - supervise quality control workers
- Making Decisions and Solving Problems (by evaluating information)
  - make decisions
- Organizing, Planning, and Prioritizing Your Work
  - plan or organize work
- Scheduling Work and Activities
  - develop maintenance schedules
  - establish production schedule
  - schedule work to meet deadlines
- Establishing and Maintaining Interpersonal Relationships (and maintaining them over time)
- Resolving Conflicts and Negotiating with Others
- Monitor Processes, Materials, or Surroundings (to detect or assess problems)
- Problem Sensitivity (ability to tell when something is wrong or is likely to go wrong)
- Coordination Skills
- Monitoring Skills
- Critical Thinking Skills

Local Programs

Most industrial production managers have a bachelor's degree in business administration or industrial engineering. Sometimes, production workers with many years of experience take management classes or complete a Master of Business Administration (MBA) and become a production manager. At large plants, where managers have more oversight responsibilities, employers may look for managers who have an MBA or a graduate degree in industrial management. Virtually every university offers an MBA program.

Priority Occupation Profile for

Mechanical Engineers

What They Do

Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.

AKA: Air Conditioning Engineer; Automotive Engineer; Body Engineer; Combustion Engineer; Design Engineer; Equipment Engineer; Heating Engineer; Hydraulic Engineer; Mechanical Engineer; Refrigeration Engineer; Sheet Metal Engineer; Supplier Quality Engineer (SQE); Textile Engineer; Tool/Die Engineer; Validation Engineer; Ventilating Engineer

Common Tasks:

- Read and interpret blueprints, technical drawings, schematics, or computer-generated reports.
- Develop and test models of alternate designs and processing methods to assess feasibility, operating condition effects, possible new applications and necessity of modification.
- Conduct research that tests or analyzes the feasibility, design, operation, or performance of equipment, components, or systems.
- Specify system components or direct modification of products to ensure conformance with engineering design and performance specifications.

O*NET Link: http://www.onetonline.org/link/details/17-2141.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Entry-level engineers usually begin their careers as junior engineers, working under the supervision of experienced engineers. As they gain experience and knowledge, they generally advance to positions of greater responsibility. For engineers, advancement can lead to senior engineer, project manager, research & development manager, and vice president for engineering. Some become consultants or start their own engineering firms. Those with a graduate degree can also become college and university professors.

Career Pathway Group: Science, Technology, Engineering and Mathematics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$29.59	$34.15	$43.88	$56.69	$70.06
Alameda Co:	$30.29	$34.96	$44.91	$58.03	$71.72
East Bay Region:	$30.13	$34.77	$44.67	$57.72	$71.33
California:	$26.48	$33.53	$43.18	$54.35	$66.70
United States:	$24.68	$30.52	$38.09	$47.39	$57.67

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	388	410	6%	22	62	84
Alameda Co:	1,275	1,385	9%	110	203	313
East Bay Region:	1,663	1,795	8%	132	265	397
California:	23,135	24,299	5%	1,164	3,900	5,064
United States:	247,883	257,522	4%	9,639	45,575	55,214

Key Industries

National Employment Matrix	**% of jobs**
Research and development in the physical, engineering, and life sciences	6.2
Federal government, excluding postal service	5.5
Navigational, measuring, electromedical, and control instruments	4.6
Aerospace product and parts manufacturing	4.6
Motor vehicle parts manufacturing	3.4
Other general purpose machinery manufacturing	3.3
Testing laboratories	2.8
Other fabricated metal product manufacturing	2.3
Motor vehicle manufacturing	2.2
Semiconductor and other electronic component manufacturing	2

Most Important Knowledge, Skills & Abilities

- Engineering or Technology Knowledge
- Design Knowledge
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
    - develop or maintain databases
    - use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
    - use computer graphics design software
    - use computers to enter, access or retrieve data
    - use relational database software
    - use spreadsheet software
    - use word processing or desktop publishing software
- Mechanical Knowledge
- Mathematics Knowledge
- Getting Information (from all relevant sources)
- Making Decisions and Solving Problems (by evaluating information)
- Analyzing Data or Information
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Complex Problem Solving Skills
- Information Ordering (ability to arrange things or actions in a certain order or pattern)
- Mathematical Reasoning Abilities (choosing the right mathematical methods or formulas to solve a problem)

Local Programs

University of California-Berkeley - http://www.berkeley.edu/

In addition, many community colleges have engineering degree transfer programs where a student can take their first two years of lower division (and general education) courses and then transfer to a 4-year college or university to complete their degree.

Priority Occupation Profile for

Software Developers, Applications

What They Do

Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. May supervise computer programmers.

AKA: Application Architect; Applications Developer; Database Designer; Enterprise Architect; Game Developer; Information Architect; Internet Application Developer; Internet Site Designer; Software Designer; Software Developer; Software Engineer; Software Quality Engineer; Video Game Developer; Videogame Designer

Common Tasks:

- Confer with systems analysts, engineers, programmers and others to design system and to obtain information on project limitations and capabilities, performance requirements and interfaces.
- Analyze user needs and software requirements to determine feasibility of design within time and cost constraints.
- Develop and direct software system testing and validation procedures, programming, and documentation.
- Modify existing software to correct errors, allow it to adapt to new hardware, or to improve its performance.
- Determine system performance standards.

O*NET Link: http://www.onetonline.org/link/details/15-1132.00

What It Requires

Education: Bachelor's degree

Training: No training program certificate is required for most jobs.

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Most computer application engineers, developers and architects either begin as programmers or as junior software engineers. They may work alone on simple assignments after some initial instruction, or they may be assigned to work on a research and development team with more experienced engineers. Because technology changes so rapidly, software engineers must continuously update their knowledge and skills by taking courses sponsored by their employer or by software vendors, or offered through local colleges and universities. For skilled software engineers who keep up to date with the latest technology, the prospects for advancement are good. In large organizations, they may be promoted to lead positions and be given supervisory responsibilities. Some may be promoted to management positions.

Career Pathway Group: Information Technology

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$28.50	$35.03	$43.68	$51.94	$63.32
Alameda Co:	$32.58	$40.05	$49.94	$59.38	$72.39
East Bay Region:	$31.68	$38.95	$48.57	$57.74	$70.40
California:	$30.96	$39.33	$49.69	$60.81	$71.00
United States:	$26.43	$33.80	$42.92	$53.84	$65.62

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	1,629	1,649	1%	20	97	117
Alameda Co:	5,890	6,333	8%	443	303	746
East Bay Region:	7,519	7,983	6%	464	399	863
California:	92,945	102,551	10%	9,606	4,788	14,394
United States:	584,092	653,797	12%	69,705	30,510	100,215

Key Industries

National Employment Matrix	**% of jobs**
Computer systems design and related services	33.4
Software publishers	7.9
Management of companies and enterprises	5.1
Computer and peripheral equipment manufacturing	2.8
Management, scientific, and technical consulting services	2.6
Data processing, hosting and related services	2.5
Research and development in the physical, engineering, and life sciences	2.5
Professional and commercial equipment and supplies merchant wholesalers	2.5

Most Important Knowledge, Skills & Abilities

- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
  - adjust computer operation system
  - check hardware or software to determine reliability
  - develop or maintain databases
  - install hardware, software, or peripheral equipment
  - program computers for electronic engineering applications
  - program computers using existing software
  - program mainframe computer
  - revise or correct errors in computer programs, software, or systems
  - test computer programs or systems
  - use computer programming language
  - use computers to enter, access or retrieve data
  - use spreadsheet software
  - write computer software, programs, or code
- Computers or Electronics Knowledge
- Thinking Creatively
  - design computer hardware or software interface
  - design data processing systems
  - design data security systems
  - design electronic equipment
  - design hardware or software systems
  - develop mathematical or computer languages
  - develop mathematical simulation models
- Making Decisions and Solving Problems (by evaluating information)
  - resolve engineering or science problems
- Getting Information (from all relevant sources)
  - read blueprints
  - read schematics
  - read technical drawings
- Analyzing Data or Information
  - analyze technical data, designs, or preliminary specifications
  - evaluate computer system user requests or requirements
  - evaluate prototype computer software systems
- Processing Information
- Updating and Using Relevant Knowledge

Local Programs

California State University-East Bay - http://www20.csueastbay.edu/

University of California-Berkeley - http://www.berkeley.edu/

Northwestern Polytechnic University (Fremont) - http://www.npu.edu/

In addition, many community colleges have computer degree transfer programs where a student can take their first two years of lower division (and general education) courses and then transfer to a 4-year college or university to complete their degree.

Priority Occupation Profile for

Chemical Plant and System Operators

What They Do

Control or operate entire chemical processes or system of machines.

AKA: Continuous Operator; Process Development Associate; Chemical Operator; Warehouse Technician; Process Technician; Process Operator; Process Development Technician; Operator; Control Room Operator; Chemical Technician; Chemical Plant Operations Technician; Operations Technician

Common Tasks:

- Confer with technical and supervisory personnel to report or resolve conditions affecting safety, efficiency, or product quality.
- Regulate or shut down equipment during emergency situations, as directed by supervisory personnel.
- Control or operate chemical processes or systems of machines, using panelboards, control boards, or semi-automatic equipment.
- Monitor recording instruments, flowmeters, panel lights, or other indicators and listen for warning signals, to verify conformity of process conditions.
- Draw samples of products and conduct quality control tests to monitor processing and to ensure that standards are met.
- Notify maintenance, stationary-engineering, or other auxiliary personnel to correct equipment malfunctions or to adjust power, steam, water, or air supplies.
- Record operating data, such as process conditions, test results, or instrument readings.
- Move control settings to make necessary adjustments on equipment units affecting speeds of chemical reactions, quality, or yields.
- Start pumps to wash and rinse reactor vessels, to exhaust gases or vapors, to regulate the flow of oil, steam, air, or perfume to towers, or to add products to converter or blending vessels.

O*NET Link: http://www.onetonline.org/link/details/51-8091.00

What It Requires

Education: High school diploma or equivalent

Training: Long-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

This is an entry level occupation, although many employers prefer people who have related experience in chemical plants. Employers may prefer applicants who have taken chemistry classes and have a background in engine repair. Chemical plant operators may move up through several levels of responsibility until they reach the highest paying operator jobs. Advancement requires mastery of job skills and training. Additional vocational training at a two-year college may speed an operator's rate of advancement. Some operators with experience and leadership skills advance into supervisory positions.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$18.85	$22.91	$27.71	$34.18	$37.99
Alameda Co:	$15.27	$18.56	$22.44	$27.68	$30.77
East Bay Region:	$17.61	$21.41	$25.89	$31.94	$35.50
California:	$15.22	$19.99	$24.40	$28.50	$33.69
United States:	$16.55	$20.95	$26.90	$32.52	$35.81

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	48	43	-10%	-5	13	8
Alameda Co:	29	34	17%	5	4	9
East Bay Region:	77	77	0%	0	18	18
California:	1,305	1,298	-1%	-7	307	300
United States:	40,368	38,997	-3%	-1,371	10,204	8,833

Key Industries

National Employment Matrix	**% of jobs**
Basic chemical manufacturing	42.4
Resin, synthetic rubber, and artificial synthetic fibers and filaments mfg.	18.8
Pesticide, fertilizer, and other agricultural chemical manufacturers	12.9
Petroleum and coal products manufacturing	7.5
Pharmaceutical and medicine manufacturing	3.9
Other chemical product and preparation manufacturing	3.8
Soap, cleaning compound, and toilet preparation manufacturing	2.6
Pulp, paper, and paperboard mills	2.4

Most Important Knowledge, Skills & Abilities	• Monitor Processes, Materials, or Surroundings (to detect or assess problems)
	  ○ monitor production machinery/equipment operation to detect problems
	• Production or Processing Knowledge
	• Controlling Machines and Processes
	  ○ operate chemical processing equipment
	  ○ operate power driven pumps
	  ○ use precision measuring tools or equipment
	• Getting Information (from all relevant sources)
	  ○ read work order, instructions, formulas, or processing charts
	• Operation Monitoring Skills (machines)
	• Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
	• Making Decisions and Solving Problems (by evaluating information)
	• Inspecting Equipment, Structures, or Material
	• Identifying Objects, Actions, and Events
	• Mechanical Knowledge
	• Operation and Control Skills (equipment or systems)

Local Programs	No local training or education programs identified.

Priority Occupation Profile for

Electrical and Electronics Repairers, Commercial and Industrial Equipment

What They Do

Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.

AKA: Instrument Technician; Winder; Line Maintenance Technician; Industrial Maintenance Electrician; Service Technician; Industrial Electrician; Industrial Controls Field Service Technician; Instrument and Electrical Technician (I&E Tech); Locksmith; Maintenence Technician; Repair Technician; Technical Maintenance Specialist; Technical Support Specialist; Tester; Industrial and Control Technician; Electrical Technician; Process Controls Technician; Electrical and Electronics Repair and Maintenance Person; Calibration Technician; Electronic Mechanic; Control Technician; I&C Tech (Instrument and Control Technician); Electrical and Instrument Mechanic; Electrical and Instrument Technician (E&I Tech); Electrical and Instrumentation Mechanic; Electrical Repairman; Electrician; Electronics Technician; Engineering Technician; Field Technician; Hydro Maintenance Technician; Hydro Plant Technician; Electrical Maintenance Technician; Certified Test Technician

Common Tasks:

- Study blueprints, schematics, manuals, or other specifications to determine installation procedures.
- Test faulty equipment to diagnose malfunctions, using test equipment or software, and applying knowledge of the functional operation of electronic units and systems.
- Perform scheduled preventive maintenance tasks, such as checking, cleaning, or repairing equipment, to detect and prevent problems.
- Coordinate efforts with other workers involved in installing or maintaining equipment or components.
- Inspect components of industrial equipment for accurate assembly and installation or for defects, such as loose connections or frayed wires.
- Maintain equipment logs that record performance problems, repairs, calibrations, or tests.
- Operate equipment to demonstrate proper use or to analyze malfunctions.

O*NET Link: http://www.onetonline.org/link/details/49-2094.00

What It Requires

Education: Postsecondary education/training program completion

Training: Long-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Employers often prefer to hire applicants who have taken courses in electronics at a community college or technical school, although a high school diploma may be enough for some jobs. Entry-level repairers may begin by working with experienced technicians, who provide technical guidance, and work more independently after developing their skills. With experience, repairers may be promoted to positions of greater responsibility and pay, including supervisory positions.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$18.89	$23.60	$31.03	$37.98	$44.52
Alameda Co:	$17.72	$22.13	$29.10	$35.61	$41.75
East Bay Region:	$18.04	$22.53	$29.63	$36.27	$42.52
California:	$16.86	$22.29	$28.30	$33.65	$38.60
United States:	$15.66	$20.06	$25.16	$29.90	$35.10

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	118	121	3%	3	15	18
Alameda Co:	305	296	-3%	-9	48	39
East Bay Region:	424	417	-2%	-7	64	57
California:	6,805	6,961	2%	156	920	1,076
United States:	68,175	68,805	1%	630	10,085	10,715

Key Industries

National Employment Matrix	**% of jobs**
Federal government, excluding postal service	16.8
Electrical contractors and other wiring installation contractors	5.7
Electrical and electronic goods merchant wholesalers	4.8
Electronic and precision equipment repair and maintenance	4.4
Navigational, measuring, electromedical, and control instruments	3.8
Commercial and industrial machinery and equipment	3.6
Local government, excluding education and hospitals	3.2
Professional and commercial equipment and supplies merchant wholesalers	2.5
Wireless telecommunications carriers (except satellite)	2.3
Wired telecommunications carriers	2.2
Basic chemical manufacturing	2

Most Important Knowledge, Skills & Abilities

- Repairing and Maintaining Electronic Equipment
  - analyze operation of malfunctioning electrical or electronic equipment
  - calibrate or adjust electronic equipment or instruments to specification
  - conduct sequential tests to locate electronic malfunction
  - install electrical fixtures or components
  - install electronic equipment, components, or systems
  - install electronic power, communication, control, or security equipment or systems
  - install or replace meters, regulators, or related measuring or control devices
  - install/connect electrical equipment to power circuit
  - modify electrical or electronic equipment or products
  - repair computer controlled manufacturing systems
  - repair electronic components, equipment, or systems
  - repair or replace electrical wiring, circuits, fixtures, or equipment
  - replace electronic components
  - test electrical/electronic wiring, equipment, systems or fixtures
  - test electronic or electrical circuit connections
  - use diagnostic software in electronics repair
- Inspecting Equipment, Structures, or Material
- Getting Information (from all relevant sources)
  - obtain information from clients, customers, or patients
  - read blueprints
  - read schematics
  - read technical drawings
  - read work order, instructions, formulas, or processing charts
- Computers or Electronics Knowledge
- Making Decisions and Solving Problems (by evaluating information)
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
- Identifying Objects, Actions, and Events
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Repairing Skills (machines or systems)

Local Programs

Chabot College - http://www.chabotcollege.edu/ (see Engineering Technology or Electronics Systems Technology)

Diablo Valley College - http://www.dvc.edu/ (see Electricity/Electronics Technology)

Los Medanos College - http://www.losmedanos.edu/ (see Electrical Technology)

Priority Occupation Profile for

Electricians

What They Do

Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems.

AKA: Inside Wireman; Maintenance Electrician; Journeyman Electrician; Control Electrician; Electrician Technician; Electrician; Journeyman Wireman; Industrial Electrician

Common Tasks:

- Test electrical systems or continuity of circuits in electrical wiring, equipment, or fixtures, using testing devices, such as ohmmeters, voltmeters, or oscilloscopes, to ensure compatibility and safety of system.
- Repair or replace wiring, equipment, or fixtures, using hand tools or power tools.
- Work from ladders, scaffolds, or roofs to install, maintain, or repair electrical wiring, equipment, or fixtures.
- Use a variety of tools or equipment, such as power construction equipment, measuring devices, power tools, and testing equipment, such as oscilloscopes, ammeters, or test lamps.
- Assemble, install, test, or maintain electrical or electronic wiring, equipment, appliances, apparatus, or fixtures, using hand tools or power tools.
- Connect wires to circuit breakers, transformers, or other components.
- Diagnose malfunctioning systems, apparatus, or components, using test equipment and hand tools to locate the cause of a breakdown and correct the problem.
- Inspect electrical systems, equipment, or components to identify hazards, defects, or the need for adjustment or repair, and to ensure compliance with codes.
- Prepare sketches or follow blueprints to determine the location of wiring or equipment and to ensure conformance to building and safety codes.
- Fasten small metal or plastic boxes to walls to house electrical switches or outlets.
- Plan layout and installation of electrical wiring, equipment, or fixtures, based on job specifications and local codes.
- Place conduit, pipes, or tubing, inside designated partitions, walls, or other concealed areas, and pull insulated wires or cables through the conduit to complete circuits between boxes.
- Perform physically demanding tasks, such as digging trenches to lay conduit or moving or lifting heavy objects.
- Install ground leads and connect power cables to equipment, such as motors.

O*NET Link: http://www.onetonline.org/link/details/47-2111.00

What It Requires

Education: High school diploma or equivalent

Training: Apprenticeship

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Electricians usually learn their trade through a 4-5 year apprenticeship program that combines classroom instruction with on-the-job-training. These programs usually are sponsored by a local trade union. Others start as helpers and learn the skills of the trade informally through experience and by taking courses offered by community colleges and trade schools. After completing the apprenticeship, one becomes a journey level electrician (called "journeyman" in the trade). Advancement usually takes the form of moving to positions with greater responsibility and pay. Some become specialists, while others become supervisors, inspectors, or project managers. A few become self-employed licensed electrical contractors.

Career Pathway Group: Architecture and Construction

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$25.30	$29.62	$38.48	$46.25	$54.15
Alameda Co:	$22.90	$26.80	$34.81	$41.84	$48.99
East Bay Region:	$23.90	$27.98	$36.34	$43.69	$51.15
California:	$16.51	$22.02	$28.75	$37.36	$45.12
United States:	$14.61	$18.06	$23.71	$31.38	$39.75

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	1,231	1,329	8%	98	166	264
Alameda Co:	1,638	1,533	-6%	-105	338	233
East Bay Region:	2,869	2,862	0%	-7	504	497
California:	44,797	48,578	8%	3,781	6,688	10,469
United States:	521,248	555,831	7%	34,583	85,596	120,179

Key Industries

National Employment Matrix	**% of jobs**
Electrical contractors and other wiring installation contractors	61.6
Local government, excluding education and hospitals	2.7

Note: Electricians work in a wide variety of industries, including in the manufacturing sector. In addition, about 10% are self-employed or work as licensed electrical contractors.

Most Important Knowledge, Skills & Abilities

- Getting Information (from all relevant sources)
  - read blueprints
  - read tape measure
  - read technical drawings
- Inspecting Equipment, Structures, or Material
- Making Decisions and Solving Problems (by evaluating information)
- Identifying Objects, Actions, and Events
  - distinguish colors
  - understand service or repair manuals
- Performing General Physical Activities
  - climb ladders, scaffolding, or utility or telephone poles
  - install/string electrical or electronic cable or wiring
  - move or fit heavy objects
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Handling and Moving Objects (using hands and arms)
- Mechanical Knowledge
- Repairing and Maintaining Electronic Equipment
- Evaluating Information to Determine Compliance with Standards
- Problem Sensitivity (ability to tell when something is wrong or is likely to go wrong)

Local Programs

Apprenticeship training is required, although there are technical training programs and pre-employment training programs available. For example:

Chabot College - http://www.chabotcollege.edu/

Wyotech-Fremont - http://www.wyotech.edu/

Priority Occupation Profile for

Heavy and Tractor-Trailer Truck Drivers

What They Do

Drive a tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial drivers' license.

AKA: Tanker Driver; Over the Road Driver (OTR Driver); Owner Operator; Pick Up and Delivery Driver (P & D Driver); Road Driver; Rubbish Truck Driver; Long Haul Truck Driver; Short Haul Driver; Over the Road Commercial Truck Driver (OTR Commercial Truck Driver); Transport Heavy Equipment Driver; Truck Driver; Trucker; Semi Truck Driver; Feeder Driver; Belly Dump Driver; City Driver; Concrete Mixer Driver; Over the Road Tractor Trailer Driver (OTR Tractor Trailer Driver); Driver; Long Distance Trucker; Flatbed Truck Driver; Garbage Truck Driver; Hazmat Materials Driver; Heavy Equipment Hauler; Line Haul Driver; Local Truck Driver; Delivery Driver

Common Tasks:

- Operate equipment, such as truck cab computers, CB radios, and telephones, to exchange necessary information with bases, supervisors, or other drivers.
- Check vehicles to ensure that mechanical, safety, and emergency equipment is in good working order.
- Report vehicle defects, accidents, traffic violations, or damage to the vehicles.
- Collect delivery instructions from appropriate sources, verifying instructions and routes.
- Drive trucks with capacities greater than 3 tons, including tractor-trailer combinations, to transport and deliver products, livestock, or other materials.
- Check conditions of trailers after contents have been unloaded to ensure that there has been no damage.
- Perform basic vehicle maintenance tasks, such as adding oil, fuel, or radiator fluid or performing minor repairs.
- Maintain logs of working hours or of vehicle service or repair status, following applicable state and federal regulations.

O*NET Link: http://www.onetonline.org/link/details/53-3032.00

What It Requires

Education: High school diploma or equivalent

Training: Short-term on-the-job training

Experience: Depends on the job. Most jobs require 1-5 years of experience, although employers will sometimes hire truck drivers for entry-level jobs.

Licensing: Truck drivers must possess a valid commercial driver's license which requires a good driving record and the ability to pass a vision and health examination.

Career Path

Advancement opportunities are limited and usually take the form of driving runs that provide increased earnings or preferred schedules and working conditions. Some long-distance drivers purchase their own truck and go into business for themselves. Many of these truck owner-operators are successful; however, some fail to earn a profit and go out of business.

Career Pathway Group: Transportation, Distribution and Logistics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$15.35	$17.89	$21.53	$27.35	$32.22
Alameda Co:	$13.23	$15.42	$18.55	$23.56	$27.75
East Bay Region:	$13.71	$15.98	$19.23	$24.42	$28.77
California:	$12.81	$15.86	$19.51	$23.74	$28.98
United States:	$11.96	$14.67	$18.24	$22.66	$28.10

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	1,565	1,564	0%	-1	187	186
Alameda Co:	5,393	5,775	7%	382	537	919
East Bay Region:	6,957	7,339	5%	382	723	1,105
California:	127,425	139,132	9%	11,707	12,705	24,412
United States:	1,575,291	1,681,962	7%	106,671	171,320	277,991

Key Industries

National Employment Matrix	**% of jobs**
General freight trucking	32.5
Specialized freight trucking	12.4
Self-employed owner-operator business	7.9
Grocery and related product wholesalers	4
Cement and concrete product manufacturing	3.3
Other specialty trade contractors	2.1
Support activities for road transportation	2
Warehousing and storage	2

Most Important Knowledge, Skills & Abilities

- Operating Vehicles, Mechanized Devices, or Equipment (includes forklifts, passenger vehicles, aircraft, and water craft)
  - drive tractor-trailer truck
  - drive truck with capacity greater than 3 tons
  - transport passengers or cargo
  - use truck-mounted hydraulic lifts or other accessories
- Inspecting Equipment, Structures, or Material
- Getting Information (from all relevant sources)
  - read maps
- Performing General Physical Activities
- Control Precision Abilities (machine or vehicle)
- Far Vision Abilities (see details at a distance)
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Identifying Objects, Actions, and Events
- Operation and Control Skills (equipment or systems)
- Multilimb Coordination Abilities

Local Programs

Many vocational and truck driving schools offer truck driver training. See http://etpl.edd.ca.gov/wiaetplocc.asp for a list of training providers.

Priority Occupation Profile for

Industrial Machinery Mechanics

What They Do

Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.

AKA: Machine Adjuster; Maintenance Electrician; Welder; Overhauler; Millwright; Mechanic; Master Mechanic; Maintenance Technician; Maintenance Mechanic; Industrial Machinery Mechanic; Machine Repairman; Machinist; Industrial Electrician; Industrial Mechanic; Loom Fixer; Loom Technician; Machine Mechanic; Engineering Technician

Common Tasks:

- Disassemble machinery or equipment to remove parts and make repairs.
- Examine parts for defects, such as breakage or excessive wear.
- Repair or replace broken or malfunctioning components of machinery or equipment.
- Clean, lubricate, or adjust parts, equipment, or machinery.
- Repair or maintain the operating condition of industrial production or processing machinery or equipment.
- Reassemble equipment after completion of inspections, testing, or repairs.
- Operate newly repaired machinery or equipment to verify the adequacy of repairs.
- Cut and weld metal to repair broken metal parts, fabricate new parts, or assemble new equipment.

O*NET Link: http://www.onetonline.org/link/details/49-9041.00

What It Requires

Education: High school diploma or equivalent

Training: Apprenticeship or long-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Industrial machinery mechanics usually learn their trade through a 4-year apprenticeship program that combines classroom instruction with on-the-job-training. These programs usually are sponsored by a local trade union. Others start as helpers and learn the skills of the trade informally through experience and by taking courses offered by machinery manufacturers, community colleges, and trade schools. For entry-level jobs, employers prefer to hire those who have completed high school or technical school, and have taken courses in mechanical drawing, mathematics, blueprint reading, computers, and electronics. Opportunities for advancement vary by specialty. Some may advance either by working with more complicated equipment or by becoming supervisors.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$22.71	$29.26	$35.76	$41.06	$48.00
Alameda Co:	$18.40	$23.71	$28.98	$33.27	$38.90
East Bay Region:	$19.83	$25.55	$31.23	$35.85	$41.92
California:	$16.50	$21.03	$26.39	$32.21	$39.15
United States:	$14.80	$17.95	$22.25	$27.68	$33.61

Employment Projections

	2013 Jobs	*2018 Jobs*	*% Change*	*New Jobs*	*Replace-ments*	*Total Openings*
Contra Costa Co:	454	516	14%	62	43	105
Alameda Co:	897	981	9%	84	85	169
East Bay Region:	1,351	1,497	11%	146	128	274
California:	20,640	23,057	12%	2,417	1,972	4,389
United States:	311,306	342,533	10%	31,227	311,306	342,533

Key Industries

National Employment Matrix	**% of jobs**
Commercial and industrial machinery and equipment	9.9
Local government, excluding education and hospitals	3
Plastics product manufacturing	2.8
Animal slaughtering and processing	2.8
Electric power generation, transmission and distribution	2.5
Motor vehicle parts manufacturing	2.4
Converted paper product manufacturing	2.3
Federal government, excluding postal service	2.1
Fruit and vegetable preserving and specialty food manufacturing	2.1
Pulp, paper, and paperboard mills	2

Most Important Knowledge, Skills & Abilities

- Repairing and Maintaining Mechanical Equipment
  - adjust or set mechanical controls or components
  - adjust production equipment/machinery setup
  - align or adjust clearances of mechanical components or parts
  - assemble, dismantle, or reassemble equipment or machinery
  - conduct tests to locate mechanical system malfunction
  - diagnose mechanical problems in machinery or equipment
  - inspect machinery or equipment to determine adjustments or repairs needed
  - install equipment or attachments on machinery or related structures
  - install water or sewer treatment plant equipment
  - lubricate machinery, equipment, or parts
  - maintain or repair industrial or related equipment/machinery
  - maintain or repair small engines
  - maintain or repair work tools or equipment
  - maintain specialized manufacturing or commercial equipment or machinery
  - maintain welding machines or equipment
  - overhaul industrial or construction machinery or equipment
  - overhaul power-generating equipment or machinery
  - perform hydraulic plumbing
  - position, align, or level machines, equipment, or structures
  - repair or adjust measuring or control devices
  - repair or replace malfunctioning or worn mechanical components
  - test mechanical products or equipment
- Mechanical Knowledge
- Repairing Skills (machines or systems)
- Inspecting Equipment, Structures, or Material
  - conduct performance testing
- Handling and Moving Objects (using hands and arms)
  - assemble and install pipe sections, fittings, or plumbing fixtures
  - bend tubing or conduit
  - fabricate, assemble, or disassemble manufactured products by hand
- Getting Information (from all relevant sources)
- Equipment Maintenance Skills
- Performing General Physical Activities
- Troubleshooting Skills
- Reaction Time Abilities (respond quickly with the hand, finger, or foot to a signal)
- Operation Monitoring Skills (machines)

Local Programs

No local training or education programs identified. However, Diablo Valley College (Pleasant Hill) plans to offer a new Industrial Maintenance and Machinist Mechanic (MTEC) program in Fall, 2013.

Priority Occupation Profile for

Machinists

What They Do

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.

AKA: Manual Lathe Machinist; Millwright; Mold Tooling Designer (MTD); Moldmaker; Precision Grinder Machinist; Production Machinist; Set-Up / Machinist; Tool Room Machinist; Tool and Die Maker; Maintenance Technician; Tool Maker; Utility Operator; Set-Up Machinist; CNC Machinist (Computer Numerically Controlled Machinist); Maintenance Specialist; Toolmaker; 4-Slide Operator; Automation Technician; CNC Machinist (Computer Numerical Control Machinist); CNC Operator (Computer Numerical Control Operator); CNC Operator and Programmer (Computer Numerically Controlled Operator and Programmer); Gear Machinist; Machine Operator; Machine Repair Person; Machinist; Machinist Tool and Die; Maintenance Machinist; CNC Machine Operator (Computer Numerically Controlled Machine Operator)

Common Tasks:

- Select the appropriate tools, machines, and materials to be used in preparation of machinery work.
- Calculate dimensions and tolerances using knowledge of mathematics and instruments such as micrometers and vernier calipers.
- Align and secure holding fixtures, cutting tools, attachments, accessories, or materials onto machines.
- Set up, adjust, and operate all of the basic machine tools and many specialized or advanced variation tools to perform precision machining operations.
- Clean and lubricate machines, tools, and equipment to remove grease, rust, stains, and foreign matter.
- Monitor the feed and speed of machines during the machining process.
- Observe and listen to operating machines or equipment to diagnose machine malfunctions and to determine need for adjustments or repairs.
- Study sample parts, blueprints, drawings, and engineering information to determine methods and sequences of operations needed to fabricate products, and determine product dimensions and tolerances.
- Machine parts to specifications, using machine tools, such as lathes, milling machines, shapers, or grinders.

O*NET Link: http://www.onetonline.org/link/details/51-4041.00

What It Requires

Education: High school diploma or equivalent

Training: Apprenticeship or long-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Employers look for entry-level machinists with mechanical aptitude and a good work ethic. Some begin as shop helpers. Some employers prefer to hire only skilled machinists or those with technical school training. As machinists gain knowledge and experience, they are given greater responsibility. Some machinists advance to CNC programmer positions. Some are promoted to supervisory positions. A few will open their own shops.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$13.69	$17.97	$23.99	$31.28	$37.15
Alameda Co:	$12.27	$16.11	$21.50	$28.04	$33.30
East Bay Region:	$12.50	$16.40	$21.89	$28.54	$33.89
California:	$11.17	$14.75	$19.06	$24.56	$30.12
United States:	$11.73	$14.99	$18.86	$23.17	$28.49

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	320	317	-1%	-3	35	32
Alameda Co:	1,761	1,837	4%	76	161	237
East Bay Region:	2,081	2,153	3%	72	198	270
California:	31,958	33,444	5%	1,486	3,216	4,702
United States:	385,066	397,960	3%	12,894	45,500	58,394

Key Industries

National Employment Matrix	% of jobs
Machine shops	20.2
Employment services	6.5
Aerospace product and parts manufacturing	5.9
Motor vehicle parts manufacturing	5.5
Metalworking machinery manufacturing	5.4
Other general purpose machinery manufacturing	4.2
Other fabricated metal product manufacturing	3.3
Agriculture, construction, and mining machinery manufacturing	2.8
Turned product and screw, nut, and bolt manufacturing	2.7
Medical equipment and supplies manufacturing	2.3
Engine, turbine, and power transmission equipment manufacturing	2
Industrial machinery manufacturing	2

Most Important Knowledge, Skills & Abilities

- Getting Information (from all relevant sources)
- Mathematics Knowledge
- Controlling Machines and Processes
- Mechanical Knowledge

Local Programs

Chabot College - http://www.chabotcollege.edu/

Laney College - http://www.laney.edu/wp/

Priority Occupation Profile for

Millwrights

What They Do

Install, dismantle, or move machinery and heavy equipment according to layout plans, blueprints, or other drawings.

AKA: Millwright Instructor; Millwright; Maintenance Mechanic; Precision Millwright; Maintenance Millwright

Common Tasks:

- Weld, repair, and fabricate equipment or machinery.
- Insert shims, adjust tension on nuts and bolts, or position parts, using hand tools and measuring instruments, to set specified clearances between moving and stationary parts.
- Assemble machines, and bolt, weld, rivet, or otherwise fasten them to foundation or other structures, using hand tools and power tools.
- Move machinery and equipment, using hoists, dollies, rollers, and trucks.
- Shrink-fit bushings, sleeves, rings, liners, gears, and wheels to specified items, using portable gas heating equipment.
- Signal crane operator to lower basic assembly units to bedplate, and align unit to centerline.
- Assemble and install equipment, using hand tools and power tools.
- Align machines and equipment, using hoists, jacks, hand tools, squares, rules, micrometers, and plumb bobs.
- Replace defective parts of machine or adjust clearances and alignment of moving parts.
- Attach moving parts and subassemblies to basic assembly unit, using hand tools and power tools.
- Fabricate and dismantle parts, equipment, and machines using a cutting torch or other cutting equipment.
- Conduct preventative maintenance and repair, and lubricate machines and equipment.
- Dismantle machinery and equipment for shipment to installation site, usually performing installation and maintenance work as part of team.
- Level bedplate and establish centerline, using straightedge, levels, and transit.
- Bolt parts, such as side and deck plates, jaw plates, and journals, to basic assembly unit.
- Lay out mounting holes, using measuring instruments, and drill holes with power drill.
- Dismantle machines, using hammers, wrenches, crowbars, and other hand tools.

O*NET Link: http://www.onetonline.org/link/details/49-9044.00

What It Requires

Education: High school diploma or equivalent

Training: Apprenticeship or long-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Millwrights usually learn their trade through a 4-year apprenticeship program that combines classroom instruction with on-the-job-training. These programs usually are sponsored by a local trade union. Others start as helpers and learn the skills of the trade informally through experience and by taking courses offered by machinery manufacturers, community colleges, and trade schools. For entry-level jobs, employers prefer to hire those who have completed high school or technical school, and have taken courses in mechanical drawing, mathematics, blueprint reading, computers, and electronics. Opportunities for advancement vary by specialty. Some may advance either by working with more complicated equipment or by becoming supervisors.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$23.00	$26.49	$31.70	$37.72	$42.02
Alameda Co:	$24.28	$27.97	$33.46	$39.82	$44.36
East Bay Region:	$23.97	$27.61	$33.03	$39.31	$43.79
California:	$16.04	$19.90	$25.51	$31.66	$39.33
United States:	$15.12	$18.53	$23.69	$30.17	$35.00

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	99	98	-1%	-1	11	10
Alameda Co:	306	289	-6%	-17	50	33
East Bay Region:	405	386	-5%	-19	62	43
California:	1,930	1,921	0%	-9	278	269
United States:	37,351	35,593	-5%	-1,758	6,862	5,104

Key Industries

National Employment Matrix	**% of jobs**
Other building equipment contractors	25.3
Nonresidential building construction	10.9
Pulp, paper, and paperboard mills	6
Motor vehicle parts manufacturing	4.8
Plumbing, heating, and air-conditioning contractors	3.3
Sawmills and wood preservation	3.2
Veneer, plywood, and engineered wood product manufacturing	2.7
Foundries	2.2
Employment services	2.2
Commercial and industrial machinery and equipment	2.1

Most Important Knowledge, Skills & Abilities

- Mechanical Knowledge
- Repairing and Maintaining Mechanical Equipment
  - adjust or set mechanical controls or components
  - align or adjust clearances of mechanical components or parts
  - assemble, dismantle, or reassemble equipment or machinery
  - conduct tests to locate mechanical system malfunction
  - diagnose mechanical problems in machinery or equipment
  - install equipment or attachments on machinery or related structures
  - lubricate machinery, equipment, or parts
  - maintain or repair industrial or related equipment/machinery
  - maintain or repair work tools or equipment
  - maintain welding machines or equipment
  - perform hydraulic plumbing
  - position, align, or level machines, equipment, or structures
  - repair or replace malfunctioning or worn mechanical components
  - test mechanical products or equipment
- Handling and Moving Objects (using hands and arms)
  - assemble and install pipe sections, fittings, or plumbing fixtures
  - fabricate, assemble, or disassemble manufactured products by hand
- Performing General Physical Activities
  - construct, erect, or repair wooden frameworks or structures
  - cut, bend, or thread pipe for gas, air, hydraulic, or water lines
  - erect scaffold
  - install/string electrical or electronic cable or wiring
  - move materials or goods between work areas
  - move or fit heavy objects
- Getting Information (from all relevant sources)
  - read blueprints
  - read schematics
  - read specifications
  - read technical drawings
  - read work order, instructions, formulas, or processing charts
- Mathematics Knowledge
- Inspecting Equipment, Structures, or Material
  - conduct performance testing
- Installation Skills (equipment, machines, wiring, or programs)
- Making Decisions and Solving Problems (by evaluating information)
- Controlling Machines and Processes
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)

Local Programs

No local training or education programs identified. However, Diablo Valley College (Pleasant Hill) plans to offer a new Industrial Maintenance and Machinist Mechanic (MTEC) program in Fall, 2013.

Priority Occupation Profile for

Prepress Technicians and Workers

What They Do

Format and proof text and images submitted by designers and clients into finished pages that can be printed. Includes digital and photo typesetting. May produce printing plates.

AKA: Production Coordinator; Prepress Digital Technician; Prepress Manager; Prepress Operator; Type Setter; Prepress Specialist; Prepress Stripper; Prepress Technician; Scanner Operator; Electronic Prepress Technician (EPP Tech); Pre-Press Technician; Prepress Supervisor; Computer to Plate Operator (CTP Operator); Graphic Designer; Pre-Press Proofer; Composing Room Manager; Desktop Operator; Digital Prepress Operator; Electronic Prepress Operator (EPP Operator); Graphic Artist; Graphic Technician; Gravure Press Operator; Plate Maker; Plate Mounter

Common Tasks:

- Enter, store, and retrieve information on computer-aided equipment.
- Enter, position, and alter text size, using computers, to make up and arrange pages so that printed materials can be produced.
- Maintain, adjust, and clean equipment, and perform minor repairs.

O*NET Link: http://www.onetonline.org/link/details/51-5111.00

What It Requires

Education: Postsecondary education/training program completion

Training: Postsecondary education/training program completion

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Prepress workers sometimes start their careers as layout or production artists, or as desktop publishers. As they gain experience and knowledge, they may advance to entry-level prepress positions. Others come into the printing industry with a background in graphic design. At the entry-level, prepress workers usually work under the close supervision of an experienced prepress technician. As they gain knowledge and experience, they are given more challenging assignments and work more independently. Advancement usually takes the form of moving to jobs with better pay and benefits, or better working conditions. Some may become supervisors, or move into management.

Career Pathway Group: Arts, Audio/Video Technology and Communications

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$13.02	$15.59	$18.14	$22.04	$31.30
Alameda Co:	$13.63	$16.32	$18.98	$23.07	$32.76
East Bay Region:	$13.48	$16.14	$18.78	$22.82	$32.41
California:	$11.43	$15.68	$19.99	$26.79	$34.23
United States:	$10.65	$13.90	$17.82	$22.50	$28.01

Employment Projections

	2013 Jobs	*2018 Jobs*	*% Change*	*New Jobs*	*Replace-ments*	*Total Openings*
Contra Costa Co:	104	90	-13%	-14	27	13
Alameda Co:	302	213	-29%	-89	129	40
East Bay Region:	406	303	-25%	-103	156	53
California:	4,156	3,332	-20%	-824	1,353	529
United States:	38,604	33,506	-13%	-5,098	10,431	5,333

Key Industries

National Employment Matrix	**% of jobs**
Printing and related support activities	56.2
Newspaper publishers	11.2
Converted paper product manufacturing	5.6
Advertising, public relations, and related services	2.6

Most Important Knowledge, Skills & Abilities

- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
- Getting Information (from all relevant sources)
  - read blueprints
  - read production layouts
  - read specifications
  - read technical drawings
  - read work order, instructions, formulas, or processing charts
- Making Decisions and Solving Problems (by evaluating information)
- Computers or Electronics Knowledge
- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
- English Language Knowledge (structure and content)

Local Programs

Chabot College - http://www.chabotcollege.edu/ (see Art Dept)

Laney College - http://www.laney.edu/wp/ (see Graphic Arts)

Las Positas College - http://www.laspositascollege.edu/ (see Visual Communications)

Los Medanos College - http://www.losmedanos.edu/ (see Art Dept)

Priority Occupation Profile for

Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic

What They Do

Develop programs to control machining or processing of metal or plastic parts by automatic machine tools, equipment, or systems.

AKA: Process Engineer; Welding Engineer; Tool Maker; Tool and Die Maker; Software Engineer; Project Engineer; Programmer; Mold Maker; Manufacturing Engineer; Machinist; Computer Numerical Control Programmer (CNC Programmer); CAD CAM Programmer (Computer-Aided Design Computer-Aided Manufacturing Programmer); Programmer

Common Tasks:

- Analyze job orders, drawings, blueprints, specifications, printed circuit board pattern films, and design data in order to calculate dimensions, tool selection, machine speeds, and feed rates.
- Determine the sequence of machine operations, and select the proper cutting tools needed to machine workpieces into the desired shapes.
- Modify existing programs to enhance efficiency.
- Determine reference points, machine cutting paths, or hole locations, and compute angular and linear dimensions, radii, and curvatures.
- Observe machines on trial runs or conduct computer simulations to ensure that programs and machinery will function properly and produce items that meet specifications.
- Write programs in the language of a machine's controller and store programs on media such as punch tapes, magnetic tapes, or disks.

O*NET Link: http://www.onetonline.org/link/details/51-4012.00

What It Requires

Education: High school diploma or equivalent

Training: Moderate-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Employers look for applicants with computer numerical control (CNC) programmer training or experience. Others hire or promote machinists or machine tool operators and train them in CNC programming. Advancement may lead to supervisory positions. A few will open their own shops.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$11.90	$14.51	$20.74	$26.64	$31.83
Alameda Co:	$13.49	$16.44	$23.50	$30.19	$36.08
East Bay Region:	$13.30	$16.22	$23.18	$29.79	$35.59
California:	$14.79	$18.50	$25.51	$32.40	$40.70
United States:	$14.69	$17.50	$22.06	$27.80	$34.36

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	23	23	0%	0	3	3
Alameda Co:	172	179	4%	7	17	24
East Bay Region:	195	203	4%	8	19	27
California:	2,360	2,440	3%	80	266	346
United States:	21,626	22,561	4%	935	2,690	3,625

Key Industries

National Employment Matrix	**% of jobs**
Machine shops	19.1
Metalworking machinery manufacturing	13.6
Aerospace product and parts manufacturing	7.5
Other fabricated metal product manufacturing	6.3
Other general purpose machinery manufacturing	6.2
Architectural and structural metals manufacturing	5.3
Agriculture, construction, and mining machinery manufacturing	4.9
Forging and stamping	3.3
Turned product and screw, nut, and bolt manufacturing	2.9
Industrial machinery manufacturing	2.6
Motor vehicle parts manufacturing	2.1

Most Important Knowledge, Skills & Abilities	• Interacting With Computers (to program, write software, set up functions, enter data, or process information)
	  ○ configure computers in industrial or manufacturing setting
	  ○ program computer numerical controlled machines
	  ○ use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
	  ○ use computers to enter, access or retrieve data
	• Mathematics Knowledge
	• Getting Information (from all relevant sources)
	• Programming Skills (computer programs)
	• Mechanical Knowledge

Local Programs	No local training or education programs identified.

Priority Occupation Profile for

Computer-Controlled Machine Tool Operators, Metal and Plastic

What They Do

Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.

AKA: Brake Press Operator; Welder; Production Worker; Mold Maker; Machinist; Machine Operator; Computer Numerical Control Set Up Technician (CNC Set Up Technician); Computer Numerical Control Operator (CNC Operator); Computer Numerical Control Mill Operator (CNC Mill Operator); Computer Numerical Control Machinist (CNC Machinist); Computer Numerical Control Lathe Operator (CNC Lathe Operator); Computer Numerical Control Machine Operator (CNC Machine Operator); Computer Numerical Control Set-Up Operator (CNC Set-Up Operator)

Common Tasks:

- Stop machines to remove finished workpieces or to change tooling, setup, or workpiece placement, according to required machining sequences.
- Confer with supervisors or programmers to resolve machine malfunctions or production errors or to obtain approval to continue production.
- Listen to machines during operation to detect sounds such as those made by dull cutting tools or excessive vibration and adjust machines to compensate for problems.
- Lift workpieces to machines manually or with hoists or cranes.
- Check to ensure that workpieces are properly lubricated and cooled during machine operation.
- Measure dimensions of finished workpieces to ensure conformance to specifications, using precision measuring instruments, templates, and fixtures.
- Clean machines, tooling, or parts, using solvents or solutions and rags.
- Set up and operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic workpieces.
- Adjust machine feed and speed, change cutting tools, or adjust machine controls when automatic programming is faulty or if machines malfunction.

O*NET Link: http://www.onetonline.org/link/details/51-4011.00

What It Requires

Education: High school diploma or equivalent

Training: Moderate-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Employers look for applicants with computer controlled machine tool operator training or experience. Others prefer to train in-house. Advancement may lead to computer numerical control (CNC) programmer and supervisory positions. A few will open their own shops.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$10.78	$13.10	$17.09	$20.20	$24.87
Alameda Co:	$12.16	$14.77	$19.27	$22.78	$28.04
East Bay Region:	$12.00	$14.57	$19.02	$22.47	$27.67
California:	$10.55	$13.00	$17.29	$22.33	$27.74
United States:	$11.19	$13.56	$16.93	$20.93	$25.17

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	57	64	12%	7	5	12
Alameda Co:	429	474	10%	45	41	86
East Bay Region:	486	538	11%	52	46	98
California:	10,167	10,932	8%	765	1,086	1,851
United States:	136,552	147,138	8%	10,586	16,104	26,690

Key Industries

National Employment Matrix	% of jobs
Machine shops	19.1
Metalworking machinery manufacturing	13.6
Aerospace product and parts manufacturing	7.5
Other fabricated metal product manufacturing	6.3
Other general purpose machinery manufacturing	6.2
Architectural and structural metals manufacturing	5.3
Agriculture, construction, and mining machinery manufacturing	4.9
Forging and stamping	3.3
Turned product and screw, nut, and bolt manufacturing	2.9
Industrial machinery manufacturing	2.6
Motor vehicle parts manufacturing	2.1

Most Important Knowledge, Skills & Abilities

- Interacting With Computers (to program, write software, set up functions, enter data, or process information)
- Mathematics Knowledge
- Getting Information (from all relevant sources)
- Programming Skills (computer programs)
- Mechanical Knowledge

Local Programs

No local training or education programs identified.

Priority Occupation Profile for

Driver/Sales Workers

What They Do

Drive truck or other vehicle over established routes or within an established territory and sell or deliver goods, such as food products, including restaurant take-out items, or pick up or deliver items such as commercial laundry. May also take orders, collect payment, or stock merchandise at point of delivery. Includes newspaper delivery drivers.

AKA: Sales Route Driver; Delivery Driver; Territory Manager; Truck Driver; Driver; Pizza Delivery Driver; Route Salesman

Common Tasks:

- Collect money from customers, make change, and record transactions on customer receipts.
- Drive trucks to deliver such items as food, medical supplies, or newspapers.
- Write customer orders and sales contracts according to company guidelines.
- Inform regular customers of new products or services and price changes.
- Record sales or delivery information on daily sales or delivery record.
- Listen to and resolve customers' complaints regarding products or services.

O*NET Link: http://www.onetonline.org/link/details/53-3031.00

What It Requires

Education: High school diploma or equivalent

Training: Short-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Driver/sales workers usually begin as part-time or on-call drivers, or drivers-in-training. Advancement usually takes the form of increased earnings, preferred schedules, or better working conditions. A few become dispatchers or managers.

Career Pathway Group: Business, Management and Administration

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$8.00	$8.38	$11.30	$20.57	$31.44
Alameda Co:	$9.05	$9.50	$12.98	$24.00	$36.92
East Bay Region:	$8.77	$9.20	$12.53	$23.08	$35.46
California:	$8.52	$8.99	$11.54	$18.25	$24.57
United States:	$8.01	$8.76	$10.95	$16.60	$21.98

Employment Projections

	2013 Jobs	*2018 Jobs*	*% Change*	*New Jobs*	*Replace-ments*	*Total Openings*
Contra Costa Co:	779	868	11%	89	75	164
Alameda Co:	2,105	2,226	6%	121	208	329
East Bay Region:	2,884	3,094	7%	210	283	493
California:	40,292	44,606	11%	4,314	3,919	8,233
United States:	402,741	421,912	5%	19,171	42,779	61,950

Key Industries

National Employment Matrix	**% of jobs**
Limited-service eating places	27.6
Grocery and related product wholesalers	17.1
Full-service restaurants	6
Direct selling establishments	4.6
Drycleaning and laundry services	4
Beer, wine, and distilled alcoholic beverage merchant wholesaler	3.2

Most Important Knowledge, Skills & Abilities

- Operating Vehicles, Mechanized Devices, or Equipment (includes forklifts, passenger vehicles, aircraft, and water craft)
- Establishing and Maintaining Interpersonal Relationships (and maintaining them over time)
- Performing for or Working Directly with the Public (includes serving customers in restaurants and stores, and receiving clients or guests)
- Customer or Personal Service Knowledge

Local Programs

No local training or education programs identified.

Priority Occupation Profile for

Laborers and Freight, Stock, and Material Movers, Hand

What They Do

Manually move freight, stock, or other materials or perform other general labor.

AKA: Stocker; Receiving Associate; Receiving Clerk; Yard Man; Roll Wrapper; Material Mover; Sales Associate; Selector; Shipping and Receiving Materials Handler; Stock Replenisher; Storeroom Clerk; Warehouse Loader; Warehouse Worker; Warehouseman; Warehouser; Receiver; Shipping Clerk; Core Finisher; Ramp Agent; Cooler Worker; Customer Service Representative; Delivery Driver; Fleet Service Agent; Fork Lift Operator; Forklift Driver; Line Tender; Loader; Material Handler; Merchandise Customer Assistant; Preloader; Press Helper; Laborer; Merchandise Pickup / Receiving Associate

Common Tasks:

- Move freight, stock, or other materials to and from storage or production areas, loading docks, delivery vehicles, ships, or containers, by hand or using trucks, tractors, or other equipment.
- Read work orders or receive oral instructions to determine work assignments or material or equipment needs.

O*NET Link: http://www.onetonline.org/link/details/53-7062.00

What It Requires

Education: Less than high school

Training: Short-term on-the-job training

Experience: Not usually required

Career Path

Jobs for this occupation are almost always entry-level jobs. Advancement usually takes the form of increased earnings, preferred schedules, or better working conditions. A few become supervisors. In some cases, experience may allow workers to qualify or become trainees for jobs such as construction trades workers; assemblers, or other production workers; or motor vehicle operators.

Career Pathway Group: Transportation, Distribution and Logistics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$8.57	$9.94	$12.42	$16.12	$20.83
Alameda Co:	$9.43	$10.94	$13.67	$17.74	$22.93
East Bay Region:	$9.21	$10.68	$13.34	$17.32	$22.39
California:	$8.71	$9.55	$11.83	$15.35	$20.12
United States:	$8.27	$9.25	$11.42	$14.67	$18.61

Employment Projections

	2013 Jobs	*2018 Jobs*	*% Change*	*New Jobs*	*Replace-ments*	*Total Openings*
Contra Costa Co:	3,636	3,730	3%	94	602	696
Alameda Co:	10,437	10,862	4%	425	1,678	2,103
East Bay Region:	14,073	14,592	4%	519	2,280	2,799
California:	245,983	264,418	7%	18,435	39,197	57,632
United States:	2,136,909	2,240,398	5%	103,489	357,769	461,258

Key Industries

National Employment Matrix	**% of jobs**
Employment services	14.7
Warehousing and storage	7.1
Couriers and express delivery services	6.1
Grocery and related product wholesalers	3.2
Other general merchandise stores	3.1
Department stores	2.8
General freight trucking	2.7
Building material and supplies dealers	2.5
Grocery stores	2.1
Miscellaneous durable goods merchant wholesalers	2

Most Important Knowledge, Skills & Abilities	• Performing General Physical Activities
	  ○ clean rooms or work areas
	  ○ handle props during performances
	  ○ load, unload, or stack containers, materials, or products
	  ○ move or fit heavy objects
	• Getting Information (from all relevant sources)
	  ○ read technical drawings
	  ○ read work order, instructions, formulas, or processing charts
	• Inspecting Equipment, Structures, or Material
	• Monitor Processes, Materials, or Surroundings (to detect or assess problems)
	• Operating Vehicles, Mechanized Devices, or Equipment (includes forklifts, passenger vehicles, aircraft, and water craft)
	• Handling and Moving Objects (using hands and arms)

Local Programs	No local training or education programs identified.

Priority Occupation Profile for

Light Truck or Delivery Services Drivers

What They Do

Drive a light vehicle, such as a truck or van, with a capacity of less than 26,000 pounds Gross Vehicle Weight (GVW), primarily to deliver or pick up merchandise or to deliver packages. May load and unload vehicle.

AKA: Route Driver; Utility Driver; Courier; Truck Driver; Warehouse Driver; Service Provider; Run Driver; Package Car Driver; Driver; Delivery Driver; Bulk Delivery Driver; Package Delivery Driver; Dock Person

Common Tasks:

- Load and unload trucks, vans, or automobiles.
- Obey traffic laws and follow established traffic and transportation procedures.
- Report any mechanical problems encountered with vehicles.
- Read maps and follow written or verbal geographic directions.
- Inspect and maintain vehicle supplies and equipment, such as gas, oil, water, tires, lights, or brakes, to ensure that vehicles are in proper working condition.
- Maintain records, such as vehicle logs, records of cargo, or billing statements, in accordance with regulations.

O*NET Link: http://www.onetonline.org/link/details/53-3033.00

What It Requires

Education: High school diploma or equivalent

Training: Short-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Light truck and delivery services drivers usually begin as part-time or on-call drivers. Advancement usually takes the form of increased earnings, preferred schedules, or better working conditions. A few become dispatchers or managers.

Career Pathway Group: Transportation, Distribution and Logistics

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$8.79	$11.21	$14.75	$20.70	$25.37
Alameda Co:	$9.77	$12.47	$16.40	$23.01	$28.21
East Bay Region:	$9.49	$12.11	$15.93	$22.35	$27.40
California:	$9.29	$11.31	$14.77	$20.35	$29.29
United States:	$8.67	$10.47	$13.98	$19.41	$28.10

Employment Projections

	2013 Jobs	*2018 Jobs*	*% Change*	*New Jobs*	*Replace-ments*	*Total Openings*
Contra Costa Co:	1,950	2,068	6%	118	193	311
Alameda Co:	4,761	4,614	-3%	-147	669	522
East Bay Region:	6,711	6,682	0%	-29	862	833
California:	92,045	96,249	5%	4,204	9,645	13,849
United States:	785,787	815,379	4%	29,592	86,009	115,601

Key Industries

National Employment Matrix	**% of jobs**
Couriers and express delivery services	15.5
Self-employed owner-operator services	7.8
Automotive parts, accessories, and tire stores	4.6
General freight trucking	3.8
Grocery and related product wholesalers	3.5
Building material and supplies dealers	3.4
Motor vehicle and motor vehicle parts and supplies merchant wholesalers	3.1
Furniture stores	2.4
Specialized freight trucking	2.3
Miscellaneous nondurable goods merchant wholesalers	2
Employment services	2

Most Important Knowledge, Skills & Abilities

- Operating Vehicles, Mechanized Devices, or Equipment (includes forklifts, passenger vehicles, aircraft, and water craft)
  - drive automobile, van, or light truck
  - transport passengers or cargo
- Getting Information (from all relevant sources)
  - read maps
- Handling and Moving Objects (using hands and arms)
- Performing for or Working Directly with the Public (includes serving customers in restaurants and stores, and receiving clients or guests)
- Performing General Physical Activities

Local Programs	Many vocational and truck driving schools offer truck driver training leading toward obtaining a CDL (Commercial Driver's License) – which is required for larger vehicles and trucks. See http://etpl.edd.ca.gov/wiaetplocc.asp for a list of training providers.

Priority Occupation Profile for

Maintenance and Repair Workers, General

What They Do

Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.

AKA: Utility Specialist; Maintenance Specialist; Mechanic; Maintenance Supervisor; Maintenance Mechanic; Maintenance Support Specialist; Maintenance Technician; Mechanical Specialist; Plant Maintenance Technician; Process Technician; Terminal Mechanic; Building Maintenance Mechanic; Maintenance Man; Stationary Engineer; Facilities Manager; Building Services Mechanic; Maintenance Engineer; Equipment Engineering Technician; Building Mechanic; Fireman (Boilers); HVAC Tech (Heating, Ventilation, and Air Conditioning Technician); I&C Technician (Instrument and Controls Technician); Industrial Maintenance Mechanic; Industrial Mechanic; Instrumentation and Electrical Technician (I/E Technician); Maintenance Electrician; Engineering Mechanic

Common Tasks:

- Use tools ranging from common hand and power tools, such as hammers, hoists, saws, drills, and wrenches, to precision measuring instruments and electrical and electronic testing devices.
- Adjust functional parts of devices or control instruments, using hand tools, levels, plumb bobs, or straightedges.
- Perform routine preventive maintenance to ensure that machines continue to run smoothly, building systems operate efficiently, or the physical condition of buildings does not deteriorate.
- Order parts, supplies, and equipment from catalogs and suppliers, or obtain them from storerooms.
- Assemble, install, or repair wiring, electrical or electronic components, pipe systems, plumbing, machinery, or equipment.

O*NET Link: http://www.onetonline.org/link/details/49-9071.00

What It Requires

Education: High school diploma or equivalent

Training: Moderate-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Beginning general maintenance and repair workers need to find a job where they can learn the trade and develop their skills. Some of the knowledge and skills needed can be acquired by taking shop classes in high school and career technical education classes in community college. But there's no substitute for hands-on experience and learning from a more experienced maintenance technician. As one becomes more skilled, they are usually given more responsibility and, eventually, higher pay. Advancement may lead to supervisory positions or to self-employment as a handyman. Some move on to skilled construction trades such as carpenter, electrician or plumber, or go into business for themselves as licensed contractors.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$11.94	$15.57	$20.37	$26.87	$33.57
Alameda Co:	$11.78	$15.36	$20.10	$26.51	$33.12
East Bay Region:	$11.83	$15.43	$20.19	$26.63	$33.27
California:	$10.78	$13.66	$18.23	$24.25	$29.65
United States:	$10.01	$12.81	$16.84	$21.81	$27.30

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	2,498	2,619	5%	121	229	350
Alameda Co:	5,117	5,357	5%	240	469	709
East Bay Region:	7,615	7,976	5%	361	698	1,059
California:	121,947	129,052	6%	7,105	11,148	18,253
United States:	1,282,110	1,339,770	4%	57,660	122,374	180,034

Key Industries

National Employment Matrix	**% of jobs**
Lessors of real estate	10
Local government, excluding education and hospitals	8.5
Activities related to real estate	7.2
Elementary and secondary schools; local	3.3
General medical and surgical hospitals; private	2.1

Note: General maintenance and repair workers work in a wide variety of industries, including in the manufacturing sector.

Most Important Knowledge, Skills & Abilities	• Inspecting Equipment, Structures, or Material • Repairing Skills (machines or systems) • Performing General Physical Activities • Handling and Moving Objects (using hands and arms) • Repairing and Maintaining Mechanical Equipment • Equipment Maintenance Skills
Local Programs	No local training or education programs identified.

Priority Occupation Profile for

Maintenance Workers, Machinery

What They Do

Lubricate machinery, change parts, or perform other routine machinery maintenance.

AKA: Maintenance Worker; Winding Head Overhauler; Maintenance Mechanic; Machinist; Maintenance Technician; Mechanic; Millwright; Oiler; Overhauler; Maintenance Machinist; Welder; Maintenance Craftsman; Maintainer; Machine Repairer; Industrial Maintenance Technician; Industrial Maintenance Millwright; Industrial Maintenance Mechanic; Heavy Equipment Mechanic; Electro / Mechanical Technician; Electrician; Maintenance Electrician

Common Tasks:

- Start machines and observe mechanical operation to determine efficiency and to detect problems.
- Dismantle machines and remove parts for repair, using hand tools, chain falls, jacks, cranes, or hoists.
- Lubricate or apply adhesives or other materials to machines, machine parts, or other equipment, according to specified procedures.
- Reassemble machines after the completion of repair or maintenance work.
- Collect and discard worn machine parts and other refuse in order to maintain machinery and work areas.
- Install, replace, or change machine parts and attachments, according to production specifications.
- Collaborate with other workers to repair or move machines, machine parts, or equipment.
- Inspect or test damaged machine parts, and mark defective areas or advise supervisors of repair needs.
- Read work orders and specifications to determine machines and equipment requiring repair or maintenance.
- Clean machines and machine parts, using cleaning solvents, cloths, air guns, hoses, vacuums, or other equipment.
- Record production, repair, and machine maintenance information.

O*NET Link: http://www.onetonline.org/link/details/49-9043.00

What It Requires

Education: High school diploma or equivalent

Training: Moderate-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Most machinery maintenance workers get started in this occupation by finding a job where they can learn the trade and develop their skills, usually working closely with a more experienced machinery maintenance mechanic. Some of the knowledge and skills needed can be acquired by taking shop classes in high school and career technical education classes in community college, but most of the knowledge is likely to be acquired through on-the-job training and experience. As one becomes more skilled, they are usually given more responsibility and, eventually, higher pay. Advancement may lead to supervisory positions.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$14.59	$20.60	$29.33	$36.24	$39.63
Alameda Co:	$11.82	$16.69	$23.76	$29.36	$32.10
East Bay Region:	$12.56	$17.74	$25.26	$31.21	$34.13
California:	$10.83	$13.79	$19.24	$25.83	$32.05
United States:	$11.68	$14.89	$18.98	$24.08	$28.78

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	116	117	1%	1	11	12
Alameda Co:	314	323	3%	9	29	38
East Bay Region:	430	440	2%	10	40	50
California:	6,425	6,588	3%	163	709	872
United States:	80,436	82,080	2%	1,644	9,619	11,263

Key Industries

National Employment Matrix	**% of jobs**
Local government, excluding education and hospitals	4.4
Plastics product manufacturing	3.9
Support activities for air transportation	3.1
Animal slaughtering and processing	3.1
Textile mills	2.5
Converted paper product manufacturing	2.5
Motor vehicle parts manufacturing	2.4
Commercial and industrial machinery and equipment	2.4
Fruit and vegetable preserving and specialty food manufacturing	2

Most Important Knowledge, Skills & Abilities

- Repairing and Maintaining Mechanical Equipment
  - adjust or set mechanical controls or components
  - clean equipment or machinery
  - inspect machinery or equipment to determine adjustments or repairs needed
  - install equipment or attachments on machinery or related structures
  - lubricate machinery, equipment, or parts
  - maintain or repair industrial or related equipment/machinery
  - repair or replace malfunctioning or worn mechanical components
  - test mechanical products or equipment
- Mechanical Knowledge
- Controlling Machines and Processes
  - fabricate sheet metal parts or items
  - operate hoist, winch, or hydraulic boom
  - operate sandblasting equipment
  - operate vacuum or air hose
  - use acetylene welding/cutting torch
  - use control or regulating devices to adjust or maintain industrial machinery
  - use hand or power tools
  - use hand or power woodworking tools
  - use high voltage apparatus
  - use measuring devices in repairing industrial or heavy equipment
  - use pneumatic tools
  - use precision measuring devices in mechanical repair work
  - use pressure gauges
- Handling and Moving Objects (using hands and arms)
- Inspecting Equipment, Structures, or Material
- Performing General Physical Activities

Local Programs

No local training or education programs identified.

Priority Occupation Profile for

Print Binding and Finishing Workers

What They Do

Bind books and other publications or finish printed products by hand or machine. May set up binding and finishing machines.

AKA: Spiral Binder Operator; Knife Operator; Machine Operator; Offset Printer; Perfect Binder Operator; Production Associate; Quality Control Person; Saddle Stitcher Operator; Small Equipment Operator; Folder Operator; Stitcher Operator; Material Handler; Shipper; Bindery Cutter Operator; Collator Operator; Binder Operator; Bindery Folder Operator; Bindery Helper; Bindery Machine Operator; Bindery Operator; Bindery Technician; Operator; Bindery Worker; Binder; Case Binder Operator; Bookbinder; Bindery Production Manager

Common Tasks:

- Apply color to edges of signatures using brushes, pads, or atomizers.
- Bind new books, using hand tools such as bone folders, knives, hammers, or brass binding tools.
- Compress sewed or glued signatures, using hand presses or smashing machines.
- Cut binder boards to specified dimensions, using board shears, hand cutters, or cutting machines.
- Cut cover material to specified dimensions, fitting and gluing material to binder boards by hand or machine.
- Design original or special bindings for limited editions or other custom binding projects.
- Form book bodies by folding and sewing printed sheets to form signatures and assembling signatures in numerical order.
- Imprint or emboss lettering, designs, or numbers on book covers, using gold, silver, or colored foil, and stamping machines.
- Insert book bodies in devices that form back edges of books into convex shapes and produce grooves that facilitate cover attachment.
- Maintain records, such as daily production records, using specified forms.

O*NET Link: http://www.onetonline.org/link/details/51-5113.00

What It Requires

Education: High school diploma or equivalent

Training: Short-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Jobs for this occupation are almost always entry-level jobs. As one gains knowledge and experience, advancement may take the form of increased earnings, preferred schedules, or better working conditions. A few become supervisors or bindery department managers.

Career Pathway Group: Arts, Audio/Video Technology and Communications

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$11.98	$12.97	$14.63	$18.01	$21.95
Alameda Co:	$11.83	$12.80	$14.45	$17.78	$21.67
East Bay Region:	$11.86	$12.84	$14.49	$17.83	$21.73
California:	$9.04	$10.39	$12.75	$16.09	$20.78
United States:	$9.13	$11.12	$14.15	$18.09	$22.11

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	39	39	0%	0	7	7
Alameda Co:	139	114	-18%	-25	50	25
East Bay Region:	178	153	-14%	-25	57	32
California:	3,483	3,072	-12%	-411	1,051	640
United States:	50,191	46,712	-7%	-3,479	14,341	10,862

Key Industries

National Employment Matrix	**% of jobs**
Printing and related support activities	83
Converted paper product manufacturing	2.3

Most Important Knowledge, Skills & Abilities

- Getting Information (from all relevant sources)
- Handling and Moving Objects (using hands and arms)

Local Programs

No local training or education programs identified.

Priority Occupation Profile for

Printing Press Operators

What They Do

Set up and operate digital, letterpress, lithographic, flexographic, gravure, or other printing machines. Includes short-run offset printing presses.

AKA: Flexographic Press Operator; Pressman; Web Offset Press Feeder; Raw Material Handler; Printing Pressman; Printing Press Operator; Printer; Pressroom Foreman; Web Pressman; Press Operator; Press Helper; Offset Pressman; Journeyman Press Operator; Feeder; 3rd Pressman; 2nd Pressman; 1st Pressman; Journeyman Pressman

Common Tasks:

- Collect and inspect random samples during print runs to identify any necessary adjustments.
- Examine job orders to determine quantities to be printed, stock specifications, colors, or special printing instructions.
- Verify that paper and ink meet the specifications for a given job.
- Start presses and pull proofs to check for ink coverage and density, alignment, and registration.
- Change press plates, blankets, or cylinders, as required.
- Obtain or mix inks and fill ink fountains.
- Feed paper through press cylinders and adjust feed and tension controls.
- Load presses with paper and make necessary adjustments, according to paper size.
- Secure printing plates to printing units and adjust tolerances.
- Adjust digital files to alter print elements, such as fonts, graphics, or color separations.
- Clean ink fountains, plates, or printing unit cylinders when press runs are completed.
- Monitor automated press operation systems and respond to fault, error, or alert messages.
- Clean or oil presses or make minor repairs, using hand tools.
- Adjust ink fountain flow rates.

O*NET Link: http://www.onetonline.org/link/details/51-5112.00

What It Requires

Education: High school diploma or equivalent

Training: Moderate-term on-the-job training

Experience: Depends on the job. Some are entry-level and some require previous experience.

Career Path

Printing press operators traditionally completed formal apprenticeships, but these days they tend to learn the job informally through on-the-job training. Manual dexterity, attention to detail, and familiarity with electronics and computers are essential for beginning press operators. As they gain knowledge and experience, they may advance in pay and responsibility by working on more complex printing presses. Advancement may lead to supervisory positions or to cost estimator, where there is often the ability to make more money.

Career Pathway Group: Arts, Audio/Video Technology and Communications

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$10.27	$13.18	$17.27	$21.15	$25.44
Alameda Co:	$10.66	$13.68	$17.93	$21.95	$26.41
East Bay Region:	$10.57	$13.57	$17.79	$21.78	$26.20
California:	$9.82	$12.46	$16.84	$21.87	$27.50
United States:	$9.83	$12.58	$16.49	$21.07	$26.07

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	177	178	1%	1	19	20
Alameda Co:	601	506	-16%	-95	158	63
East Bay Region:	778	684	-12%	-94	177	83
California:	14,905	13,589	-9%	-1,316	2,948	1,632
United States:	168,487	159,872	-5%	-8,615	31,255	22,640

Key Industries

National Employment Matrix	**% of jobs**
Printing and related support activities	52.7
Converted paper product manufacturing	7.6
Newspaper publishers	6.3
Self-employed print shop owners	4.9
Advertising, public relations, and related services	3.1
Plastics product manufacturing	2.7

Most Important Knowledge, Skills & Abilities

- Controlling Machines and Processes
  - fabricate printing plates
  - operate bindery equipment
  - operate cameras
  - operate fabric printing equipment
  - operate graphic reproduction equipment
  - operate printing equipment/machinery
  - operate scanner
  - use color analyzer
  - use densitometer
  - use hand or power tools
  - use precision measuring tools or equipment
- Making Decisions and Solving Problems (by evaluating information)
  - make independent judgment in assembly procedures
- Inspecting Equipment, Structures, or Material
  - examine products or work to verify conformance to specifications
  - maintain consistent production quality
  - perform safety inspections in manufacturing or industrial setting
- Identifying Objects, Actions, and Events
  - distinguish colors
  - identify color or balance
  - understand technical operating, service or repair manuals
- Getting Information (from all relevant sources)
- Repairing and Maintaining Mechanical Equipment

Local Programs

No local training or education programs identified.

Priority Occupation Profile for

Team Assemblers

What They Do

Work as part of a team having responsibility for assembling an entire product or component of a product. Team assemblers can perform all tasks conducted by the team in the assembly process and rotate through all or most of them rather than being assigned to a specific task on a permanent basis. May participate in making management decisions affecting the work. Includes team leaders who work as part of the team.

AKA: Filter Assembler; Laborer; Sub-Assembly Team Worker; Production Assistant; Manufacturing Associate; Operator Technician; Packaging Inspector; Production Assembler; Line Worker; Production Associate; Production Line Worker; Respooler; Team Assembler; Tiedown Operator; Welder; Production Cell Leader; Fiber Optic Assembly Worker; Repairer; Assembly Lead Person; Factory Worker; Assembly Inspector; Assembly Line Leader; Assembly Line Machine Operator; Assembly Line Worker; Production Supervisor; Assembly Operator; Assembler; Assembly Technician; Cabinet Assembler; Carousel Operator; Certified Composites Technician (CCT); Commercial Light Fixture Assembler; Electrical Assembler; Factory Assembler; Fabricator; Assembly Person; Assembly Associate

Common Tasks:

- Shovel, sweep, or otherwise clean work areas.
- Rotate through all the tasks required in a particular production process.
- Perform quality checks on products and parts.
- Package finished products and prepare them for shipment.

O*NET Link: http://www.onetonline.org/link/details/51-2092.00

What It Requires

Education: High school diploma or equivalent

Training: Moderate-term on-the-job training

Experience: Not usually required

Career Path

Jobs for this occupation are almost always entry-level jobs, although the amount of on-the-job training varies greatly depending on the industry and employer. As assemblers gain knowledge and experience, they generally progress to jobs that require greater skill. This is usually accompanied by increased earnings. Experienced assemblers may advance to supervisory positions, or if they have a mechanical aptitude, they may move into positions such as maintenance technician or machinery mechanic. Assemblers can also advance to quality control jobs.

Career Pathway Group: Manufacturing

What It Pays

Percentile:	***10th***	***25th***	***Median***	***75th***	***90th***
Contra Costa Co:	$9.12	$10.71	$13.44	$17.35	$22.22
Alameda Co:	$9.62	$11.30	$14.18	$18.30	$23.45
East Bay Region:	$9.52	$11.18	$14.03	$18.11	$23.20
California:	$8.78	$9.81	$11.94	$15.86	$20.42
United States:	$8.67	$10.25	$13.22	$17.14	$22.31

Employment Projections

	2013 Jobs	***2018 Jobs***	***% Change***	***New Jobs***	***Replace-ments***	***Total Openings***
Contra Costa Co:	759	719	-5%	-40	118	78
Alameda Co:	3,052	3,078	1%	26	354	380
East Bay Region:	3,811	3,798	0%	-13	471	458
California:	78,919	80,087	1%	1,168	9,849	11,017
United States:	970,290	975,128	0%	4,838	139,786	144,624

Key Industries

National Employment Matrix	% of jobs
Employment services	14
Motor vehicle parts manufacturing	7.4
Motor vehicle manufacturing	4.1
Plastics product manufacturing	3.3
Medical equipment and supplies manufacturing	3.1
Motor vehicle body and trailer manufacturing	2.8
Other general purpose machinery manufacturing	2.6
Other fabricated metal product manufacturing	2.6
Agriculture, construction, and mining machinery manufacturing	2.6
Navigational, measuring, electromedical, and control instruments	2.6
Other wood product manufacturing	2.5
Ventilation, heating, air-conditioning, and commercial refrigeration	2.5
Household appliance manufacturing	2.1
Semiconductor and other electronic component manufacturing	2
Architectural and structural metals manufacturing	2

Most Important Knowledge, Skills & Abilities

- Getting Information (from all relevant sources)
  - read work order, instructions, formulas, or processing charts
- Communicating with Supervisors, Peers, or Subordinates (by telephone, in written form, e-mail, or in person)
  - confer with engineering, technical or manufacturing personnel
- Identifying Objects, Actions, and Events
- Monitor Processes, Materials, or Surroundings (to detect or assess problems)
- Inspecting Equipment, Structures, or Material
  - examine products or work to verify conformance to specifications
  - perform safety inspections in manufacturing or industrial setting
- Evaluating Information to Determine Compliance with Standards
- Documenting/Recording Information
- Making Decisions and Solving Problems (by evaluating information)
- Performing General Physical Activities
- Controlling Machines and Processes
- Handling and Moving Objects (using hands and arms)

Local Programs	No local training or education programs identified.