



**ECONOMIC &  
WORKFORCE  
DEVELOPMENT**  
*through the*  
CALIFORNIA  
COMMUNITY  
COLLEGES

**BUSINESS AND WORKFORCE  
PERFORMANCE IMPROVEMENT INITIATIVE**



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**Environmental Scan Report  
South Central Region**

**SOUTH CENTRAL MANUFACTURERS  
NEED SKILLED WORKERS**



**Center of Excellence**

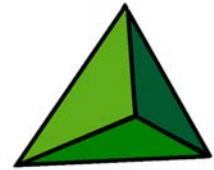
**Hosted by Ventura College**

**October 2007**



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# **Environmental Scan for South Central Community Colleges**

## **Manufacturing Industry**

**October 2007**

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OUR MISSION IS TO STRENGTHEN CALIFORNIA'S WORKFORCE AND ADVANCE ECONOMIC GROWTH THROUGH EDUCATION, TRAINING AND JOB DEVELOPMENT.

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**SOUTH CENTRAL REGIONAL MANUFACTURERS EXPECT TO HIRE AT LEAST 1,100 NEW EMPLOYEES IN THE NEXT TWO YEARS. HIGH DEMAND OCCUPATIONS WITHIN THE MANUFACTURING INDUSTRY ARE PROJECTED TO GROW AT A RATE OF 12 PERCENT BETWEEN 2006 AND 2012.** – SOURCES: VENTURA COLLEGE CENTER OF EXCELLENCE, SURVEY OF SELECTED REGIONAL MANUFACTURERS, JAN. 2007; ECONOMIC MODELING SPECIALISTS, INC., JULY 2007

## Executive Summary

A select group of manufacturing employers in the South Central Region expect to hire **over 1,100 new employees** in the next two years. Seventy percent of these same employers report that there is a shortage of competent, technically-skilled workers to fill open positions. Fifty six percent believe that high schools, community colleges and technical schools are not training enough entry-level workers.<sup>1</sup> **South Central regional manufacturers are turning to their local community colleges for assistance.**

Manufacturing is often referred to as the backbone of the United States. While in decline in some sectors, and geographically across the United States and California, the industry is holding steady in the South Central Region and is actually projected to grow in the area of the region that serves the north portion of Los Angeles County. Overall growth in select sectors of the industry is expected to reach **12 percent** between 2006 and 2012. **High-demand occupations** within the industry are also projected to grow at a rate of **12 percent** during this same six year time frame.<sup>2</sup> The industry's stability and economic value is strengthened by the fact that it provides middle class, family-wage jobs and career ladder employment opportunities. It is, however, facing workforce-related challenges:

- As with many industries, its workforce is aging;
- Jobs are going offshore;
- Technology has increased;
- There is a critical shortage of skilled workers.

Career and Technical Education (CTE) programs have all but disappeared in the K-12 school system. Consequently, there is not a consistent pipeline of high school students entering community college CTE programs. It is no surprise then that there is a shortage of **new** and **skilled** workers available to local manufacturing employers.

South Central regional colleges have an opportunity to respond to the needs of the manufacturing industry. They can serve as the catalyst to partner with employers, K-12 and workforce development partners to address the critical workforce shortages now present in the industry.

<sup>1</sup> Ventura College Center of Excellence: Survey of Selected Regional Manufacturers, January 2007

<sup>2</sup> Economic Modeling Strategies, Inc., July 2007

## Introduction and Overview of Strategic Opportunity

Manufacturing ranks third in the South Central Region in terms of number of jobs and earnings per worker, accounting for over 12 percent of all jobs in the region<sup>3</sup>. Despite its importance, there is a critical shortage of skilled workers in the South Central Region. Local manufacturing employers struggle to fill jobs. They sometimes resort to out of state recruiting in an effort to find these desperately needed skilled workers. Out of state recruiting is expensive and its success is significantly impacted by the high cost of living throughout the South Central Region (San Luis Obispo, Santa Barbara, Ventura Counties and the north portion of Los Angeles County). Local employers report that they would much rather “grow their own” (workforce) and are turning to community colleges for assistance.

This report is designed to present information about the manufacturing industry (durable goods), its training and skill needs, occupational projections and suggested response from regional colleges. It focuses on specific sectors of the industry in the South Central Region including:

- Fabricated metal product manufacturing
- Machinery manufacturing
- Computer and electronic product manufacturing
- Electrical equipment, appliances and component manufacturing
- Miscellaneous manufacturing (products such as medical equipment and supplies, jewelry, sporting goods, toys and office supplies).

These particular sectors were selected because they are growing at a rate that outpaces the rest of the state’s manufacturing growth. Individual employers within these sectors account for more than 50 percent of the manufacturing jobs in the South Central Region. Please see **Appendix B** for specific industry data relative to the region in terms of jobs, earnings and projected growth in these selected sectors of the manufacturing industry.

A number of sources were utilized to gather data about the industry. A regional survey was conducted and a forum was held to bring employers together to further define and validate industry needs. After reviewing the data, survey findings and employer input, there is evidence to suggest that there is a strategic opportunity for South Central regional colleges. Like many industries, manufacturing is suffering from an aging workforce. More importantly, however, is the fact that the industry has advanced technologically and has an additional and critical need for more skilled workers. The problem is further exacerbated by the fact that the former pipeline of new high school students selecting career and technical education programs has all but vanished at the community college level. This has resulted in an additional shortage of entry level workers for the industry. South Central regional colleges have the opportunity to partner with

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<sup>3</sup> Economic Modeling Specialists, Inc. (EMSI) 2007

local employers, K-12 school districts, and other community resources to respond to these critical needs of the manufacturing industry.

**“Remember – quality of life starts with a good job and, for a significant portion of the local population, manufacturing could be the avenue to the middle class.”**

Jack Kyser, LAEDC  
Manufacturing in Southern California, March 2007

## Industry Overview

Nationally, the manufacturing sector accounts for 14 percent of U. S. Gross Domestic Product (GDP) and 11 percent of total U.S. employment.<sup>4</sup> U.S. manufacturers exported \$293 billion of goods overseas in 2006, or nearly two-thirds of all total exports.<sup>5</sup> In California (2005), manufacturing comprises a 10 percent share of the Gross State Product.<sup>6</sup>

Much of today’s literature suggests that manufacturing is declining in California and in one sense it is. California lost almost 400,000 jobs in manufacturing between January 1990 and September 2003. In January 1990 almost 16 percent of all jobs in California were manufacturing jobs; by September 2003 that percentage dropped to just below 11 percent.<sup>7</sup> In spite of the downturn in employment, as of March 2007 the manufacturing industry continues to provide jobs for almost 1.5 million workers in California. Technology and increased globalization have, on the one hand, reduced the number of low-skill jobs and on the other, provided opportunities for high-skill manufacturing employment to expand.<sup>8</sup> So, while there are fewer jobs overall, manufacturing remains a powerful engine of economic growth and stability.

Local manufacturing firms are under heavy competitive pressure, either from off-shore production or from firms in other states, due to the high cost of operating in California. Costs in the state of California are over 24 percent higher than the national average.<sup>9</sup> As a result, manufacturing firms, both statewide and locally, have made a heavy push to improve productivity by investing in plant and equipment, and/or using temporary help.<sup>10</sup> So, while actual employee counts may be declining, productivity has been, and continues to be on the rise.

<sup>4</sup> U.S. Commerce Department

<sup>5</sup> NAM/U.S. Commerce Department based on 3-digit NAICS codes

<sup>6</sup> NAM/U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, U.S. Census Bureau and Commerce Department

<sup>7</sup> Manufacturing in California, The Keystone Group, February 2004

<sup>8</sup> Current Issues in Economics and Finance – A Leaner, More Skilled Manufacturing Workforce, March 2006

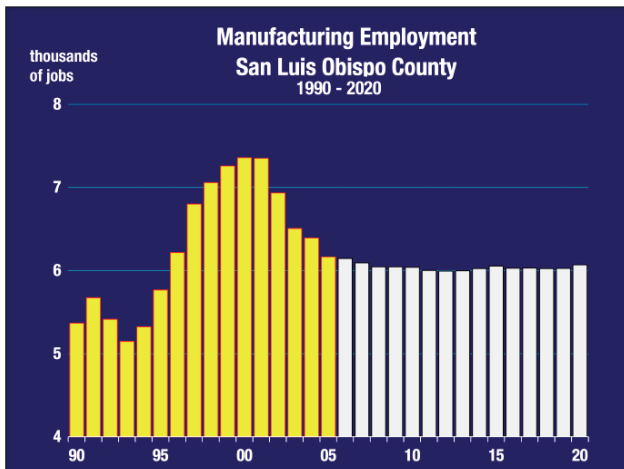
<sup>9</sup> California Manufacturing and Technology Association (CMTA)

<sup>10</sup> Manufacturing in Southern California, Jack Kyser/LAEDC, March 2007

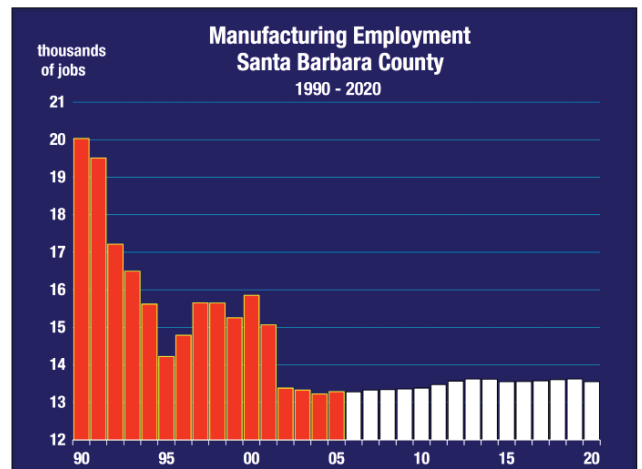
Manufacturing jobs in California are becoming one of the state’s few sources of middle-class and family-wage jobs. The manufacturing industry as a whole employs almost 69,000 workers in the South Central Region; over 36,000 of those workers work in the selected sectors discussed in this report.<sup>11</sup> South Central regional manufacturers who responded to the regional survey expect to hire at least **1,100 new employees** over the next two years. This is significant because these projections reflect the needs of only 82 companies in the region (survey respondents) representing approximately 9,500 workers. This is a **12 percent increase in jobs** in what is a relatively small slice of the industry in the region. This 12 percent increase reported by local employers is consistent with and validates labor market data projections.

Mark Schneipp, Executive Director, California Economic Forecast, prepared industry data specifically for the South Central Region of colleges in June of 2006. He identified manufacturing as a stable industry across the region with projected growth in the northern portion of Los Angeles County. The following graphs illustrate this stability and/or growth across the region. While there has been a significant decline in the industry to this point, the sections in white illustrate that it is projected to stay stable and/or grow through 2020.

### MANUFACTURING EMPLOYMENT IN THE SOUTH CENTRAL REGION By County and Service Area 1990-2020

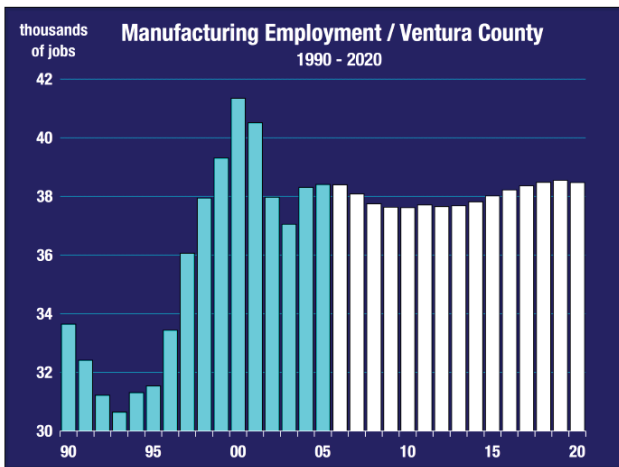


Source: California Economic Forecast, June 2006

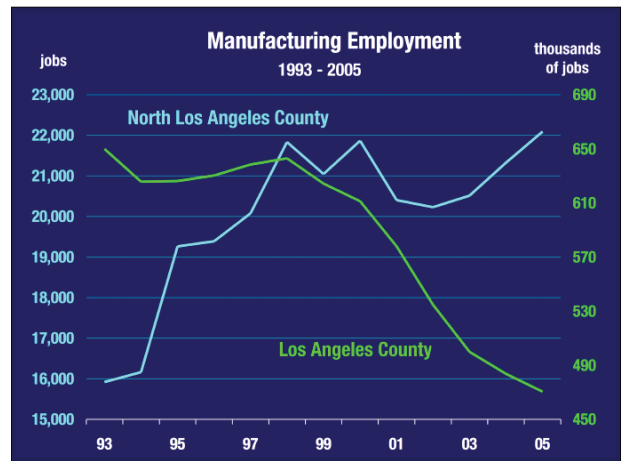


Source: California Economic Forecast, June 2006

<sup>11</sup> Info USA 2006



Source: California Economic Forecast, June 2006



Source: California Economic Forecast, June 2006

***“The acute shortage of technically competent workers in Ventura County is impacting businesses. Haas Automation struggles daily to find trained personnel for such positions as machinists, assemblers, and inventory clerks, among others,”***  
*Peter Zierhut, Director Public Relations, Haas Automation, Inc.  
 April 2006*

At a regional Manufacturers’ Forum sponsored by the Ventura College Center of Excellence in March 2007, eight employers representing seven companies and approximately 1,500 employees made the following industry observations:

- There is a high level of technology prevalent in the industry now. This is a dramatic shift over the past five years.
- Work is going offshore.
- Companies are constantly challenged to do more with less.
- The key to competing successfully is people and higher technology.
- The current trend is to either go away entirely or go offshore.
- The businesses that are left are much stronger and healthier.
- There is a huge need for machinists and engineers.
- There is a cost of living concern across the region that results in a significant challenge to pay a “living” wage.
- In general, there are not enough available workers.

(Please see **Appendix C** for a complete list of Forum participants.)

Regional colleges have an opportunity and a responsibility to respond to these industry needs and challenges.

## Occupational Overview

**“Skilled manufacturers in California earn salaries of between \$50,000 and \$80,000 a year, according to the California Employment Department. The average industrial technician, for example, earned \$54,643 last year while all other full-time U.S. workers earned a median income of less than \$34,000.”**

*Jack Stewart, President CMTA*

*“Schools Should Prepare Students for Real-World Jobs,” October 15, 2006*

Occupational data was obtained from a variety of sources. At the Governor’s Career and Technical Education Summit on March 13, 2007, Secretary Victoria Bradshaw, California Labor & Workforce Development Agency identified manufacturing as one of four industries with jobs in high demand that pay well, and have career ladder potential, in the state of California. She focused on specific occupations within the industry and utilized California Employment Development - Labor Market Information Data (EDD-LMID) for employment projections. Additional occupations for this study were added based on local input. The median hourly wage range for these occupations is \$9.75 (Team Assembler) on the low end and \$36.29 (Mechanical Engineers) on the high end. **Appendices D and E** graphically present occupational data for the nine selected manufacturing industry occupations in the South Central Region.

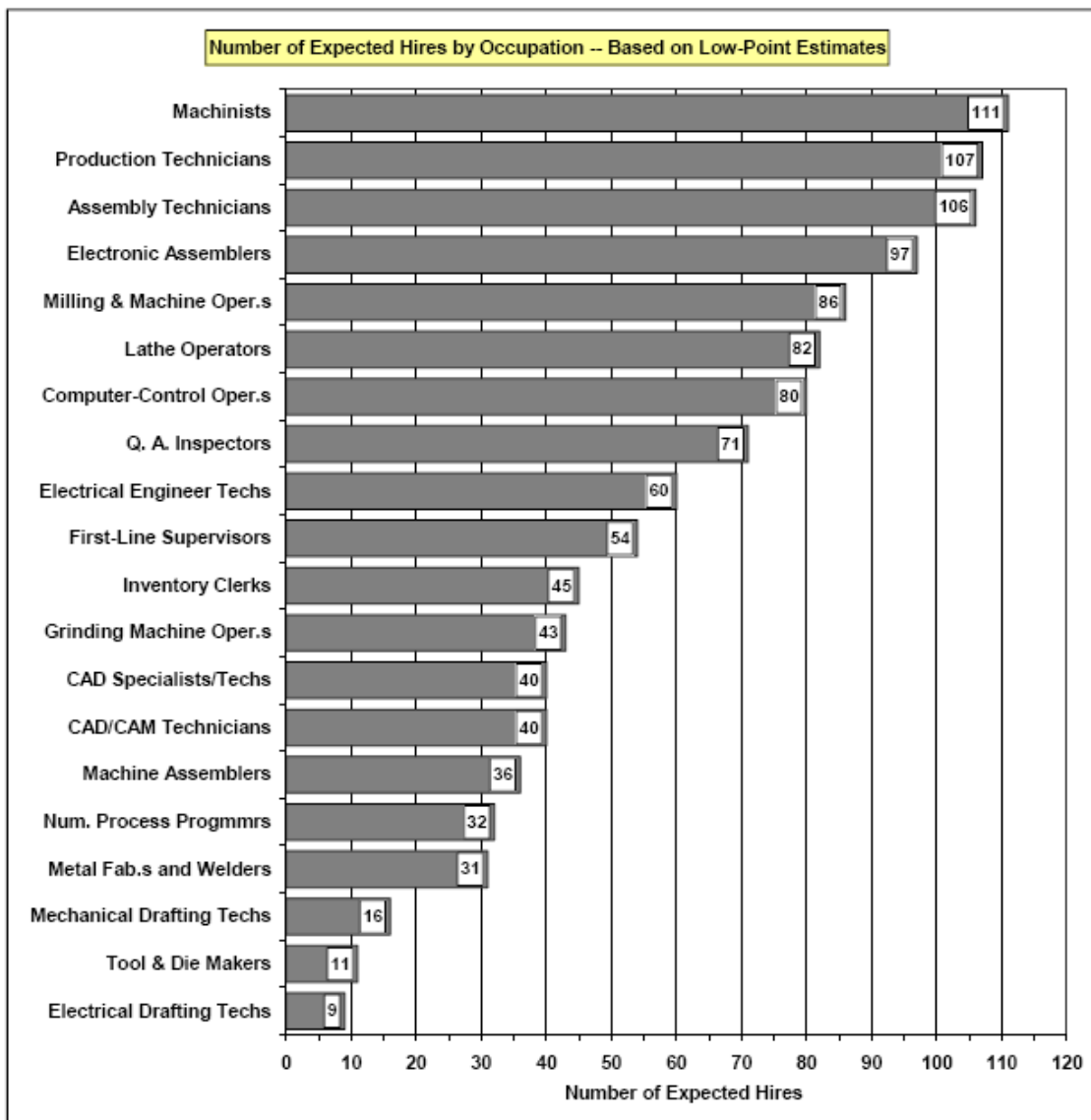
In preparation for this report, the Center of Excellence conducted a **Survey of Selected Regional Manufacturers** in specific industry sectors. These sectors were mentioned previously and include the following:

NAICS Code 332	Fabricated metal product manufacturing
NAICS Code 333	Machinery manufacturing
NAICS Code 334	Computer and electronic product manufacturing
NAICS Code 335	Electrical equipment, appliances & component manufacturing
NAICS Code 339	Miscellaneous manufacturing

Surveys were sent to 398 regional employers with 20 or more employees. A total of 82 firms responded to the survey to yield a 21 percent response rate overall. Twenty occupations were listed in the survey; respondents were asked to indicate their expected number of hires in each occupation within the next two years. Respondents were given four choices: **1 – 3 hires**, **4 – 6 hires**, **7 – 9 hires** and **10 or more hires**. Based on employer responses, **low-point** and **mid-point** estimates were calculated for each occupation. The 82 survey respondents indicated that they expect to hire a total of over 1,100 new employees (low-point estimate) over the next two years. In 10 of the 20 occupations the 82 respondents indicated that they collectively expected to hire over 50 new employees in the next two years (in each of the 10 occupations). Those 10 occupations and the number of new jobs expected are depicted below.

- |                                      |                              |
|--------------------------------------|------------------------------|
| Machinists (111)                     | Production Technicians (107) |
| Assembly Technicians (106)           | Electronic Assemblers (97)   |
| Milling & Machine Operators (86)     | Lathe Operators (82)         |
| Computer Control Operators (80)      | QA Inspectors (71)           |
| Electrical Engineer Technicians (60) | First Line Supervisors (54)  |

The following graph is taken from the **Key Findings** of the **Survey of Selected Regional Manufacturers**. It lists all 20 occupations presented in the survey and the low-point estimate of hires. Survey respondents represented over 9,500 employees; the expected hires are 12 percent of total current employees. Please see **Appendix F** for **Key Findings** of the **Survey of Selected Regional Manufacturers**.



Source: Ventura College Center of Excellence Survey of Selected Regional Manufacturers, January 2007

At the Ventura College Center of Excellence Manufacturers' Forum, local employers reported that their hard to fill positions were:

- Machinists
- Sheet metal workers
- Warehouse workers
- Welders
- Maintenance/service technicians (mechanical and electrical)

Data and industry input suggest that there is a need for skilled workers in a variety of occupations across the manufacturing industry.

## Employer Needs and Challenges

The manufacturing industry is facing several workforce-related challenges:

- As with many industries, its workforce is aging;
- Jobs are going offshore;
- Technology has increased;
- There is a critical shortage of skilled workers.

Attendees at the March 7<sup>th</sup> Manufacturers' Forum offered the following relative to training and educational needs:

- Employers are working with state-of-the-art equipment; schools are challenged to stay current.
- Employers need to work more with schools to develop internal internship programs for students upon graduation.
- Students need to be exposed to today's technology; they need to make real-world connections.
- There is a need for more college level training (e.g. basic skills, employability skills, critical thinking, problem solving)
- Basic skills are an ongoing need, now and in the future.
- Machinists need the basic knowledge about how the machines run in order to facilitate critical thinking and problem solving.
- Today's workers need more skills, e.g. machinists need knowledge of tools and materials so they understand the "how" and "why" of things.
- Additional programs need to be developed for higher level technological skill needs.

To address these needs, schools might want to explore the possibility of a six month **Basic Employability Certificate Program**.

Survey respondents also indicated that entry level workers often lack skills in:

- English language competency (70%)
- Reading (49%)
- Basic Math (50%)
- Employability (65%)

Fifty six percent of the survey respondents felt that high schools, community colleges and technical schools are not training enough entry-level workers. (See survey **Key Findings** in **Appendix F**.)

***“America can’t compete without skilled workers,” said the NAM’s President John Engler. “Eighty percent of NAM members have trouble finding qualified employees for today’s high-tech workplace and the problem is only getting worse. This skills gap reflects a perfect storm that is quickly converging on manufacturers in their effort to fill factory floor jobs. The need for technologically knowledgeable employees is expanding and global competition is increasing even as the Baby Boom generation begins retiring.”***

*CMTA, California not the Only State Struggling to Find Skilled Workers  
September 14, 2006*

There are a number of challenges facing the manufacturing industry, its need for skilled workers and its ability to access a trained and educated workforce. The industry is undergoing a profound transformation. The reduction in low-skill jobs has given way to a substantial need for high-skill workers and the subsequent creation of a leaner, more skilled workforce in general. This trend is not going to reverse itself.<sup>12</sup>

Vocational education programs at the high school level have all but disappeared. Consequently, the pipeline of high school students moving into community college programs has also disappeared. A vast majority of today’s community college manufacturing technology students are already working. They have two “missions” in mind – they want a job, the financial means to “pay the rent” and/or, they are individuals who are already working in manufacturing and looking for new skills. What is noticeably absent is the pipeline of eager, career-focused high school graduates.

### **Occupational Skill Needs**

The Occupational Information Network (O\*NET OnLine) is the nation’s primary source of occupational information. Visitors to the O\*NET website at <http://online.onetcenter.org/find/> can find comprehensive occupational information by occupational title, SOC code, job families, or by industry. O\*NET was utilized to research specific occupations within the manufacturing industry relative to knowledge, skills and abilities. **Appendix G** presents a matrix of knowledge, skills and abilities (KSA’s) of high-demand manufacturing industry occupations in the South Central Region.

<sup>12</sup> Current Issues in Economics and Finance, “A Leaner, More Skilled Manufacturing Workforce, Richard Deitz and James Orr, February/March 2006

## Existing Curriculum and Industry Involvement

### College Programs

Seven of the eight colleges in the South Central Region have manufacturing technology related programs. They range from Engineering and Electronics Technology to Aircraft Fabrication to Manufacturing and Industrial Technology, and to Machining and Welding Technology. Allan Hancock College is completing the first year of a two year Industry Driven Regional Collaborative grant to update its Manufacturing Technology curriculum. This funded project supports the Region's interest in the industry and further validates the need for updated and/or new programs. Overall, South Central regional colleges have the resources to respond to the needs of the industry. Please see **Appendix H** for Matrix of South Central regional programs. This table presents a list of available classes and programs available through South Central colleges. They are a combination of certificate and degree programs.

### South Central Region Economic and Workforce Development Initiatives

The **Center for Applied Competitive Technologies** hosted at College of the Canyons is designed to help manufacturers increase productivity through such things as process improvements, advanced materials technology, environmentally sound manufacturing, workforce assessment, customized training, and quality improvement techniques.

The **Workplace Learning Resource Initiative** hosted at Oxnard College specializes in, among other things, basic skills instruction, English as a second language and customer service. There are also a number of vocational English as a second language (VESL) modules specific to manufacturing that are available for individual college use.

And lastly, The **Small Business Development Center** hosted at Ventura College serves Ventura and Santa Barbara Counties. Its purpose is to assist prospective and existing small business owners to retain or expand their business. One-on-one counseling services are available at no charge to the business owner and address a wide variety of business issues.

### Industry Initiatives

The manufacturing industry itself has taken the initiative to address its workforce challenges. As recently as June 29, 2007 the National Association of Manufacturers announced its partnership with Skills USA to “prepare more students for career leadership in advanced manufacturing and help meet the industry’s growing need for highly-skilled employees.”<sup>13</sup>

Similarly, the **Manufacturing Skill Standards Council (MSSC)** is a national, industry-led organization that focuses on the core knowledge and skills needed

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<sup>13</sup> NAM, <http://www.nam.org>

by production workers in the nation's advanced manufacturing sector and provides a potential resource and partnership opportunity for community colleges. While well supported and successful in the Midwest and Eastern United States, its adoption in the Western United States has been slow. There is, however, a Department of Labor grant currently underway in Southern California designed to build awareness and adoption of this assessment, training and certification program.

**WorkKeys** (an ACT initiative) is a national skill assessment system. It, like MSSC, has been slow to take off in California and other western states. WorkKeys creates a common language for educators, employers and employees to identify, assess, and train for specific skills and competencies for over 13,000 occupations across a wide variety of industries. Its greatest success has been in manufacturing. Most recently WorkKeys has created a National Career Readiness Certificate program. It has already been fully embraced and officially adopted by 15 states across the United States. Flagship programs utilizing the WorkKeys National Career Readiness Certificate in partnership with California community colleges are currently underway throughout California. WorkKeys is a viable resource for South Central community colleges.

## **Recommendations for Community Colleges**

### ***Timing is Good for Community College Response***

South Central regional colleges have an opportunity to respond to the needs of manufacturing industry employers. This opportunity is timely in that:

- California K-12 schools have made a commitment to CTE; standards have been developed and are ready for implementation.
- The state is committing significant resources (SB 70 funds) to build CTE programs and partnerships between K-12 and community colleges.
- Regional manufacturers need skilled workers and are ready to partner with local high schools and community colleges to address their workforce needs.

Potential response activities by community colleges may include the following:

- Improve and increase articulation agreements between local high schools and colleges to align curriculum and create a new pipeline of students
- Encourage the development and/or increase of dual credit programs between high schools and community colleges
- Create and maintain a formal alliance with local and regional manufacturing employers
- Actively partner with local and regional manufacturers and high schools to acquire supplies and equipment to enhance and support the learning process
- Educate counselors on high school and college campuses to increase awareness of and appreciation for careers in manufacturing

- Replicate models being created throughout the state to implement WorkKeys and its National Career Readiness Certificate
- Explore the possibility of partnership with MCCS
- Utilize SB 70 funds to develop and support these initiatives

## **Conclusion**

The manufacturing industry in the South Central Region is strong. It provides family wage jobs and career opportunities. Outsourcing and other economic factors have resulted in the need for more highly skilled workers. The K-12 educational system is making a renewed commitment to career and technical education. Employers are acknowledging the fact that they need to be part of the solution to develop the skilled workers they are looking for. Employers want to create a Manufacturers Alliance to facilitate discussion of and action around workforce issues. There are a number of community and educational resources available to address these workforce challenges. South Central regional colleges have the opportunity to be the mechanism to take lead and address these vital industry needs.

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## **Appendix A: How to Utilize this Report**

### ***About Us - Description of BWPI***

The Business and Workforce Performance Improvement (BWPI) initiative is focused on building the capacity of the colleges in the area of economic and workforce development to enhance their ability to deliver education and training services to businesses and workers in high growth industries, new technologies, and other clusters of opportunities.

The Centers of Excellence (COE) within BWPI provide information regarding workforce trends, increasing awareness and visibility about the colleges economic and workforce development programs and services, and building partnerships with business and industry.

The difference this will make to the colleges is that it will position them as THE workforce partners of choice to business and industry and ensure that college programs are current and responsive. This will contribute to the overall economic vitality of the communities in which they serve.

### ***How to Use This Strategic Possibility Report***

The Centers of Excellence within the Business and Workforce Performance Improvement Initiative of the California Community College Economic and Workforce Development Program have undertaken Industry Scanning to provide targeted and valuable information to community colleges on high growth industries and occupations.

This report, while not a full industry scan, is intended to assist the decision-making process of California community college administrators and planners in addressing local and regional workforce needs and emerging job opportunities in the workplace as they relate to college programs. The information contained in this report can be used to guide program offerings, strengthen grant applications, and support other economic and workforce development efforts.

This report is designed to provide current industry data that will:

- Define potential strategic opportunities relative to an industry's emerging trends and workforce needs;
- Influence and inform local college program planning and resource development; and
- Promote a future-oriented and market responsive way of thinking among stakeholders.

This Industry Scan included a review of the California Regional Economies Project reports and Employment Development Department (EDD) Labor Market

Information (LMID) projections that cover the communities in this region, as well as many other sources as listed.

***Important Disclaimer:***

All representations included in this Environmental Scan product/study have been produced from a secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings. The purpose of the Environmental Scan is to assist the California Community Colleges to respond to emerging market needs for workforce performance improvement. However, neither the Business and Workforce Performance Improvement Centers of Excellence, COE host college or California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon this study including components or recommendations.

## Appendix B: Manufacturing Industry Snapshot for the South Central Region

The following tables provide industry data relative to jobs, earnings and growth for the selected sectors of the Manufacturing industry in the South Central Region referenced in the body of this report. Regional growth outpaces both state and national growth.

### Summary of Selected Sectors and Basic Information

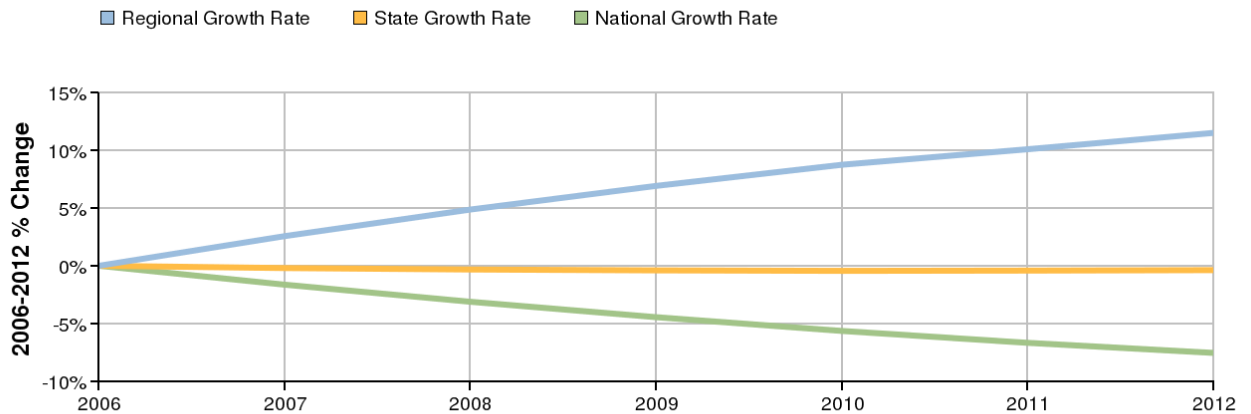
Selected Industries	
Fabricated metal product manufacturing (NAICS 332)	
Machinery manufacturing (NAICS 333)	
Computer and electronic product manufacturing (NAICS 334)	
Electrical equipment and appliance mfg. (NAICS 335)	
Miscellaneous manufacturing (NAICS 339)	

Basic Information	
2006 Industry Jobs	36,313
2012 Industry Jobs	40,488
Total Change	4,175
Total % Change	11.5%
2006 Average Earnings/Worker	\$80,339

Source: Economic Modeling Specialists, Inc. 7/07

### Industry Change Summary

#### Industry Change Summary



Source: CCbenefits, 2007

Description	2006 Jobs	2012 Jobs	Change	% Change	EPW	2006 Establishments
Regional Total	36,313	40,488	4,175	11%	\$80,339	0
State Total	677,676	675,133	-2,543	-0%	\$105,532	0
National Total	5,337,854	4,935,475	-402,379	-8%	\$75,879	150,767

Source: Economic Modeling Specialists, Inc. 7/07

## Appendix C: Manufacturers’ Forum Participant List

NAME	TITLE	ORGANIZATION
Michael Callahan	Office of Research & Evaluation	Ventura College
Sharon Dwyer	Director, Center of Excellence	Ventura College
Kay Faulconer Boger	Dean, Economic and Community Development	Ventura college
Ray Hobson	Dean, Academic Affairs	Allan Hancock College
<b>Lisa Kenyon</b>	<b>Director, Human Resources</b>	<b>Karl Storz Imaging, Inc.</b>
Steve Kinney	Executive Director	City of Oxnard, Economic Development Corporation
Richard McNeal	WIB Resource Development	County of Ventura
<b>Rick Munoz</b>	<b>Machining Services Manager</b>	<b>Karl Storz Imaging, Inc.</b>
<b>Mike Quinn</b>	<b>Vice President, Operations</b>	<b>Aquafine Corporation</b>
Scot Rabe	Instructor, Industrial Design and Manufacturing; Tech Prep Manager	Ventura College
Howard Ramsden	Industry Driven Regional Collaborative Project Director	Allan Hancock College
<b>Rick Slaney</b>	<b>President</b>	<b>Ronlo Engineering, Ltd.</b>
Rayvell Snowden	Department Chair, Industrial Technology; Instructor, Welding	Allan Hancock College
<b>Andrea Stapf</b>	<b>Human Resources Executive</b>	<b>Hirose Electric</b>
Gary Van Meter	Coordinator, Resource Development	Ventura College
Peggy Velarde	Principal	Ventura County Schools, ROP
<b>Rob Worcester</b>	<b>General Manager</b>	<b>Cryogenic Experts, Inc.</b>
<b>Peter Zierhut</b>	<b>Director of Public Relations</b>	<b>Haas Automation, Inc.</b>
<b>Erich Zimmerman</b>	<b>President</b>	<b>C &amp; K Technologies</b>
Peter Bellas	Director, Center for Applied Competitive Technology	College of the Canyons

**NOTE: Names in bold represent industry participants**

## Appendix D: Occupational Projections

### *Selected Occupations and Educational Requirements*

SOC CODE	OCCUPATION	EDUCATIONAL REQUIREMENTS
17-3023	Electrical & Electronic Engineering Technicians	Associate Degree
51-4121	Welders, Cutters, Solderers, & Brazers	Post Secondary, Vocational Education
51-4041	Machinists	Long term on the job training
47-2211	Sheet Metal Workers	Moderate on the job training
17-2141	Mechanical Engineers	Bachelor's Degree
51-2023	Electrical & Electronic Equipment Assemblers	Work Experience
51-2092	Team Assemblers	Short term on the job training
17-3027	Mechanical Engineering Technicians	Associate Degree
17-3026	Industrial Engineering Technicians	Associate Degree

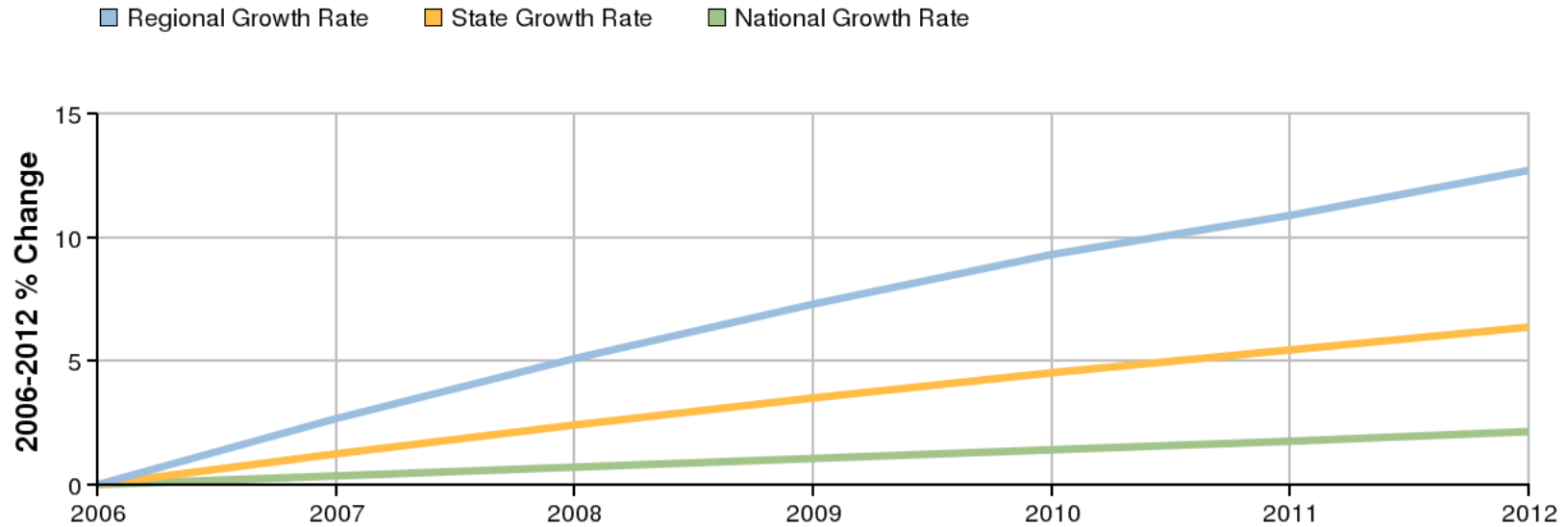
Sources:

### ***Basic Information About Selected Manufacturing Occupations in the South Central Region***

The tables below provide general information about the manufacturing occupations depicted above relative to current number of jobs, projected occupational growth and total earnings.

BASIC INFORMATION	
2006 Occupational Jobs	15,434
2012 Occupational Jobs	17,394
Total Change	1,960
Total % Change	12.7%
2006 Median Hourly Earnings/Worker	\$16.83

## Occupational Change Summary



Source: CCbenefits, 2007

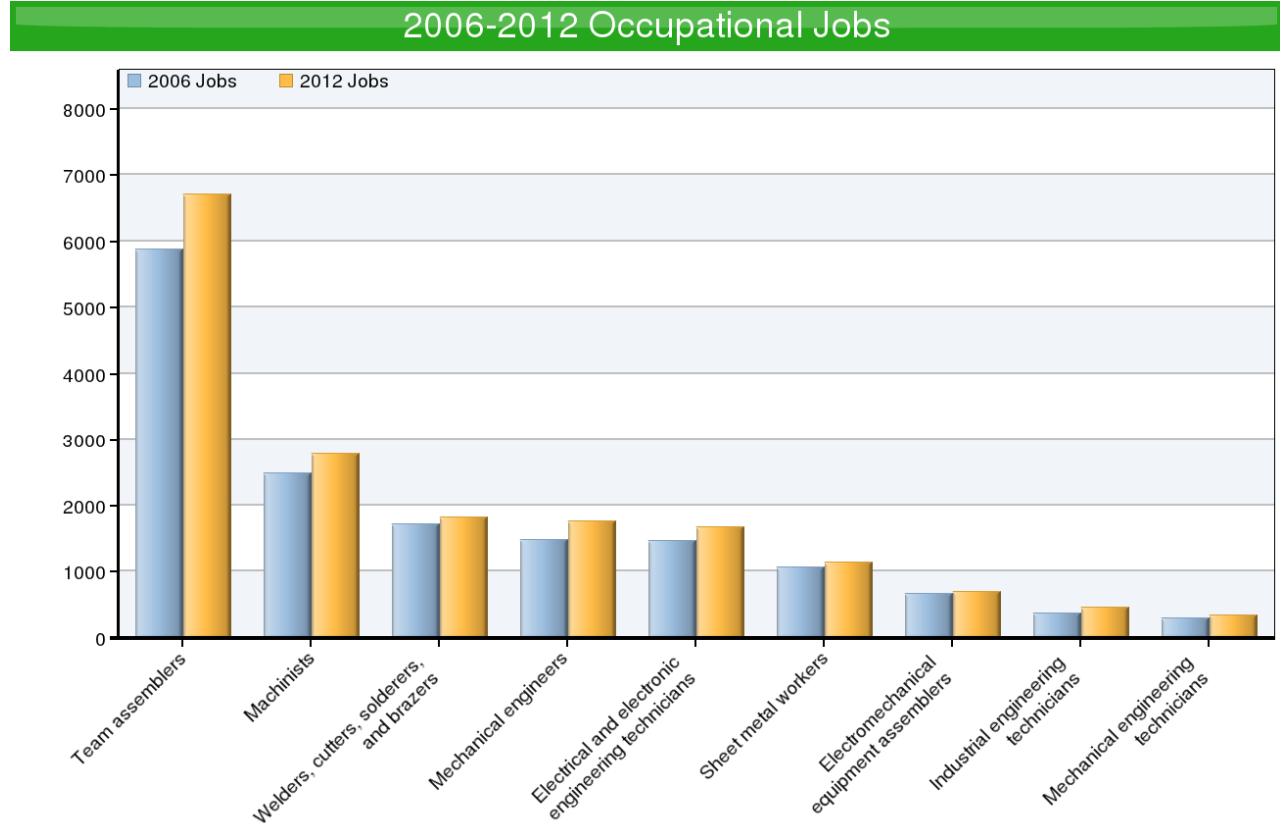
### State and Nation Comparisons of Selected Manufacturing Industry Occupations

Region	2006 Jobs	2012 Jobs	Change	% Change	Hourly EPW
Regional Total	15,434	17,394	1,960	13%	\$16.83
State Total	267,174	284,174	17,000	6%	\$17.08
National Total	2,983,081	3,047,034	63,953	2%	\$15.98

Source: Economic Modeling Specialists, Inc. 7/07

## Appendix E: Job Growth and Earnings

The following tables graphically depict job growth and earnings for specific occupations within the manufacturing industry.



Source: CCbenefits, 2007

SOC Code	Description	2006 Jobs	2012 Jobs	Hourly EPW
51-2092	Team assemblers	5,884	6,714	\$9.75
51-4041	Machinists	2,490	2,792	\$16.30
51-4121	Welders, cutters, Solderers, and brazers	1,712	1,818	\$14.66
17-2141	Mechanical engineers	1,486	1,757	\$36.29
17-3023	Electrical and electronic engineering technicians	1,463	1,674	\$26.80
47-2211	Sheet metal workers	1,064	1,140	\$19.24
51-2023	Electromechanical equipment assemblers	667	694	\$12.36
17-3026	Industrial engineering technicians	368	457	\$24.35
17-3027	Mechanical engineering technicians	299	348	\$19.64
	<b>Total</b>	<b>15,434</b>	<b>17,394</b>	

Source: Economic Modeling Specialists, Inc. – 7/07

NOTE: EPW = Earnings per Worker

## Appendix F: Survey Key Findings

**Time Frame** The survey was conducted in **December 2006**.

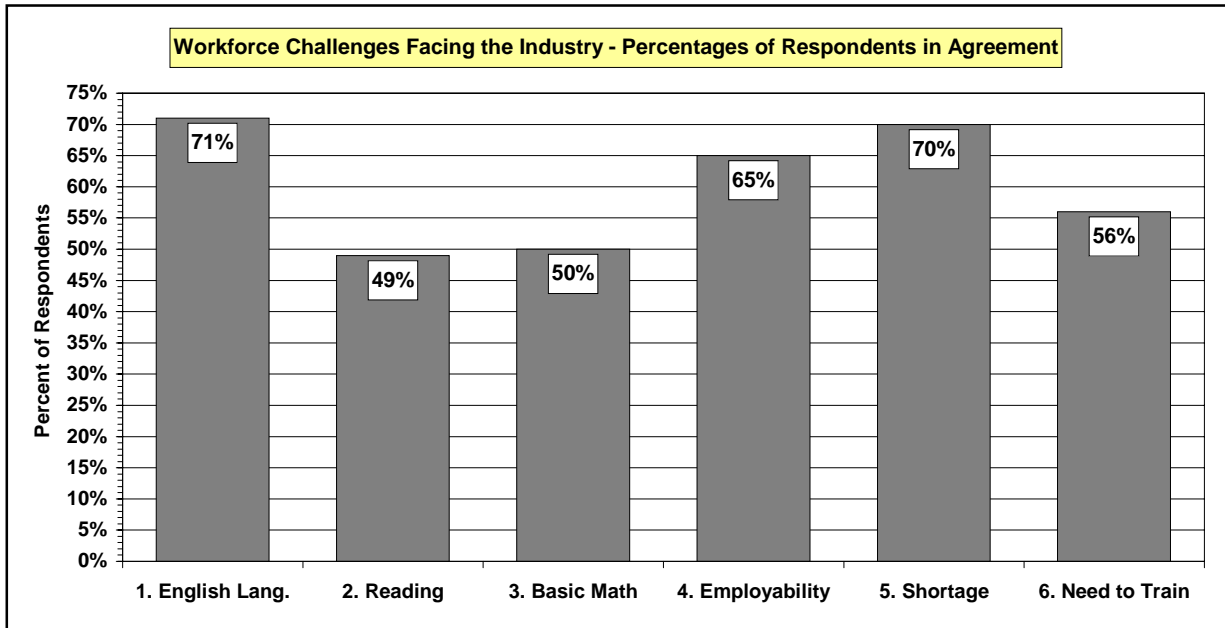
**Survey Region** San Luis Obispo, Santa Barbara and Ventura counties, and northeast Los Angeles County.

**Industry Sectors** Companies in **five** sectors of the manufacturing industry were surveyed.

NAICS Codes and Titles	Surveyed	Replied
332 Fabricated Metal Product Manufacturing	100	31
333 Machinery Manufacturing	52	14
334 Computer and Electronic Product Manufacturing	128	22
335 Electrical Equipment, Appliances & Component Manufacturing	27	2
339 Miscellaneous Manufacturing	91	13
<b>Total</b>	<b>398</b>	<b>82</b>

**Response Rate** The overall response rate is **21%** – **82** out of the **398** companies surveyed.

**Industry Challenges** Workforce Challenges – Skill Development and Capacity (Pipeline).

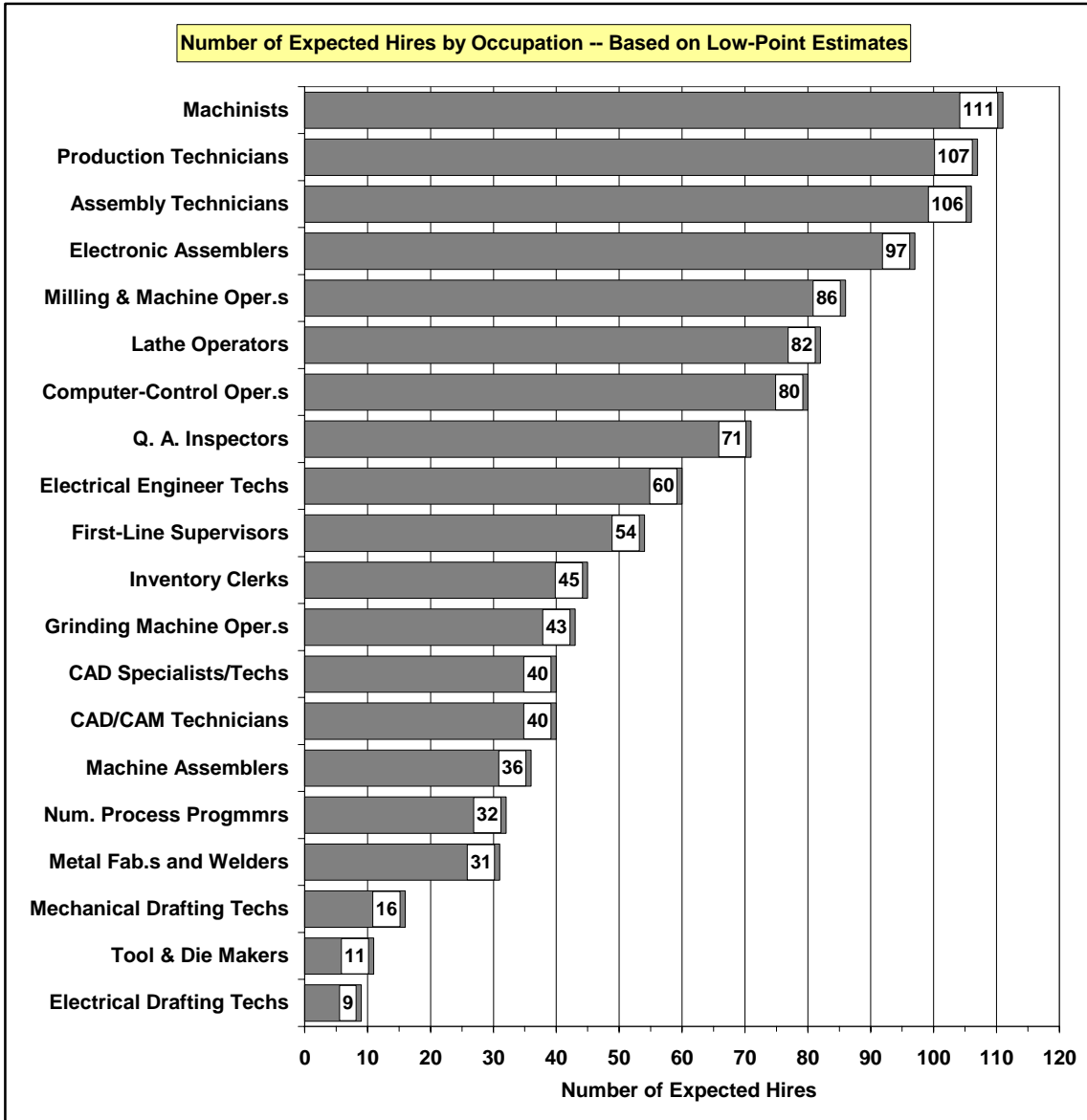


### Respondents in Agreement with Specific Challenges

	Respondents	
	Number	Percent
<i>Skill Development Challenges</i>		
1. Entry-level workers often lack – English language skills	58	71%
2. Entry-level workers often lack – Reading skills	40	49%
3. Entry-level workers often lack – Basic math skills	41	50%
4. Entry-level workers often lack – Employability skills	53	65%
<i>Capacity (Pipeline) Challenges</i>		
5. There is a current shortage of competent technically-skilled workers	57	70%
6. HSs, community colleges and tech. schools are not training enough entry-level workers	46	56%

**Expected Hires** A realistic estimate of expected hires over the next **two years** is **1,157**.

Over the next two years, the **82** regional manufacturers that returned surveys expect to hire between **1,157** and **1,601** workers in the **twenty** occupations listed on the survey. To indicate their expected number of hires in each occupation, respondents were given four choices: **1 – 3** hires, **4 – 6** hires, **7 – 9** hires, and **10 or more** hires. Based on employer responses, a **low-point** and a **mid-point** estimate were calculated for each occupation. The **low-point** estimate uses the lower value in each hiring category in the calculations of expected hires. Low-point estimates are graphically depicted in the chart below.



**Employees** Survey respondents employ a total of **9,578** individuals. Expected hires (low-point estimate of **1,157**) are **12%** of total employees (**9,578**).

**Responding Companies**

<b>18%</b> of respondents employ <b>24 or less</b>	<b>15%</b> employ <b>50 to 99</b>
<b>44%</b> of respondents employ <b>25 to 49</b>	<b>23%</b> employ <b>100 or more</b>

## Appendix G: Knowledge, Skills and Abilities for High Demand Occupations in Manufacturing

The following table presents knowledge, skills and abilities (KSA's) for high demand occupations within the manufacturing industry. Not surprisingly, there are a number of KSA's that are common across occupations and within the realm of community college course offerings. They include English, Math, Design, Production and Process, Engineering and Technology, Safety and Security, Computers, Critical Thinking, Active Listening, Time Management, Oral and Written Comprehension, Judgment and Decision Making, and Trouble-shooting.

		OCCUPATION									
		Electrical Engr Tech	Electronics Engr Tech	Machinists	Sheet Metal Work	Mechanical Engineers	Electromech Equip Assemblers	Team Assemblers	Industrial Engr Tech	Mechanical Engr Tech	Welding, Soldering
K		<ul style="list-style-type: none"> <li>▪ Computers &amp; Electron</li> <li>▪ Engineer &amp; Tech</li> <li>▪ English</li> <li>▪ Design</li> <li>▪ Mechanical</li> <li>▪ Math</li> <li>▪ Production &amp; Process</li> <li>▪ Safety &amp; Security</li> </ul>	<ul style="list-style-type: none"> <li>▪ Computers &amp; Electron</li> <li>▪ English</li> <li>▪ Engineer &amp; Tech</li> <li>▪ Mechanical</li> <li>▪ Math</li> <li>▪ Production &amp; Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mechanical</li> <li>▪ Math</li> <li>▪ Engineer &amp; Tech</li> <li>▪ Computers &amp; Electron</li> <li>▪ Production &amp; Process</li> <li>▪ Design</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mechanical</li> <li>▪ Math</li> <li>▪ Building &amp; Construct</li> <li>▪ Design</li> <li>▪ Production &amp; Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ Engineer &amp; Tech</li> <li>▪ Mechanical</li> <li>▪ Design</li> <li>▪ Production &amp; Process</li> <li>▪ Math</li> <li>▪ Admin &amp; Mgmt</li> <li>▪ English</li> <li>▪ Computers &amp; Electron</li> <li>▪ Physics</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mechanical</li> <li>▪ Computers &amp; Electron</li> <li>▪ Production &amp; Process</li> <li>▪ Engineer &amp; Tech</li> </ul>	<ul style="list-style-type: none"> <li>▪ Production &amp; Process</li> </ul>	<ul style="list-style-type: none"> <li>▪ Production &amp; Process</li> <li>▪ Engineer &amp; Tech</li> <li>▪ Math</li> <li>▪ English</li> <li>▪ Clerical</li> <li>▪ Design</li> <li>▪ Computers &amp; Tech</li> <li>▪ Mechanical</li> <li>▪ Education &amp; Training</li> <li>▪ Admin &amp; Mgmt</li> </ul>	<ul style="list-style-type: none"> <li>▪ Engineer &amp; Tech</li> <li>▪ Mechanical</li> <li>▪ Design</li> <li>▪ Production &amp; Process</li> <li>▪ English</li> <li>▪ Computers &amp; Electron</li> <li>▪ Math</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mechanical</li> <li>▪ Production &amp; Process</li> <li>▪ Safety &amp; Security</li> </ul>
	S		<ul style="list-style-type: none"> <li>▪ Trouble-shooting</li> <li>▪ Math</li> <li>▪ Critical Thinking</li> <li>▪ Reading Comp</li> <li>▪ Active Learning</li> <li>▪ Active Listening</li> <li>▪ Equipment Select</li> <li>▪ Learning Strategies</li> <li>▪ Repairing</li> <li>▪ Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>▪ Trouble-shooting</li> <li>▪ Repairing</li> <li>▪ Equip Maint</li> <li>▪ Equipment Select</li> <li>▪ Time Manage</li> <li>▪ Reading Comp</li> <li>▪ Judgment &amp; Decision Making</li> <li>▪ Operation Monitoring</li> <li>▪ Active Learning</li> <li>▪ Complex Problem Solving</li> </ul>	<ul style="list-style-type: none"> <li>▪ Operation &amp; Control</li> <li>▪ Operation &amp; Monitor</li> <li>▪ Math</li> <li>▪ Equipment Select</li> <li>▪ Trouble-shooting</li> <li>▪ Reading Comp</li> <li>▪ QC Analysis</li> <li>▪ Equipment Maintain</li> <li>▪ Active Learning</li> <li>▪ Active Listening</li> </ul>	<ul style="list-style-type: none"> <li>▪ Math</li> <li>▪ Active Listening</li> <li>▪ Equipment Select</li> <li>▪ Installation</li> <li>▪ Coordination</li> <li>▪ Instructing</li> <li>▪ Writing</li> <li>▪ Critical Thinking</li> <li>▪ Reading Comp</li> <li>▪ Speaking</li> </ul>	<ul style="list-style-type: none"> <li>▪ Math</li> <li>▪ Complex Problem Solving</li> <li>▪ Critical Thinking</li> <li>▪ Reading Comp</li> <li>▪ Science</li> <li>▪ Active Listening</li> <li>▪ Judgment &amp; Decision Making</li> <li>▪ Time Mgmt</li> <li>▪ Writing</li> <li>▪ Speaking</li> </ul>	<ul style="list-style-type: none"> <li>▪ QC Analysis</li> <li>▪ Equipment Select</li> <li>▪ Installation</li> <li>▪ Math</li> <li>▪ Operation Monitoring</li> <li>▪ Reading Comp</li> </ul>	<ul style="list-style-type: none"> <li>▪ Learning Strategies</li> <li>▪ Active Listening</li> <li>▪ QC Analysis</li> <li>▪ Active Learning</li> <li>▪ Instructing</li> <li>▪ Operation Monitoring</li> <li>▪ Equipment Select</li> <li>▪ Reading Comp</li> <li>▪ Coordination</li> <li>▪ Equipment Maintain</li> </ul>	<ul style="list-style-type: none"> <li>▪ Active Listening</li> <li>▪ Complex Problem Solving</li> <li>▪ Critical Thinking</li> <li>▪ Judgment &amp; Decision Making</li> <li>▪ Coordination</li> <li>▪ Active Learning</li> <li>▪ Reading Comp</li> <li>▪ Instructing</li> <li>▪ Speaking</li> <li>▪ Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reading Comp</li> <li>▪ Active Listening</li> <li>▪ Coordination</li> <li>▪ Judgment &amp; Decision Making</li> <li>▪ Math</li> <li>▪ Complex Problem Solving</li> <li>▪ Time Mgmt</li> <li>▪ Active Listening</li> <li>▪ Trouble-shooting</li> <li>▪ Equipment Select</li> </ul>

OCCUPATION										
	Electrical Engr Tech	Electronics Engr Tech	Machinists	Sheet Metal Work	Mechanical Engineers	Electromech Equip Assemblers	Team Assemblers	Industrial Engr Tech	Mechanical Engr Tech	Welding, Soldering
A	<ul style="list-style-type: none"> <li>▪ Near Vision</li> <li>▪ Problem Sensitivity</li> <li>▪ Deductive Reasoning</li> <li>▪ Oral Comp</li> <li>▪ Written Comp</li> <li>▪ Inductive Reasoning</li> <li>▪ Oral Express</li> <li>▪ Written Express</li> <li>▪ Finger Dexterity</li> <li>▪ Arm-Hand Steady</li> </ul>	<ul style="list-style-type: none"> <li>▪ Deductive Reasoning</li> <li>▪ Near Vision</li> <li>▪ Problem Sensitive</li> <li>▪ Written Comp</li> <li>▪ Information Ordering</li> <li>▪ Oral Comp</li> <li>▪ Oral Express</li> <li>▪ Inductive Reasoning</li> <li>▪ Speech Clarity</li> <li>▪ Visualization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Problem Sensitive</li> <li>▪ Arm-Hand Steady</li> <li>▪ Information Ordering</li> <li>▪ Near Vision</li> <li>▪ Control Precision</li> <li>▪ Math Reasoning</li> <li>▪ Deductive Reasoning</li> <li>▪ Inductive Reasoning</li> <li>▪ Visualization</li> <li>▪ Oral Comp</li> </ul>	<ul style="list-style-type: none"> <li>▪ Near Vision</li> <li>▪ Manual Dexterity</li> <li>▪ Information Ordering</li> <li>▪ Oral Comp</li> <li>▪ Problem Sensitive</li> <li>▪ Selective Attention</li> <li>▪ Arm-Hand Steady</li> <li>▪ Control Precision</li> <li>▪ Visualization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Oral Comp</li> <li>▪ Problem Sensitive</li> <li>▪ Written Comp</li> <li>▪ Deductive Reasoning</li> <li>▪ Inductive Reasoning</li> <li>▪ Information Ordering</li> <li>▪ Near Vision</li> <li>▪ Oral Express</li> <li>▪ Flexibility of Closure</li> <li>▪ Speech Clarity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Manual Dexterity</li> <li>▪ Visualization</li> <li>▪ Arm-Hand Steady</li> <li>▪ Finger Dexterity</li> <li>▪ Near Vision</li> <li>▪ Extent Flexibility</li> <li>▪ Number Facility</li> <li>▪ Deductive Reasoning</li> <li>▪ Problem Sensitive</li> <li>▪ Trunk Strength</li> </ul>	<ul style="list-style-type: none"> <li>▪ Manual Dexterity</li> <li>▪ Oral Comp</li> <li>▪ Oral Express</li> <li>▪ Arm-Hand Steady</li> <li>▪ Finger Dexterity</li> <li>▪ Information Ordering</li> <li>▪ Near Vision</li> <li>▪ Control Precision</li> <li>▪ Problem Sensitive</li> <li>▪ Deductive Reasoning</li> </ul>	<ul style="list-style-type: none"> <li>▪ Deductive Reasoning</li> <li>▪ Inductive Reasoning</li> <li>▪ Near Vision</li> <li>▪ Oral Comp</li> <li>▪ Problem Sensitive</li> <li>▪ Oral Express</li> <li>▪ Selective Attention</li> <li>▪ Speech Clarity</li> <li>▪ Category Flexibility</li> <li>▪ Information Ordering</li> </ul>	<ul style="list-style-type: none"> <li>▪ Deductive Reasoning</li> <li>▪ Near Vision</li> <li>▪ Written Comp</li> <li>▪ Oral Comp</li> <li>▪ Problem Sensitive</li> <li>▪ Inductive Reasoning</li> <li>▪ Information Ordering</li> <li>▪ Oral Express</li> <li>▪ Visualization</li> <li>▪ Finger Dexterity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Control Precision</li> <li>▪ Manual Dexterity</li> <li>▪ Information Ordering</li> <li>▪ Near Vision</li> <li>▪ Problem Sensitive</li> <li>▪ Arm-Hand Steady</li> </ul>

Source: O\*NET OnLine (<http://online.onetcenter.org>)

**NOTES:**

- • K,S,A's (row titles) = Knowledge, Skills and Abilities
- • Welding & Soldering = Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders

This table represents summary data for knowledge, skills and abilities of referenced occupations. For more comprehensive occupational information, please visit the Occupational Information Network (O\*NET OnLine).

## Appendix H: South Central Region Program Matrix

The following table is a listing of courses and programs available as of July 2007 at South Central Regional Colleges in the areas of Manufacturing Technology and related disciplines. They represent both certificate and degree programs.

PROGRAMS	COLLEGE							
	Allan Hancock College	Antelope Valley College	College of the Canyons	Cuesta College	Moorpark College	Oxnard College	Santa Barbara City College	Ventura College
	Engineering Technology (AS)	Engineering Technology	Mechanical Drafting	Electronics & Electric Technology		Electronics & Electric Technology	Drafting Technology	Engineering Technology
	Electronics & Electric Technology	Electronics & Electric Technology	Manufacturing & Industrial Technology	Industrial Electronics		Environmental Control Technology (HVAC)		Electrical, Electronic, and Electro-Mechanical Drafting
	Drafting Technology	Environmental Control Technology (HVAC)	Welding Technology	Electro-Mechanical Technology				Mechanical Drafting
	Machining & Machine Tools	Aircraft Fabrication		Drafting Technology				Machining & Machine Tools
	Welding Technology	Drafting Technology		Welding Technology				Welding Technology
Other Engineering & Industrial Technologies								

Source: California Community College Program Inventory, July 2007 (<http://misweb.cccco.edu/webproginv/prod/sortbycollege>)