Trends in Manufacturing & Returning Manufacturing to San Diego

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San Diego Manufacturing Trends

• San Diego Still Lost Manufacturing Jobs in 2013
• “Reshoring”/Resurgence of “Made in USA”
• Additive Manufacturing
• Training to meet Manufacturing Skills Gap
• Inventors Choosing Licensing vs. starting a company
Nonfarm Private Manufacturing Payroll Employment (NPPMNF)

Source: Automatic Data Processing, Inc.

Shaded areas indicate US recessions.

2014 research.stlouisfed.org
California manufacturing is declining 13% more than U.S. 2001 - 2013

January, 2001
1.867 million manufacturing jobs

March 2002
1.656

July 2004
1.534

May 2007
1.465

Sept. 2010
1.237

March, 2013
1.242 million

CA lost 33% of industrial base
625,700 manufacturing jobs

While the U.S. lost only 29% - a 13% difference

California improving but lagging behind U.S. manufacturing job growth
Percent change since 2010

employment numbers are seasonally adjusted
• From 2000 to 2011, the U. S. lost 5.8 million manufacturing jobs and 57,000 manufacturing firms closed.

• U.S. Department of Commerce shows that “U.S. multinational corporations... cut their work forces in the U.S. by 2.9 million during the 2000s while increasing employment overseas by 2.4 million.”
• Offshoring has been major cause of:
  – Slow economic growth after Great Recession
  – U.S and state budget deficits
  – High unemployment
  – Weakened middle-class
  – Declining innovation
  – Lower sales levels in weakened home market
Offshoring: partially herd behavior

• A ‘herd’ mentality to participate in the ‘Chinese miracle’ developed among giant global corporations --{Peter Nolan; University of Cambridge; - 9/03)

• People tell their bosses what they want to hear—(going to China) gives a boost to the stock valuation, but you really have to do the analysis on a case by case basis.” (Technology Forecasts 10/03)

Source: Stone & Associates
• Most companies don’t look beyond quoted unit price to make decision of which vendor to select.

• Should do Total Cost of Ownership (TCO) analysis - estimate of direct and indirect costs

• 13th edition APICS dictionary says:
  – "In supply chain management, the total cost of ownership of the supply delivery system is the sum of all the costs associated with every activity of the supply stream.”
• Should expand TCO to include the physical length of the entire supply chain and the lead times associated with the entire process.

• TCO should include:
  – Transportation alternatives
  – Inventory costs and control
  – Cost of quality controls
  – Reserve capacity
  – Responsiveness
  – Technological depth
Offshore Supply Chain Dynamics Changing

- Oil prices - tripled in the last 5 years raising logistics costs
- Labor rates rose about 15% year-over-year last 5 years in China & 60% predicted this year
- Component/material prices increasing
- Automation in U.S. has increased productivity
- Political instability - Labor riots/strikes
- Exchange rate variables
- Risk of disruption from natural disasters
- U.S. $ declining
• The Reshoring Initiative was founded by Harry Moser, former CEO of GF Agie Charmilles in 2010

• Goal: Change the Sourcing Mindset From “Offshored is Cheaper” to “Local Reduces the Total Cost of Ownership.”

• Train OEMs & Suppliers on why to source local and how to use TCO Calculator.

• Provides Free Total Cost of Ownership (TCO) Software for companies & suppliers/unions

• www.reshorenow.org
Sourcing Moving Home Slowly

• 61% of larger companies surveyed “are considering bringing manufacturing back to the U.S.”

• 15.3% of U.S. companies stated that they are "definitively" planning to reshore activities to the U.S.  
  Source: 2012 MIT FORUM FOR SUPPLY CHAIN INNOVATION REHORING STUDY

• 40% of contract manufacturers have done reshoring work this year

• Source: MFG.com 4/12
Reshoring / Offshoring are about in balance

### Manufacturing Jobs / Year

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2013</th>
<th>% Change</th>
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</thead>
<tbody>
<tr>
<td>New offshoring *</td>
<td>~150,000*</td>
<td>30-50,000*</td>
<td>-70%</td>
</tr>
<tr>
<td>New reshoring</td>
<td>2,000*</td>
<td>30-40,000**</td>
<td>+1,500%</td>
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</table>

*Estimated / **Calculated

Reshoring’s share of manufacturing job growth since Jan. 2010:
Job growth: \(\approx 500,000\)
Reshored jobs: \(\approx 80,000\)
Reshoring % of total: \(\approx 15\%\)
Major Companies Returning Manufacturing to U. S.

- Apple
- Caterpillar
- General Electric
- Whirlpool

Local Manufacturers that Reshored:
- EcoATm,
- Fluidmaster
- 451 Degrees
- Solatube
Solatube International

- Set up mfg. of Tubular Daylighting Devices in EPZ in China in 2008 - cheaper for 20 new plastic molding dies
- Moved mfg. back to their plant in Vista, CA at end of 2011

Reasons:
- Rising direct labor and indirect overhead costs
- Rising shipping costs
- Cost of quality problems
- More efficient in USA
TCO Estimator Benefits

- Provides a single TCO for each source
- Flexible: values are 100% user selected.
- Broad:
  - 29 cost factors.
  - Via pull down menus you automatically insert:
    - Freight rates for 17 countries
    - Duty rates for parts or tools, e.g. molds
  - Current value and 5 year forecast of TCO.
- Easy to use:
  - Explanations and references to help select values.
  - Instruction Manual.
- Free
TCO Comparison Example: a Moderate Labor Content Part

PRESENT AND FORECAST U.S AND CHINA PRICE AND TCO: PARTS

<table>
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<th>Year</th>
<th>COST, U.S. $</th>
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<tr>
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<td>6</td>
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U.S. TCO
China TCO
U.S. Price
China Price
Advantages of Sourcing Domestically

• Ease of Communication
  – Same language
  – Same or close time zone

• Flexible Delivery
  – Rapid turnaround for tooling or prototypes
  – Just-in-time
  – Kan Ban

• Reliable Transportation
  – Many choices for ground transportation
  – Express or air freight available

• Smoother Design Changes
  – Easier to make changes understood
  – More willingness to make changes
• **Lower Cost of Inventory**
  – Lower minimum buys
  – Just-in-time delivery option
  – Kan Ban delivery Option

• **Higher Quality**
  – Materials match specifications
  – Consistent dimensional standards

• **Lower Travel Expenses**
  – Local/regional vendors within driving distance
  – Lower air fares for visiting domestic vendors

• **No Intellectual Property Infringement**

• **Favorable Purchase Order and Credit Terms**
• Offshore outsourcing will continue indefinitely
• Desirable” locations for outsourcing will change over time
• Purely financial benefits of lower cost will erode over time
• Challenge is to keep as much as possible within the United States
• Utilizing TCO estimator worksheet will help maintain and return manufacturing to America.
Additive Manufacturing

- Hailed by ‘The Economist’ as catalyst of ‘the third industrial revolution’
- Projected to have a significant impact on manufacturing in the near future
- Has the potential to revolutionize the way we make almost everything
- Currently about 28% of the money spent on printing things is for final products
- Predicted to rise to 50% by 2016 and 80% by 2020
Additive Manufacturing Methods

- Stereolithography
- 3D printing
- Laser sintering
  - high powered laser fuses powered metals into fully dense 3D objects, layer by layer
- Fused-deposition modeling
  - A plastic or metal wire is unwound from a coil, supplying material to an extrusion nozzle to form success layers
Local Product Development Companies

A Squared Technologies
Clarity Design
DD Studio
D&K Engineering
Dynapac Design Group
Expertise Engineering
Fallbrook Engineering
Leardon Solutions
Redpoint Engineering
• MakerPlace – think of it as your “dream” garage shop

• A place to use a variety of fabrication equipment & tools to work on projects: woodworking, metalworking, electronics, embroidery, sewing and specialty tools such as 3D printers, laser cutters and engravers.

• “Incubator” offices upstairs for businesses to operate out of the same building as the fab shop.
Training for Manufacturing Jobs

Today’s manufacturing jobs require a variety of skills
@ 10,000 Baby Boomers are retiring every day since 2011
Nationwide shortage of 600,000 skilled manufacturing workers

President Obama’s Skills Certification System
NAM-Endorsed Manufacturing Skills Certification System
Society of Manufacturing Engineers (SME)
Manufacturing Skills Training thru ToolingU
Career Technical Training Options

• San Diego Community College
• SDCCD Continuing Education Center
• Miramar College
• MiraCosta College
• San Pasqual High School
• Chaparell High School (Charter)
• Quality Controlled Manufacturing Inc.
• Workshops for Warriors (non-profit)
Licensing vs. Starting Company

• San Diego Inventors Forum
  – 70% of inventors in last two years plan to license their technology vs. start a company

• CONNECT Springboard
  – No change in demand, but change in composition
  – Technology, biotech/biomed and life science

• UCSD Jacobs School of Engineering von Liebig Entrepreneurism Center
  – Currently 30 teams that want to start company
2014 Outlook

● Positives:
  – Reshoring is creating more manufacturing jobs and generating more regional GDP
  – Additive manufacturing is accelerating development of new products
  – Broad access to skills training available in San Diego

● Negatives:
  – Unknown economic impact of Obamacare
  – Possibility of full sequestration being restored
Michele Nash-Hoff is available for speaking and consulting on when and how to return manufacturing to America.

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