A Career in Toolmaking or Machining Technologies: The Right Choice for Students, Community & Country

Harry C. Moser
President
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GF AgieCharmilles
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For more information on promoting careers in manufacturing or on EDM’s for schools and colleges, contact:
Agie Charmilles
560 Bond Street
Lincolnshire, IL  60069-4224
FAX:  847/913-5342
PHONE:  847/913-5300
LuAnn Twite, Schools & Centers Coordinator, 847/955-7170
Harry C. Moser, President, 847/955-7102
Importance to the Country

- Manufacturing Supplies 47% of non-farm employment
  - 16% Direct Manufacturing Jobs
  - 31% Secondary Jobs Generated by Manufacturing

- A Manufacturing Job creates three to five times more Secondary Jobs than does a Service Job.

- World Class Production Requires and Follows World Class Tooling.

“THE ONLY COMPARATIVE ADVANTAGE OF THE DEVELOPED COUNTRIES IS IN THE SUPPLY OF KNOWLEDGE WORKERS”
REQUIREMENTS FOR BEING WORLD COMPETITIVE:
- QUALITY
- COST
- DELIVERY

NECESSARY CONDITIONS:
- SKILLED LABOR
- TECHNOLOGY INVESTMENT

PROBLEMS:
- VERY SHORT SUPPLY
- 40% OF COMPANIES CAN NOT MODERNIZE EQUIPMENT BECAUSE WORKERS LACK THE SKILLS
- INEFFECTIVE SKILLS AMONG EMPLOYEES HAVE PREVENTED ONE IN FIVE MANUFACTURERS FROM EXPANDING.*

CONCLUSION: A COMPETITIVE U.S. ECONOMY REQUIRES MORE SKILLED MANUFACTURING TRADESPEOPLE.

SOURCE: Competitiveness Policy Council
*SOURCE: National Association of Manufacturers
Manufacturing Skills Shortages are Impacting Business!

Figure 1: To Which Extent Does the Shortage of Available Skills Impact Your Company’s Ability to Serve Customers (1=no impact; 5=greatest negative impact)

Greatest Negative Impact

No Impact

Source: NAM 2005 Skills Gap
Biggest Shortages: Skilled Production

What Types of Employees are Expected to Be in Short Supply Over the Next Three Years? (Select All that Apply)

- Skilled Production
- Scientists and Engineers
- Unskilled Production
- Sales and Marketing
- Management and Administration
- Customer Service
- Others
- None

Source: NAM 2005 Skills Gap
Community Colleges Offer a Good Solution

How Prepared for a Typical Entry Level Job in Your Company Are Applicants with a Certificate from a 2-Year College?

- Adequately Prepared
- Poorly Prepared

Source: NAM 2005 Skills Gap
# Should We Train Service Providers or Toolmakers?

<table>
<thead>
<tr>
<th>Trainee</th>
<th>Work Importable/Exportable?</th>
<th>Impact on Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautician or Carpenter</td>
<td>No</td>
<td>U.S. Jack vs. U.S. Jill</td>
</tr>
<tr>
<td>Toolmaker</td>
<td>Yes</td>
<td>U.S. vs. Hong Kong</td>
</tr>
</tbody>
</table>

**CONCLUSION:** Our training resources should be directed to the kinds of work that are both highly paid and subject to import competition.
76,000 Job Openings

-OPENINGS, % OF WORKFORCE 10.1%*
-AVERAGE STARTING WAGE $16.82/HOUR
-AVERAGE ANNUAL INCOME (to start, including Overtime) $42,000/year

U.S. PROJECTION:
-JOBS, ALL MACHINISTS 76,000
-TOTAL SALES $10 BILLION/YR
-IMPACT ON GDP @2.4 MULTIPLIER $24 BILLION/YR
-IMPACT ON U.S. BUDGET DEFICIT $6 BILLION/YR

SOURCE: NTMA/CHARMILLES MARCH 2006 SURVEY OF NTMA MEMBER SHOPS: 167 RESPONSES = 10%
*VS. 2.5% IN THE ENTIRE US WORKFORCE, ALL JOB CATEGORIES
Did You Know?
- Entry level toolmakers can average $35,000 a year during a four-year training program.
- Experienced precision metalworkers’ earnings range from $40,000 to $75,000 annually.
- The U.S. Government projects 3 job openings for every new certified precision metalworker.
- Precision machining provides a practical basis for an engineering or business degree.
- The gloomy rooms and greasy machines of the past are replaced with computers and high technology.
- Many toolmakers eventually own their own shops. The typical shop brings in sales of $2 million per year and was founded by a 35-year old precision machinist.

Note
The median incomes in all categories...
- Vary approx. +/- 35% based on location and skill level.
- Include overtime on a 50 hour workweek for the precision machinists/toolmakers. (Most workers in other high income categories work overtime but are not paid extra.)

Sources
- U.S. Bureau of Labor Statistics
- NSF/SRS
- NTMA, TMA, AMBA, PMA

For More Information
Contact associations listed on the back.

U.S. TOOLMAKING/MACHINING INDUSTRY

- # of Companies: 12,000
- # of Employees: 240,000
- Annual Sales: $26 Billion
- # of Job Openings: 5,000

HOW EARNINGS COMPARE

ANNUAL INCOME
- Precision Machinist or Toolmaker: $60,000
- All workers with a Master’s Degree: $55,000
- All workers with a Bachelor’s Degree: $47,000
- All workers with an Associate’s Degree: $35,000
- All workers with some college, no degree: $32,000
- All workers with four years of High School: $29,000
- All workers with less than a High School Degree: $21,000

Provided by: GF AgieCharmilles
### Overtime: Toolmakers & Other Professions

<table>
<thead>
<tr>
<th>EMPLOYEE GROUP</th>
<th>AVERAGE WEEKLY WORK HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toolmakers</td>
<td>45-55 Hours</td>
</tr>
<tr>
<td>Medical Residents, Investment</td>
<td>70-80 Hours</td>
</tr>
<tr>
<td>Bankers, Corporate Lawyers and other Professionals</td>
<td></td>
</tr>
<tr>
<td>All Full Time Workers:</td>
<td>50.8 Hours</td>
</tr>
</tbody>
</table>

**CONCLUSION:** TOOLMAKERS WORK ABOUT AS MUCH OVERTIME AS OTHERS WITH HIGH INCOMES.

A TOOL & DIE MAKER WORKS HARD BUT CAN LEAVE WORK BEHIND. IN CONTRAST FOR BUSINESS EXECUTIVES ON VACATION:

26% CHECK OFFICE DAILY, 63% WEEKLY
18% TAKE WORK ALONG
36% DO WORK ON VACATION

SOURCE: AMERICAN MANAGEMENT ASSOCIATION, SURVEY OF 645 EXECUTIVES, 6/10/02
GLOBE & MAIL
Projected Average Annual Job Openings 1990-2005

<table>
<thead>
<tr>
<th>Category</th>
<th>OPENINGS</th>
<th>NUMBER OF CREDENTIALS AWARDED</th>
<th>NET OPENINGS</th>
<th>OPENINGS PER CREDENTIALS AWARDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Managerial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Executive, Administration</td>
<td>436,000</td>
<td>506,830</td>
<td>-70,830</td>
<td>0.86</td>
</tr>
<tr>
<td>- Construction Managers</td>
<td>7,000</td>
<td>825</td>
<td>+6175</td>
<td>8.48</td>
</tr>
<tr>
<td>- Marketing, Advertising, and Public Relations Managers</td>
<td>23,000</td>
<td>66,416</td>
<td>-43,416</td>
<td>0.35</td>
</tr>
<tr>
<td>Professional Specialty</td>
<td>623,000</td>
<td>1,120,063</td>
<td>-497,063</td>
<td>0.56</td>
</tr>
<tr>
<td>- Physical Scientists</td>
<td>8,000</td>
<td>35,163</td>
<td>-27,163</td>
<td>0.23</td>
</tr>
<tr>
<td>- Lawyers</td>
<td>28,006</td>
<td>44,314</td>
<td>-16,308</td>
<td>0.63</td>
</tr>
<tr>
<td>Technical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Technicians</td>
<td>183,000</td>
<td>212,767</td>
<td>-29,767</td>
<td>0.86</td>
</tr>
<tr>
<td>- Health</td>
<td>79,000</td>
<td>71,804</td>
<td>+7,196</td>
<td>1.10</td>
</tr>
<tr>
<td>- Engineering</td>
<td>52,000</td>
<td>85,611</td>
<td>-33,611</td>
<td>0.61</td>
</tr>
<tr>
<td>Blue-Collar Technical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Craft, Precision Metal, and Specialized Repair</td>
<td>455,000</td>
<td>133,057</td>
<td>+321,943</td>
<td>3.42</td>
</tr>
<tr>
<td>- Mechanics, Installers, Repairers</td>
<td>160,000</td>
<td>91,758</td>
<td>+68,242</td>
<td>1.74</td>
</tr>
<tr>
<td>Service Occupation</td>
<td>882,000</td>
<td>237,062</td>
<td>+644,938</td>
<td>3.72</td>
</tr>
<tr>
<td>Operators, Laborers</td>
<td>477,000</td>
<td>41,504</td>
<td>+435,496</td>
<td>11.49</td>
</tr>
<tr>
<td>Farming, Forestry, Fishing</td>
<td>90,000</td>
<td>14,547</td>
<td>+75,453</td>
<td>6.19</td>
</tr>
</tbody>
</table>


Conclusion: Precision Machining is one of the few careers with both a high ratio of demand to supply and a high income.
## ROI on Skilled Workforce Training

<table>
<thead>
<tr>
<th>PERSPECTIVE</th>
<th>MFG. TECH, ASSOCIATES DEGREE</th>
<th>TOOL&amp;DIE APPRENTICE</th>
<th>ENGLISH, BACHELOR’S DEGREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORKER</td>
<td>39%</td>
<td>125%</td>
<td>6%</td>
</tr>
<tr>
<td>UNITED STATES</td>
<td>163%</td>
<td>233%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Modern Machine Shop, May 2005
THE LOWEST RISK OF DROPPING OUT OF HIGH SCHOOL IS FOR STUDENTS WITH:

3 CAREER & TECHNICAL EDUCATION UNITS PER 4 ACADEMIC UNITS

CONCLUSION: TAKING SOME HIGH SCHOOL CAREER AND TECH COURSES ENHANCES EDUCATIONAL CONTINUITY.

60% of students learn best in context

Schools should offer:

- Career focus for all students (reason to remain in school and continue education)
- Contextual teaching strategy (enables students to master high levels of academics)
- Real world, open ended problems

Www.cord.org/news.cfm?headline=12
### Income, Workers Age 20-34 in March of 1996

#### Full Year, Full Time, Total 1995 Earnings

<table>
<thead>
<tr>
<th></th>
<th>Less than $30,000</th>
<th>$30,000 or More</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Non-High School Graduate</td>
<td>271,847</td>
<td>41,268</td>
<td>13.2%</td>
</tr>
<tr>
<td>High School Graduate</td>
<td>1,358,704</td>
<td>397,462</td>
<td>22.6%</td>
</tr>
<tr>
<td>Some College, No Degree</td>
<td>774,103</td>
<td>290,643</td>
<td>27.3%</td>
</tr>
<tr>
<td>Precision Production, Craft &amp; Repair</td>
<td>356,233</td>
<td>284,545</td>
<td>44.4%</td>
</tr>
</tbody>
</table>

Source: Data March 1996 Current Population Survey, Census Bureau, Great Lakes States, only. (Latest available data, 9/1/01.)

Analysis: Don Grimes, University of Michigan, for Michigan Future, Inc.

**Conclusion:** College drop-outs are not much better off than High School graduates. Precision Machinists are much better off than either.
TOOL & DIE CUMULATIVE WEALTH ADVANTAGE

Assumptions:
1. Zero wage inflation
2. Savings = 50% of difference in income
3. Investment return of 7% per year on savings
Key Questions

IS TOOLMAKING A BETTER CHOICE THAN A LIKELY M.D. FROM HARVARD OR STATE UNIVERSITY?

NO

IS TOOLMAKING, LINKED TO A TECHNICAL DEGREE, MUCH BETTER THAN A PROBABLE COLLEGE DROP-OUT OR A MARGINAL LIBERAL ARTS COLLEGE GRADUATE?

YES

YES, FOR THE INDIVIDUAL:

- income
- job security
- career

YES, FOR THE COMMUNITY AND COUNTRY:

stability
competitiveness
## Misallocation of Subsidies

<table>
<thead>
<tr>
<th></th>
<th>CURRENT OPENINGS</th>
<th># GRADUATED/YEAR</th>
<th>DROP OUT RATE</th>
<th>% UTILIZING TRAINING</th>
<th>AVERAGE INCOME</th>
<th>GOVERNMENT SUBSIDY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRECISION TOOLMAKER</strong></td>
<td>30,000</td>
<td>3,000</td>
<td>25%</td>
<td>MOST</td>
<td>$53,000</td>
<td>0</td>
</tr>
<tr>
<td><strong>HISTORY MAJOR</strong></td>
<td>0</td>
<td>22,000</td>
<td>40%</td>
<td>FEW</td>
<td>$40,000</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

**GOVERNMENT SUBSIDIES OF:**
- EXCESS COLLEGE DEGREES APPROX: $5 BILLION/YEAR
- COLLEGE DROPOUTS APPROX: $6 BILLION/YEAR

**TAX COST OF BILL IF # OF TRAINEES DOUBLES:**
(IGNORING LATER HIGHER INCOME TAXES) $45 MILLION/YEAR
“Machine shops……

-it’s a respectable trade and there’s still a lot of money to be made.”

“True machinists don’t think of metal as something hard and unchangeable. They can make anything they want, or replace nearly any part that’s ever been made. I have a lot of respect for those guys. I always will.”

-Jay Leno

Source: June 2000 issue of Popular Mechanics.
2002 AMBA Newsletter
Advice About Careers in the Precision Metalworking Trade

“Go for it! It has given me a lot of discipline at work and at home. It is great when you can use your brain and hands all day long! Precision Metalworking trade is an excellent step for a good and meaningful future.”

“It’s not a job, it’s a career.”

“Get into metalworking because there’s a lack of decent metalworkers. Very good job availability and benefits. Don’t become a pantywaist office working drone - be a man, work with steel.”

“It’s fun, never boring, challenging, mind opening, sensory perceptional and very, very rewarding after completion of a job or project.”

“Do it, it’s a lot of fun and good money.”

“It’s a good and challenging skilled environment.”