



FILLING THE MANUFACTURING WORKFORCE PIPELINE

by Mary Heindl

Jeff Kelly, president of Hamill Manufacturing and national chairman of the National Tooling & Machining Association (NTMA), chose “Filling the Manufacturing Workforce Pipeline – Building a skilled, dedicated and loyal workforce for the future,” as the 2007 theme for his chairmanship. This was also the title of a conference held at SMC Business Councils on February 8, sponsored by NTMA in conjunction with the Advanced Manufacturing Career Collaborative, a program of New Century Careers. The goal here, too, was to discover ways to encourage careers in manufacturing.

Defining the Crisis in Manufacturing

The manufacturing workforce is aging and the supply of skilled workers is in decline. In fact, manufacturing has experienced a nearly 40 percent growth in demand for highly skilled workers, while demand for low skilled workers continues to decline. A recent education report by the international Organization for Economic Co-Operation and Development (OECD) says it all. The United States ranks #1 in adults 45-64 with a high school diploma, we

are in fifth place with adults 35-44, and a dismal tenth place with adults 25-34 with a basic high school diploma. The reality is 75 percent of new job growth requires some level of post-high school training.

“We have an URGENT problem, and it requires our immediate attention,” said Phyllis Miller of NTMA and

metalworking industry. And Pennsylvania has taken the lead in making NIMS credentials a requirement in the vo-tech machining curriculum in the state.

2. Reach out to high schools and vocational schools to help recruit young people into machining programs.

“Seventy-five percent of new job growth in manufacturing requires some level of post-high school training.”

—Organization for Economic Co-Operation and Development

Hamill Manufacturing, opening the conference. Ms. Miller delivered comments on behalf of Jeff Kelly. According to Mr. Kelly, there are not enough active apprentice programs available and most high school counselors and parents are encouraging their students to attend college. For some students, a technical or vo-tech course would be a better fit. Mr. Kelly had four suggestions for manufacturers:

1. Implement new or expand existing NIMS-based apprenticeship programs. The National Institute of Metalworking Skills, or NIMS, has set achievable standards for the

3. Open our facilities to tours for young people, technical school classes and to outsiders who may help influence young people to embrace manufacturing.
4. Get involved with BattleBots IQ (see sidebar). The NTMA is a founding sponsor of this initiative because it believes it stimulates young people to consider manufacturing as a viable career. Bots IQ, the name by which it will be known moving forward, is the NTMA’s most visible public advocacy program.



"Manufacturing careers are great jobs with good benefits," said SMC President Cliff Shannon, as he introduced the panel. "We have many opportunities going forward in the global market and the good things about manufacturing should be stressed."

Shannon explained that, in 2005, manufacturing employees earned an average of \$66,000 a year in wages and benefits compared to employees in the remainder of the economy that earned about \$56,000 – an 18 percent difference. And more than one in six private sector jobs in the U.S. depend on the manufacturing base, which accounts for about 12 percent of GDP. According to the Employment Benefit Research Institute, 84 percent of manufacturers nationwide provide health care benefits to their employees. "This level of coverage is second only to government," Shannon added. Between 2000 and 2004, increases in benefits accounted for more than half of the increases in manufacturing compensation, according to a survey of executives by Advanced Technology Services.

Tom Palisin, Pennsylvania's Manufacturing ombudsman, said a 2005 Skills Gap survey conducted by the National Association of

Manufacturers indicated that more than 80 percent of respondents could not find qualified workers to fill their job openings. The same survey also revealed that a startling 90 percent of respondents stated that they could not find enough skilled production employees, including front-line workers, such as machinists, operators, craft workers, distributors, and technicians, to fill their job openings. Palisin also noted that there are not enough science and engineering graduates in manufacturing to sustain our growth. "China produced 350,000 engineering graduates in 2004 while the United States had less than half of that," he said, urging review of science and engineering curriculum.

Jim Conn of Allegheny Ludlum wondered aloud why students are no longer interested in manufacturing. He believes we must move in new directions to change the public's negative impression of manufacturing as a career choice.

Kristen Bastaja described some of the methods Penn United Technologies uses to attract high school students. These include visits

to guidance counselors, plant tours for students and teachers, partnerships with workforce training programs, and support of state-approved apprentice programs. "We must think outside the box," she said.

Ron Painter of the Three Rivers Workforce Investment Board said Pennsylvania is facing a 50-50 challenge. "50,000 of our workers are older than other areas of the United States and we have 50,000 fewer younger workers than other competitive regions." Besides manufacturing, Painter said other industries having an older work force (45-50 age group) included mining at 50 percent and primary metals at 41 percent. The United States has a 300 million total population with a student drop out rate of 40 percent. "Our challenge is to reach students in the system from K to 12 and to upgrade curriculum in vo-tech schools and universities to meet the challenges of the global market and increased competition." ▼

Note: Mary Heindl is the editor of the award-winning Dynamic Business magazine, the flagship publication of SMC Business Councils. She can be reached via e-mail, mary@smc.org.



BattleBots IQ is a unique educational program that motivates students to learn about technology to help them prepare for the priority and high-demand jobs of the

future. It introduces students to

a range of technologies as they plan, design, build, test and compete with 15-pound robots. At the same time, they develop the skills desperately needed in the workplace such as teamwork, problem solving, and communication.

The BattleBots IQ program in southwestern Pennsylvania has been sponsored through funding from the Pennsylvania Department of Labor and Industry, the regional workforce investment boards, and regional companies who want to get students excited about technology. Student teams have industry partners who work closely with them as they develop their Battlebots.

This year's competition was held on March 3 at Century III Mall with 17 high school teams competing. For more information, check out BattleBots IQ on the web at www.BattleBotsIQpa.org.

Preparing the 21st Century American Workforce

by Paul Anselmo

The Southwestern Pennsylvania Manufacturing Workforce Development Training System is a region-wide manufacturing initiative to train local workers, address shortages in the manufacturing workforce, and prepare workers for advanced manufacturing positions. This initiative was developed with the help of private industry, existing manufacturing training programs, youth councils, local and national foundations, and community and four-year colleges.

Training is offered in a continuum, with each step adding additional skills and offering career advancement possibilities. The program begins by offering training and awareness initiatives at the middle school and high school levels. Next, training programs are offered for unemployed and underemployed workers to prepare these individuals to take a skilled entry-level position in manufacturing. The next step offers training to incumbent workers in skills identified by the manufacturing industry as areas having shortages. Finally, the linked training system offers college level courses of study for those wishing to achieve higher positions in the industry, including degrees in Manufacturing Technology and Manufacturing Engineering. Following are some of the pathways that are helping to fill the manufacturing workforce pipeline.

Molding Minds in Manufacturing – Pre College

Hundreds of youth have participated in this program at Community Colleges in Allegheny and Westmoreland Counties, which allows middle and high school students to discover the excitement and challenge of careers in manufacturing through demonstrations and hands-on projects.

Manufacturing 2000

New Century Careers developed this program for unemployed and underemployed women and men, and displaced workers, to prepare them for entry into the manufacturing workforce as machinists or welders. The program recruits, screens, tests, trains, and places individuals for manufacturers in southwestern Pennsylvania's nine-county region and prepares them for a career demanding lifelong learning. The program also includes skill development in the areas of Technical Math, Machine Theory, Blueprint Reading and Metrology. A detailed summary of both the Welding and Machining curriculum is available at www.ncsquared.com.

National Tooling & Machining Association (NTMA) – Apprenticeship

The NTMA Pittsburgh Chapter has been providing machinist apprenticeships programs for the past 28 years. The theory/related instruction portion of apprenticeship is accomplished in partnership with public vocational technical schools to dozens of the region's metalworking companies. The NTMA has been promoting the validation of skill competency through the earning of nationally recognized NIMS credentials for their apprentices. Their curriculum assures companies that apprentices have the theoretical basis for earning relevant NIMS credentials. The NTMA provides 576 hours, over four years, in the areas of: Technical Mathematics, Blueprint Reading, Geometric Dimensioning and Tolerancing, Machine Tool Technical Theory, and specialized theory such as Tool & Die and Computer Numerical Controls. For information on apprentice programs visit, www.pgntma.org.

“Follow US on our Pathways to a Sustainable, Regional Manufacturing Workforce Development System.”

– Paul Anselmo

Community Colleges – Two Year Degrees

Allegheny County Community College South (CCAC), Butler County Community College (BCCC), and Westmoreland County Community College (WCCC) each offer two-year A.S. degree programs in Manufacturing Technology. In addition CCAC offers a three-year Technology to Engineering bridge program that allows graduates to enter the Robert Morris University manufacturing engineering program as juniors. All programs were developed in close partnership with industry and are designed to meet accreditation standards. This has enabled teams of academic and industry personnel to create educational materials using an active learning paradigm called the Manufacturing Learning Model. Using this model and innovative delivery techniques such as web conferencing, students experience the integration of theory, experimentation, and industry practice in a systematic manner. Industry partners are deeply involved through the sharing of case studies, video footage, and tours of their facilities.

Manufacturing 2000 PLUS

This program developed by New Century Careers targets incumbent manufacturing workers who desire advanced technical skills. Employers seeking a competitive advantage through increased productivity are the primary customers. Training mod-

ules range from four to 45 hours and typically involve highly technical applications such as: CAD/CAM engineering software such as MasterCam; blueprint reading and geometric dimensioning and tolerancing; advanced, specialized welding processes and techniques; and customized training, based on company-specific skill gap analysis for efficiencies such as tool selection and tool life.

Robert Morris University – Four Year Degree

Robert Morris University offers the Bachelor of Science degree in Manufacturing Engineering, with a Computer Integrated Engineering Enterprise – Learning Factory. This comprehensive facility for hands-on learning was created to support educational programs college-wide, serve as a test bed for research and development activities, support outreach and recruitment activities, and provide an environment for lifelong learning. Students are proficient in Engineering Materials and Processes; Process, Assembly and Products Engineering; Manufacturing Competitiveness; and Manufacturing Systems Design. ▼

Editor's Note: Paul Anselmo is director of NCC Services at New Century Careers and can be reached via phone at 412.258.6622 or via e-mail, anselmo@ncsquared.com.

Attention Central Region Members

If you would like to learn more about upskilling technical jobs, consider attending the "Symposium on Training the Workforce of Tomorrow," which will be held on Wednesday, March 21 and Thursday, March 22, 2007 at the Reading Area Community College in Reading, PA. Contact Joyce Lenox at 717.735.0333. For more information about workforce training programs in your area, refer to the following:

- Job Ready Pennsylvania – Governor Rendell's Strategy for Building a Skilled Workforce provides information on grants and workforce training programs available in the state. www.paworkforce.state.pa.us
- Lancaster Workforce Investment Board – helps individuals in the community find long-term positions and aids employers in finding the right candidates to full vacancies, while encouraging retraining activities. <http://www.jobs4lanaster.com>
- MANTEC, Inc. – serves small and mid-sized manufacturing entities in South Central PA as an Industrial Resource Center. MANTEC provides customized job training grants ranging from \$25,000 to more than \$150,000 to cover 70-100 percent of the training costs for new employees and re-training costs of existing employees. <http://www.mantec.org>

For more information on regional manufacturing education and training initiatives, please visit the following websites:

- **Advanced Manufacturing Career Collaborative (AMC2)** <http://www.amcsquared.com>
- **National Tooling & Machining Association (NTMA) – Pittsburgh Chapter** <http://www.pghntma.org>
- **Pathfinders:** Workforce Investment Boards are charged with assessing and monitoring changes in the supply and demand for labor:
 - Westmoreland-Fayette Workforce Investment Board <http://www.westfaywlb.org>
 - Southwest Corner Workforce Investment Board <http://www.washingtongreene.org/schwlb/>
 - Three Rivers Workforce Investment Board <http://www.trwlb.org/>
 - Tri-County Workforce Investment Board <http://www.tricountywlb.org/tcwlb/>
- **New Century Careers** – Their mission is to increase the availability and advance the skills of the region's manufacturing workforce. <http://www.ncsquared.com>
- **PRIME** (Partnership for Regional Innovation in Manufacturing Education) - is an industry-driven coalition that united Robert Morris University, and the Community Colleges of Allegheny, Butler and Westmoreland Counties, and California University of Pennsylvania to build support for manufacturing education, increase awareness of employment opportunities, and develop a feeder program for individuals seeking degrees.
 - PRIME - Partnership for Regional Innovation in Manufacturing Education <http://www.primepa.org>
 - Butler County Community College (BCCC) <http://www.bc3.edu>
 - California University of Pennsylvania (CUP) <http://www.cup.edu>
 - Community College of Allegheny County (CCAC) <http://www.ccac.edu>
 - Robert Morris University (RMU) <http://rmu.edu>
 - Westmoreland County Community College (WCCC) <http://www.wccc-pa.edu>