

# Spokane

## PREPARING FOR THE FUTURE

Advanced Manufacturing  
Workforce Initiative

SKILL PANEL REPORT

# TABLE OF CONTENTS

THE CHALLENGE.....	1
THE PROCESS.....	2
AMWI Skill Panel Workplan.....	3
THE FINDINGS.....	4
Advanced Manufacturing.....	4
Manufacturing Workforce .....	8
Knowledge-based Workforce.....	10
Job Description—	
Advanced Manufacturing Environment .....	12
CONCLUSION – LOOKING FORWARD .....	13
RECOMMENDATIONS .....	14
POST SCRIPT .....	19
ADDENDUM .....	21
Addendum # 1 – SURVEY FINDINGS .....	21
Addendum # 2 – ONSITE VISITS .....	24
Addendum # 3 – “APPLIED/CONTEXTUAL”	
ACADEMIC SKILLS REQUIRED IN ADVANCED	
MANUFACTURING.....	29
Addendum # 4 – CREDITS .....	32

## THE CHALLENGE

The effective use of Advanced Manufacturing techniques and technologies enables manufacturers to increase productivity and produce present and next generation goods faster, cheaper and cleaner than ever before. The often labor-intensive assembly lines of the 20<sup>th</sup> Century are in most cases being replaced by robotics, smart processes and intelligent systems requiring knowledge-based core competencies and skills.

Many manufacturers in the Spokane Region are upgrading the skills of present employees as well as hiring new employees from board room to store room. This is a costly and timely process. Many of these companies are discovering it is difficult to find employees – specifically younger individuals – who have both the desire and the competencies to fill these better than average paying jobs. The problem in the Spokane regional manufacturing sector is not unemployment but rather employability. This report presents findings as well as recommendations to aid manufacturing companies and potential employees to better understand, cope with and address some of the challenges the Spokane region is facing.

This challenge must be met. Spokane County is home to 580 manufacturers that employ 17,200 people, approximately 8.6 percent of the county workforce. Wages in manufacturing average \$38,349 per year, substantially more than the average wage for all occupations in Spokane County. Spokane's drive to support expansion and recruitment of competitive manufacturing firms is dependent upon the availability of a skilled manufacturing labor force.

Only 31, or 5.3 percent, of the 580 manufacturers located in Spokane County employ 100 or more employees. The majority of the manufacturing jobs are located in firms that are considered small businesses. Small businesses do not have the resources to absorb the high cost of retraining. Therefore, it is essential that the education system in partnership with business produce a workforce with adequate skills.

Of the 35 new facilities that have opened in the Spokane Region since 2001 12, or 34 percent, are manufacturing firms. All of these new firms employed or had plans to employ fewer than 100 employees. (The question posed here is did we lose potential bigger firms because of the lack of a trained workforce?)

The average age of the manufacturing workforce in the Spokane region is in the mid-forties. This mirrors other surveys conducted throughout the United States. The National Association of Manufacturers predicts there will be a need for 10 million workers by 2020 because of the current aging workforce. In the Spokane Region, several hundred

current and/or future job openings were cited by the companies surveyed in April, May and June of 2005.

Manufacturing is the engine that has driven a segment of our national and local economy for decades, and it will continue to do so. The ability of American manufacturers to remain competitive and keep advancing in today's environment is a national and local imperative.

## **THE PROCESS**

The Boards of the Spokane Regional Chamber of Commerce and Spokane Area Economic Development Council held a joint board retreat in August 2004 to find consensus on goals that would make the Spokane Region more competitive for existing and new business.

A consultant to the EDC, Audrey Taylor of Chabin Concepts, advised that advanced manufacturing is a cluster with growth potential for the region, building on our current base. A key element in the growth of that cluster is ensuring a talented pool of available workers for manufacturers to draw from – a pool that doesn't currently exist.

Taylor's observations were corroborated by Bob Potter, a business recruiter for Spokane and Kootenai Counties who reported that California-based manufacturers find our business climate attractive, but they are concerned about the lack of a skilled manufacturing workforce. This is the number one impediment to attraction of new business, according to Potter. Mary Lou Thomas with Triumph Composite Systems (formerly Boeing Spokane) agreed with the "outside assessment," saying that their ability to bring more work to the Spokane plant is dependent on employees and vendors/suppliers that are ISO 9000 qualified. She reported that local companies like Triumph Composites and McKay Manufacturing were facing the same problems – limiting their ability to bring contract work to Spokane.

The Spokane Chamber and Spokane EDC took this issue to the State Workforce Training & Education Coordinating Board when they met in Spokane. A few months later, the State Workforce Board awarded a \$75,000 Skill Grant to the Chamber for our Advanced Manufacturing Workforce Initiative (AMWI). A steering committee worked with the Spokane Chamber's Manufacturers' Roundtable to solicit input from local manufacturers on their workforce needs. A skill panel was formed with representation from business, labor and education. Roger Ingebretsen, Ingebretsen Consulting LLC, was selected to facilitate the skill panel process.

## **AMWI Skill Panel Workplan**

With a goal to promote a climate that fosters growth and development of the manufacturing and technology base within the greater Inland Northwest region, the skill panel began its work. Over an eight month timeframe the panel met with manufacturers, education and training specialists and technical education programs.

Members of the panel traveled to Seattle to meet with members of the Center for Manufacturing Excellence at Shoreline Community College. In conjunction with the Chamber's Manufacturers' Roundtable, the panel presented a Town Hall Meeting on Manufacturing attended by 125 representatives from manufacturing companies and organizations. Participants completed a "Manufacturers' Perspective Questionnaire" to get feedback on their workforce issues. This questionnaire was also distributed by email to the manufacturing industry in Spokane County. Ingbretsen completed site visits and interviews with over 30 manufacturing firms and 20 workforce and training specialists. A complete summary of results from Manufacturers' Perspective Survey can be found in Addendum #1.

Input from regional manufacturers was compiled and presented to the AMWI Skill Panel in July and August '05 for review of feedback and recommendations. The report of recommendations was presented to a Manufacturers' Workforce Forum on September 28, 2005. The forum provided an opportunity for participants to decide on the top priorities for addressing workforce readiness.

## **THE FINDINGS**

### **Advanced Manufacturing**

Advanced manufacturing is not an easy concept to define since companies/organizations all across the Spokane Region have their own definitions that reflect particular interests and objectives. Advanced Manufacturing as defined by this skills panel is, "the insertion of new technology, improved processes, a high-impact workforce and leading-edge management methods to improve the manufacturing of products."

What the skill panel discovered is a highly competitive environment that favors brains over brawn. Manufacturing has become a race and drive to identify customer requirements, and in turn, produce products that meet them faster than the competition. In this environment, competitive prices, precise operations, and quality products are entry

criteria. What differentiates certain companies is a unique ability to create a competitive advantage in this environment – these manufacturers think and do faster – and by definition, these advantages make them “advanced.” Hugh Severs, VP of Human Resources for ISR explains it this way, “We look for people who are highly adaptive to changing environments, strong on computer and math skills and good in production planning and project management. We hire for attitude, work ethic and basic skill sets with application ability.”

Advanced manufacturing is accomplished by making extensive use of computers, high-precision equipment and information technologies integrated with a high-performance “knowledge-based workforce” in a production system capable of furnishing a variety of products in small or large volumes, with both the efficiency of mass production and the flexibility of custom manufacturing in order to respond rapidly to customer demands.

Advanced Manufacturing includes the themes of lean manufacturing, agility and flexibility, e-commerce or digital real-time systems, knowledge-based manufacturing, supply chain management, ISO, Six Sigma, and design for manufacturability, the extended enterprise, quick response manufacturing and collaborative manufacturing. It is the conclusion of the manufacturers that whatever system or combination of systems used, it is imperative for overall improvement to continuously take place rather than a limited prescription for any specific practice. Although the responses vary by industry sector, size of company, public versus private ownership and a number of other factors, it was agreed that no company will be exempt from the need to improve, using best practices and a “knowledge-based workforce.”

In response to industry need, Spokane Community College has increased and strengthened its technical education format. The SCC program includes an Applied Education component that requires students to learn basic skills needed to enter the workforce. The following table shows the programs and certificate/degree options currently available in the SCC Technical Education department.

	<b>Apprentice/ Journeyman</b>	<b>Certificate</b>	<b>Associate in Applied Science</b>
Apprenticeship & Journeyman Training Center	X		
Architecture and Engineering		X	X
Automotive	X	X	
Aviation		X	X
Biomedical Equipment			X
Carpentry and Cabinetry		X	X
CNC Machining Technology			X
Cosmetology		X	X
Electrical Maintenance and Automation		X	X
Electronics Engineering			X
Heating, Ventilation, Air Conditioning, and Refrigeration			X
Heavy Equipment			X
Hydraulic and Pneumatic Automation Technology			X
Machine Shop			X
Professional Truck Driver Training		X	
Public Safety (Fire Science and Corrections)			X
Welding and Fabrication		X	

Source: Spokane Community College

## **Four Basic Characteristics of an Advanced Manufacturing Workforce**

- 1. Workforce Attitude** – This refers to what the workforce believes and values. It speaks to their concern and desire with regard to their psychological attitude toward things such as adaptability, commitment, flexibility, initiative, life-long-learning, risk-taking and teamwork.
- 2. Workforce Behavior** – This refers to the accepted normal and specific actions the workforce takes and does with regard to agility, ambiguity and change, brainstorming, cooperation, diligence, teamwork and work intensity.
- 3. Workforce Capability** – This represents the individual and collective mix of competencies, experience, knowledge and skills that can be actually applied to what the workforce is expected to produce.
- 4. Leadership Practices** – These are the practices which are in place to drive and influence all organizational human capital productivity such as how the workforce is selected and developed, how information is developed and shared, how leadership is developed and shared, how creativity and innovation is encouraged, how decisions are made, how work is organized and how individuals and teams are rewarded.

Inside the business community, advanced manufacturing workforce development consists of a particular business organization quickly and continually upgrading the skills of their present workforce to meet business demands to produce a quality product, quickly and in the most cost effective manner. It also consists of providing the education and training community, the “needs and criteria” required by business, to prepare knowledge workers for expansion or replacement of the current workforce.

## **Manufacturing Workforce**

In the context of this study, manufacturing will need the help of the federal, state and local governments, along with public and private education and training resources to meet these challenges, particularly in the areas of creating a more technical workforce.

According to the U.S. Bureau of Labor Statistics, in 1950, 60 percent of manufacturing jobs were unskilled; today, only 20 percent are unskilled and, by 2007, the number is expected to shrink to 15 percent. According to a recent U.S. Census Bureau survey, more than half of the responding companies cited the “need for better education and training” as one of the most significant barriers to the adoption of new technologies.

### **Three Basic Skills Required in the Advanced Manufacturing Workforce**

- 1. Generic or Core Competency Skills** – These are the transferable skills that can be used across many different occupational groups or clusters. These skills cover areas such as reading, written and oral communication, basic business math, problem solving, critical thinking or reasoning, interpersonal and team skills, customer relations, basic quality practices and basic work attitude and discipline skills.
- 2. Technical or Occupational Skills** – These are specific technical skills needed to work within a given occupational group some of which may be transferable to other related occupations. These can be covered in apprenticeship programs or occupational standards produced by a specific industry.
- 3. Job Specific Skills** – These skills include functional skills such as operating a specific piece of equipment, organizational specific functions such as quality standards, or in-company team structure or process related skills.

Management consultant Anand Sharma, CEO of Durham, N.C.–based TBM Consulting Group, sees a role for government in encouraging worker education and training. “They can provide incentives. They can provide the right environment and encourage companies to invest more in their people,” says Sharma. “The only appreciating asset a corporation has is its people. They continually learn. Everything else depreciates – your buildings, your products, your equipment and your technology.”

The Spokane manufacturing community felt that more effort should be directed at developing a seamless education system. A seamless workforce development system is a system of education, training and workforce preparation for all learners, tied to the needs of a competitive economic workplace.

Workforce development starts in the K-12 system and continues on through higher education. It is normally built through articulation agreements. A seamless system can encompass not only public and private traditional education schools, but also private technical training centers. The essence of a seamless system is to ensure the individual is fully prepared for the next level of learning – college or a job! No individual is passed on who will require retraining in basic core competency skills.

Core competencies are those “essential characteristics” needed for on-the-job success. Core competencies are powerful enablers, not magic result producers.

Nevertheless, the evidence suggests that a competency-based advanced manufacturing workforce development system is one of the best ways to leverage and provide an advantage to the Spokane regional worker in the next decade and beyond.

Core competencies can be as basic as possessing a solid work ethic to as difficult as being creative in quickly solving work related problems as they occur. “The schools need to teach core competencies to create good learners, and then business can teach the technical skills needed for our industry,” observed Rick Pickle, Haskins Steel.

## **Knowledge-based Workforce**

The jobs of today and the jobs of tomorrow will require workers at all levels within the manufacturing sector (boardroom to storeroom) to be engaged in lifelong learning. Readiness for training and retraining “the ability to learn” will be an essential core competency requirement for all workers. Young workers, as well as seasoned workers, will frequently be called upon to return to the classroom or learn new skills on the job.

Many workers in recent years have found that they lack the basic skills in reading, math and the principles of science that support their efforts to acquire new skills. Both the skill panel and the manufacturers interviewed backed this point, and they cited many situations where “applied” math and science skills (a strong capability in math and science with the added dimension of application to actual problem solving) along with solid communication skills (the ability to read/interpret instructions and write coherent findings/reports) are requirements to accomplish tasks by a knowledge-based workforce. See attachment #3 for examples of how applied learning is used in advanced manufacturing.

A knowledge worker is anyone who works for a living at the tasks of developing or using knowledge. For example, a knowledge worker might be someone who works at any of the tasks of planning, acquiring, searching, analyzing, organizing, storing, programming, distributing, marketing, testing or otherwise contributing to the transformation and commerce of information and those (often the same people) who work at using their knowledge to actually produce a product or service. A knowledge worker is a problem solver who can handle autonomy and understands their responsibility to accomplish an objective, often without direct supervision. A knowledge worker understands the fact that their “earning power” is enhanced by and comes from their “learning power.”

Many studies about workforce development have come to a conclusion that is both simple and profound. A primary responsibility of the public/private schools must be to provide and teach “core competencies” to all students. Other goals, whatever their merits, must come second. Showing up at school on time and ready to be engaged in the learning process is the same core competency required in showing up to work on time ready to contribute to the success of the organization. Also, those who enter the workforce after earning a high school diploma and some post-secondary training need virtually the same core competencies as those going on to college, but have less opportunity to acquire them. Therefore, a high priority must be placed on teaching core competencies especially in the junior high and high school years.

It is also acknowledged that students may vary widely in capability and in learning styles, that no one curriculum will satisfy the needs of all, but that the goal for all must be the same: to develop a set of basic skills and competencies needed for lifelong learning. These core competencies include skills in reading, writing, computation, reasoning and problem solving that enable a person to “apply” what he or she already knows to a new situation.

This study came to the same conclusion based on extensive interviews with manufacturers in the Spokane Region. However, it was also found the need for core competency skills extends beyond the student in high school to include college graduates and adults having to make career changes at a later point in their life.

Competency-based systems require significant investment in people, but the potential payoff in performance is worth it. A versatile, skillful worker, performing additional varied functions, better increases individual and group productivity and provides a quantum leap in effectiveness and efficiency. “People” are the key in competency-based systems. Well trained individuals can best apply competencies to produce quality outputs. These outputs yield the kind of results which can keep the advanced manufacturing sector viable. The SCANS core competency list, along with the Twelve Skills for Self-reliance, are provided as a suggested path to be embedded into both public and private training and education initiatives as we move forward.

### **Job Description—Advanced Manufacturing Environment**

The following is a “typical” job description/requirement for an individual working in an Advanced Manufacturing environment.

- Must be able to generate, follow and explain detailed operating procedures (i.e., assembly instructions, inspection procedures, quality and regulatory standards).

- Must be able to analyze and correct complex product and/or process issues using independent judgment.
- Must be able to plan, organize, and implement multiple concurrent tasks.
- Must have and apply excellent analytical/math skills.
- Must have and apply excellent reasoning and problem solving skills.
- Must have and apply excellent interpersonal and communication skills.
- Must have the ability to work effectively in a fast paced environment, which will at times require working extended hours to complete a project.
- Must have the ability to work with and assemble small objects and component parts.
- Must have the ability to operate small hand tools, inspection equipment, and common office/computer equipment.
- Must have the ability to respond to ambiguity and change.
- Must have the ability to continually learn.

In the end, only the smartest companies will survive in the global environment. No matter how they build their strategic advantage, advanced manufacturers will need to differentiate themselves by speed to market, flexibility, quality and economy. These qualities all come from a “talented and competent workforce” that can implement better processes than their competitors.

## **CONCLUSION – LOOKING FORWARD**

In the Spokane region, several hundred current and/or future job openings were cited by the companies surveyed in April, May and June of 2005. Additionally, several companies surveyed stated they were turning down some contracts because they can’t find qualified workers, which amounted to millions of dollars of lost revenue to the Region’s economy. As a community we need to convince students in high school and college that manufacturing is a career field that has great potential. As a community, we need to understand that many high paying manufacturing jobs will be staying in the U.S. and in our region.

The message is clear. Those seeking employment in the “high-skill, high-wage” jobs of today and the future need to be “workforce ready” for “knowledge-based careers.” This statement is true whether exiting high school, post-secondary education, a university or transitioning from a sunset to a sunrise job. Additionally, for those individuals entering the advanced manufacturing “knowledge-based career” sector, “workforce-ready” and “college-ready” have now become virtually one and the same.

As a region we must build a learning covenant between business, labor, education, government and the individual. We must all understand, engage, and establish a stronger foundation and connection between all segments and stakeholders with regard to developing the manufacturing workforce required to meet the employment needs of both business and the individual.

## **RECOMMENDATIONS**

### **1. Address the lack of “applied” math, science and language skills.**

A concerted effort in partnership with business, labor and education should be undertaken to reemphasize and teach more “applied” math, science and language skills in the present curriculum of the K–20 educational systems.

Applied math, science and language skills refer to the need to “know and apply mathematics, science and language to practical applications in the workplace.” The message from the business community as well as college professors is clear. Individuals do not need more math, science and language curriculum. Rather, they need to be able to accomplish “applied” math, science and language skills in the context of work and college level courses.

Firmly embed the “applied courses” currently being offered by the community college into the Region’s high schools and articulate these courses forward into the community college and four-year college programs. This would offer a fast track for individuals desiring post secondary training in the business, trades (apprenticeship programs) and technical/engineering professions. These courses could be placed in the Spokane Skills Center and/or area high schools at a relatively low cost and would benefit both college and work bound students.

It is recommended that a quick response team be set up between the community college and regional high school districts to explore the feasibility of this recommendation and move this process along as quickly as possible.

## **2. Address the lack of “core competencies” in the workforce.**

This is the number one request of the manufacturing community. The following are examples of skills the business community believes are important in today’s workplace.

- Knowing how to learn throughout life
- Reading, writing and computation skills
- Listening and oral/written communication skills
- Creative thinking and problem solving skills
- Self-esteem, self-motivation, goal setting and personal career development skills
- Interpersonal skills
- Negotiation and team work skills

To be most effective core-competency training should start at a young age and be conducted over many formative years of an individual’s life. With this said, there exists today a need to bring many people up to the basic level of competency required in the high-skills, high-wage jobs available in the manufacturing sector. “Core competency training must include incumbent workers as much as emerging and new workers,” commented Beth Thew, Executive Director of the Spokane Area Labor Council.

In an effort to “jump start” core competency training, the Region needs to develop or use current core competency measurement/training systems in the form of some type of “Core Competency Certificate Program.” This effort should be directed at the high school graduate and the unemployed and/or incumbent worker. The goal would be to quickly teach/inform individuals currently seeking employment the basic competencies required to get and hold a sunrise 21<sup>st</sup> Century job.

This program along with aptitude, drug testing and a background check would go a long way toward helping individuals become employable in the more skilled and higher paying jobs. In addition, this effort would specifically help the small to medium size business sector which normally does not have the expertise or the training dollars to conduct this type of training and screening process.

The State Workforce Board has selected the Spokane business community through the Spokane Chamber as a test site for the newly released “Work Readiness Credential Project” sponsored by the Center for Workforce Preparation at the U.S. Chamber of Commerce.

### **Work Readiness Credential Measures**

1. Speaks so others can understand
2. Listens actively
3. Reads with understanding
4. Observes critically
5. Cooperates with others
6. Resolves conflict and negotiates
7. Uses math to solve problems
8. Solves problems and makes decisions
9. Takes responsibility for learning
10. Uses information and communications technology

Further, the Spokane Chamber's Manufacturers' Roundtable is working with the Center for Manufacturing Excellence in Seattle to introduce a "Certificate for Basic Manufacturing."

### **Program Content for the Certificate in Basic Manufacturing**

- Introduction to Manufacturing
- Sketching, Drawing & Print Reading
- Introduction to Inventory/Production Control
- Health & Safety
- Computer Aided Design, Technology in Manufacturing and Quality

An additional approach is to make information available to the general public through the media and on-line, which clearly states what core competencies the business community sees as important toward being hired for 21<sup>st</sup> Century jobs.

### **3. Make available an ongoing LEAN certification program:**

Bring into the Community Colleges of Spokane a “Lean Manufacturing Certification Program.” After core competency training, this was the second most sought after training need cited by manufacturers. Michael Schneider of Washington Manufacturing Services and Mike Mires, Dean of Instruction for Technical Education, Spokane Community College have agreed to quickly make this program available. It is suggested the program be validated for content and relevance by the newly formed Spokane region Lean Management Consortium. It is also suggested that the Lean Management Consortium actively promote training events which bring a broad avenue of learning on this subject to the community.

### **4. Update, revitalize and promote machinists’ training programs:**

Working closely with business and labor, reestablish and update the machinist training programs at the Spokane Skills Center and in the Community Colleges of Spokane.

Still, there is now a shortage of machinists in the Spokane Region. Companies are turning down business because they do not have the personnel to support added revenue, even with overtime hours.

Spokane Community College has recently acquired updated equipment. This equipment along with assistance from the business/manufacturing sector should be quickly set up, curriculum updated and a region wide awareness program initiated to train machinists to quickly fill the gap. It is estimated that, with the newer equipment and an updated curriculum, a class size of 24 individuals could be supported.

**Note:** Progress has been made on machinist training during the time in which the Skill Panel has been active. This information from SCC is provided as an update.

According to Mike Mires, Dean at SCC, “In recent years there has been an ever increasing demand for Machinists and Computer Numerical Control (CNC) operators in the Spokane area. In response to that demand the Spokane Community College has made a concerted effort to fill the shortage.”

In order to remain technologically current, the Tech-Ed department spent approximately \$100,000 in 2005 to upgrade the equipment in the machining labs. With the addition of the new equipment, the CNC area boasts five Machining Centers, three Turning Centers and 20 seats of Virtual Gibbs. The conventional machining lab has

received seven lathes, five Bridgeport Mills, and three grinders. Lathes and mills of 1950's vintage have been replaced.

In addition to the two-year AAS Degree offered during the day, a one-year certificate in both CNC and Conventional machining will be available in the fall of 2006. The certificate will only be available as an evening class. The day program can handle up to 40 full-time students. There are currently 34 students enrolled. There are 14 students enrolled in the night program. In the fall of 2006 the certificate capacity will be 36 students. Surveys of graduates indicate that over 75 percent are working locally, with starting wages ranging from \$10.00 to \$15.00 per hour.

While it is recognized that shortages come and go in this career, quick response training for machinists will have a positive impact on jobs and the Region's economy. It is recommended that a quick response team be set up and this effort be used as a learning experience by the community on how to respond to the ever changing needs/demands of the job market. This career is also an excellent example of why basic applied math is important to job success in a high-skills, high-wage career.

#### **5. Awareness of manufacturing jobs is key:**

Establish a training day, facilitated by business and labor, for superintendents, principals, teachers and counselors in the Spokane regional K-12 school districts, explaining the many good paying jobs "and the prerequisites required" to develop/acquire a career in the manufacturing and the trades sector. Brian Benzel, Ph.D., Superintendent of Spokane Public Schools sees the need for a long range commitment, "The community should put more emphasis on career paths and building student awareness of what it takes to be prepared for a career in manufacturing."

In parallel, develop a public relations campaign inside and outside the education system promoting manufacturing/trades careers. The public relations campaign for manufacturing careers can be accomplished at a relatively low cost using the material already produced by Shoreline Community College for their Basic Manufacturing Certificate Program. In the meantime, see what we mean by going to <http://www.cme-scc.com>.

Additionally, money earmarked at the state level for promoting high skills/high wage careers can/should be targeted at advancing manufacturing careers. Develop a media package (information/articles) to help bring attention to the high-skills and high-wage jobs associated with the manufacturing sector of the Spokane Region.

## POST SCRIPT

A Manufacturers' Workforce Forum was held on September 29, 2005 to seek further input on the five recommendations from the AMWI Skill Panel. Eighty participants from business, labor and education were briefed on the AMWI Report and on the Workforce Training and Education Coordinating Board's support for skill panels and for the Work Readiness Credential. Participants then discussed the recommendations in breakout groups facilitated to formulate priorities for action and for inclusion in the Phase II AMWI Skill Panel Work Plan. After reporting from each breakout group, the eighty participants "voted" to arrive at a consensus.

This is a summary of their priorities for action:

Overall Theme – Change the cultural perspective of manufacturing.

- Define audiences, messages and media to create an understanding of high skill, high wage manufacturing careers. Use testimonials by students, video tours of companies and a CD to distribute broadly in junior and senior high schools to reach the youth market. Use more traditional media, including billboards to reach the parent/adult market. (AMWI recommendation #5)
- Develop an improved and expanded regional labor market Information system to gather and report accurate current and forecast information on jobs in this region. (AMWI recommendation #5)
- Get manufacturers into schools to demonstrate practical applications of math, science and languages and to promote manufacturing careers. Get high school counselors into manufacturing companies to create awareness of the industry and available careers. Culminate this into a manufacturers' "career day". (AMWI recommendation #1 and #5)
- Influence legislation to change curriculum toward more applied learning and to increase funding for costly, high-demand technical programs. (AMWI recommendation #1 and #3)
- New manufacturing concepts need to be taught in addition to lean management. Industry can and is willing to fund training programs. (AMWI recommendation #4)

# ADDENDUM

## Addendum #1 – SURVEY FINDINGS

As a result of the many one-on-one interviews, a survey was generated to verify our findings. The questions were developed using the input gathered by direct comments made by key management individuals and front-line workers and by observation of actual manufacturing processes.

Comments from questions 10, 11, 12, 13, and 15 are contained in other parts of this report; however, we have provided the number of “yes” and “no” responses to questions 1 thru 9 and 15 for your review. As you will observe, the “yes” responses heavily support the findings of the report. Ingbreetsen Consulting LLC believes the overall findings would apply to most, if not all, manufacturing regions of the U.S.

### MANUFACTURERS’ PERSPECTIVES

**Question 1:** Manufacturers are finding it difficult to attract young people to the industry.

Yes – 81%                      No – 19%

**Question 2:** The average age of the workforce in most manufacturing companies is in the mid forties.

Yes – 74%                      No – 26%

**Question 3:** Companies are hiring but finding it difficult to find “employable” people.

Yes – 89%                      No – 11%

**Question 4:** Basic “applied or contextual” math, science and language skills are often missing in applicants; a requirement needed to do measurements, read and interpret procedures and communicate results within processes.

Yes – 93%                      No – 7%

**Question 5:** Real world “applied math, science and language skills” need to be embedded into the K -16 education system to help prepare people for the workplace.

Yes – 100%                      No – 0%

**Question 6:** Manufacturers need people with solid core competencies (good attitude, work ethic, the ability to solve problems, interpersonal/team skills) they can then teach many or most job specific skills.

Yes – 96%                      No – 4%

**Question 7:** Manufacturers need people who can deal with change, are flexible and possess the ability to continually learn new processes and equipment.

Yes – 100%                      No – 0%

**Question 8:** Manufacturers want to hire and are looking for people who want to be engaged and creative in productivity efforts and growing the business.

Yes – 100%                      No – 0%

**Question 9:** Business would like to know where and what technical or occupational skills the public and private education/training sector can provide. Would a directory of education/training be of interest to your company?

Yes – 85%                      No – 15%

**Question 10:** The education/training community wants a better or clearer direction from business as to what specific courses, apprenticeships, and/or certificate programs they need and would support. Please list some specific needs you have and would support, if provided.

Yes – 63%                      No – 37%

**Question 11:** There are companies in the region who could possibly offer training in specific advanced manufacturing techniques/processes such as LEAN, Six Sigma, supply chain management and design for manufacturability. Would this be of interest to your company? If so, in what specific area are you interested?

Yes – 63%                      No – 37%

**Question 12:** There are manufacturing related programs currently offered by the Washington State Community College System that could be brought into the Spokane Community College System if there was a need and support for them. Does this interest you?

Yes – 78%                      No – 22%

**Question 13:** Small manufacturers do not have training departments and need a workforce training system/program they could draw employable people from. Does this interest you? If so, what training/screening would you like from this process?

Yes – 63%                      No – 37%

**Question 14:** Are you now or in the near future hiring?

Yes – 81%                      No – 19%

**Question 15:** Additional Concerns and Comments

“This kind of concern stretches beyond manufacturing and into skilled crafts across the board. In the construction industry, this is an extremely acute problem as well. In education, kids who are bound toward skill careers seem to be left behind and forgotten. Being a journeyman anything used to be considered a good, life-long career path. Now those kids are looked at as losers and those types of jobs are looked at as lesser positions. We all aren’t going to be computer programmers and I think educators need to do a better job of building the esteem of those whose paths ultimately take them into the trades. We need to do a better job of encouraging youth into skill professions.”

“K-12 schools need to promote vocational education as a *valued* path of education, providing basic skills for entry level workers.”

“Young workers want more prestige type jobs. If skills are not glamorous, some workers underestimate a job’s potential.”

## **Addendum # 2 - ONSITE VISITS**

**Career Path Services** - Bill Marchioro, Executive Director

**Eastern Washington University** - Harm-Jan Steenhuis, Asst. Professor

**Washington State Employment Security Department** - Jeff Zahir, Regional Labor Economist

**Esprit Technologies** – Cathleen Brown and Janice Green

**Gonzaga University** – Phil Appel, Asst. Professor Mechanical Engineers

**Humanix Personnel Services** - Nancy Nelson, Vice President

**ITT Technical Institute** - Ray Gibson

**Community Colleges of Spokane Institute for Extended Learning** - Joanne Murcar, Ph.D., Interim Dean

**Manpower** -Thomas Droz, Area Manager

**New Horizons Computer Learning Center** - David Schoengold, G.M. and Owner

**Spokane Community Colleges** - Steve Hanson, President and Joe Dunlap Ph.D.

**Spokane Area Economic Development Council** - Theresa Sanders, Executive Vice President

**Spokane Public Schools** - Brian Benzel, Ph.D., Superintendent

**Spokane Skills Center** – Don Howell, Director

**Washington Manufacturing Services** - Patric Sazama, Manager and Mike Schneider

**Volt Services Group** - Wendy Hahn

**WorkSource Spokane** - Don Ott, Administrator and Frankie Arteaga, Manager

**Advanced Input Systems** - Mike Johnson, Director of Operations

**Altek, Inc.** - Michael Marzetta, CEO

**ASC Machine Tools Inc.** - Jim Dunn, Vice President of Manufacturing Operations

**Cascade Windows** - Pat Collins, Vice President of Operations

**Columbia Lighting Inc.** - Jesse Riley, Human Resource Director

**Flexcell** - Debra Williams, Human Resource Manager

**Haskins Steel Co. Inc.** - T. Ray Looper General Manager

**Honeywell Electronic Materials**, Al Cutrone, Plant Operations Manager

**Huntwood Industries** - Randy Quintero, Director of Human Resources

**Itronix** - Cliff Allen, Sr. Vice President of Operations

**Itron, Inc.** - Debbie Curless, Vice President of Human Resources

**Isothermal Systems Research** - Hugh Severs, Vice President of Human Resources  
**Lloyd Industries, Inc.** - John Crow, President  
**Lyn-Tron**, Dominic Borland  
**MacKay Manufacturing Inc.** - Michael MacKay, President  
**Monaco Industries** - Buddy McWatters, Operations Manager  
**Multifab Inc.** - Mike Deale, Plant Manager  
**Novation Inc.** - Fred LeFrieck, President  
**Nova Services** - Linda Brennan, Executive Director  
**Pearson Packaging Systems** - Michael Senske, President & CEO  
**Proto Technologies, Inc.** - Rory Nay, President and Irene Gonzales, Customer Service  
**Purcell Systems** - Tonya Sherman, Human Resources Director  
**Pyrotek Inc.** - Bridgette Brazda, Human Resources Manager  
**Schweitzer Engineering Laboratories** - Susan Fagan, Director of Public Affairs  
**Tate Technology, Inc.** - Lee Tate, President  
**Triumph Composite Systems** – Mary Lou Thomas, General Manager  
**Wagstaff, Inc.** - Paul May, COO & Executive Vice President

## **Quotes from interviews conducted with manufacturers:**

“We want people who think it’s really cool to make things.”

“We need folks who can read and interpret documentation.”

“The ability to continuously learn new things is very important.”

“I need people who get engaged and really participate in the manufacturing process.”

“We want people who take personal responsibility seriously.”

“We set a very high bar for professional behavior.”

“I look for individuals who want to join others in creative problem solving.”

“I need people who aspire to learn and do excellent work.”

“We expect our folks to take charge of their own careers.”

“We need individuals with high personal integrity and a commitment to be engaged in their job.”

“We need people to be honest during their interview process.” (i.e., are not just looking for a job for the short term, but truly interested in working for a growing company)

“All our employees must pass a drug test and not be a felon.” (Voiced by many companies)

“We must have folks who can do applied math.” (Common to all companies)

“We only hire people who have a great attitude.” (Common to most companies)

“We need people who can work well with others in a team or on a project.”

“We need people who can learn several jobs and change jobs within the manufacturing environment.”

“We need life-long learners and people who can deal with continual change.”

“We need people who can think for themselves, make a decision and fix a problem.”

“We look for people with a great attitude, are reliable and can make good quality decisions.”

“We need people who can learn, follow instructions, want to contribute and display a sense of urgency.”

“Our employees are required to make measurements using several types of measurement devices and fill out paperwork in a proper and clear manner.”

“Being able to work in teams with others is important.”

“Good interpersonal skills and reliability are a must.”

“General vocational skills need to be offered and promoted.”

“Students need to hear more about what High Tech manufacturing is and that it’s a cool career path.”

“We need entry level employees with a work ethic and enthusiasm for their job.”

“We need to encourage more young people to work in manufacturing – we can do a lot of training if they have a good attitude to work.”

“Good communications skills, written and verbal, are required in manufacturing.”

“We are often faced with difficulties related to individuals who do not possess the ability or desire to work regularly on-time, continue to work with minimal direction and depart work on-time.”

**Quotes from interviews conducted with educators/trainers:**

“Most students stay away from math and science classes, it’s hard and it messes up their grade point average.”

“Our curriculum does not call for applied/contextual math and science skills.”

“Students don’t see a future in manufacturing.”

“Most students don’t feel comfortable doing problem-solving exercises.”

“It is difficult to get students to believe the importance of developing their soft skills.”

“Students don’t think attitude is that important to getting or keeping a job.”

“Most students think that teaching problem-solving and analytical skills are just to make learning difficult and will not be used on the job.”

“Many students can’t read well so they struggle in most class work from the fourth grade and on – often their lack of reading skills prevents learning and they drop out of school.”

### **Addendum # 3**

## **“APPLIED/CONTEXTUAL” ACADEMIC SKILLS REQUIRED IN ADVANCED MANUFACTURING**

Mathematic skills required in advanced manufacturing include:

- the ability to add, subtract, multiply and divide whole numbers, mixed numbers, fractions and decimals mentally and in writing
- an ability to understand and apply basic and advanced
  - o methods of measurements
  - o properties of functions and algebra
  - o concepts of geometry, data analysis and distributions, probabilities and statistics
- the ability to use a variety of mathematical approaches and strategies within a problem solving, data collection and measuring context.
- the ability to use a calculator to add, subtract, multiply, divide whole and mixed numbers, decimals and calculate percentages, ratios, and square roots.
- the ability to apply mathematic skills to develop charts and graphs which can best depict a given situation, i.e., production flow, percent on-time, quality rates, machine output, etc.

Science skills required in advanced manufacturing include:

- Knowledge and understanding of
  - o the principles of electrical forces such as basic power and static electricity.
  - o the forces of motion.
  - o the nature of material such as chemical reactions and how they react to one another.
  - o the environmental impact of solid, liquid and gaseous materials.
  - o the relationship of changes in properties such as pressure, temperature and volume, and/or states of material such as liquids, gases or solids.
  - o the use of common laboratory equipment and procedures.

Language skills required in advanced manufacturing include:

- Demonstrated competence
  - o in locating, understanding and interpreting written information.
  - o in the ability to apply reading skills to both short and longer complex directions and procedures, translating the reading into action.

- o in using written material to gain understanding of ideas or concepts and then be able to apply that knowledge to new concepts or processes.
- o in using different sources of information including the computer and various forms of written material such as technical manuals, specifications, blue prints, diagrams, procedures, etc.
- o in the ability to write memos, procedures, reports and letters using correct English, spelling, grammar and punctuation.
- o to make formal and informal presentations using data to support statements and media technology to support the type of presentation.
- o with good listening and speaking skills being aware of both verbal and nonverbal messages so others can best understand the required communication.
- o the ability to convey points clearly, quickly and concisely to others.
- o the ability to provide both written and oral information related to getting self and others to make good decisions and take a course of action which attains the desired outcome.
- o the ability to clarify information and data by listening and asking questions to promote understanding, and making sure others involved in a procedure/project also are clear.
- o the ability to use the phone and/or e-mail to quickly and professionally communicate ideas, concepts and information.

Additional skills required in advanced manufacturing include:

- A demonstrated ability to;
  - o adapt by being able to change behavior, approach and work habits/methods to other people or to changing situations and be receptive to new ideas, information, processes, technology or strategies required to achieve desired goals or objectives.
  - o interact with others in ways that are courteous, friendly and tactful and that demonstrate respect for individual and cultural differences and for the attitudes, beliefs and feelings of others.
  - o make sound decisions and judgments, which consider relevant facts, information, risks, benefits and the short- and long-term consequences of alternatives.
  - o use information and communication technology, selecting and accessing necessary information, data and communications related technology such as basic personal computers, telecommunications equipment, Internet, electronic calculators, voice mail, email, fax machines and copying equipment to accomplish work related activities.
  - o Apply acquired knowledge to help identify own work and career interests, strengths and skills, and actively manage one's own learning and development.

**Note:** The above is not all inclusive, but is meant to provide examples and encourage the teaching of applied/contextual academic skills so individuals are workplace ready regardless of their level of education (K-12, post secondary, college graduate).

## **Addendum #4 - CREDITS**

### **AMWI Skill Panel Members**

Special thanks to the AMWI Skill Panel members for their direction, guidance and active involvement in this on-going process.

John Baumhofer, Spokane Area Workforce Development Council

Brian Benzel, Ph.D., Spokane Public Schools

Dave Carlson, Kaiser Aluminum (USWA 338)

Craig Dias, Haskins Steel

Joe Dunlap, Community Colleges of Spokane

Rich Hadley, Spokane Regional Chamber of Commerce

Stan Key, Spokane Area Economic Development Council

Jennifer MacKay, Triumph Composite Systems (SEIU)

Mike Marzetta, Altek

Mike Mires, Spokane Community College

Joanne Murcar, Ph.D., Community Colleges of Spokane Institute for Extended Learning

Michael Senske, Pearson Packaging Systems

Lee Tate, Tate Technologies, Inc.

Beth Thew, Spokane Area Labor Council

Mary Lou Thomas, Triumph Composite Systems

Lisa White, Spokane Public Schools

Wayne Williams, Telect, Inc.

Roger Ingbretsen, Ingbretsen Consulting LLC

This report was prepared with funds made available by the Washington State Workforce Training and Education Coordinating Board.