



# WELCOME

Closing the Manufacturing Skills Gap Project  
Work Session: Welders & Machinists

October 26, 2011



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**AGENDA**

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Time	What
7:30-8:00am (30min)	<b>Continental Breakfast &amp; Networking</b>
8:00-8:15am (15min)	<b>Welcome</b>
8:15-8:30am (15min)	<b>Manufacturing Primer</b> Laying a foundation for discussion
8:30-9:15am (45min)	<b>Table Discussion: Skills Development</b> Facilitated discussion about the skills required for a job or career in manufacturing, in particular as a welder or machinist.  <ol style="list-style-type: none"> <li>1. Brainstorm who, where and how these skills are being introduced and developed in the talent pool.</li> <li>2. Share who you are partnering or working with currently to develop these skills.</li> <li>3. Brainstorm if there are other ideas we should explore or expand.</li> <li>4. Select the top 5 ideas or resources you have identified as priorities for the <i>Closing the MFG Skills Gap</i> project to advance</li> </ol>
9:15-9:45am (30min)	<b>Table Reports:</b> Share the top 5 resources you have identified as priorities to focus on
9:45-10:00am (15min)	<b>Prioritization Exercise</b> Participants cast 5 votes for the top priorities to focus on as we advance the Closing the Manufacturing Skills Gap Project.
10:00-10:15am	<b>Break</b>
10:15-10:45am (30min)	<b>Parallel Table Discussion: Promotion</b> Facilitated discussion about how best to promote jobs/careers as well as outlets for development to the current workforce and those in the talent pipeline.  <ol style="list-style-type: none"> <li>1. Brainstorm who, where and how we are reaching those currently unemployed, underemployed and disenfranchised workers with development and job opportunities?</li> <li>2. Brainstorm who, where and how we could promote the development and pursuit of careers in manufacturing, welding and machining to parents, teachers, counselors, students, the public, etc?</li> <li>3. Brainstorm if there are other ideas we should explore or expand.</li> <li>4. Select the top 5 ideas or resources your table has identified as priorities for advancement in the <i>Closing the MFG Skills Gap Project</i>.</li> </ol>
10:45-11:15am (30min)	<b>Table Reports:</b> Share the top 5 ideas you have selected as priorities to focus on
11:15-11:30am (15min)	<b>Prioritization Exercise</b> Participants cast 5 votes for the top priorities to focus on as we advance the Closing the Manufacturing Skills Gap Project.
11:30-11:45am (15min)	<b>Next Steps</b>
11:45am – Noon (15min)	<b>Closing &amp; Thank You</b>
Noon – 1:00pm	<b>Grab a box lunch to go, or grab a seat</b>

**Session Support Document:**

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**CLOSING THE MFG SKILLS GAP PROJECT**  
**First Focus: Welders and Machinists**

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**Project Partners:** MMAC, Waukesha County Business Alliance, Milwaukee 7  
**Project Hosts:** Tim Sheehy and Tim Sullivan, MMAC; Suzanne Kelly, WCBA  
**Project Contact:** Shelley Jurewicz, MMAC/M7, [sjurewicz@mmac.org](mailto:sjurewicz@mmac.org), 414.287.4143

**Project Description:** A collaborative effort to put the Milwaukee Region in the best position to grow a skilled manufacturing workforce

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**Project Kick-Off Session:**

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**When:** Wednesday, October 26, 7:30am-Noon  
**Where:** Caterpillar Inc. | 6744 S. Howell Avenue | Oak Creek, Wisconsin 53154  
**Session Sponsors:** Caterpillar and Kolb & Co.

**Session Focus:**

Address manufacturers’ employment needs with a focus on welders and machinists

**Session Goal:**

To receive direct input from manufacturers, educators, workforce development, community leaders and others, on how and where to proceed in closing the skills gap and pipeline of **welders** and **machinists**

**Session Outcomes:**

- Validate the fundamental skills required
- Identify the resources for education, training & development, and best practices and ideas for skills development
- Prioritize which resources to focus on for greatest impact
- Prioritize which avenues to market manufacturing jobs, careers and skills development

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**FUNDAMENTAL SKILLS REQUIRED FOR EMPLOYMENT OR PURSUIT OF A MANUFACTURING CAREER:  
Help Wanted: Skilled Welders and Machinists**

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Deloitte and The Manufacturing Institute released a report in October, 2011 that estimates there are upwards of 600,000 manufacturing skilled positions currently open in the U.S.

Factors that are putting a stress on the talent pipeline include a retiring workforce, a talent pool with low interest in manufacturing, and a lack of basic employability skills. There are currently 5,816 open production positions in the Milwaukee Region with an unemployment rate of 8.2%. Comparatively Milwaukee County is at 9.2%, the State is at 7.3% and national unemployment is at 9.1%. The gap plays out with Manufacturers reporting they are receiving hundreds of applicants for a single position with few too many candidates emerging with the potential requisite qualifications and skills.

Manufacturers are consistent in their skills gap assessment of the current candidate pool. This list of needs identified by participants at the January 2011 Wingspread Conference organized by the Racine County Workforce Development Center is being echoed across the country:

- Lack of Basic Skills – showing up for work (on-time everyday), etc.
- Lack of Essential Skills – critical thinking, problem solving, teamwork, etc.
- Lack of Basic Technical Skills – blueprint reading, measurements, computer, etc.
- Lack of Advance Technical Skills – such as advanced computer and machining skills
- Lack of Experience – no prior or relevant work experience
- Changing Expectations – on behalf of manufacturers, parents and the students and workforce

Welders and machinists are in greatest demand. There are over 12,000 people employed as welders and machinists throughout the Milwaukee Region. There are currently 757 positions opening, with projections reaching 1,860 by 2018.

In the pipeline, MATC, WCTC and Gateway technical colleges, as of June 2011, have 1,222 students enrolled in manufacturing programming for welding and machining.

The *Closing the Manufacturing Skills Gap Project* is putting initial focus on the basic skills or what we are calling employability skills and the basic manufacturing skills for welders and machinists.

To build a common skills platform for this project, manufacturers completed a skills assessment survey in advance of the opening session on October 26, 2011. The following is a high-level survey summary.

**Manufacturing Needs Assessment Survey Results:**

Nineteen employers completed the survey to help verify the fundamental skills required of those seeking employment in manufacturing. The manufacturers ranged in size from fewer than 50 employees to over 1,000.

The survey asked manufacturers to identify which basic skills they required on day one of employment and which they would expect to develop within the first 90 days of employment. The skills were divided into five categories:

1. Employability Skills
2. Pre-Employment Metal Machining Skills
3. Basic Metal Machining Skills
4. Pre-Employment Welding Skills
5. Basic Welding Skills

The lists of skills utilized in the survey were initially defined by Second Chance and confirmed by the session's design team.

The prioritized results that follow provide a window into what employers are expecting from educators and workforce development, and which skills they can look internally to develop.

When manufacturers were asked to identify which skills they would required on day one of employment and which would be expected to develop within the first 90 days of employment, they responded:

<b>1. Employability Skills</b>	<b>No. of Respondents Requiring on Day 1</b>	<b>No. of Respondents Requiring w/i 90 Days</b>
On time at work & meetings	22	0
Reliable & truthful	22	0
Acts professionally & accountable for actions	20	2
Asks questions when needed to perform work accurately	19	3
Maintains a safe work environment	19	3
Reads & understands written & printed material	18	4
Able to read numbers & calculate accurately	18	4
Works well with all people & customers	18	4
Able to read & use measurement tools accurately	16	6
Demonstrates proper safety procedures	16	6
Willing to continuously learn & grow	16	6
Communicates clearly with leads & others	14	8
Manages self & work responsibly	13	9
Accepts feedback to improve	12	10
<b>2. Pre-Employment Machining Skills</b>	<b>No. of Respondents Requiring on Day 1</b>	<b>No. of Respondents Requiring w/i 90 Days</b>
Read a steel rule & combination square set	13	3
Measure with micrometer instruments	13	5
Identify & describe various lines on a blueprint	13	5
Interpret dimensions & tolerance on blueprints	13	5
Identify vertical milling machines & milling machine safety	11	6
Identify Vernier instruments & their application	11	6
Able to identify manufacturing methods & equipment	11	7
Identify metal cutting, drilling & machining equip. & applications	9	9
Identify arrangement of views on a blueprint	9	9
Identify pedestal (bench) grinders & their applications	8	10
Set up & use quality testing X, Y, & Z QA testing equip.	2	14
<b>3. Basic Machining Skills</b>	<b>No. of Respondents Requiring on Day 1</b>	<b>No. of Respondents Requiring w/i 90 Days</b>
Identify motions between tool & work-piece	12	5
Set up & perform a drilling operation in a 4 jaw chuck	8	6
Set up & perform a facing operation in a 3 jaw chuck	8	7
Set up & perform a turning operation between centers	8	8
Set up & perform a boring operation in a collet chuck	7	7
Demonstrate climb & conventional milling on a vertical mill	6	9
Identify & machine carbon steel, stainless and aluminum	6	10

Identify & utilize various types of milling cutters	6	10
Identify chip cutting theory & machineability	6	11
Identify ferrous and non-ferrous metals	5	9
Identify variables for milling cutter speeds & feeds	5	11
Identify setups & adjustments of a vertical milling machine	5	11
Set up & operate a surface grinder	4	11
Identify what affects steel during heat treatment	3	11
Develop a process plan for a part from a blueprint	2	13
<b>4. Pre-Employment Welding Skills</b>	<b>No. of Respondents Requiring on Day 1</b>	<b>No. of Respondents Requiring w/i 90 Days</b>
Operate welding equipment	16	0
Interpret basic elements of a fabrication drawing	14	2
Read a steel rule & combination square set	14	3
Make fillet welds on plain carbon steel	13	1
Interpret welding symbol information	13	2
Identify & describe the basic parts of welding equipment	13	3
Set up for welding operations on plain carbon steel	12	2
Make groove welds on plain carbon steel	11	3
Able to identify proper welding methods for base metals	11	6
Know the different welding terms NDT, DPT, MPT, SMAW etc,	10	5
Perform safety inspections of equipment and accessories	10	8
Interpret dimensions & tolerance on blueprints	9	8
<b>5. Basic Welding Skills</b>	<b>No. of Respondents Requiring on Day 1</b>	<b>No. of Respondents Requiring w/i 90 Days</b>
Works responsively & safely without endangering others	16	0
Understands welding equipment, accessories & nomenclature	14	2
Have a good understanding of weld symbols & wire types	14	2
Gathers the required consumables & tools for the work	11	5
Checks the welding equipment for proper connection & polarity	10	4
Identify different types of joining methods used in industry	9	5
Identify the different types of ferrous & nonferrous materials	8	5
Able to avoid work distortion by following sequences	8	7
Aware of consumable storage & handling	8	8
Able to produce different joining methods	6	7
Able to utilize cranes & forklifts in a safe & effective manner	6	9
Welds defect-free weld joints & negligible weld repair	5	10
Able to identify welding defects & perform necessary repair	5	11

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## **PUBLIC PERCEPTION OF MANUFACTURING**

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Deloitte, in partnership with the Manufacturing Institute, conducted its 2011 Annual Index – the third on the public perception of manufacturing. Highlights include:

- In 2010, the number of manufacturing jobs in the U.S. grew 1.2%, the first increase since 1997.
- Americans generally hold strong views on the importance of manufacturing while they hold negative views about its future.
- Manufacturing job creation tops the list of the type of jobs most welcomed by a community, recognized for its importance to the economy and offering higher wage jobs.
- The manufacturing sector is viewed as fragile and unstable with 55% of respondents believing it is becoming weaker, not stronger.
- 77% of survey respondents fear the loss of domestic manufacturing jobs to other nations contributes to a sense that manufacturing is an unstable long-term career choice.
- Manufacturing is near the bottom of the list of career choices.
- Among 18-24 year olds, manufacturing ranks last among industries in which they would choose to start their careers.

A ManpowerGroup survey earlier this year found the top two factors employers' cited for finding it difficult to fill open positions:

1. Organizational Factors: Candidates looking for more pay than is offered; poor image of business sector/occupation; poor image of co. and/or its culture; undesirable geographical destination
2. Talent Specific Factors: Lack of knowledge of business /academic principles or lack of industry/formal qualifications; lack of hard job skills or technical skills; lack of soft skills or interpersonal/communication skills; lack of experience; don't possess right values and mindset; don't possess right personality and intelligence

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## **WHAT MANUFACTURERS SUPPORT**

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At the December 2010 National Manufacturing Talent Development Roundtable hosted by the Manufacturing Institute, participants laid out a manufacturing talent development road map which includes:

- Application of competency based education (vs. driven by a length of time)
- Launching of the NAM – Manufacturing Skills Certification System (WI is one of 30 states piloting)
- Infusion of technology in education
- Implementation of “Dream it. Do it.” – manufacturing career campaign and online resources

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## **RESOURCES AND PARTNERSHIPS**

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Many around the region are working to address the skills gap and reduce unemployment, such as:

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|------------------------|---|
| • Second Chance        | • WIWorknet                               |
| • Project Lead the Way | • Apprenticeships                         |
| • Teach for America    | • Youth Job Program                       |
| • Dream It. Do It.     | • High School / Manufacturer Partnerships |
| • Milwaukee Succeeds   | • Job Fairs                               |
| • Talent Dividend      | • Boot Camps                              |
| • KnowHow2GoWI         | • Manufacturer Bus Tours                  |
| • WICareerPathways     | • NAM Skills Certification Pilot          |
| • WIJobsCenter         |   |