



REGIONAL EMPLOYMENT BOARD
OF HAMPDEN COUNTY, INC.

Precision Manufacturing Training Project (PMTP)

Business Impacts

Final Report

Introduction

The **Precision Manufacturing Training Project (PMTP)** was a strategic initiative of the Regional Employment Board of Hampden County, Inc. (REB), in collaboration with the following partners, to respond to the skills shortage issue in the precision manufacturing industry in the Pioneer Valley Region:

Companies	Technical High Schools	Community Colleges	Training Providers
Advance Manufacturing	Westfield Vocational Technical	Springfield Technical Community Coll.	MA Career Dev't Institute
Berkshire Industries	Putnam Vocational Technical	Asnuntuck Community College	Smith & Wesson
Peerless Precision	Pathfinder Regional Vocational	Greenfield Community College	
Hoppe Tool	Smith Vocational & Agricultural		
B&E Tool Group	Chicopee Comprehensive		
Tell Tool Inc.			
Mitchell Machine			
WGI, Inc.			

The Precision Manufacturing Training Project had two goals:

Goal 1- Training in Machine Tool Technology for 40 Unemployed/Underemployed Individuals.

Goal 2- Skills Enhancement Training in 40 Training Slots for 60 Incumbent Employees.

This **Final Report** focuses on Business Impacts for **Goal- 2**, and presents findings from a survey of precision manufacturing companies whose employees voluntarily participated in a series of skills enhancement courses during the time period of September 2007-April 2009. The analysis of the findings in the Final Report was intended to provide baseline data and information on the impact of the workforce development intervention on the incumbent employees and the companies.

The REB is confident that the on-going findings from the Business Impact Survey for Goal No. 2 will provide critical business intelligence that will allow for creative and sustainable workforce development programming and interventions that will benefit the incumbent employees, and create cluster-wide innovation and expansion resulting in increased market share on the regional, national and international levels for the precision manufacturing companies in the Pioneer Valley Region.

December 2009

OVERVIEW

The **Final Report on Business Impacts** for Goal No. 2 of the Precision Manufacturing Training Project (PMTTP) presents findings from a workforce development intervention that involved incumbent employees from precision manufacturing companies who **voluntarily** attended industry aligned skills enhancement courses that were conducted after or before their normal work hours in four, eight week, 20 hour cycles from September 2007-April 2009.

The decision to conduct the specific courses that prepared the incumbent employees to acquire skills competencies for their present employment position as well as skills competencies for future employment opportunities was intentional.

Twenty-two (22) companies (Attachment A), representing fifty (51) unduplicated incumbent employees, responded to the final Survey (Attachment B) which was conducted in the summer/fall 2009. The company response to the final Survey was 71%. The 51 incumbent employees represented in the Survey responses were 66% of the unduplicated total participants involved in the Goal # 2 intervention. The size of the sample used to generate the data and findings in the Final Report was very significant, and represents responses from a diverse cross section of the regional precision manufacturing companies.

The Interim and Final Reports were prepared as described below. The data, findings, and analysis contained in the Final Report covered a **two year** time period.

Report	Training Cycles	Period Covered
Interim # 1	September 2007, January 2008 (2)	September 2007- April 2008
Interim # 2	September 2008, January 2009 (2)	September 2008- April 2009
Final	September 2007-January 2009 (4)	September 2007- April 2009

The Final Report can be viewed on the web site of the Regional Employment Board of Hampden County Inc. at www.rebhc.org, and on the web site of the Western Massachusetts Chapter of the National Tooling and Machining Association (WMNTMA) at <http://www.wmntma.org/members-resources/industry-reports/>.

The Precision Manufacturing Training Project was funded by the Workforce Competitiveness Trust Fund managed by Commonwealth Corporation. Matching in-kind funds were provided by the lead agency, the Regional Employment Board of Hampden County, Inc., and other project partners.

CONTACT INFORMATION

For additional information on the **Final Report** or on the Precision Manufacturing Training Project (PMTTP), please contact David M. Cruise at 413-755-1362 or dcruise@rebhc.org.

For information on Commonwealth Corporation, please visit their web site at www.commcorp.org.

Precision Manufacturing Training Project (PMTTP)

Business Impacts

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I. Description of the Precision Manufacturing Cluster

High technology precision manufacturing is one of the most important industry clusters in the Pioneer Valley Region. The high technology precision manufacturing companies in the Region, led by the Western Massachusetts Chapter of the National Tooling and Machining Association (WMNTMA), are small and medium size contract manufacturers that are primarily engaged in supplying precision mechanical components and sub-assemblies to prime contractors and OEM's in the aerospace, defense, commercial, medical devices, and power generation industries. The companies perform value-added precision manufacturing processes and operations utilizing high technology equipment and world class technology development.

The companies in the cluster have invested extensive resources on building manufacturing capacity by improving manufacturing processes and incorporating innovative new technology. Since many of these markets are cyclical, the long term prosperity and growth of the precision machining firms, as part of various integrated supply-chains, might be jeopardized by global economic changes. The sector faces a shrinking workforce, increased competitive strains from off-shore suppliers, and market pressures that might compromise business and employment growth in the Region.

The precision manufacturing cluster in the Region is led by the regular member companies of the Western Massachusetts Chapter of the National Tooling and Machining Association. In calendar year 2008, the regular member companies of the WMNTNA experienced the following growth in employment levels and estimated gross sales:

Estimated Gross Sales of Regular Member Companies: Adjusted for Changes in Company Membership in WMNTMA

Year	No. of Companies	No. of Employees	Estimated Gross Sales
2005	24	899	\$108 Million
2006	29	993	\$155 Million
2007	33	1281	\$229 Million
2008	39	1386	\$252 Million
Change '07-'08	(+) 6	(+) 105 (8.2%)	(+) \$23 Million (10%)
Change '05-'08	(+) 15	(+) 487 (54.2%)	(+) \$144 Million (133%)

The dollar added value per employee was \$181,818, which is 16.5% higher than the reported Massachusetts average of \$156,065. In addition, the sectors multiplier effect (4.0) generates comparable growth within their supplier and support network. This level of productivity was achieved with an

8.2% increase in the number of employees, and affirms the sectors commitment to investment in new equipment, and implementation of lean manufacturing processes.

II. Goals of the Precision Manufacturing Cluster

The cluster has established the following goals for 2009-2010 that define and validate its commitment to develop true cluster identity and collaborative actions that will result in job retention, wealth creation, job growth, and continued economic development in the Region and the State:

Goal 1. Increase industry-wide awareness of the Region as an innovative and agile high technology precision manufacturing area.

Goal 2. Transform Industry Capability to Improve Manufacturing Processes and Operations

Goal 3. Strengthen Cluster Development and Increase Business Competitiveness

Goal 4. Build a Well-Educated, Technologically Skilled and Highly Adaptable STEM Workforce.

III. The Workforce Development Intervention

The workforce development intervention that is described in this Final Report involved incumbent employees of precision manufacturing companies who **voluntarily** attended industry aligned skills enhancement courses that were conducted after or before their normal work hours. The courses were conducted in four cycles from **September, 2007 -April, 2009**. Each course, with the exception of college credit courses which were conducted on a standard college semester schedule, was conducted for eight weeks for a total of 20 hours. The 51 employees referenced in this report are an unduplicated count, and represent 66% of the total incumbent employees who completed one or more courses during the time cycle referenced above.

The 22 companies who responded to the final report survey represent 71% of the companies who participated in the PMTP. The average size of the responding companies was 36 employees. The REB believes that the diversity of the participating companies, the length of the business impact study, and the challenges and change that occurred during the survey process, resulted in a final report that is a candid, transparent, and comprehensive account of the impact of the intervention on this specific sector during the stated time period.

The courses that were conducted in Goal # 2 fall into the following two categories:

- ✚ Courses that presented information that would increase the employee's skills competencies in their current employment position.
- ✚ Courses that presented information that would position the employee's to move into more advanced machining positions at higher wages.

The decision to conduct courses that prepared employees to acquire skills competencies for their present employment position as well as future employment opportunities was intentional. The precision machining sector in the Region, with its focus on aerospace and defense work, is very agile and is positioned to respond quickly to surges in demand. In order to respond to these surges, they need to maintain a flexible workforce that has the skills sets to move seamlessly to more advanced machining work. In analyzing the impact of this workforce intervention, it is important to look at the findings with the understanding that the Supervisor's Comments that resulted in the Business Impact Ratings reflect their evaluation of current skills competencies acquired by the employees as well as future competencies, which may be more difficult to assess and measure.

IV. Business Impact Levels

The Final Report is using the business impact levels derived from the original work of Donald Kirkpatrick¹ to provide some basic understanding relative to the impact of a workforce development intervention on worker effectiveness. This analysis is also grounded in information and guidance provided by Commonwealth Corporation². The following is a basic summary of each level:

Level of Impact	Description
I	Employers and participants satisfaction with workforce development intervention.
II	Attainment, in concrete terms, of specific skills or knowledge of participants, or changes in participants' attitudes.
III	Changes in employees behaviors as a result of the programmatic interventions.
IV	Change in business practices and outcomes.

V. Business Impact Findings

KEY:

Business Impact Rating: (1= Significant Impact to 4 = Minimum Impact)

Sources: (DP) = Daily Production Sheet, (WP) = Weekly Production Report, (SR) = Supervisors Report, (SC) = Supervisors Comments

Degree of Impact: % Increase/Reduction

No. of Companies Responding to Final Survey: 22 (71%) **No. of Incumbent Employees:** 51 (66%)

Business Impact Objective	Business Impact Rating			Sources				Degree of Impact			
	1 Sig. ←————→ 4 Min.			DP	WP	SR	SC	% Increase			
	Interim # 1	Interim # 2	Final					1-5	6-10	11-19	20+
1. Increase Overall Employee Safety Awareness	2.69	2.64	2.76	1	1	3	15	3	1		5
2. Increase Overall Employee Productivity and Efficiency	2.53	1.84	2.21	4	4	2	12	3			8
3. Increase Employee Stability (Retention, Turnover)	2.69	2.00	2.56	1	1	2	15	3	1		5
4. Improve Employee Attitude, Motivation and Work Habits	2.30	1.94	2.12	1	1	2	15	3			5
5. Increase Communication between Co-Workers	2.76	2.05	2.68	1	1	1	16	4			5
6. Increase Communication with Front Line Supervisors	2.38	1.83	2.46	1	1	1	15	4			5
7. Improve Equipment and Controls Set-Up and Operating Time	2.38	1.89	2.16	3	4	3	12	4		1	5
8. Increase Employee Ability to Complete More Complex Machining Tasks	2.23	1.83	2.02	1	3	3	13	4			6
9. Reduce Over-the-Shoulder Training Time	2.38	1.94	2.20	2	2	3	14	4	<u>% Reduction</u>		4
									1		
10. Increase Managements Ability to Quote on New Work	3.63	2.80	3.07	Comment				Comment			
11. Increase Managements Ability to Perform New Value-Added Work	3.18	2.43	2.97	Comment				Comment			
12. Help to Improve the Company's Profit Margins	2.80	2.54	2.54	Comment				Comment			

¹Evaluating Training Programs, Kirkpatrick, D., American Society for Training and Development, 1975.

² Business Impact Primer: Speaking the Language of Employers, Commonwealth Corporation, 2007

VI. Analysis of Business Impact Findings

In analyzing the findings from the initial study of the impact of this workforce development intervention, we categorized the Business Impact Objectives by their Level of Impact. This allows us to more clearly understand and measure the impact of the intervention on worker effectiveness, as well as its immediate and future impact on the company. As was referenced in the **Overview**, the companies were asked to measure the business impacts over a two (2) year time period from September 2007 through October 2009, which is a statistically significant time period. During this time period, the economic and business climate of the industry and the companies changed significantly. The findings and corresponding analysis in the Final Report should be viewed with an awareness of this fact.

Business Impact Objective	Business Impact Rating			Sources				Degree of Impact			
	1 Sig. ←————→ 4 Min.			DP	WP	SR	SC	<u>% Increase</u>			
	Interim # 1	Interim # 2	Final					1-5	6-10	11-19	20+
Level I											
1. Increase Employee Stability (Retention, Turnover)	2.69	2.00	2.56	1	1	2	15	3	1		5
Level II											
2. Increase Overall Employee Safety Awareness	2.69	2.64	2.76	1	1	3	15	3	1		5
3. Increase Overall Employee Productivity and Efficiency	2.53	1.84	2.21	4	4	2	12	3			8
4. Improve Employee Attitude, Motivation and Work Habits	2.30	1.94	2.12	1	1	2	15	3			5
5. Improve Equipment and Controls Set-Up and Operating Time	2.38	1.89	2.16	3	4	3	12	4		1	5
6. Increase Employee Ability to Complete More Complex Machining Tasks	2.23	1.83	2.02	1	3	3	13	4			6
Level III											
7. Increase Communication between Co-Workers	2.76	2.05	2.68	1	1	1	16	4			5
8. Increase Communication with Front Line Supervisors	2.38	1.83	2.46	1	1	1	15	4			5
Level IV											
9. Reduce Over-the-Shoulder Training Time	2.38	1.94	2.20	2	2	3	14	4	<u>% Reduction</u>		4
10. Increase Managements Ability to Quote on New Work	3.63	2.80	3.07			-					-
11. Increase Managements Ability to Perform New Value-Added Work	3.18	2.43	2.97			-					-
12. Help to Improve the Company's Profit Margins	2.80	2.54	2.54			-					-

- ✚ The rating for Objective # 1 in **Level I** is significant. The **2.56** final rating suggests that, despite the challenges experienced by the companies in the first three quarters of calendar year 2009, the intervention positively impacted employee stability.
- ✚ The final ratings under **Sources** indicate that the evaluation source in the Final Report, as compared with both Interim Reports, changed from Supervisors Comments to information and data obtained from the Daily Production Sheets and the Weekly Production Reports. We believe that the skills competencies obtained by the incumbent employees involved in the intervention have increased their overall efficiency and productivity, and their efficiency and productivity are now being measured by actual data from the weekly and daily production sheets rather than just by the

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Supervisors Comments. This is particularly evident in **Level II- #3, 5, and 6**. We believe these findings are trending in a positive direction, and will continue to have a long term positive impact on the all important business impact Objectives in **Level IV**.

- ✚ The final ratings for Objectives # 4, 5, 6 in **Level II**, ranging from **2.02-2.16**, continue to indicate that the intended outcomes of the workforce development intervention, which were to provide the incumbent employees with real time and future skills competencies that would increase their ability to perform more complex manufacturing processes and operations, increase production and efficiency, and improve the employees' attitude, motivation, and work habits, are being realized. This change has been consistent, and we believe will have a long term positive impact on the all important business impact Objectives in **Level IV**.
- ✚ The **Degree of Impact** for all the Objectives in **Level II**, but in particular Objectives # 3, 6, is significant, and is consistent with the results from Interim Reports #1 and #2. The majority of the responding companies saw an increase of 20% or more in those objectives, with the majority of the companies indicating an increase of 50% or more. These two year period increases, based on the 20 hour program design, and multiple inter-related course offerings, indicate that the workforce development intervention provided targeted and relevant content, and has positively impacted the manufacturing process on the factory floor.
- ✚ The final rating for Objective # 3 in **Level II**, of **2.21** in overall employee productivity and efficiency is the most significant numerical change in Level II business impact objectives, and clearly indicates the positive impact of the intervention. The Degree of Impact is also significant in that eight (8) responding companies reported an increase of 20% or more. We believe that this increase in overall employee productivity and efficiency should continue to contribute to Objective # 9 in **Level IV**.
- ✚ The consistency in the rating for Objective # 4 in **Level II** is significant, and indicates that the intervention positively impacted employees' attitude, motivation and work habits. The **2.12** rating is the second highest rating in the Final Report survey and reflects a very positive trend, as does the 20% or more increase reported by a majority of the responding companies. We continue to believe that the result from this particular objective is significant for employees and employers going forward, and will continue to positively contribute to increasing the business impact ratings in **Level IV**.
- ✚ The final rating for Objective # 6 in **Level II**, of **2.02** is the highest rating from the final survey as it was from the previous two surveys, and continues to indicate that the design of the intervention and the course content had the desired outcome of increasing the incumbent employee's ability to complete more complex machining tasks. As companies introduce new technology into the manufacturing process, the ability of employees to have the technical skills to transition to more complex machining processes and operations will be important to the growth and success of the company.
- ✚ The final ratings of **2.46-2.68**, for Objectives # 7, 8 in **Level III** are interesting. The final ratings are consistent with the findings from Interim Report No. 1, but lower than the findings from Interim Report #2. Based on the number of responding companies reporting a more than 20% increase in communication between the employees themselves and between the employees and front line supervision, we believe that the intervention contributed to an improvement in communication. Given the nature of the manufacturing process, and the importance of employees working as a team, these ratings are important indicators that should be closely monitored in future incumbent employee workforce interventions.

- ✚ The final **2.20** rating for Objective # 9 in **Level IV** is significant, and is a direct, positive correlation with the impact ratings in Objectives #3, 5, 6 in **Level II**. The ability to reduce over-the-shoulder training time is an important employer cost savings measure, and we believe that this outcome of the workforce development intervention is beginning to positively impact the business operations.
- ✚ The final rating for Objective # 10 in **Level IV** continues to be significant. Although the final rating is the only rating over 3.00, the final increase of .56 is the largest numerical change from Interim Report #1. Given the changing and cyclical state of the precision manufacturing business over the past twelve months, management's confidence in having the technology and appropriately trained and agile workforce to complete new work orders and deliver them on time and according to specifications is an essential component to their ability to quote on new business.
- ✚ The final **2.54** rating for Objective # 12 in **Level IV** is consistent and significant and indicates that the intervention is beginning to impact a critical factor in measuring true sectoral change. In the end for the employer, it is the bottom line. The ratings are clear evidence that from the owners' perspective, the intervention has begun to create a positive impact on the company's profit margins.
- ✚ The overall ratings in **Level IV** indicate a positive change in business practices and outcomes. There are many factors that influence true sectoral change; however, we believe that this workforce development intervention contributed to this positive change in business practices and outcomes.

VII. Observations Going Forward

1. The REB believes that the Measuring Business Impact deliverable in the Precision Manufacturing Training Project (PMTP) was an excellent strategy and methodology to gauge the impact of a sectoral workforce development intervention in response to an identified business need or gap in sectoral programs and/or services.
2. The REB believes that the Business Impact measurement instrument and the methodology used to collect the data and evaluate the business impact in the Precision Manufacturing Training Project (PMTP) was appropriate, and will continue to use the instrument and collection methodology in future data collection and reporting.
3. The intentional workforce development intervention in the Precision Manufacturing Training Project (PMTP) was clearly aligned with the business needs of the precision manufacturing sector in the Pioneer Valley Region. The data and information contained in the Final Report, supported by data and information contained in Interim Reports #1 and #2, substantiated that the intentional workforce development intervention achieved the desired business impacts and results.
4. The REB will continue to sustain the partnership between the precision manufacturing companies and the training/educational institutions that developed in the Precision Manufacturing Training Project (PMTP), and will develop a process to monitor the project's MOU employer partners, and other employer partners, to assess the long term impact of the intervention on meeting the objectives described in **Level IV**.

VIII. Conclusion

The Business Impact Reports developed in the Precision Manufacturing Training Project (PMTTP) provided some important and significant data on the impact of this intentional workforce development intervention. The data, information, and resulting analysis of the findings, provided critical business intelligence that informed our collaborative decision making, allowed for mid-course corrections, and insured that the project attained its planned goals and objectives.

The Regional Employment Board of Hampden County, Inc. will continue to use the lessons learned, and promising practices that evolved from this project, to develop strategies, interventions and programs that will position the precision manufacturing industry in the Pioneer Valley Region to strengthen its present business, expand into new and emerging markets, retain its existing workforce, generate job growth, and continue to be a significant contributor to the economic development of the Region and the Commonwealth.

The REB thanks Commonwealth Corporation for its guidance, support, and encouragement throughout the project cycle.

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Participating Companies

- + Berkshire Industries Inc.**
- + Hardigg Industries**
- + Smith and Wesson**
- + Hoppe Tool Inc.**
- + Tell Tool Inc.**
- + WGI Inc.**
- + B&E Tool Group, LLC**
- + Lenox**
- + Ben Franklin Design and Manufacturing Co.**
- + Sisson Engineering Corporation**
- + Advance Manufacturing**
- + Valley Steel Stamp**
- + Whip City Tool and Die**
- + G&L Tool Inc.**
- + Boulevard Machine and Gear**
- + Marox**
- + LPI, Inc.**
- + Millitech**
- + Peerless Precision Inc.**
- + Governors America Corporation**
- + Vaupell**
- + Easthampton Quality Machine Co.**
- + The Small Corporation**

Precision Manufacturing Training Project (PMTTP)
Incumbent Employees Technology Clusters Skills Enhancement Courses
Measuring Business Impact: Developing a Plan

Company: _____ Contact Person: _____ Employees: _____

Using a **Business Impact Rating** from 1-4 (1= Significant Impact to 4 = Minimum Impact), please rate the impact on your employees overall job performance as a result of their voluntary participation in the fall 2007 and/or winter 2008 skills enhancement courses funded by the WCTF, and sponsored by the REB-WMNTMA, and the value-added to your overall manufacturing and business operations of this workforce development initiative.

Please select **one or more** of the following **Sources** that serve as the basis for your rating for **each** Business Impact Objective. **1. = Daily Production Sheet (DP)** **2. =Weekly Production Report (WP)** **3. =Supervisors Report (SR)** **4. =Supervisors Comments (SC)** **5. =% Increase (Please Indicate %)**. Please use separate sheet to **Comment** on **Numbers 10-12**.

Business Impact Objective	Business Impact Rating				Sources				Degree of Impact
	Sig.	←————→		Min.	DP	WP	SR	SC	
1. Increase Overall Employee Safety Awareness	1	2	3	4	1	2	3	4	___ % Increase
2. Increase Overall Employee Productivity and Efficiency	1	2	3	4	1	2	3	4	___ % Increase
3. Increase Employee Stability (Retention, Turnover)	1	2	3	4	1	2	3	4	___ % Increase
4. Improve Employee Attitude, Motivation and Work Habits	1	2	3	4	1	2	3	4	___ % Increase
5. Increase Communication between Co-Workers	1	2	3	4	1	2	3	4	___ % Increase
6. Increase Communication with Front Line Supervisors	1	2	3	4	1	2	3	4	___ % Increase
7. Improve Equipment and Controls Set-Up and Operating Time	1	2	3	4	1	2	3	4	___ % Increase
8. Increase Employee Ability to Complete More Complex Machining Tasks	1	2	3	4	1	2	3	4	___ % Increase
9. Reduce Over-the-Shoulder Training Time	1	2	3	4	1	2	3	4	___ % Reduction
10. Increase Managements Ability to Quote on New Work	1	2	3	4	Comment				Comment
11. Increase Managements Ability to Perform New Value-Added Work	1	2	3	4	Comment				Comment
12. Help to Improve the Company's Profit Margins	1	2	3	4	Comment				Comment
13. OTHER	1	2	3	4					

2. Please describe any changes that have occurred in your manufacturing operations as a result of your employees' participation in this workforce development initiative.

3. Please identify any technical areas that would positively impact your manufacturing operations, that we should consider in developing future skills enhancement courses for your employees.
