

CENTRAL PENNSYLVANIA PLASTICS INDUSTRY CLUSTER

NEEDS ASSESSMENT SURVEY

Conducted by the



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Sponsored by

CENTRAL PENNSYLVANIA WORKFORCE DEVELOPMENT CORPORATION

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NEEDS ASSESSMENT OF THE PLASTICS INDUSTRY IN CENTRAL PENNSYLVANIA

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EXECUTIVE SUMMARY

This report outlines the analysis completed to determine the needs of plastics manufacturers within central Pennsylvania. The report was funded by the Central Pennsylvania Workforce Development Corporation (CPWDC) and was conducted by the Plastics Manufacturing Center (PMC) of the Pennsylvania College of Technology (Penn College). The report consists of data collected through an interview process, as well as a data analysis of existing reports outlining the importance of the plastics industry within the Central Pennsylvania Region.

The report focused on three general areas of need within the plastics industry: workforce issues, resources and technology. Specifically, the goals of the study were to:

- Determine needs of local plastics manufacturers.
- Determine opportunities for collaboration.
- Determine local resource requirements in terms of technology and workforce development.
- Compare local needs with state and national needs.

To better understand the needs of plastics manufacturers, a series of interviews were conducted to determine the primary needs of these manufacturers. The principal source of empirical data for this report was obtained through the use of face-to-face interviews. The interview process consisted of an interviewer following a pre-established protocol with both open and closed-ended questions. The protocol was administered by a single researcher to 21 selected businesses involved with the plastics industry throughout the central region of the Workforce Investment Board (WIB). An examination of these issues and how they impact local organizations will help to determine the needs of the plastics industry in the region.

The results indicate that many plastics manufacturers are facing the same issues in the areas of financial concerns, human resource concerns, research and development concerns and international competition. Several major themes surfaced during this study:

- International competition from both Europe and the Pacific Rim is taking its toll on area manufacturers.
- More R&D in areas of new product development is needed to remain competitive; however, resources to conduct this work are scarce.
- Costs are escalating for materials, personnel and healthcare.
- Plastics manufacturers in the region are investing in capital expansions and hiring new employees.
- Manufacturers are having difficulty finding employees locally with the right set of skills in the areas of processing and R&D.
- Collaboration among plastics manufacturers would be welcome if it could be spearheaded by an external group.
- Mathematical and soft skills training are needed for local plastics employees.

INTRODUCTION

The plastics industry is important to Pennsylvania in general, and to central Pennsylvania in particular, with a large number of plastics manufacturers clustered in this region. One focus of this study was to determine the needs of these plastics manufacturers and to examine the needs in the context of a cluster.

According to a report published by the international consulting firm, Deloitte Consulting, LLP, titled “*Manufacturing Pennsylvania’s Future: Regional Strategies That Build From Current Strengths and Address Competitive Challenges*,” the plastics industry in Pennsylvania is the number three driver industry within the state. Driver industries are industries in which the region has its greatest competitive advantage (Hill & Brennan, 2000). These industries form the heart of the industrial cluster. The plastics industry within Pennsylvania forms an industrial cluster because it is fed by, and in turn feeds, other industries within Pennsylvania thus driving economic performance within the state.

Competitive industrial clusters are a “geographic concentration of competitive firms or establishments in the same industry that have close buy-sell relationships with other industries in the region, use common technologies or share a specialized labor pool that provides firms with a competitive advantage over the same industry in other places. This four-part definition requires that the first part, as a necessary condition (a geographic concentration of competitive firms or establishments in the driver industry or industries), be combined with at least one of the other three parts before a group of industries can be considered an industrial cluster,” (Hill & Brennan, 2000).

Plastics is a strong, competitive cluster within Pennsylvania and has a concentrated presence in central Pennsylvania, in part, because of the significant plastics-related resources provided by Pennsylvania College of Technology in terms of students and industry services. The PMC and the degree programs in plastics at Penn College serve as a hub of plastics technology, education and training within central Pennsylvania.

A better understanding of the educational, technological, financial and training needs will help academic, private and governmental agencies to better serve the plastics cluster within this region. Understanding the needs is the first step toward addressing those needs and ensuring the success of local manufacturers.

This report provides insights into the various plastics companies within the region. It also provides recommendations for actions that can be taken to serve the area and strengthen the role of plastics manufacturers within central Pennsylvania.

This report consists of both qualitative and quantitative data to provide the entire “picture” of the needs on more than one dimension. This multi-data approach means that both numeric and anecdotal data was analyzed to help decision makers become better informed on multiple levels concerning the issues facing this region’s plastics manufacturers.

METHODOLOGY

The primary source of empirical data for this report was obtained through the use of face-to-face interviews. The interview process consisted of an interviewer following a pre-established protocol with both open and closed-ended questions. The protocol was administered by a single researcher to 21 selected businesses involved with the plastics industry throughout the central region of the WIB.

The following section describes the process used to collect the data for the study. Every effort was made to ensure that the collected data accurately reflects the plastics industry within the Central Pennsylvania Region. This included conducting a review of the current literature, developing data collection instruments and carefully analyzing the results.

LITERATURE REVIEW

The study began with a literature review of previous studies that focused on manufacturing in general and plastics in particular. The list of reviewed reports is contained in the table below:

REPORT/ARTICLE TITLE	YEAR PUBLISHED	PUBLISHED BY:
<i>“Back to Prosperity: A Competitive Agenda for Renewing Pennsylvania”</i>	2003	Brookings Institution Center on Urban and Metropolitan Policy in Washington, D.C.
Data provided by the Pennsylvania Department of Labor and Industry’s Center for Workforce Information and Analysis (CWIA)	2003	Pennsylvania Department of Labor and Industry’s Center for Workforce Information and Analysis (CWIA)
<i>“Information Technology Manufacturing and Competitiveness”</i>	2004	President’s Council of Advisors on Science and Technology (PCAST)
<i>“Manufacturing Pennsylvania’s Future: Regional Strategies That Build From Current Strengths and Address Competitive Challenges”</i>	2004	Deloitte Consulting, LLP - Presented to Industrial Resource Centers (IRCs) of Pennsylvania, the Department of Community and Economic Development and TeamPA
<i>“Top Tech Firms to Boost R&D Spending”</i>	2004	Wall Street Journal

These reports revealed both national and Pennsylvania-specific trends in manufacturing and the plastics industry. The external reports helped to identify issues to be examined in detail during the data collection phase of the study. The reports revealed five main areas in which plastic manufacturing firms may face challenges:

- 1) Financial
- 2) Technical
- 3) Training and Development
- 4) Research and Development
- 5) Global

The five main challenges that emerged from the literature review became the basis for the data collection efforts. The goal was to determine how these particular issues impacted the plastics manufacturing cluster within central Pennsylvania.

COMPANIES INTERVIEWED

- AEP Industries - Mountaintop, PA
- Akro Plastics - Kent, PA
- Alcan Cable - Williamsport, PA
- Alkoa Kama - Hazleton, PA
- Bemis Corp. - Hazleton, PA
- Berwick Offray - Berwick, PA
- Canton Manufacturing Inc. - Canton, PA
- Charlotte Pipe - Muncy, PA
- Construction Specialties - Muncy, PA
- FabriKal - Hazleton, PA
- First Quality Products - McElhattan, PA
- Jet Plastica - Hatfield, PA
- Ken Meese - Lewisburg, PA
- Kleerdex Company - Bloomsburg, PA
- Magee Rieter - Bloomsburg, PA
- Polymics - State College, PA
- Precise Polestar - State College, PA
- Sound Technology - Boalsburg, PA
- Trucklite Corp. - McElhattan, PA
- Unimark Corp. - Lewistown, PA
- West Pharmaceutical Services – Montgomery, PA

INTERVIEW PROCESS

A series of 21 interviews were conducted in mid-to-late April and early May with representatives from various plastics manufacturing companies within the Central Pennsylvania Region. One hypothesis is that many plastics manufacturing plants within the region share similar operating conditions such as regulatory requirements, training needs, economic conditions, competitive forces and raw material needs. One goal of the study was to affirm or contradict that hypothesis. For the purposes of this study, the Central Pennsylvania Region consists of the following counties: Clinton, Centre, Columbia, Lycoming, Mifflin, Montour, Northumberland, Union and Snyder.



The one-hour interviews were conducted using a prescribed interview protocol that included both open-ended and closed-ended questions. The same individual conducted all of the interviews to ensure consistency of data collection.

INTERVIEW PROTOCOL

The interview protocol was divided into two separate areas for ease of administration and timeliness of data collection. Since the personnel selected to be interviewed were within key areas of their organizations, care was taken to limit the interviews to 60 minutes or less. While this meant we were limited in how much data we could collect, it was felt that the time limit of 60 minutes would help to ensure that the requested interview would take place and that all of the questions would be answered.

The questions for the interview were grouped according to specific categories. This was done to help the interviewer quickly collect and record data and to facilitate a logical progression through the topics. The four topics and what each encompassed are listed below.

INTERVIEW QUESTIONS - CATEGORIES

DEMOGRAPHICS

The first section consisted of the collection of demographic information such as:

- Category of Plastics Manufacturing
- Number of People Employed
- Number of Plants in Pennsylvania
- Primary Products Produced

RECRUITMENT AND PERSONNEL QUALIFICATIONS

The next group of questions centered on recruitment and qualifications of personnel. These questions included a Likert-type scale question, as well as open-ended and multiple-choice questions.

TYPES OF TRAINING AND SPENDING AMOUNTS

The next set of questions focused on types of training and spending amounts in the area of training and employee wages. These questions were yes/no and open-ended.

MAJOR CHALLENGES

The final set of questions centered on open-ended questions focusing on five major challenges. The interview protocol requested information on the challenges faced by the plastics manufacturers, as well as possible remedies to those challenges. The five categories of challenges are:

- 1) Financial
- 2) Technical
- 3) Training and Development
- 4) Research and Development
- 5) Global

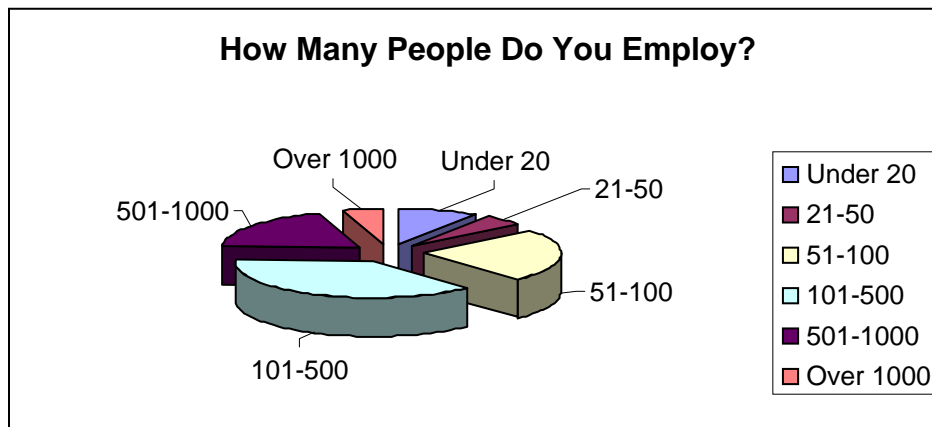
RESULTS

The results of the interview questions for the main areas listed previously are displayed on the following pages. The most dramatic result of the data collection effort is the similarity among the manufacturing organizations in terms of challenges and needs which confirmed the hypothesis that many plastics manufacturing plants within the region share similar operating conditions such as regulatory requirements, training needs, economic conditions, competitive forces and raw material needs.

DEMOGRAPHICS

The size of the companies selected to be interviewed ranged from less than 20 employees to approximately 2,000 employees.

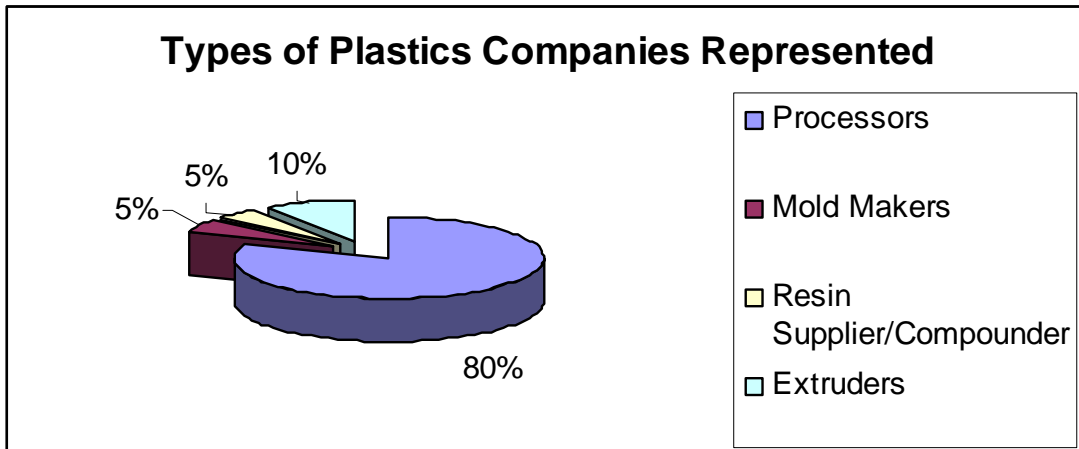
The company breakdown is as follows: two companies with fewer than 20 employees, one company with between 21-50 employees, five companies with between 51-100 employees, eight companies with between 101-500 employees, four companies with between 501-1,000 employees and one company with 2,000 employees. The breakdown of the company sizes is included in the chart below:



The three largest segments of number of employees were in the ranges of 51-100, 101-500 and 501-1,000. This spread of various corporate sizes provided a well-distributed company size demographic for conducting data analysis and for generalizations based on the results of the collected data.

The primary types of companies represented were processors. The list below and diagram on the next page indicates the number of plastics companies within each category:

- Processors (17)
- Mold Makers (1)
- Resin Supplier/Compounder (1)
- Extruders (2)



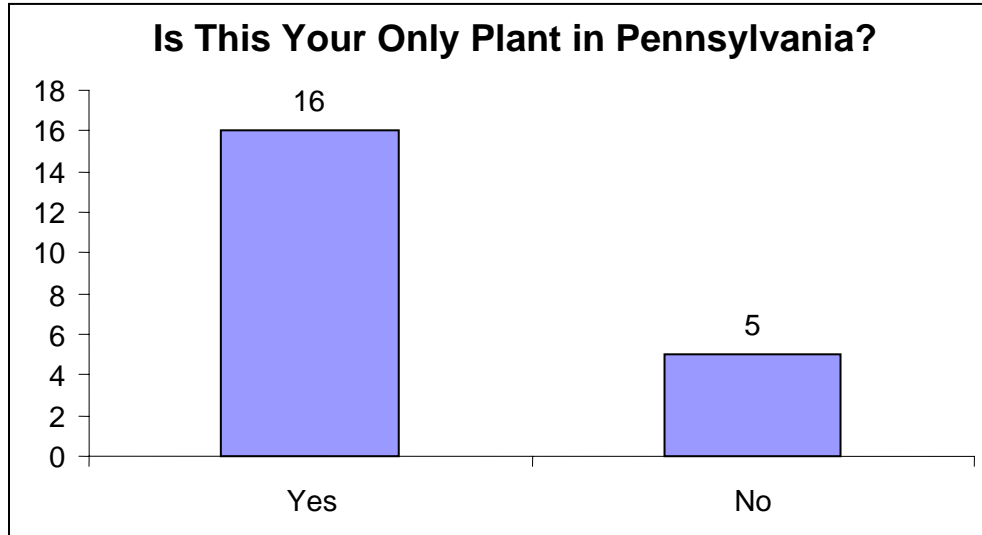
PRODUCTS PRODUCED

The organizations interviewed produced a wide variety of plastics and plastics-related parts. The products indicated by the organizations include the following:

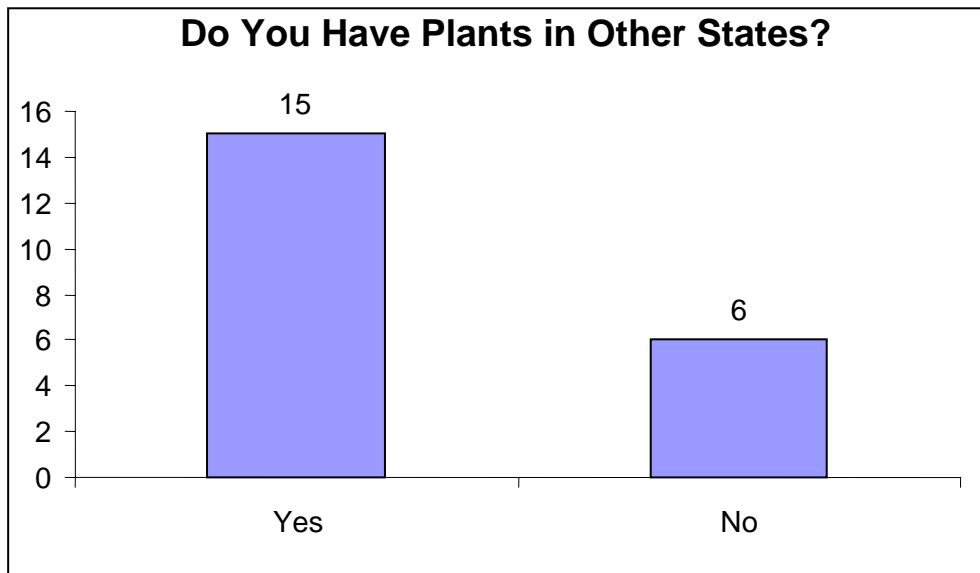
- | | | |
|---------------------------|------------------------------|---|
| • Drinking Cups | • Ultrasound Transducers | • Ribbons and Bows |
| • Food Containers | • Wet/Dry Vacuum | • Packaging (3) |
| • Straws | • Wall Protection | • Lights for Trucking Industry |
| • PVC Pipe | • Plastic Sheet and Film (2) | • High Performance Polymers and Compounds |
| • Automotive Floor Carpet | • Power Cable | |
| • Medical Devices (4) | | |

PRESENCE IN PA AND OTHER STATES

When asked, “Is this your only plant in Pennsylvania?” Sixteen of the companies indicated yes. This means that only five of the companies interviewed have additional plants within the state. The majority of companies interviewed have no additional manufacturing plants within Pennsylvania.



When asked, “Do you have plants in other states?” Fifteen of the companies indicated that they did have plants in other states. While six companies indicated that they did not have plants in other states. No question was asked about the number of international plant sites.

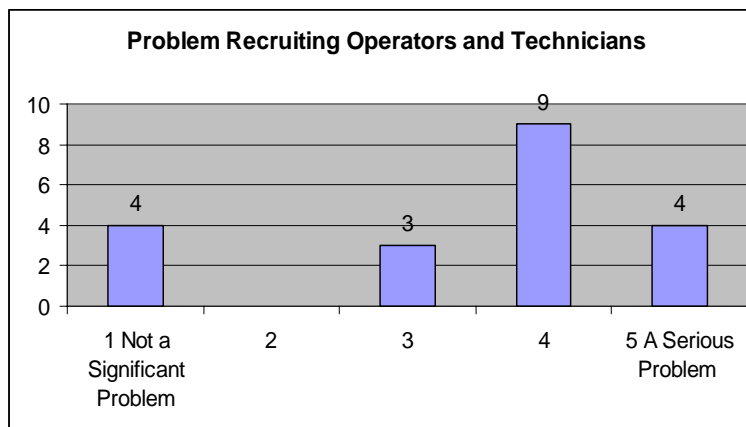


RECRUITMENT AND PERSONNEL QUALIFICATIONS

This portion of the interview asked questions about employee recruitment and any difficulties the companies encountered attempting to recruit employees.

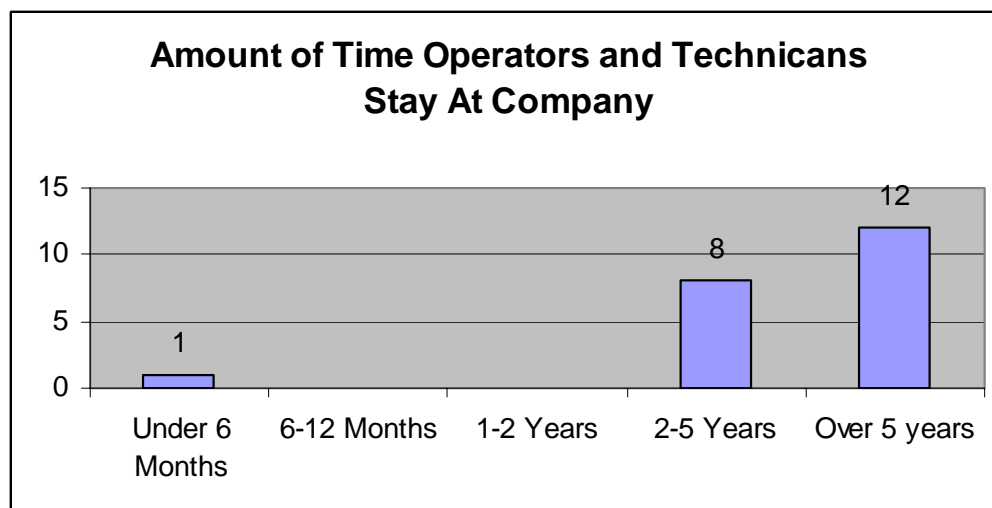
RECRUITING ISSUES

This part of the interview started with the question, “On a scale of 1-5, with 1 as ‘not significant’ and 5 as ‘a serious problem,’ do you have a problem with recruiting operators and technicians?” The weighted average for all of the numbers was 3.45 with one organization not answering this particular question. This weighted average indicates that many of the companies do have a problem (although not serious) with recruitment of technicians and operators.



EMPLOYEE TENURE

The next question in this section dealt with employee turnover. The following question was asked, “What is your turnover rate or experience with operators and technicians?” Most companies in the survey have employees stay for over five years. Therefore, turnover did not seem to be a major issue for these companies.



HOW EMPLOYEES ARE QUALIFIED

The next question was focused on how the companies qualified potential employees as to skill level. The following is a listing of the answers that were given. A variety of testing methods are used, and many companies seek technically adept employees with hands-on experience.

- Background Check
- Resume
- Testing
- Outside Sourcing
- Drug Tests
- Probationary Period
- Mechanical Reasoning
- Multiple Interviews
- Panel Interview
- Single Interview
- Educational Level
- CAD Test
- Physical Exam
- Use Software Program for Testing
- Knowledge of Hydraulic Electronics
- Mathematical Knowledge
- Theoretical Knowledge
- Union Shop Use Bidding Based on Seniority
- Personality Profile
- PC Experience
- Reference Checks
- Mechanical Aptitude Test
- High School Diploma
- 2-3 Years of Manufacturing Experience
- Hands-on Experience

EDUCATIONAL NEEDS

This portion of the interview also included the question, “In your opinion, what is the primary area of training in which your employees can use more education?” These answers included both technical skills (math, mechanical skills) as well as what is more traditionally known as soft skills (work ethics, social skills, interpersonal skills).

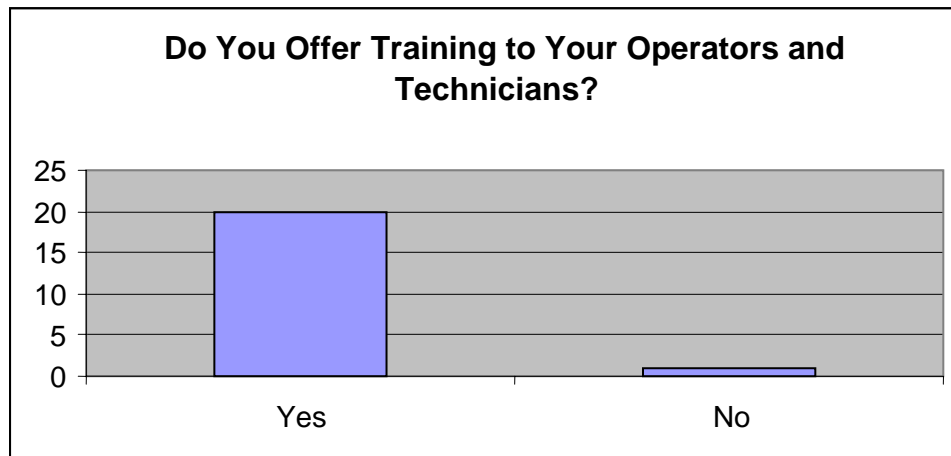
- Quality
- Math Skills
- Science Skills
- Mechanical Skills
- Writing
- Team Building
- Statistics
- Following Procedures
- PC Skills
- Communication
- Plastic Techniques
- Associate Degree in Plastics
- Work Ethics
- Reading Comprehension
- Injection Molding Trouble Shooting
- Machine Operator Training
- Material Handling Training
- Train-the-Trainer
- Social Skills
- Interpersonal Skills
- English as a Second Language

In spite of a request for soft skills, the most requested skill of all those listed above was math skills. This was followed by technical skills (operator training, mechanical skills, plastic techniques, etc).

TYPES OF TRAINING AND SPENDING AMOUNTS

The next set of questions focused on what the companies were doing in terms of training their personnel and what amounts of money and types of training they were utilizing to help their employees remain skilled.

The first question in this section was, “Do you offer training to your operators and technicians?” Only one company indicated that they did not offer training to their operators and technicians. The other 20 did offer some type of training.



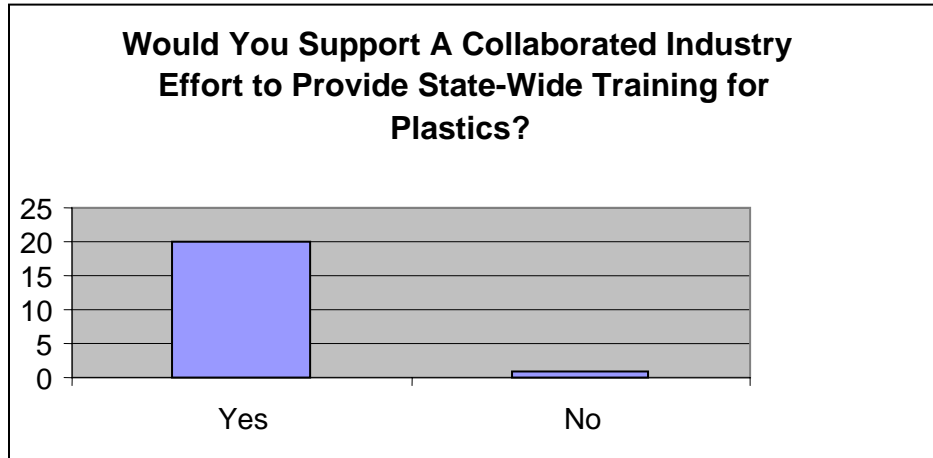
TYPES OF DELIVERY

Additional questions in this section were, “What training have you used in the past, now offer or would like to offer in the future? What training methods would you be unlikely to use?” The respondents could choose more than one answer. This question yielded a result that indicated that informal, on-the-job training was used within every organization that was interviewed. Also, in-house instruction was a popular choice among the companies. Satellite-based training was not a likely option for these manufacturers. Another area that could be explored in the future is the willingness of these organizations to try web-based training (WBT).

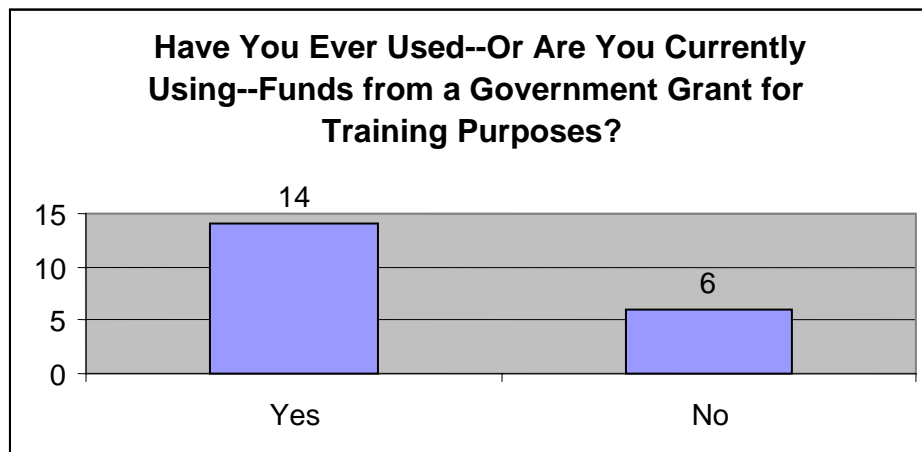
TYPE OF TRAINING	USED IN THE PAST	NOW OFFER	WOULD CONSIDER USING	UNLIKELY TO USE
Informal On-the-Job Training	21	21	2	0
In-House Instruction	20	20	2	0
Classes at a Local College	18	18	5	2
Prepared Course Materials (Videos, Books, CDs)	15	14	2	4
Interactive, Satellite-Based Training	3	3	5	14
National Seminars	14	12	2	8

SUPPORT FOR INDUSTRY SPONSORED TRAINING

The question, “Would you support a collaborated industry effort to sponsor/promote state-wide training for plastics?” was also asked. A large number of the respondents (20) indicated that they would be willing to participate in such an undertaking.



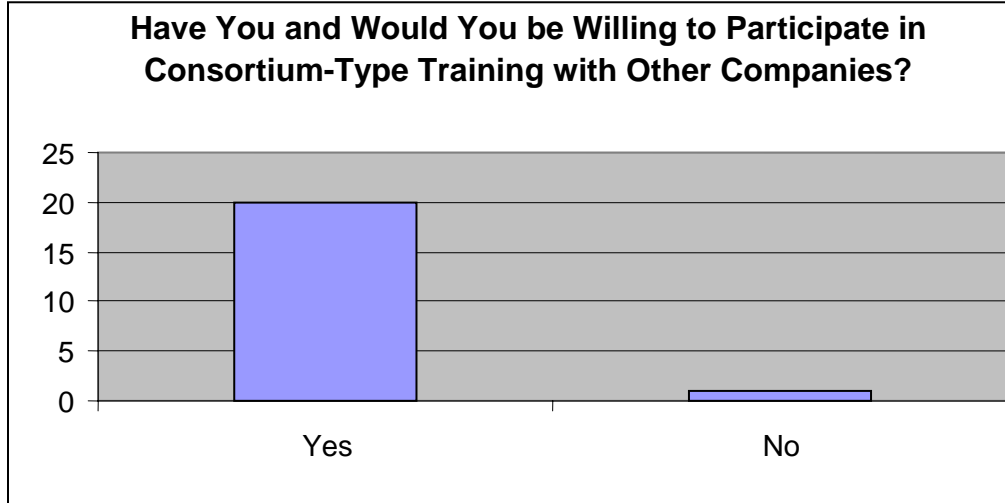
The next question was asked to the 20 interviewees who responded “Yes” to the previously asked question. This question was, “Have you ever used, or are you currently using, funds from a government grant for training purposes?”



Of the companies who would support a collaborative industry effort to provide state-wide training for plastics, 14 have used either WEDnetPA or WIB services or both. The types of training used with WEDnetPA include:

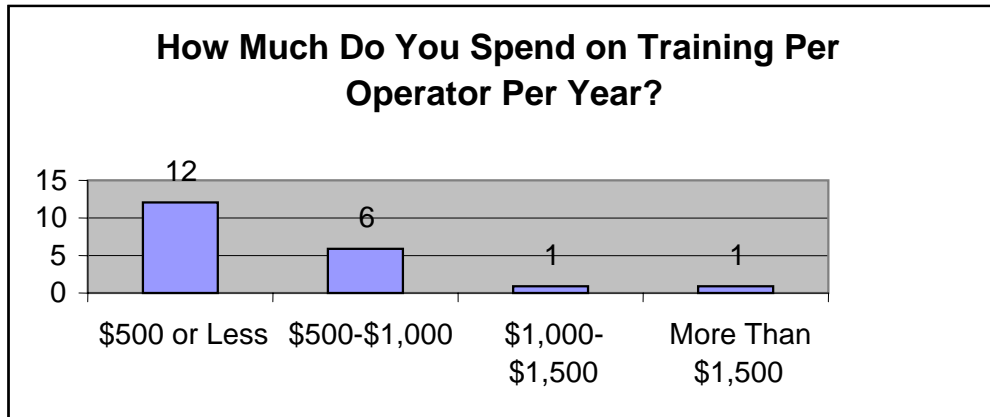
- Injection Molding
- Extrusion
- Basic Computer
- Educate Operators and Technicians
- CAD
- SPC
- Quality Tools

Interviewees were also asked, “Have you and would you be willing to participate in consortium-type training with other companies?” Twenty responded “Yes.” One responded “No.”

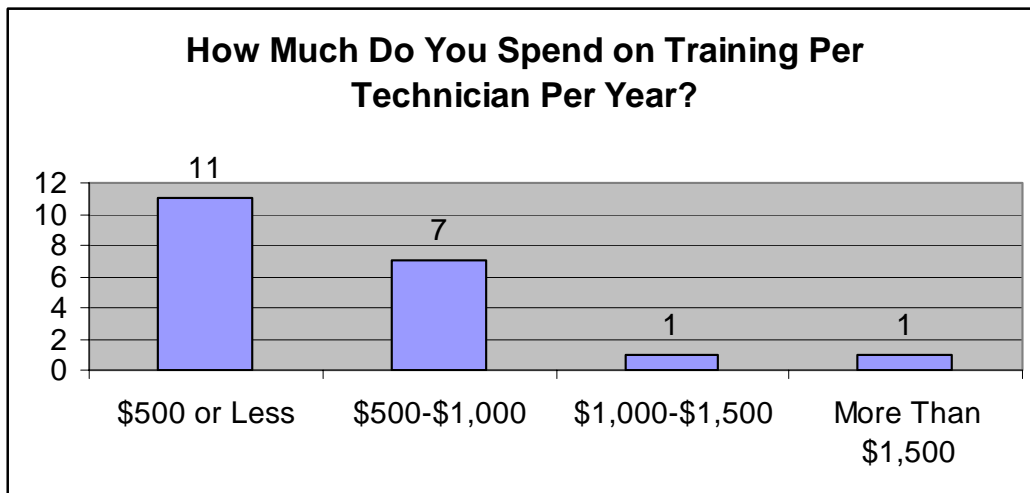


SPENDING ON EMPLOYEE TRAINING

The next two questions dealt with how much money the companies spend on training per employee per year for both operators and technicians. Most of the training for *operators* is \$500 or below. Only two of the 21 companies spend more than \$1,000 per employee in training per year.

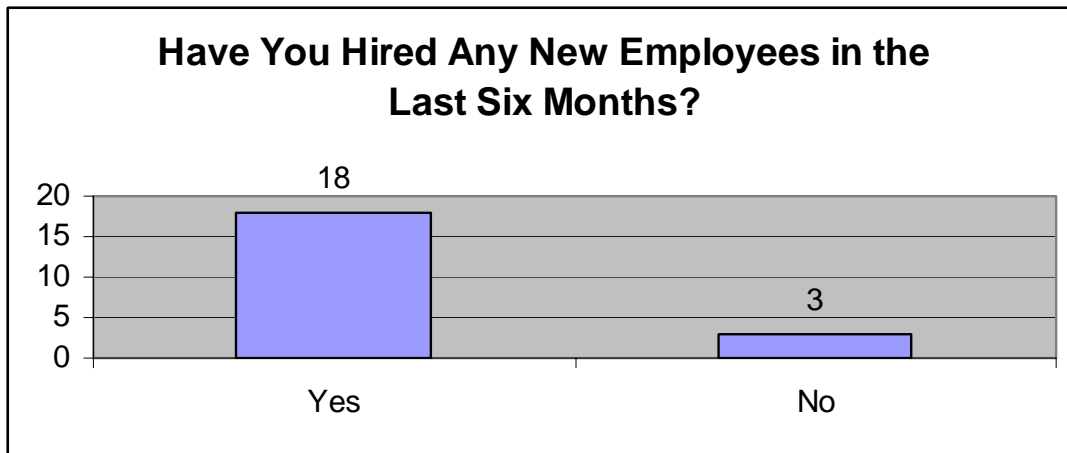


Training dollars allocated to *technicians* are almost identical to dollars allocated to operators. Again, only two companies spend more than \$1,000 on technical training.

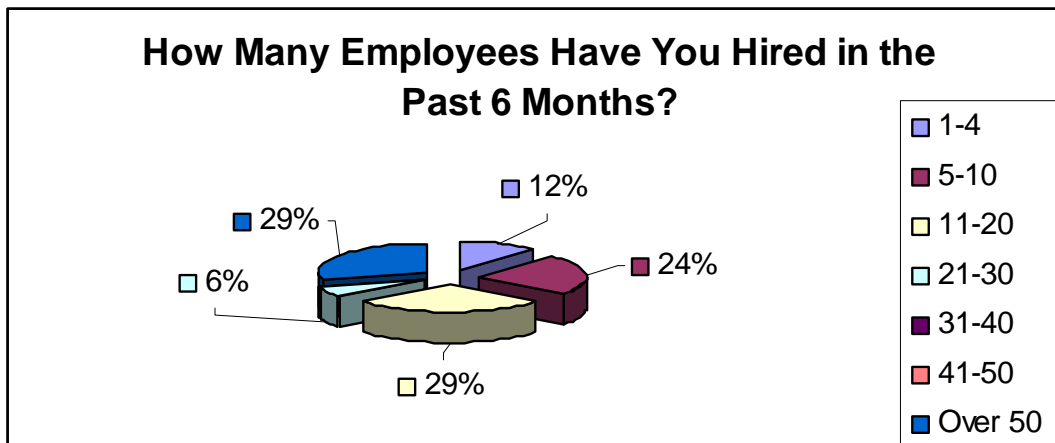


HIRING TRENDS

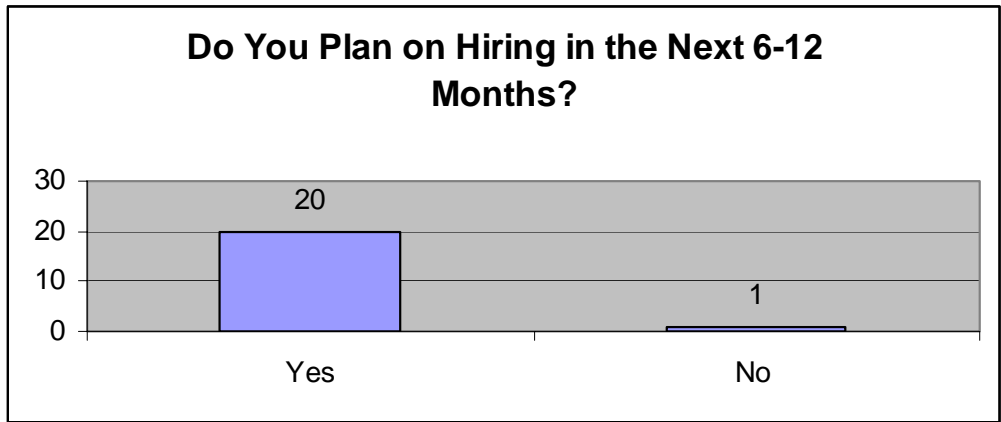
After asking questions about how much is spent on training per operator and technician, the interviewer asked questions focusing on hiring within the last six months. The interviewer asked, “Have you hired new employees in the last six months?” Eighteen out of twenty-one respondents indicated that they had hired new employees within the last six months.



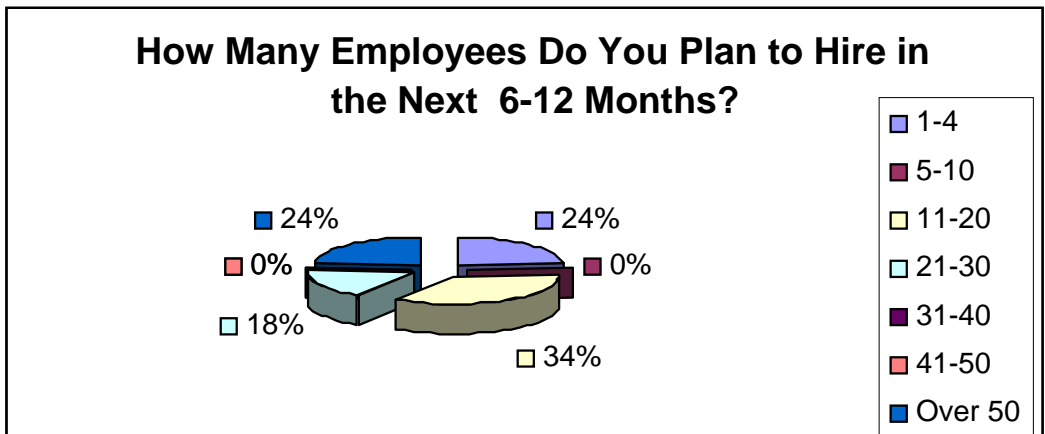
A follow-up question was, “How many employees have you hired in the past six months?” The results indicated that 29% of the companies had hired between 11-20 employees while another 29% had hired over 50 employees within the past six months.



The next question was to determine future needs in terms of hiring and to help indicate whether or not the companies that were interviewed were expanding or contracting. The interviewer asked, “Do you plan on hiring in the next 6-12 months?” Only one of the companies indicated that they would not be hiring any new employees within the next 6-12 months. The majority of companies indicated that they did plan on hiring in the near future.

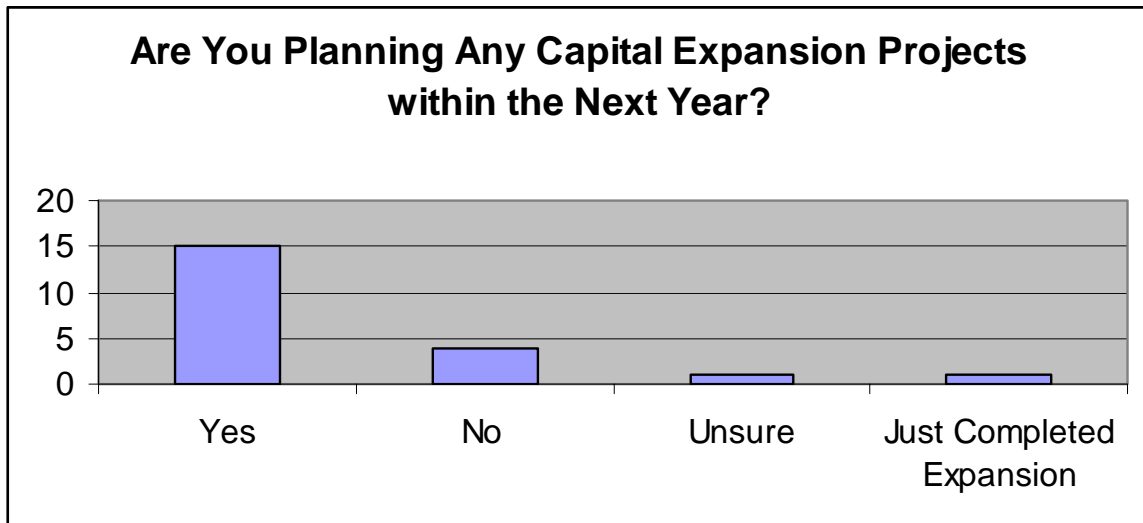


The companies indicated that the number of new employees planned to be hired in the next 6 to 12 months ranged from 1 to 200 with most companies hiring between 11 and 20.



CAPITAL EXPANSION PROJECTS

Another indication of possible expansion is an investment in capital expansion projects. The interviewer asked, “Are you planning on any capital expansion projects within the next year?” The results indicate that 15 of the companies were planning on a capital expansion project, one had just completed a project and the rest were either unsure or were not going to invest in a capital expansion project within the next year.

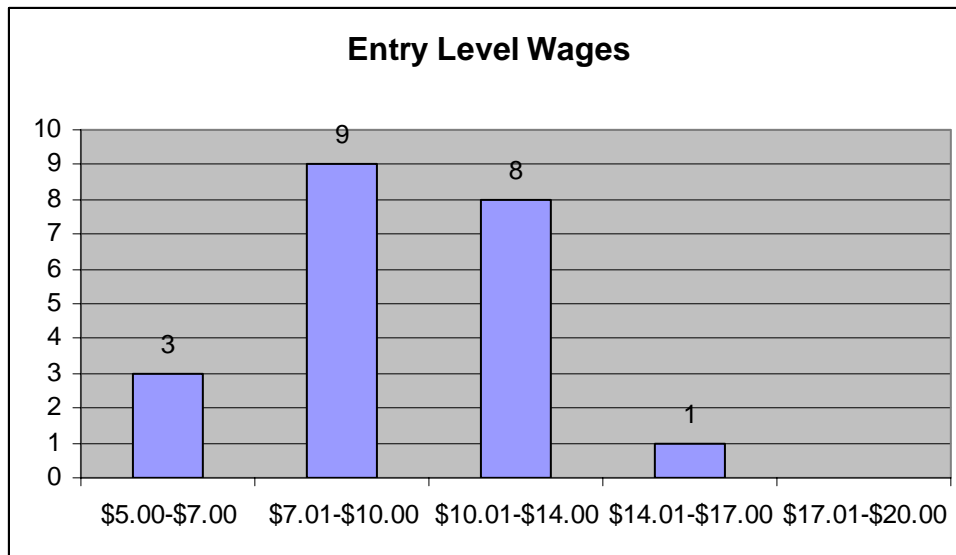


The capital expansion project sizes ranged from \$150,000 to \$7 million.

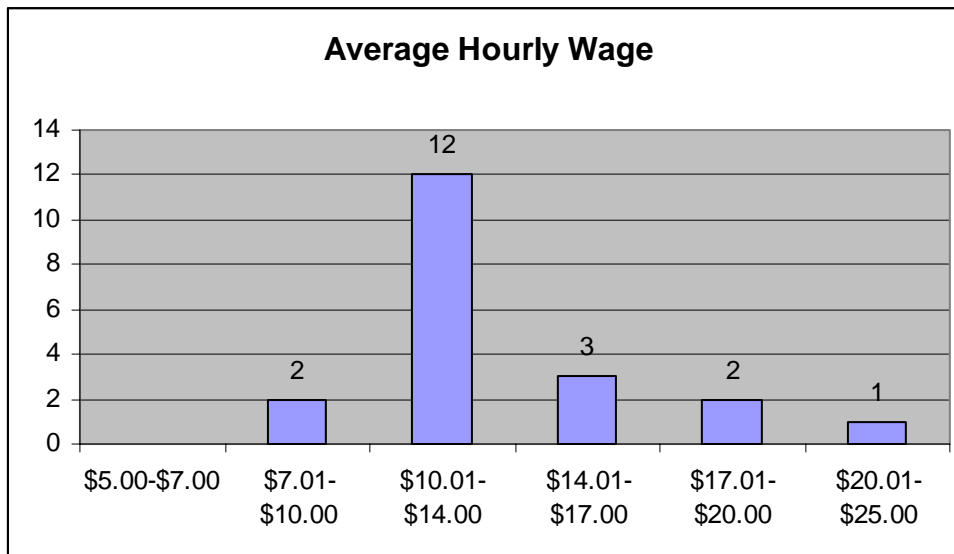
WAGES

The interviewer asked questions about the entry-level wages of new employees, as well as the average wage of hourly employees.

Most of the entry-level wages were between \$7 and \$14. The mean average was \$10, the highest was \$15 and the lowest was \$6.25.



The interviewer also asked, “What is the average wage of your hourly employees?” The mean average was \$12.75, the highest was \$21 and the lowest was \$8.50. On average, the majority of the companies pay hourly workers between \$10 and \$14 an hour. One company did not respond to this question.



GENERAL RECRUITMENT OR TRAINING PROBLEMS

The last question in this section was an open-ended question. The question asked by the interviewer was, “We would appreciate your opinion and comments on recruitment and training problems in the plastics industry.”

The comments provided by the company representatives are:

- Not enough local training available; rural community wants more money than what company can afford.
- Recruiters will sometimes move a person for a dollar per hour more from one company to another. Training is not a problem per se.
- Skills are unique and difficult to come across.
- Challenge to find capable employees to run the machines.
- Can't get talented people in rural area.
- Recruitment for last three years hasn't been a problem due to flat economy since it is economy driven--better than five years ago.
- Hard to find qualified employees with experience.
- Difficult to bring qualified people to rural areas.
- Graduates of local colleges are not staying in the area.
- Took a long time to hire qualified people two years ago, things are better now, haven't had the need to recruit lately.
- People who graduate from school think they can demand more money than they are worth.
- Have promoted from within. Have hired new employees from PCT-very happy with Penn College students.
- Challenge to find someone with prior experience.
- Not enough qualified kids coming out of high school; kids not choosing science.

MAJOR CHALLENGES

The more qualitatively focused area of the study included asking the interviewees to identify major problems they are encountering in five main areas. These areas are:

- Financial
- Technical
- Training and Development
- Research and Development
- Global/International

The following section provides a summary of the issues indicated by the plastics manufacturers for each category. Following the summary information, a table is included which indicates detailed information in terms of the major issues faced by each organization.

FINANCIAL

The main financial concerns indicated in the survey revolved around the concept of escalating costs. The interviewees indicated that the following costs were escalating and were of financial concern:

- Raw Material
- Healthcare
- Training
- Innovation
- Funding for R&D

They also indicated a need to grow their manufacturing organizations in what is widely perceived as a flat market.

TECHNICAL

The technical issues revolve around finding new materials, receiving training on new equipment or technology and how to understand where is the best place to leverage technology within the organization. Here are the following needs:

- Materials
 - Finding new materials
 - Developing new materials
- Training on Automation Technology
- Getting New Technology Implemented
- Pressure to Automate Without the Knowledge of How or Where to Get the Most Impact

TRAINING AND DEVELOPMENT

Training and development issues focused on both new personnel and existing personnel in both operator and R&D positions.

- Training New Employees
- Need to Train 24/7 at Our Location
- Soft Skills Training
- Hands-on Skills/Technical Training
- Hard to Find Qualified Employees Locally

RESEARCH AND DEVELOPMENT

Research and development issues again focused on materials similar to technical issues previously. The issues also revolved around predicting new materials and new material development.

- Materials
 - Finding new materials
 - Developing new materials
- Need More Qualified Testing Labs
- Trying to Justify R&D
- More Education in R&D of Current Employees
- Predicting New Materials

GLOBAL/INTERNATIONAL

The primary global issue was competition. However, a few of the companies indicated that they needed increased assistance to increase product/company visibility overseas.

- Competition
 - Pacific Rim
 - Europe
- Letting Others Know We Exist
- Getting Our Products Overseas

SUMMARY OF CHALLENGES

Specialty of Company	Size of Company (# of employees)	Financial Challenges	Technical Challenges	Training and Development Challenges	Research and Development Challenges	Global Challenges	Number one Concern
Processor	20	Ensuring timely customer payments	Cost of hiring technically skilled people	Cost of training	Opportunities to collaborate with suppliers are less	Foreign competition	Remaining competitive
Resin Supplier/Compounder	21-40	Escalating material costs	Training on technology	Training employees on specific skill sets	No challenges currently in this area	Exporting/importing, ISO certification	Financial constraints
Processor	40	Foreign competition	Technical training	Train employees within plant (too much time traveling to training)	N/A Satellite plant	Foreign competition	Maintaining skill level of workforce
Processor	81-100	Finding qualified employees	Getting new technology implemented	Need to train our employees in new techniques and methodologies	Automation needs	Continued imports from Pacific Rim	International challenge
Processor	81-100	Corporate taxes Escalating raw material costs	Need access to higher level technical resources	Need access to existing college level courses during the day	Not enough qualified testing labs in the area	Costs rising for materials Customers want lower prices	Costs rising for material Customers want lower prices
Processor	81-100	Customers requesting lower priced products	Cost of purchasing new technology	No challenges currently in this area	Do not conduct R&D	Cost of doing business in the USA is high compared to other countries	Cost of doing business is too high
Mold Maker	100	Volatility of pricing for fuel and plastics	Lack of variety of resins to mold with	Market costs of employees accelerate faster than their return to company	Search for new materials	Delivery of product to off-shore purchasers	Resins and conversion costs are volatile
Processor	100	Finding ways to grow in a flat market	Working with new materials	More training in quality and statistical areas	Developing flame retardant materials	Environmental issues	Remaining technologically competent
Processor	130	Funding for R&D	Employees need an understanding of materials	Need more time to train employees	Materials and process development	Educating others on our capabilities	Managing growth
Processor	215	Pricing by global competition	Costs of purchasing new technology	Soft skills training (team work, job commitment)	Predicting next generation of materials and ability to be the first one there	Continued imports from Pacific Rim	International challenge
Processor	240	Getting money for infrastructure	Keeping up with the increasing speed of technology	Training workers on technology, employing people with hands-on skills	More money is needed for R&D and trying to justify the need to spend on R&D	Offshore pricing and competing with less expensive labor supply	International challenge

SUMMARY OF CHALLENGES (CONTINUED)

Specialty of Company	Size of Company (# of employees)	Financial Challenges	Technical Challenges	Training and Development Challenges	Research and Development Challenges	Global Challenges	Number one Concern
Outsource (extrusion)	250	Affordable tooling	Color reading (color match)	Employing people with "hands-on" skills	Developing non-PVC products	Tooling requirements	Access to low cost tooling
Extrusion	250	Finding qualified people at a reasonable price	Training on technology	Hard to get qualified employees locally	Develop new products, having a qualified staff to develop new products	European market competition	Qualified people
Processor	400	Obtaining the proper return from a project	Maintenance and caring of old equipment	Need more time to train new employees since we are in a growth spurt	More education of the personnel in quality of the R&D process	Continued exportation of the plastics industry to Pacific Rim	Financial constraints which inhibit growth
Processor	450	Escalating material costs	Employees need an understanding of Thermo-forming	Training new employees	Automation needs	Foreign competition	Maintaining skill level of workforce
Processor	480	Escalating raw material costs	Need for growing automation	Hard to get qualified employees locally	Automation needs	Continued imports from Pacific Rim	Maintaining skill level of workforce
Processor	600	Escalating raw material costs	Need for growing automation	Hard to get qualified employees locally	Wider range of materials, other grades of resin, which are less expensive but acceptable in products	Continued imports from Pacific Rim	International challenge
Processor	620	Demand for products is declining (fad or trend?) Resin prices	New resins	Math skills	New product development	Foreign competition	Skilled workforce
Processor	700	Health care costs Competition	Innovation	Training new employees Training existing employees in new processes	New product development	Pacific Rim competition	Remaining competitive in terms of pricing
Processor	900	Material pricing Training staff	Tool and processing expertise	Training staff due to 24 hour shifts	No challenges currently in this area	Material pricing Global market competition	Maintaining skill level of workforce
Processor	2000	Escalating material costs	Making higher quality product with lower cost	Train employees within plant (too much time traveling to training)	Need people more knowledgeable on testing	Continued imports from Pacific Rim	International challenge

SUPPORTING EVIDENCE FROM ADDITIONAL REPORTS

This section describes how the findings of this report align with other studies conducted on the plastics industry and how the local plastics industry compares with the state-wide and national plastics industry.

NEED TO INCREASE TRAINING

According to a 2003 report titled, “*Back to Prosperity: A Competitive Agenda for Renewing Pennsylvania*,” prepared by the Brookings Institution Center on Urban and Metropolitan Policy in Washington, D.C., the share of Pennsylvania’s employment in manufacturing has fallen from 30% in 1970 to 14% in 2000. The report urges that to return to prosperity Pennsylvania needs to, among other things, invest heavily in education and training and promote development in key select industries that promote the revitalization of older communities.

This report supports the findings of this study, which clearly indicate that the plastics industry in central Pennsylvania would benefit from a concentrated training and development effort.

NEED TO INCREASE R&D EFFORTS

According to a January 2004 article in the “Wall Street Journal” titled, “*Top Tech Firms to Boost R&D Spending*,” overall R&D spending by US firms will edge up only 1% to a combined \$181.14 billion in 2004 from \$179.62 billion in 2003 based on data from the National Science Foundation and compiled by research firm Battelle Memorial Institute and “R&D Magazine.” The lackluster growth is likely to have an impact on companies’ growth prospects because innovation plays an important role for western companies in keeping them ahead of Asian competitors.

This finding supports the need of these plastics manufacturers to partner with academic institutions and other organizations to continue to invest in R&D in an attempt to stem the tide of international competition.

NEED TO INNOVATE

According to a January report issued by the President’s Council of Advisors on Science and Technology (PCAST) titled, “*Information Technology Manufacturing and Competitiveness*,” the loss of intellectual capital—research and development, innovation and design are of great concern in terms of the current state of manufacturing within the United States. The report states that a number of foreign countries not only manufacture products that have become commoditized, but they are developing the fundamental capacities to compete with the US in the area of innovation of new products. This is a clear threat to the plastics manufacturing industry within Pennsylvania.

A positive note of the report is that findings indicate that areas that possess both strong R&D centers and manufacturing capabilities have a competitive advantage. The report states that innovation seems to emerge best from clustering of manufacturing, R&D and appropriately educated and skilled workers.

This finding supports the idea of creating a manufacturing industry group (cluster) and bringing that group together on a regular basis with the support of an academic and/or R&D organization to address the challenges facing the plastics manufacturers in central Pennsylvania.

PLASTICS CLUSTER STATISTICS (LYCOMING COUNTY)

According to data provided by the Pennsylvania Department of Labor and Industry's Center for Workforce Information and Analysis (CWIA), Lycoming County has increased the number of jobs in the plastics industry from 814 in 1995 to 1,057 in 2001 and has seen a 29.85% growth in employment compared to a 4.7% growth across the state for the 1995-2001 time frame. However, the wage growth was below the state average which was 16.7%, while Lycoming County's was 13.93%. Additionally, the average wage in the plastics cluster for Lycoming County was \$29,383 as compared to the statewide average of \$35,655.

ADDITIONAL RELATIONSHIPS

The PMC should continue establishing relationships within the plastics cluster with organizations that are both suppliers and consumers of plastic materials. The cluster descriptions below were obtained from the report published by Deloitte Consulting, LLP titled, *"Manufacturing Pennsylvania's Future: Regional Strategies That Build From Current Strengths and Address Competitive Challenges."*

The idea is that the plastics cluster is both a supplier and a consumer of products within various supply chains within Pennsylvania. The concept is that the academic, private and governmental agencies working to strengthen the plastics industry within Pennsylvania should also focus on the companies that buy products and sell products to the plastics industry. Strengthening the entire cluster or value chain is what will increase the likelihood of prosperity and success within the central Pennsylvania plastics cluster.

BUY RELATIONSHIPS IN PENNSYLVANIA

Manufacturing industries from which companies in this industry purchase materials or supplies:

- Basic Chemical Manufacturing
- Converted Paper Product Manufacturing
- Glass & Glass Product Manufacturing
- Other Chemical Product & Preparation Manufacturing
- Paint, Coating & Adhesive Manufacturing
- Petroleum & Coal Products Manufacturing
- Resin, Synthetic Rubber & Artificial Synthetic Fibers & Filaments Manufacturing
- Support Activities for Rail & Road Transportation
- Warehousing & Storage

SELL RELATIONSHIPS IN PENNSYLVANIA

Manufacturing industries to which manufacturers in this industry sell their products:

- Food Manufacturing
- Beverage & Tobacco Product Manufacturing
- Wood Product & Paper Manufacturing
- Textile & Textile Product Mills
- Nonmetallic Mineral Product Manufacturing
- Primary Metal Manufacturing
- Computer & Electronic Product Manufacturing
- Transportation Equipment Manufacturing
- Furniture & Related Product Manufacturing
- Miscellaneous Manufacturing

SUMMARY OF RESULTS

An examination of the raw data and the information collected reveals the following:

- 1) Escalating materials costs, coupled with the volatility of material costs, is of financial concern to most companies in the plastics cluster.
- 2) Purchasing and subsequently developing new technologies is an issue in moving forward technologically.
- 3) It is hard for many organizations to find both technically qualified and “soft skills” qualified personnel for operations and technical work, as well as R&D work. (Soft skills being communication, team work, etc.)
- 4) Generic training within the plastics industry is hard to locate and use by small and medium size enterprises (SMEs).
- 5) Need to increase international marketing of available products.
- 6) It is difficult for companies to send employees off-site for training.
- 7) R&D efforts are lacking in part because of a need for qualified individuals and organizations to assist with the R&D efforts.
- 8) Many of these manufacturers only have one plant in Pennsylvania (16 out of 21) which means if the plant in this region shuts down or closes, not only does the Central Pennsylvania Region lose part of its industrial base, but so does the entire state.
- 9) A majority of the companies had at least one plant in other states.
- 10) Plastics manufacturing companies have a difficult time recruiting technicians and operators, but once they are recruited they tend to stay with the company for over five years.
- 11) Plastics companies in the region are expanding both with capital investment projects, as well as with new hires.
- 12) The international challenge to the plastics industry in Pennsylvania stems from both the Pacific Rim, as well as Europe. Plastics manufacturers are competing in a truly global environment.

RECOMMENDATIONS

Based on the data gathered during this study, we conclude that the following actions need to be undertaken to help plastics manufacturers in central Pennsylvania:

- Educational institutions need to work closely with manufacturing organizations to bring training to the manufacturer for operators, technicians and R&D personnel.
- Manufacturing organizations and educational institutions need to work together on R&D efforts to reduce costs for manufacturers and to provide students with “hands-on” experience that can be used on the job.
- Governmental agencies need to investigate incentives, tariffs or other measures to help the companies remain competitive due to international pressures.
- The PMC should expand efforts to establish relationships with both supplier and consumer industries that are related to the local plastics cluster.
- With the majority of manufacturers only having one plant in Pennsylvania (16 out of 21) and a majority (15) having additional plants within the United States, it is important that the cluster work hard to retain the plastics plants within the state or the work could be outsourced overseas or to other states.
- Regional plastics manufacturers need to be more aware of the skill and training levels of the graduates from the Pennsylvania College of Technology.
- A consortium of plastics companies may be able to lobby local, state and federal government for assistance in dealing with international pressures.
- Assistance can be provided to companies from an employee recruitment perspective, as well as assistance with some types of capital expansion projects since many are occurring within the region.
- A consortium-type training initiative would be welcomed by the large majority of plastics companies in the region.
- Leverage the PMC at Penn College as the focal point of a plastics cluster within the region.

SUMMARY RECOMMENDATIONS

The plastics industry is vital to central Pennsylvania. If the industry is to remain strong and compete on an international level, plastics manufacturers need to strongly define their cluster and work to increase collaboration with suppliers, customers and academic institutions.

Central Pennsylvania has a strategic advantage in the plastics industry due to Pennsylvania College of Technology's existing degree programs, labs, faculty and the PMC. The plastics industry has the opportunity to take advantage of that resource to strengthen the plastics cluster and to further expand capabilities within the region.

The resultant industry partnership in plastics will formalize existing one-on-one relationships with the region's plastics manufacturers and strengthen the workforce component to ensure opportunities exist for the emerging workforce.

EXPECTED OUTCOMES FROM DEVELOPMENT OF THE CLUSTER

CPWDC and the PMC utilize industry partnerships as important mechanisms for moving from cluster analysis to engaging in activities that support the cluster. The primary basis for developing industry partnerships is to create a network of support organizations that clearly understands the needs of target industries. In general, the proposed industry partnerships will accomplish the following objectives:

- 1) Convene key players (industry, regional partners and intermediaries) around an industry.
- 2) Serve as a repository for information that will assist workforce, technology development and education.
- 3) Promote career opportunities through the engagement of the K-12 system.
- 4) Create opportunities for appropriate public-private sector intervention strategies to support the retention, attraction or entrepreneurial development within industry.

PLASTICS PARTNERSHIP

The "Plastics Industry Partnership" will be used to add value and momentum to existing and emerging initiatives in the region. The PMC will serve as the industry intermediary for this partnership to improve regional services to this highly specialized industry.

The PMC is strategically positioned to assume this leadership role for several reasons:

- The existing support structure for industry in the form of infrastructure, product development, testing equipment and process technology.
- Unique accredited educational support provided by Penn College's Associate and Bachelor Degrees in plastics and polymer technology.
- Established relationships with industry through process and training projects.

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- Expertise of staff and access to a wide network of instructors and consultants to provide up-to-date and relevant resources.
 - Established partnerships with Ben Franklin Technology Partners and Industrial Resource Center networks, as well as the Central Pennsylvania Workforce Development Corporation.

APPENDIX A

INTERVIEW QUESTIONS

Introduction

I am here to ask you a few questions concerning your company in an attempt to form a local industry group to address some of those issues.

I am going to ask you about challenges you face and would like you to provide some insight into the impact and severity of those challenges for your organization. The challenges I am going to ask you about are in five areas.

Financial Challenges	Technical Challenges	Training and Development Challenges	Research and Development Challenges	Global Challenges
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Please feel free to add another category if you feel it is appropriate.

- 1) What are the greatest financial challenges facing your organization as a plastics manufacturer?

What do you feel could be done to address those challenges locally, by government and academic institutions?

- 2) What are the greatest technical challenges facing your organization as a plastics manufacturer?

What do you feel could be done to address those challenges locally, by government and academic institutions?

- 3) What are the greatest training and development (educational) challenges facing your organization as a plastics manufacturer?

What do you feel could be done to address those challenges locally, by government and academic institutions?

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- 4) What are the greatest research and development challenges facing your organization as a plastics manufacturer?

What do you feel could be done to address those challenges locally, by government and academic institutions?

- 5) What are the greatest global challenges facing your organization as a plastics manufacturer?

What do you feel could be done to address those challenges locally, by government and academic institutions?

- 6) Finally out of all the challenges we just discussed, what is your greatest challenge?

How do you see that challenge impacting you in five years if it cannot be overcome?

How do you see your future with that challenge overcome and behind your organization?

APPENDIX B

The Mobile (PolyLab) Project

Mobile Experiments in Polymer Processing, Design and Chemistry

Project Background

Preliminary feedback obtained during the early stages of this study indicated that workforce development was a major issue for the plastics industry and that companies have difficulty hiring qualified employees and finding students who want to work in the plastics industry. As a result of this feedback, a new K-12 mobile lab component was added to the study involving career promotion opportunities.

Pennsylvania high schools have a long and rich tradition of integrating high school engineering programs and college-level engineering technology programs, both at the associate and baccalaureate levels. One exception to this rule is plastics engineering technology. Few high school programs have plastics included as part of the curriculum, and those that do include plastics have difficulty finding support for instruction.

The Plastics Department at Penn College proposed building a mobile plastics laboratory to provide “best demonstrated practices” experiments to loan to Pennsylvania high schools. The proposed mobile plastics lab includes four polymer processing related workstations including injection molding, blow molding, rotational molding and thermoforming technology.

Eleven school districts were identified as key schools in the Central Pennsylvania Region. Each school was asked to identify one or two teachers from their district to attend a free workshop “TDC 112 – An Introduction to the Penn College Mobile PolyLab” on June 24 and 25, 2004. The concept was to train the teachers how plastics manufacturing equipment is used so they can implement this curriculum into their respective schools during fiscal year 2004/05.

Each of the following schools were visited, interviewed and given the opportunity to register for a special seminar on the mobile lab project:

- Bald Eagle School District
- Central Columbia
- Central Mountain
- Danville
- Hazleton Vo-Tech
- Lewisburg
- New Berlin
- Selinsgrove
- State College School District
- Sun Area Vo-Tech
- Warrior Run

Project Results

Four processing workstations were built and tested and an “ACT 48” seminar was offered June 24 – 25, 2004. The focus of the seminar was to certify high school teachers to use the mobile *PolyLab* workstations. Seventeen (17) teachers from five (5) school districts attended, were certified and are now eligible to use the *PolyLab* workstations at their high school during the 2004-2005 academic year. The *PolyLab* workstations will be on loan for one-month periods beginning September 2004. Penn College will provide transportation and set up for the *PolyLab* workstations.

The *PolyLab* project will be supported by the Penn College School of Industrial and Engineering Technology, Outreach for K-12, the Plastics Resources for Educators Program (PREP) and the Plastics Manufacturing Center (PMC). In addition, other industries will contribute to the project and Penn College will solicit additional school districts to participate in future years.

APPENDIX C

Plastics Cluster Meeting

A workshop was held to assemble the members of the plastics cluster group and to provide opportunities for networking, etc. Since global competition was a major topic voiced in the surveys, a well known speaker was invited to present the keynote address at this event. Also, a panel of industry experts was assembled. An event announcement is show below.

This meeting received high praise and marked the first assembling of the central Pennsylvania industry cluster. Significant issues were discussed at the meeting, and solutions were offered. Follow up is needed to begin the process of solving major issues in common to the group.

The following is the meeting announcement:

GLOBAL COMPETITION WORKSHOP

for

Central PA Plastics

Tuesday, June 15, 2004

9:00 AM – 2:00 PM

(Lunch Included)

Thompson Professional Development Center

Mt. Laurel Room

Pennsylvania College of Technology, One College Avenue, Williamsport, PA



KEYNOTE SPEAKER

Roger Jones, President, Franklin International

PANEL DISCUSSION

“Global Competition, What’s Working?”

“PLASTICS CLUSTER SURVEY” RESULTS