

Annual Report · Year Ending June 2000

Helping Indiana businesses prosper in the information age

DIRECTORS' MESSAGE

Helping Indiana businesses prosper in the information age



Robert A. Greenkorn Director



David R. McKinnis Director

Purdue University's Technical Assistance Program (TAP) was established in 1986 to help business, industry, and governmental units implement new technologies that benefit the citizens of the State of Indiana. Since that time, TAP has worked with over 4,000 companies, business start-ups, entrepreneurs, and others to help them grow in Indiana. This report contains many examples of how Purdue is successfully partnering with talented business people in our state.

The information age is causing a significant impact on the Indiana economy. Our strong base of manufacturing companies must make transitions to e-commerce, fully integrated product development systems, and enterprise resource planning. Our emerging high technology sector must attract and employ the thousands of information technology students graduating from our colleges and universities.

In response to these needs, Purdue has consulted with business leaders and developed plans to expand its partnerships with Indiana companies. The university is working with the legislature to expand TAP to twelve metropolitan regions so that all manufacturing and high technology companies have local access to the expertise they need to prosper in Indiana. We look forward to an expanded role in the support of existing businesses and the growth of new high technology companies.

Robert A. Greenkorn (effective July 1, 2000) David R. McKinnis July 2000



BENEFITS FOR INDIANA

The Technical Assistance Program (TAP) connects Indiana business, industry, and governmental units with the vast resources of Purdue University. TAP works cooperatively with other Purdue economic development programs, state agencies, and local economic development groups to meet the challenging needs of Indiana companies.

Since 1986, TAP has:

- Strengthened the competitiveness of industrial and high tech companies through the adoption of state-of-the-art technologies.
- Increased the placement of Purdue graduates in Indiana through summer intern and high tech job fair programs.
- Implemented environmental improvements such as the reduction of odors from industrial processes, pollution prevention, and more efficient operations of local wastewater treatment plants.
- Provided ready access to information and document delivery through the Technical Information Service.

Through TAP, over 150 Purdue faculty, professional staff, graduate engineers, and students serve 600 companies each year. The benefits to the State of Indiana have been significant.



Technical Assistance Projects

Each year, over 300 companies receive confidential, no cost assistance on short-term projects. Extended projects are available on a funded basis.

Common project topics include:

Information Technology

- » Electronic commerce issues
- » Web-based computing
- » Networking
- » Improvement of computer-assisted engineering methods

Business Management

- » Financial management
- » Business strategy
- » Product costing, pricing, and marketing

Advanced Manufacturing

- » Implementation of lean manufacturing practices
- » Plant layout in production and warehouse areas
- » Process improvements for machine centers, assembly lines, and individual workstations
- » ISO and QS 9000 issues

Product Development and Engineering

- » Review of design changes and improvements
- Material selection for specific applications
- Problem solving such as corrosion or component failure

Environmental

- » Waste treatment and disposal problems
- » Industrial odor problems
- Compliance with environmental regulations
- » ISO 14000 issues

TAP Program Mission

To help business, industry, and governmental units implement new technologies that benefit the citizens of the State of Indiana.

Technical Information Service (TIS)

Each year, TIS performs hundreds of information searches and delivers thousands of documents.

Common requests include:

- » Engineering and technology documents
- » Marketing information
- · Biological, veterinary, and pharmaceutical sciences questions
- » Information on management practices
- Agricultural questions

Summer Intern Program

Hundreds of students from Purdue campuses have been placed with Indiana companies to work on e-commerce, product development, manufacturing, environmental, and industrial management projects.

Typical projects include:

- Implementation of e-commerce and web-based business systems
- » Lean manufacturing
- » Improvement of ISO and QS 9000 quality systems
- » Development of environmental management systems
- Selection and implementation of management systems such as costing and scheduling
- » Product design, testing, modeling, and evaluation
- Infrastructure projects for municipalities

High Tech Job Fair for Indiana Companies

This event is held each fall at the Purdue West Lafayette campus and helps 100 Indiana companies compete for Purdue graduates in high tech fields.

Program Funding

Fiscal Year 1999-2000

During the past fiscal year, the Technical Assistance Program and the Technical Information Service were supported by state funding and fees for services.

Funding Source		
State of Indiana	\$1,121,300	
Fees for Service	\$329,000	
Total	\$1,450,300	

In additon to the above funding, the total payroll for TAP summer interns (paid directly to students by their employers) was \$460,000.

The Technical Assistance Program is administered by the Purdue University Schools of Engineering.



TAP Annual Report 2000 3

BENEFITS FOR INDIANA

The many achievements listed in this report reflect a strong working relationship between talented business people in Indiana and dedicated faculty, staff, and students at Purdue University. TAP clients are asked to provide feedback on the assistance received. Nearly all report a positive experience with TAP programs and about half are able to provide specific economic impact numbers.

Economic Impact Summary

May 1986-June 2000 Based on client evaluations of TAP work with Indiana businesses

	Year 1*	Year 2*	Total
Capital Investments	\$39,342,100	\$19,315,600	\$58,657,700
Cost Savings	\$13,345,930	\$10,889.590	\$24,235,520
Increased Sales	\$81,014,600	\$198,237,100	\$279,251,700
Jobs Added	447	974	1,421
Jobs Saved	1,295	1,092	2,387

* Following date of TAP assistance



TECHNICAL INFORMATION SERVICE

The Purdue Technical Information Service (TIS) uses advanced search techniques and databases to quickly find and deliver publicly available information from worldwide sources. TIS also performs web-based information searching for clients who need assistance with difficult information requests.

Information provided includes governmental reports, statistics, standards, patents, journal articles, books, media publication reprints, trade association data, business trends, emerging technologies, trade show dates, medical facts, demographic information, and marketing trends.



Suzanne Ward, manager of TIS, and Linda Christie use advanced search methods to respond quickly to a company request. Since 1986, the program has performed over 4,000 information searches.



Three-fourths of TTS information requests are filled from the vast collections of the Purdue library system. Information can be delivered by U.S. mail, overnight carrier, fax. and. in some cases, electronically. To date, 130,000 documents have been delivered to TTS customers.

For the convenience of Indiana companies, the TIS billing service includes all applicable copyright fees and accepts major credit cards.

PARTNERSHIP EXAMPLES

T-Square Gary

Structural analysis methods

T-Square was established in 1994 and provides custom satellite communication equipment to broadcast television, cable, and telecommunication companies. The company requested TAP assistance with the analysis of the effect of wind loading on a five-meter diameter satellite antenna. Using advanced analysis methods, Masoud Mojtahed helped the company identify design modifications needed to comply with new customer requirements. The design modifications have been implemented with no increase in the cost of the antenna, and have helped this small company quickly respond to the needs of an important customer.

Hal Tezcan, partner in T-Square, discusses the features of a five-meter satellite disb with Masoud Mojtabed, associate professor of mechanical engineering at Purdue Calumet, and Stephen Benson, mechanical engineering student.



Viskase Kentland

Automated data entry



~ Duane Dunlap, associate professor of industrial technology. and Greg Hall, manager of Viskase Technical Services, review scanning methods for data entry.

The Viskase Kentland plant produces a wide variety of cellulose and plastic packaging for the meat processing industry. Duane Dunlap responded to a request for assistance with data entry automation. He introduced the company to the available options and provided hardware and software recommendations. With this assistance, the company has internally developed and successfully implemented an automated system for collecting quality control data. The system has greatly reduced paperwork, and provides easy access to the information through a database.

Tyson Foods, Inc. Corydon

Odor control



Tom Webrenberg, environmental manager, Matt Reff, water quality superintendent, and Ron Wukasch, professor of environmental engineering, discuss recent upgrades to the wastewater treatment facility.

The Tyson Corydon plant is in the company's deli division and processes poultry for customers throughout the Midwest. The company asked for TAP assistance with odor control in their wastewater treatment facility. Ron Wukasch visited and found the odors to be anaerobically generated and biodegradable. He recommended that the odor-causing gases be collected and vented to the compressor inlet in the existing aeration system for wastewater treatment, where the odors would be scrubbed and subsequently biodegraded. This recommendation was implemented at very low cost and has significantly reduced odors.

THOMSON multimedia Indianapolis

Electrostatic discharge testing

THOMSON multimedia engineers, manufactures, and markets display components and consumer products such as televisions, VCRs, camcorders, digital decoders, DVD players, audio and communications products, and professional video equipment. The company requested a TAP assessment of new developments in electrostatic discharge susceptibility testing, and the protection of sensitive electronics from electrostatic discharge. The information provided by TAP is being used to implement more advanced product development standards and testing protocols.

Steve Crouch (center), manager of product reliability, describes THOMSON's new HDTV systems to Eric Furgason (left), professor of electrical and computer engineering, and Chris Smith, graduate student.



PARTNERSHIP EXAMPLES

Schafer Gear Works, Inc. South Bend

Manufacturing cells



~ Doug Fozo, project manager, and Jack Posey. TAP consultant, discuss the company's use of manufacturing cells.

Schafer Gear Works is a custom gear cutting and machining company that provides precision components to a broad range of industries. The company asked TAP to help them develop a productive manufacturing layout for their new 115,000 square foot facility in the Blackthorn Industrial Park. Jack Posey and Carlos Simón, TAP industrial engineering graduate student, evaluated several options and recommended that most production machinery be grouped into manufacturing cells. The cells were designed to produce components from start to finish with minimal inprocess inventory and material handling. The company's use of manufacturing cells, combined with new state-ofthe-art equipment, has resulted in substantial cost savings.

Midwest Roll Forming & Manufacturing, Inc. Pierceton

Material handling

Midwest Roll Forming is a premier supplier of roll formed parts to major trailer manufacturers such as Stoughton, Wabash National, and Monon HPC. The company requested assistance in developing a low-cost method for stacking and moving bulky and cumbersome long parts as they are produced. The objective was to enable continuous production from the roll forming line. TAP worked closely with a company team to develop a very simple and effective solution. The new material handling system was produced by the company and successfully implemented, increasing productivity of the roll forming line by 15 percent.

Joe ElGomayeI, associate professor of industrial engineering, Cliff Travis, graduate student, and Dan Franke, director of operations for Midwest Roll Forming, review the new material bandling system for 53-foot long parts called wear bands (protective plates installed inside trailers).



Great Dane Power Equipment, Inc. Jeffersonville

New plant layout



~ Herman Estrada, graduate student in industrial engineering, and Jack Posey, TAP consultant, discuss the assembly line layout for the popular Super Surfer Stand-on Rider with Mark Bland, director of engineering, and David Scharf, president.

Great Dane designs and manufactures commercial lawn equipment that is sold to customers worldwide. In just four years, this new company has grown to over \$22 million in sales and 80 employees. In order to continue this rapid growth, TAP was asked to develop a plant layout for the company's new 70,000 square foot manufacturing facility. TAP provided recommendations for space usage, material handling efficiency, and assembly line layouts that are being used to increase production to record levels.

Dynamic Corporation Montmorenci

Statistical analysis

Dynamic Corporation specializes in the design and manufacture of high-powered resistors and is a leading supplier of dynamic braking systems to the locomotive industry. The company asked TAP to assess the effect of a proposed material change on the quality of a resistor product. Regina Becker and Dwight Beaudry performed statistical analysis of current process performance information and predicted the effect of using the proposed lower cost material. This information indicated that the proposed material would meet customer specifications. An engineering change was implemented, resulting in internal cost savings and a 3.5 percent price reduction for their customer.

~ Dwight Beaudry, graduate student, and Regina Becker. manager of statistical consulting at Purdue, discuss material specifications with Frank Nachman, senior project engineer. and Chad Laux. project and training manager.



Partnership Examples | Summer Interns

Advanced Anatomical, Inc. Fort Wayne

Development of new polymers



~ Karthik Ramani, professor of mechanical engineering, and Daniel Scherer, president and CEO of Advanced Anatomical, discuss the features of anatomical models.

Advanced Anatomical, a member of the Ventura Group, is a major supplier of anatomical models for medical and educational purposes. The company requested TAP assistance with the development of new materials and processes needed to design products used in surgical training. Karthik Ramani provided background research, recommendations for material formulations, ideas for prototypes, and suggestions for long-term strategy that the company is using in their new product development program.

A key to finding future employees

To date, 667 summer interns have been placed with Indiana companies to work on information technology, product development, manufacturing, environmental, and industrial management projects.

Interns by Region

Process improvements

Monticello Spring

Corporation Monticello

Monticello Spring designs and produces precision coil springs for the automotive and other industries. TAP was asked to help identify the cause of a quality problem on a stainless steel spring. The company was pleased with the input from Tom Kanaby and Mysore Dayananda, and asked Tom to work on additional projects as a summer intern. Tom's intern assignment was to model the dimensional changes caused by heat setting so that the production processes could be refined and improved.



© Thomas Pimmler, vice president, Mysore Dayananda, professor of materials engineering, and Tom Kanaby, summer intern and graduate student in materials engineering, discuss testing metbods for coil springs.

SUMMER INTERNS

FBi Buildings, Inc. Remington

Design/build services



CDoug Sutton, associate professor of civil engineering, Brooke (Chapin) West, civil engineering intern, and Jim Smith (BSCE '88, MSCE '93), senior design engineer for FBi Buildings, inspect the construction of the new Challenger Center at the Purdue Calumet campus. FBi served as general contractor for this facility.

For the past 40 years, FBi has

provided design/build services for churches, offices, commercial facilities, and agricultural buildings. Brooke (Chapin) West was assigned many duties in the design department including software development, CAD drafting, and updating the details library.

Pacer Digital Systems, Inc. Indianapolis

Cryogenic control systems



CEric Shannon, electrical engineering technology intern, and Kevin Oeff, vice president, review the specifications of a control system for a liquid nitrogen cryogenic container.

Pacer Digital Systems designs and manufactures custom control systems for cryogenic containers. Eric Shannon, an electrical engineering technology student, designed printed circuit boards, assisted with the development of an ultrasonic level sensing product line, and wrote software for data collection and two-way communication. His efforts have supported the growth of this small technology-based company.

Pillsbury New Albany Process control



< Joseph Rezutko, electrical engineering technology intern, worked with Frank Pesyan, Pillsbury plant electrical engineer, on modifications of processes in a system using programmable logic controllers and panel views.

The Pillsbury New Albany facility employs 600 people that produce a full line of well-known refrigerated baked goods.

Environmental enhancements



Matthew Smith, mechanical engineering technology intern, worked with Ted lverson, Pillsbury facilities engineer, on environmental enbancements and reviews baving to do with process safety management and training.

TAP Annual Report 2000 11

HIGH TECH JOB FAIR for Indiana Companies

Increasing the placement of graduates in Indiana

Guide Corporation Anderson



Guide Corporation is North America's leading supplier of exterior automotive lighting systems, including both forward and signal lighting. The company has manufacturing facilities in Anderson, Indiana; Monroe, Louisiana; and Monterrey, Mexico. Guide Corporation is also a leader in the development of predictive software tools designed to shorten lead times in developing lighting products for vehicle manufacturers. Leigh Ann Heider (B.S. interdisciplinary engineering, May 2000), was recruited for the Guide Anderson facility at the High Tech Job Fair. Leigh Ann, a Guide industrial engineer, is developing manufacturing cells and lean manufacturing methods for new products.

Future High Tech Job Fairs:

- » Wednesday, October 25, 2000
- » Wednesday, November 14, 2001

For information and registration visit:

» www.purdue.edu/jobfair



~ The annual High Tech Job Fair attracts 100 companies seeking to fill over 600 high tech positions in Indiana.

Economic Partners



Purdue University provides many educational, business assistance, and research programs for Indiana manufacturers, businesses, and governmental units. Visit Connect IndianaTM (www.purdue.edu/Research/ConnectIndiana) for further information.

Don K. Gentry serves as dean of the School of Technology and special assistant to the president for economic development.

Agri-business assistance Cooperative Extension Service Phone: 765-494-8491

Distance learning Distributed Learning Services Phone: 765-496-3337

Continuing Engineering Education Phone: 765-494-7015

Center for Lifelong Learning Phone: 800-359-2968

Exporting assistance

Center for International Business, Education, and Research Phone: 765-494-4463

Industrial painting and finishing

Coating Applications Research Laboratory Phone: 765-463-4749

Industrial training

School of Technology Lifelong Learning and Outreach Phone: 765-494-7967 **Pollution prevention**

Indiana Clean Manufacturing Technology and Safe Materials Institute Phone: 765-463-4749

Purdue Research Park Phone: 765-494-1726

Research and development Division of Sponsored Program Development Phone: 765-494-6200

Technical assistance Technical Assistance Program Phone: 765-494-6258

Technical information Technical Information Service Phone: 765-494-9876

Transportation infrastructure assistance

Indiana Local Technical Assistance Program Phone: 800-428-7639

TAP PERSONNEL

Affiliated Faculty



Mysore A. Dayananda Professor Materials Engineering



Akin Ecer Professor Mechanical Engineering



Joseph I. ElGomayel Associate Professor Industrial Engineering



Eric S. Furgason Professor Electrical and Computer Engineering



Masoud Mojtahed Associate Professor Mechanical Engineering Calumet



Sherry L. Million

Secretary

Cindy L. David Administrative Assistant



Joseph T. Pearson Associate Professor Mechanical Engineering



Jack W. Posey Consultant Industrial Engineering

TAP Staff

TIS Staff



Robert A. Greenkorn TAP Director & Professor Chemical Engineering





David R. McKinnis TAP Director (effective July 2000)



Regina Becker Manager Statistical Consulting





Linda L. Christie Library Assistant

Mary M. Dugan Information Specialist

Angelin L. Muliadi Industrial Engineering Chris D. Smith Electrical and Computer Engineering Cliff C. Travis Industrial Engineering



Vickie L. McLaughlin Library Assistant

Christina L. Wassel Statistical Consulting Barbara W. Werner Management Hui Zhao Industrial Engineering



Suzanne M. Ward TIS Manager

TAP Graduate Students

Darcy Anderson Management Dwight J. Beaudry Statistical Consulting Kerry E. Brown Industrial Engineering Shawn A. Cefalu Materials Engineering

TAP Annual Report 2000

14



Mechanical Engineering

Jonathan S. Hanson Mechanical Engineering Christopher R. Jadro Management Yong Gu Ji Industrial Engineering Thomas R. Kanaby Materials Engineering

Linda K. Chadwell Clerk

Qimin Li Mechanical Engineering Lian Peet Loo Mechanical Engineering IUPUI James P. Maligas Industrial Engineering





Garnet E. Peck Professor Industrial Pharmacy



Juanita L. Thayer Secretary



Damay Peter Information Specialist



Karthik Ramani Associate Professor Mechanical Engineering

Manager of

Bruce Fox, Inc.

David A. Dull

Tuthill Transport Systems

President and Chief

Executive Officer

Associates, Inc.

Stephen S. Essex

New Albany

President

Brookston

Eikenberry &

Kokomo

President

Seymour

Essex Machine



James G. Skifstad







Keith V. Smith Management



A. Charlene Sullivan Associate Professor Management



Civil Engineering



Ronald F. Wukasch Professor Civil Engineering

Ron Overton

Edinburgh



TAP Advisory Council

Comprised of business leaders throughout Indiana

Richard P. Cochran Patrick J. Gartland Vice President of Manufacturing Services Manufacturing Atlas Foundry

Company, Inc. Marion David C. Grebe

Vice President and General Manager CTP Corporation,

Division of Tube Michael G. Eikenberry Processing Corp. Indianapolis Gregory S. Griffin Economic Development/

Market Research Consultant Indianapolis Power & Light Company

Indianapolis

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> C. Mark Hubbard President and Chief **Executive Officer Evansville Sheet** Metal Works

Evansville James N. Hufford, retired

Former Vice President of Research, Development, and Engineering CTS Corporation Elkhart

R. Michael Jahns President **G&H** Wire Company Greenwood

Ann Johnson President F.B. Fogg, Inc.

Muncie Chad Juliot

Advanced Product Planning Engineer Hitachi Cable Indiana

New Albany Gary N. Kriadis President Coil-Tran Corporation Hobart

Mark Michael President Fort Wayne Metals Research Fort Wayne

Greggory A. Notestine Vice President Arvin Industries, Inc.

Columbus Robert D. O'Callaghan General Manager Whitney Tool Company

Bedford Jon R. Odom President Productivity Fabricators, Inc. Richmond

Council Chair Chief Executive Officer **Overton & Sons** Tool & Die Company Mooresville Gary Rheude President Adkev, Inc. Goodland Fred C. Stadler President and Chief Executive Officer MAMetal Company, Inc. and County Line Tech

TAP Advisory Board Comprised of Purdue academic leaders

Emily R. Mobley Dean, Libraries Purdue University

G. Allen Pugh Dean School of Engineering, Technology, and Computer Science Indiana University-

Purdue University Fort Wayne

Richard J. Schwartz Dean Schools of Engineering Purdue University

LeRoy F. Silva Director **Business** and Industrial Development Center **Purdue University**

Jerome F. Wermuth Acting Head School of Engineering, Mathematics, and Science Purdue University Calumet

H. Oner Yurtseven Dean School of Engineering and Technology Indiana University-Purdue University Indianapolis

HOW TO REQUEST ASSISTANCE

Assistance Projects

These projects provide recommendations on a wide range of issues including manufacturing improvements, product development, industrial management, and environmental problems.

Typical Projects

- Information technology
- Lean manufacturing
- · Plant and warehouse layout
- E-business
- Design recommendations
- Environmental issues
- Activity-based costing
- · Statistical analyses

Costs and Confidentiality

For qualifying projects, TAP provides up to five days of Purdue assistance at no charge. Extended assistance is available and quoted by project. All project information, including company name, is kept confidential.

Technical Information

The extensive technical collections of Purdue University, as well as sources worldwide, are used to fill information needs on virtually any topic.

Typical Projects

- Technical articles
- · Patent searches
- · Industry standards
- · Marketing data

Costs and Confidentiality

Each request is quoted individually. Typical fees are \$150 for an in-depth information search and \$15 for each document sent. All work is kept confidential. Major credit cards are accepted.

Summer Interns

This program helps companies find qualified students for twelve-week summer projects.

Typical Projects

- · Product design
- E-business
- Lean manufacturing
- Facilities planning
- · Product costing
- · Manufacturing systems
- Civil engineering
- · Computer-aided design
- · Materials testing
- · Software development

Costs and Confidentiality

Interns are employed directly by the company. Competitive compensation for the summer ranges from \$5,000 to \$7,500. There is no charge for limited faculty assistance. All project information is kept confidential.

High Tech Job Fair for Indiana Companies

This event is held each fall at the Purdue West Lafayette campus and helps Indiana companies fill high tech positions.

Information and registration www.purdue.edu/jobfair

Contact Information:

Technical Assistance. Summer Interns, and High Tech Job Fair David R. McKinnis, Director Technical Assistance Program Phone: 765-494-6258 Fax: 765-494-9187 E-mail: tap@ecn.purdue.edu www.purdue.edu/TAP/

Technical Information

Suzanne M. Ward, Manager Technical Information Service Phone: 765-494-9876 Fax: 800-289-3144 E-mail: tis@lib.purdue.edu www.lib.purdue.edu/tis/



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