



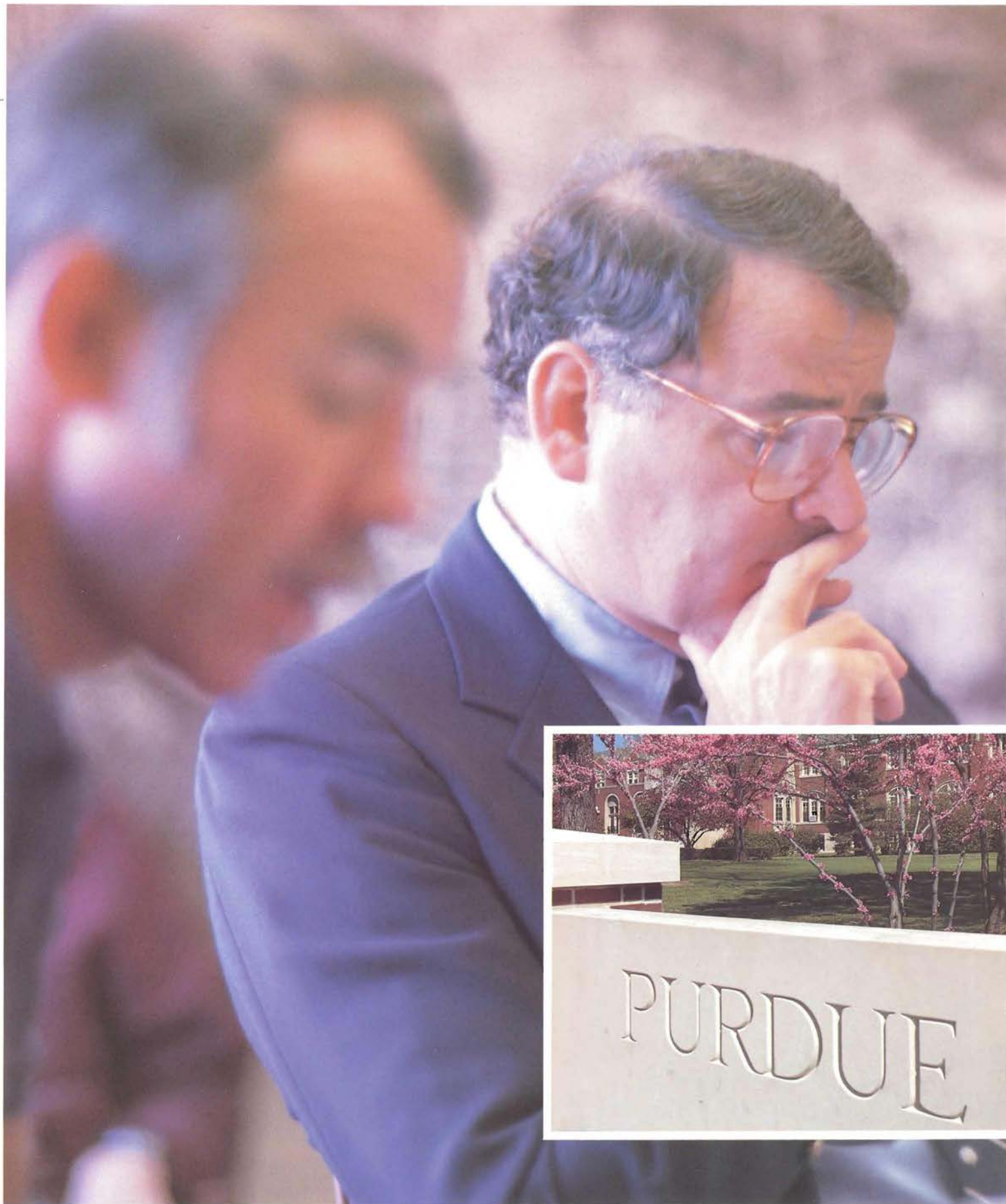
**Technical  
Assistance  
Program**



**Annual  
Report**

**Year Ending  
June 30, 1989**

**Purdue  
University**





## Annual Report

Year  
Ending  
June 30, 1989

### DIRECTOR'S MESSAGE

Much is written today about the need for American industry to make significant changes to compete nationally and internationally. Since its establishment three years ago, the Technical Assistance Program has been responding to this need by working with Indiana organizations, primarily small industries, to help them adopt new and advanced technologies in engineering, manufacturing, and management.

The twenty-five senior research faculty and graduate students in the program have worked with Indiana companies this past year on over 300 projects. The excellent results highlighted in this report speak well of their ability to work effectively with these companies. Furthermore, the results demonstrate the commitment of Indiana firms to make needed improvements and to continually upgrade their capabilities. One in five companies helped by TAP request assistance on a second project.

A unique summer intern program was added in the past year as a further means of helping companies who need extended help in a specific discipline. This program has been very beneficial to the participating companies and is described in detail later in this report.

The past year has been filled with very challenging requests from companies serious about their future, and TAP has continued to respond to these needs on an individual basis. I believe you will see in this report that this combined effort is an important part of making Indiana companies more competitive in the worldwide marketplace.



**Ben Hillberry**

The TAP program utilizes the technical resources of Purdue University to assist Indiana businesses and industries.

## TECHNICAL ASSISTANCE PROGRAM

The Technical Assistance Program (TAP) uses the technical resources of the University to assist small- and medium-sized business, industry, and governmental institutions in implementing new and advanced technologies. Through this process of technology transfer, TAP raises the technology levels of client firms and improves the economic conditions of the state.

The TAP program:

- Transfers technology on a personalized one-on-one basis with the goal of raising the technology level of the client.
- Provides assistance in the area of client interest and commitment.
- Maintains a staff that is familiar with the state-of-the-art technologies and new developments and has access to the entire University, i.e., to senior faculty and select graduate students.
- Focuses on small- and medium-sized firms, a sector with rapidly growing needs for new technologies.









**TAP's primary goal is to help Indiana companies solve technical problems, adopt new technologies, and become more competitive.**



## **FACULTY AND STAFF**

All project work is performed by senior research faculty and graduate students. The TAP faculty has extensive industrial experience as well as a strong commitment to helping Indiana firms. The graduate students, most of whom also have industrial work experience, are selected for their ability to work effectively on a personal basis.

Through regular use of the extensive information resources of the University, including access to all major computer technical data bases and the knowledge and expertise of their colleagues, this group makes available to client firms the technical resources of the University.

## **AREAS OF EXPERTISE**

- Business management
- Engineering:
  - Civil
  - Electrical
  - Environmental
  - Industrial
  - Materials
  - Mechanical
- Food science and processing
- Industrial pharmacy
- Library research



## **Fees and Confidentiality**

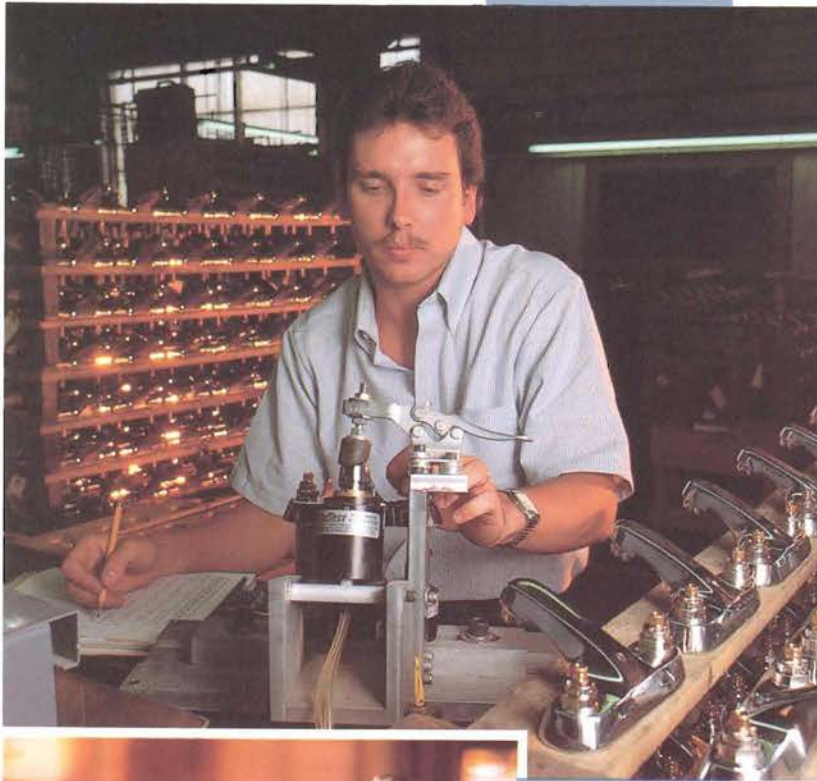
There are no charges for services provided within the scope of the program. However, only a limited amount of time can be allocated to a given project. All project information is kept strictly confidential, including the names of the participating companies.



Bill Witchger, president of Indiana Robotics in Indianapolis, has had many years experience using roll feeds to position materials for manufacturing purposes, e.g., punching holes in rubber gaskets. Through this new company he is offering his own line of roll feeds to industry and has received worldwide interest in these products.

Jeff Mayer has been employed as a summer intern to assist in developing advanced models. Indiana Robotics' customers require rollers that position materials with considerable precision. Stepper motors and other electromechanical devices are used for this precision positioning. Jeff is working on the development of microprocessor based digital controllers that generate the electrical signals which actuate these motors. His work is an important part of the development of state-of-the-art products for Indiana Robotics.

Jeff Mayer, Ph.D. student in electrical engineering, and Bill Witchger, review a prototype of a new roll feed.



**Jeff Albers, a senior in mechanical engineering, observes an improved test procedure for residential faucets.**

Indiana Brass, a Frankfort manufacturer of brass water fixtures, has added Jeff Albers to its staff this summer as part of the company's ongoing commitment to quality improvement. Jeff's work involves developing the methodology, including computer based models, to perform in line testing of various fixtures against critical design specifications. The result of the project will be improved quality and reduced processing costs.

## SUMMER INTERN PROGRAM

Many companies have been introduced to new technologies by TAP that require extended time to adopt. To support these companies TAP has established a unique summer intern program. Through this program a company is assisted in finding a well-qualified student for summer employment on a specific project involving an infusion of new technology, introduction of new analysis tools, or implementation of improved production methods. In turn, the student and the company receive advice and direction on the project from the TAP faculty during the course of the project.

The objectives of the program are:

- To provide small- and medium-sized companies with energetic, new technology-oriented University students for their work force. Students must have completed their junior year.
- To stimulate young engineering, science, and management graduates to seek employment with Indiana industries.
- To provide a challenging work experience for undergraduates that will prepare them to make informed career decisions.
- To develop closer relationships between Purdue University and Indiana industry.

The first year of the summer intern program (1988) was very successful, with the client companies reporting excellent results from the projects and the students stating that they had challenging and meaningful work assignments. This summer ten companies and fourteen students are involved. The accompanying two stories are about this year's interns.

**Bob Stewart, president of BAS OP-TEK in West Lafayette, shows Keith Smith, a TAP faculty member in management, one of the company's current products.**

Advanced manufacturing requires accurate responsive product costing systems. As president of BAS OPTEK, Bob Stewart is involved in the complex environment of manufacturing custom high quality, low volume electronic and mechanical assemblies. Recognizing the need for improvements to an already well-established internal product costing system, he asked TAP for its advice. The TAP personnel evaluated the present system, confirmed certain strengths, and recommended improvements to problem areas. These improvements have been implemented with success; and, while a specific value can not be assigned to these changes, Bob said that his company now knows its costs more precisely, and can make better decisions on pricing and on which products to offer to customers.



TAP offers an informative report on new developments in product costing titled "Cost Management Systems in the New Manufacturing Environment." To obtain a copy, simply contact TAP at the address listed at the end of this report.



**—NU/ERA—**



**TAP helps Indiana companies help themselves to acquire greater skills and implement more advanced methods.**

## PROJECT EXAMPLES

### MATERIALS ENGINEERING

**Design improvements:** A manufacturer of printed circuit boards experienced performance problems on one product due to an unidentified source of contamination. TAP helped the company identify the problem through the use of analytical techniques including energy-dispersive x-ray spectroscopy, and provided recommendations for correction. The company reported that the TAP report was excellent and is being used to make the needed improvements in their circuit board design and manufacturing process.

### ENVIRONMENTAL ENGINEERING

**Sewage system improvements:** Making decisions on large investments in infrastructure can be very difficult for small communities. When the new mayor of a small city asked for TAP input on a needed \$1.2 million improvement to their sewage system, TAP responded by working cooperatively with the city officials and all other parties involved to identify and explain the available options. The mayor was very pleased with the result and has used the information to finalize their decision on the project.

### ELECTRICAL ENGINEERING

**Product quality improvement:** A high volume manufacturer of an AC electro-mechanical device experienced undesirable audible noise on a small percent of production. At the company's request, TAP personnel visited the factory and later provided a number of recommendations to improve the production processes. Since that time the company has implemented a new quality assurance program and is fabricating new selected assembly tools to resolve the problem.

### MECHANICAL ENGINEERING

**Analysis of technical data:** The correct interpretation and understanding of highly technical data is often an important part of product development. This was the situation faced by a company searching for a unique paint formula for exterior use on a new product. TAP, through the use of industry contacts and literature searches, reviewed solar absorptivity and emissivity data and identified alternatives for the given application. With this in-

formation the company was able to work effectively with paint suppliers to arrive at a specific formulation.

#### INDUSTRIAL ENGINEERING

**Analysis of automation systems:** Determining the best method of performing complex automated assembly requires careful analysis. A manufacturer of control devices requested TAP help in comparing three different current methods of fully automated assembly before investing in additional systems at \$1,000,000 each. Working closely with the company, TAP introduced their personnel to manufacturing simulation analysis and clearly identified one of the three methods as superior for their future applications.

#### CIVIL ENGINEERING

**Material substitution:** A home products manufacturer faced a material substitution problem when their sole source for a certain aggregate became exhausted. TAP personnel visited the company to investigate the unique material requirements and made recommendations. Through this effort the company has found an acceptable alternative, which will, in addition, save over \$125,000 annually.

#### FOOD SCIENCE

**Sanitation improvement:** A small food processing company requested assistance with eliminating a mold problem in their jam and jelly products. Information and recommendations to resolve the problem were furnished in a report following an on-site visit and analysis of the processing facility.

#### PHARMACY

**Ozone disinfection:** Licensing a foreign developed technology for ozone disinfection of plastic inserts posed a difficult question for a small southern Indiana firm; how effective was the technology? TAP subjected a sample disinfectant unit to microbiological testing per the manufacturer's specifications and determined that the technology had limited effectiveness. Although the company was disappointed with the findings, they were very pleased with the TAP assistance which led them to decide against licensing the product and thus avoid a costly mistake.

**TAP makes the resources of Purdue University easily accessible to Indiana business.**



The continuous improvement of quality, customer service, and product cost is an ongoing objective at Commercial Filters, a Lebanon based company which manufactures fluid filtration products. Earlier this year Mike Fritz, operations manager, asked for TAP assistance in making manufacturing improvements. One of the TAP recommendations was the use of the work cell concept to improve quality, reduce process times, and reduce costs. To follow through on this recommendation, Sherill Hlavaty, a senior in industrial engineering, was hired for the summer to develop detailed plans for a number of manufacturing work cells. Some changes have already been implemented and others are in process. Mike said he considers this work one of the key elements of their long term commitment to maintaining excellence in manufacturing.

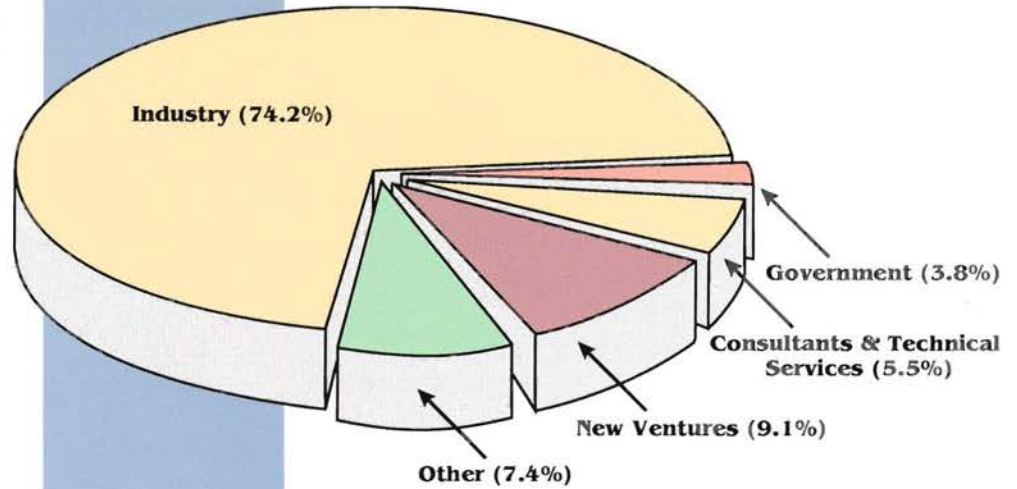
**Sherill Hlavaty and Mike Fritz of Commercial Filters in Lebanon review plans for a revised work cell.**



**TAP has had a major impact on the companies it has served. One in five has requested assistance on a second project.**

## THE TAP CASELOAD

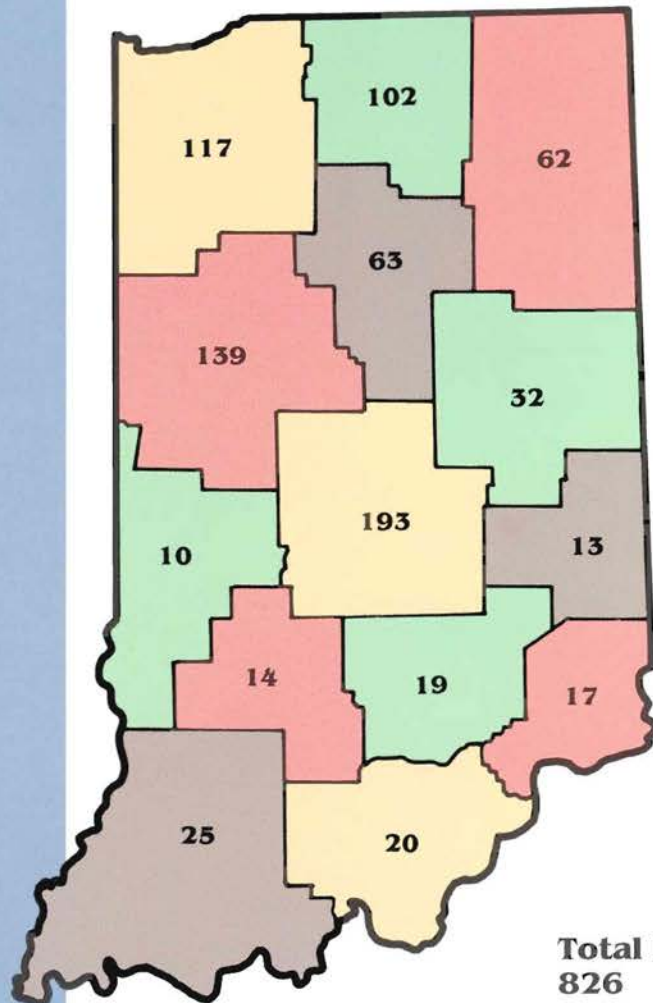
As shown by this chart, three-fourths of the Technical Assistance Program caseload comes from industry. The majority of the organizations served are small- to medium-sized manufacturing companies.



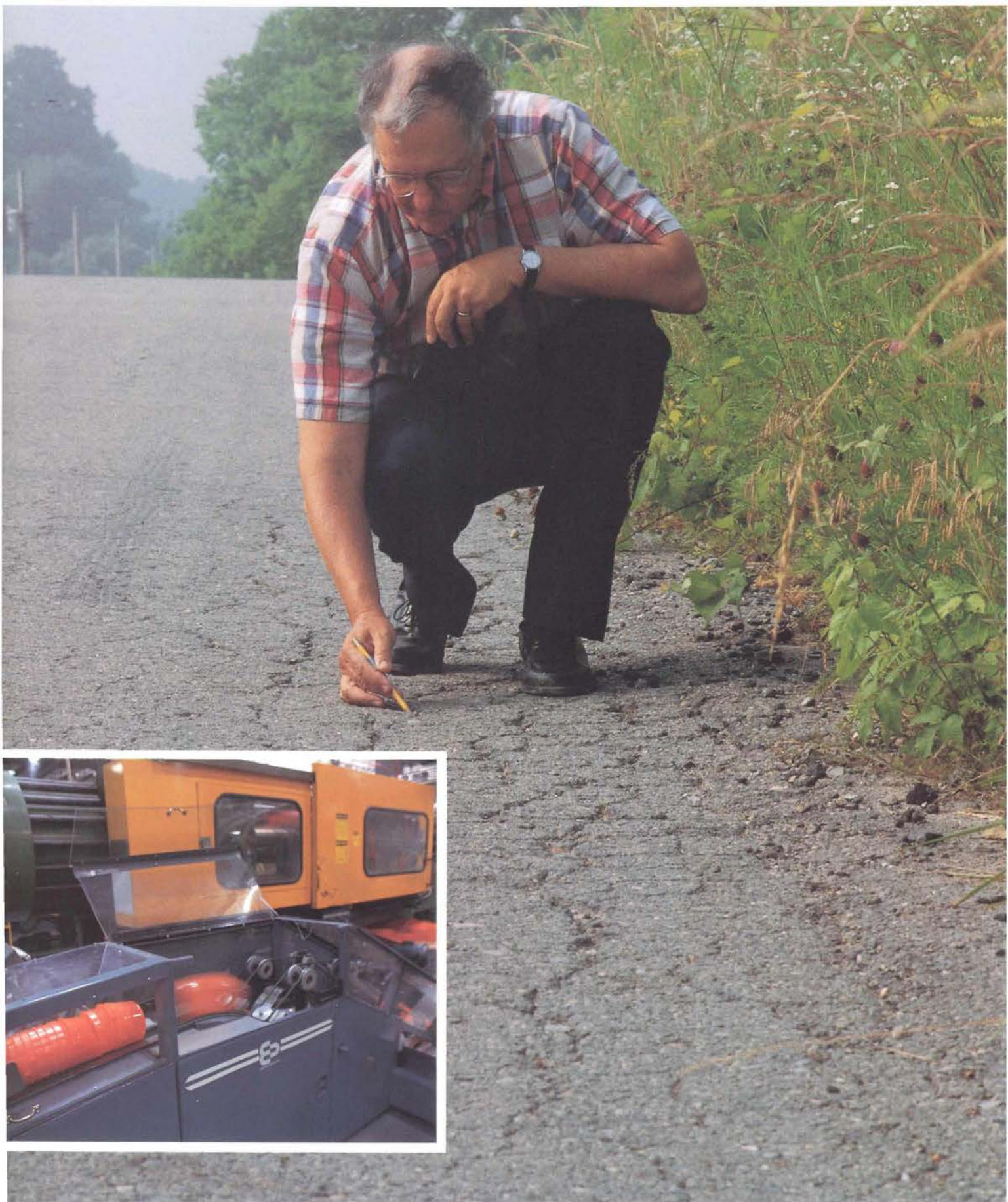
## PROJECTS BY ECONOMIC REGION

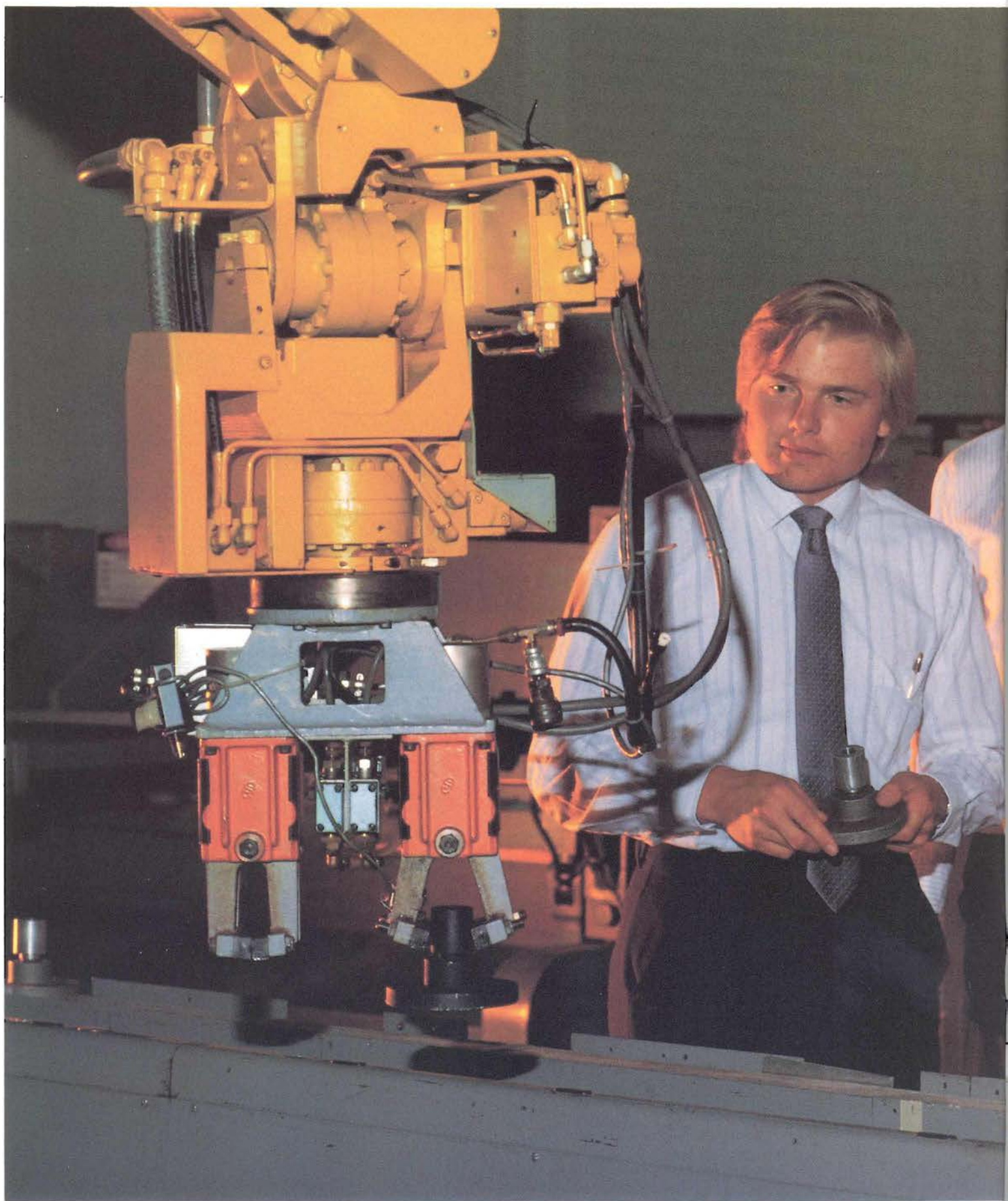
May 1986 through June 1989

TAP has served organizations throughout the state, including companies in every manufacturing sector.



**Total Projects  
826**





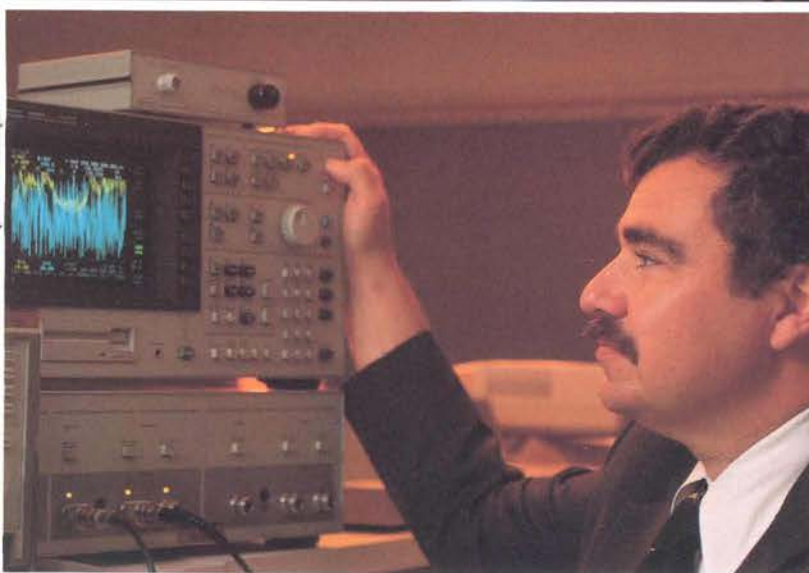


**TAP's primary focus is on small- and medium-sized established industries.**

## ECONOMIC IMPACT DATA

The project results shown here are based on material provided by the users of TAP's service. One in three client evaluations includes specific economic impact data which is summarized in this chart. Many other evaluations include positive benefits of an unquantifiable nature. In total, over 90% of the evaluations state that the TAP assistance was helpful and that the recommendations are being used.

<b>Evaluation Summary</b> (based on Client Evaluations of TAP Assistance) May 1986 through June 1989			
	Year 1	Year 2	Total
Dollars saved	\$668,500	\$694,500	\$1,363,000
Increased sales	\$1,935,000	\$15,415,000	\$17,350,000
Jobs added	55	104	159
Jobs saved	21	30	51



## HOW TO REQUEST ASSISTANCE

To request assistance or to learn more about the Purdue University Technical Assistance Program, please contact:

**Technical Assistance Program  
Purdue University  
West Lafayette, Indiana 47907**

Tel: (317) 494-6258  
FAX: (317) 494-9187



# Technical Assistance Program

## FACULTY



**Ben M. Hillberry**  
Director,  
Technical Assistance  
Program  
Professor,  
Mechanical Engineering



**David R. McKinnis**  
Associate Director,  
Technical Assistance  
Program



**John M. Bell**  
Civil Engineering



**David P. DeWitt**  
Mechanical Engineering



**Charlotte A. Erdmann**  
Libraries



**Gerald T. Heydt**  
Electrical Engineering



**Samuel J. Hruska**  
Materials Engineering



**Bernard J. Liska**  
Food Science



**Colin L. Moodie**  
Industrial Engineering



**Dean E. Nold**  
Electrical Engineering  
Technology



**Garnet E. Peck**  
Pharmacy



**Charles F. Scholer**  
Civil Engineering



**Keith V. Smith**  
Management

## GRADUATE ASSISTANTS



**Cynthia M. Blase**  
Pharmacy



**David J. Dougherty**  
Mechanical  
Engineering



**Gregory A. Loraine**  
Environmental  
Engineering



**Mark P. Leksan**  
Management



**Mauricio Leon**  
Industrial  
Engineering



**Travis J. Matthews**  
Materials Engineering

**TAP is a people-oriented program: it works to transfer technology through individual contact.**

## ADMINISTRATIVE STAFF



**John T. Modlin**  
Mechanical Engineering



**Kraig J. Olejniczak**  
Electrical Engineering



**Michael Stavreffe**  
Management



**"J. R." Steinem**  
Civil Engineering



**Sterling A. Thompson**  
Mechanical Engineering



**Detlef M. Weber**  
Industrial Engineering



**Cindy L. Meadows**  
Administrative Assistant



**Sherry L. Million**  
Secretary

## TAP Advisory Council

TAP is served by an advisory council consisting of 37 outstanding leaders from industry, consulting, government, and education. The chairman of the council is Richard G. Swennumson, president and CEO of LDI Manufacturing Company in Logansport.



The Technical Assistance Program is administered by the Purdue University Schools of Engineering and is supported by the Indiana Economic Development Council.



**TECHNICAL ASSISTANCE PROGRAM**

**Purdue University  
West Lafayette, Indiana 47907**

**Tel: (317) 494-6258**

**FAX: (317) 494-9187**



**Purdue is an equal opportunity/equal access university**