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Company 'floats' new design

By Jake Strait, aerospace engineering student working for CIRAS



Jake Strait (right) works on a rapid prototype with John Roberts.

Hawkeye Steel, located in Houghton, Iowa, manufactures a wide range of agricultural products including grain bins, swine, cattle and poultry production equipment, and feed storage and delivery systems. Hawkeye contacted CIRAS for help in redesigning the float for their Performance One E-Drink, a heated animal drinking system.

"Because of the wide range of our geographic selling efforts in all 50 states and several export markets, we often run into different water delivery requirements for animal drinkers," explains Tom Wenstrand, President of Hawkeye Steel. Some markets, for instance, need to maintain low water levels in their outside drinkers to avoid spillage, often caused by newer animals wanting to "charge" to the drinkers upon arrival. Other client concerns involve problems arising from variable water pressure, says Wenstrand, and the need to adjust water levels for optimum usage.

"We needed a float that would give optimal results in being able to handle a wider range of water pressures and water levels than our current float," says Wenstrand. Working with CIRAS Industrial Specialist Clay Crandall and Iowa State University aerospace engineering student Jake Strait, the company first identified objectives to achieve in the new design. In

addition to developing a blow-molded part, the company wanted to make other improvements, such as increasing the force that is applied to close the valve, reducing the cost of the float, and expanding the range of adjustments in water level. The new float design had to fit into the existing space in the animal drinker and meet the above requirements.

Using three-dimensional modeling software, CIRAS modeled the existing assembly and valve to identify the clearance and motion of the float. CIRAS then developed three design concepts from which Hawkeye Steel selected one to fabricate as a prototype. CIRAS then made a prototype of the float using a Stratasys, Inc., fused deposition modeling (FDM) process that generates a 3-D physical model from a CAD file.

The working prototype was shipped for testing to Hawkeye Steel, which then installed it in a Performance One E-Drink heated animal drinker with satisfactory results. The new design provided a valve-closing force three times greater than the previous design, particularly at critical adjustment positions. Also, the weight of the float was reduced significantly, along with a reduction in material costs. The redesigned water float has enabled Hawkeye Steel to give customers a wider range of water heights. The project spanned less than a two-month period.

"This is a good example of our quest for continuous improvement," states Wenstrand. "The new float should allow us to increase sales and eliminate most if not all warranty situations involving water delivery requirements in extreme situations," he speculates. CIRAS designed a float on a timely, cost-effective basis, according to Wenstrand. "We are working on implementing the production of this float, which will be available in 2004," he adds. ■

For more information on CIRAS engineering services, contact John Roberts, 515-294-0932, jroberts@ciras.iastate.edu.

CIRAS Mission Statement

The mission of CIRAS is to enhance the performance of Iowa industry and associated entities through education and technology-based services.

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Community colleges vital to Iowa's economic development

By Collette A. Saylor, One Source Training Group

Iowa's 15 community colleges play an important and unique role in the success and economic development of Iowa businesses. In addition to the valuable skills they provide to future workers through credit programs, the community colleges also offer new and incumbent workers training programs that help build the skills necessary for successful competition in a global economy. The community colleges partner with area businesses to offer three training programs unique to Iowa.

The Iowa New Jobs Training Program (260E) assists businesses that create new jobs in the state. If a company is expanding or relocating within the state, it can contact the local community college to apply for the Iowa New Jobs Training Program. The community college will help the company obtain upfront training funds from the sale of bonds, which are then repaid from a diversion of employee state withholdings generated by the additional payroll from the new jobs. The company incurs no cost for the program.

The new jobs training program is designed to be flexible. Its scope ranges from providing highly specialized, technical training to basic skills development. Over the last 20 years of partnering with companies that utilize the 260E program, Iowa's community colleges have developed a great deal of expertise in helping businesses identify and provide the training required to increase productivity and reduce the time needed to train new employees.

The Iowa Jobs Training Program (260F) invests state dollars matched with company funds to provide customized training to upgrade or enhance the skills of incumbent workers. Each community college assists businesses in developing training plans and applying for 260F funds. The maximum award is \$25,000 per project, and the company is required to provide matching funds. The training can encompass a broad range of topics, from technical skills to Lean operations to supervisory skills. Since each community college has limited funds, it is important for companies to begin the application process as soon as training needs have been identified.

The Accelerated Career Education Program (ACE) was developed to promote career education opportunities. ACE funding helps the community colleges establish or expand existing programs as a way to meet the workforce needs of Iowa businesses. Working in partnership, the college and local businesses identify the worker skills needed, design programs, recruit potential employees as students, and establish company internships. Funds from the state assist in meeting college infrastructure needs and program costs, as well as providing student aid to those enrolled in the new or expanded programs.

Iowa's community colleges are the sole providers of these types of training programs for new and relocating businesses. ■

For additional information, contact the community college closest to you.

Des Moines Area Community College 2006 S. Ankeny Boulevard Ankeny, Iowa 50021	515-964-6397
Eastern Iowa Community College District 306 West River Drive Davenport, Iowa 52801	563-336-3315
Hawkeye Community College 5330 Nordic Drive Cedar Falls, Iowa 50613	319-277-3806
Indian Hills Community College 525 Grandview Avenue Ottumwa, Iowa 52501	641-683-5216
Iowa Central Community College 330 Avenue M Fort Dodge, Iowa 50501	515-576-7201
Iowa Lakes Community College 19 South Seventh Street Estherville, Iowa 51334	712-362-0431
Iowa Valley Community College District 3702 South Center Street Marshalltown, Iowa 50158	641-752-4645
Iowa Western Community College 2700 College Road Council Bluffs, Iowa 51502	712-325-3375
Kirkwood Community College 6301 Kirkwood Boulevard SW Cedar Rapids, Iowa 52406	319-398-5623
North Iowa Area Community College 500 College Drive Mason City, Iowa 50401	641-422-1541
Northeast Iowa Community College 1625 Highway 150 Calmar, Iowa 52132	563-562-3263
Northwest Iowa Community College 603 West Park Street Sheldon, Iowa 51201	712-324-5061
Southeastern Community College 1015 South Gear Avenue West Burlington, Iowa 52655	319-752-2731
Southwestern Community College 1501 West Townline Road Creston, Iowa 50801	641-782-1443
Western Iowa Tech Community College 4647 Stone Avenue Sioux City, Iowa 51102	712-274-6419

ISU engineering faculty bring expertise to distance education

By Paul Jewell, Engineering Distance Education

One of Iowa's many valuable resources for economic change comes from the reservoir of knowledge available through Iowa State University's College of Engineering. In the past, engineering faculty members have taught several distance education courses that speak directly to Iowa's manufacturing needs and its economic and technological challenges. This spring is no exception. Here are examples of three courses being offered in Spring Semester 2004, along with a quick glance at the top-notch faculty behind them. Over 50 courses are available on-line through the EDE Web site.

Today, the Internet is a vital source of information and communication, as well as a convenient medium for manufacturing companies, large and small, to conduct financial transactions. Nationwide, companies lose billions of dollars each year due to computer attacks and loss of data, according to **Doug Jacobson**, an associate professor in ISU's Department of Electrical and Computer Engineering and director of the ISU Information Assurance Center, which was designated a Center of Excellence in Information Security Education by the National Security Agency in 1999.

"Information warfare security is important for any company that uses the Internet," emphasizes Jacobson, whose course, Information Warfare, will examine computer hacking and ways to monitor, detect, and stop attacks. Designed by Jacobson for individuals working in the areas of information technology and/or security, the course will feature a large lab where students will attempt breaking into a computer network in real time. The process will help them learn how an attack begins and the best defense systems that can be used to stop it. Jacobson is a recipient of two patents in the area of computer security, as well as two R&D 100 awards for developing security-related technology.

Converting agricultural crops into higher value products can effectively revitalize rural economies toward their potential to generate distribution, processing, and manufacturing operations across the state, according to **Robert Brown**, a professor in ISU's mechanical engineering and chemical engineering departments and director of the Center for Sustainable Environmental Technologies at Iowa State.

In an on-line course titled Biorenewable Resources, Brown will focus on alternative uses for agricultural crops that can be derived by converting biorenewable resources into bioenergy and biobased products. Industries that are slated to play a prominent role in this undertaking, according

to Brown, include existing agricultural processing industries such as wet and dry corn milling plants, soybean processing plants, and food processing companies. Additionally, small companies can also participate, points out Brown, by developing niche markets in bioplastics, fiber products, and lubricants.

Brown is the recipient of eight patents and an R&D 100 Award and is a leader in establishing the Bioeconomy Initiative at Iowa State University. He has also published a textbook on biorenewable resources, which will be used in this course. The course caters to a broad audience, including engineers from gas and electric utilities, plant managers, marketing experts in agricultural processing, managers from companies in search of new opportunities based on Iowa's natural resources, and government employees in the energy and natural resources area.

An understanding of Finite Element Analysis (FEA) is indispensable for those involved in checking design elements and the safety of a structure, states Associate Professor **Vinay Dayal** from the Department of Aerospace Engineering, an expert in nondestructive evaluation techniques. In his course titled Understand the Finite Element Analysis: A Practical Approach, Dayal will introduce students to the fundamentals of FEA use, which in recent years has gained widespread popularity for its versatility and ease of analyzing complex structures.

"Working with FEA does not necessarily require the user to be proficient in the complicated mathematics that have gone into the development of this tool," observes Dayal. Instead, he stresses, the tool is as good as the user. FEA users need to be knowledgeable of the advantages and limitations of the process itself. Another benefit of using FEA, according to Dayal, is that it considerably reduces the concept-to-market time cycle. "The typical cycle of design-fabricate-test-modify-fabricate can be condensed to design-analyze-modify-fabricate," he states.

Students will have opportunities to work on several challenging problems throughout the course, giving them the practice necessary to grasp fundamental concepts. The course is geared toward engineers who want to learn how to use FEA efficiently and effectively to solve and optimize civil, mechanical, or aerospace industry problems in structural analysis. "Designers who deal with structures that are loaded mechanically and/or thermally will especially benefit from knowledge of FEA," says Dayal. ■

For more information on EDE courses, log on to www.ede.iastate.edu or call 515-294-7470 or 800-854-1675.

IPOC helps company showcase excellence By Bruce Coney, IPOC

In Tolerance, a small contract manufacturing company located in Cedar Rapids, Iowa, recently gained national recognition for incorporating eight best manufacturing practices as identified by the U.S. Navy's Best Manufacturing Practices (BMP) Center of Excellence.

Established in 1985, the BMP program is one of the country's oldest and most closely watched systems for documenting best practices. It has since published almost 5,000 best practices of manufacturing firms, large and small, across the country. These practices then are showcased as a reservoir of ideas for government, industry, and academic communities to share and implement in their organizations. The BMP program goal is "to increase the quality, reliability, and maintainability of goods produced by American firms," thus encouraging businesses to promote exceptional manufacturing practices, methods, and procedures.

In Tolerance holds the distinction of being one of the smallest companies to date to receive recognition for its BMP status. It joins heavyweights such as large defense contractors and civilian firms with established records in demonstrating excellence. In Tolerance manufactures and assembles metal and plastic parts for industrial, communication, medical, and military-aerospace applications, including services in CNC precision machining, as well as rapid prototyping and CAD-CAM software capabilities. The company has 30 employees and clients throughout the U.S. and Puerto Rico.

An opportunity to participate in the BMP program surfaced for In Tolerance through its long-standing contact with IPOC, a regional satellite center for the national

Breakfast, Business, & More

Network with small business owners, corporate buyers, and potential clients. Connect with federal and state area representatives. Visit with local business service programs that can aid your business growth.

The next event will be a Central Iowa Breakfast to be held on **March 4, 2004**, at the Des Moines Downtown Holiday Inn, 1050 Sixth Avenue, at 7:30 a.m.

Facilitator: Ted Williams, CEO, Williams Group, Inc., Des Moines, Iowa.

Sponsors: Channell Construction Iowa & Nebraska, Principal Financial Group, and the Minority & Women Business Conference & Expo. In cooperation with IPOC/CIRAS and Drake Small Business Development Center.

For reservations, contact Kathy Bryan at 800-458-4465, kbryan@ciras.iastate.edu.

BMP program. IPOC helps businesses access information in their efforts to document quality improvement and efficiency measures.

To qualify for BMP certification, a company must first voluntarily submit to an on-site survey. In the case of In Tolerance, IPOC Manager Bruce Coney invited BMP center technical advisors Larry Halbig and



Don Hill (left), Technical Advisor of Best Manufacturing Practices Center of Excellence and Team Leader; Robert Becker (center), President of In Tolerance; Jack Hardin (right), General Manager of In Tolerance.

Larry Robertson to tour the company. A BMP survey offers several benefits to a company, from providing valuable benchmarking information at no cost to being able to gain national visibility for practices that have the seal of approval from an independent team of experts.

A best practice is defined as "a unique process, technique or innovative use of equipment or resources that have had a proven record of success." These processes must meet measurable objectives that contribute to a company's financial health. The survey itself covers six functional areas: design, testing, production, facilities, logistics, and management.

Best practices studied at In Tolerance ranged from its innovative health and fitness program that achieved low absenteeism and employee turnover to the company's use of technology in providing rapid and accurate estimates on jobs. Other best practices cited included the company's first article inspection process, an on-line parts status system that lets customers track the completion of their orders, and an automated quote inventory scheduling system software.

IPOC can also help a company access a variety of on-line BMP tools. Any company that believes it possesses a superior process that supports its product or service can obtain a survey form available through IPOC. A team can be put together based on the number of candidate surveys requested in any given location. Smaller firms, therefore, can combine their efforts to offer 10 to 15 practices for a survey.

Funded by the U.S. Navy, the BMP center strives to ensure that businesses have access to the state of the art in business practices, which translates into economic well-being and a stronger industrial base for the country. ■

For more information on the BMP program, contact Bruce Coney at 515-294-4461, bconey@ciras.iastate.edu; or Kathy Bryan, IPOC, at 515-294-4473, kbryan@ciras.iastate.edu.

CIRAS observes a milestone

CIRAS' 40th anniversary celebration, held September 11, 2003, presented an opportunity for staff members and well-wishers to reflect on CIRAS' roots and evolution and, more importantly, the vital role it plays today in promoting Iowa's diverse economy.

The event, which took place in Iowa State University's Howe Hall, began with introductory remarks by CIRAS Director Ron Cox, who traced the organization's history from its start in the university's industrial extension programs to its current status as a premier provider of industry know-how and technical assistance to Iowa's manufacturing sector.

ISU College of Engineering Dean James Melsa delivered the keynote address, which highlighted CIRAS contributions in the areas of engineering education, technology transfer activities, and services that have helped foster a diversified, 21st-century Iowa economy. ISU Extension Associate Vice Provost Michael Quart and CIRAS Advisory Council Chair Mike Goble also addressed the audience, which included former directors Lloyd Anderson and Richard Grieve, as well as several past and current CIRAS clients.

Displays and demonstrations, representing CIRAS' broad capabilities in engineering, management practices, productivity, and quality management, as well as its long-standing association with ISU Extension Services (also celebrating a milestone in its 100th anniversary this year), were part of the celebratory event.

Additionally, the Segway™ Human Transporter, a self-balancing, personal transportation device available for demonstration purposes through the College of Engineering, was present for the adventurous few wanting to experience the thrill of high-tech mobility.

After viewing displays, meeting one on one with CIRAS staff, and listening to remarks by keynote speakers, guests were treated to cake and punch.



"Whether it's lean management practices, engineering projects, procurement, or working with economically distressed communities, CIRAS is a key player in the economic development of Iowa."
—Ron Cox



"CIRAS tells Iowans that engineering at Iowa State is not merely an academic pursuit."
—Dean James Melsa



"CIRAS is not only important for its past contributions, but also strategically important for the future of Iowa manufacturing. It is a key component of our business and Iowa's economic development."
—Michael Quart



"While change is key to success, CIRAS has successfully met this challenge by providing input and guidance at critical junctures to suit a shift in the times."
— Michael Goble



Design changes save time and money

By Sunanda Vittal, *Engineering Communications and Marketing*

Improving the design of a product can be a time-consuming and costly venture for manufacturers, often involving tough choices and, in some instances, a final product that doesn't quite fit the bill. In a recent project with Brown Medical Industries in Spirit Lake, Iowa, CIRAS was able to buck the trend by offering a high-tech, cost-effective, and timely product improvement solution.

Brown Medical Industries manufactures and sells 65 products worldwide in the orthopedic, podiatric, and wound care markets. The company employs 40 people, and while it contracts out a few of its products, most are sold with the Brown Medical name.

Company president and CEO Dr. Ivan Brown wanted to develop a competitive design for a removable walking boot used by orthopedic surgeons to treat minor stress fractures. "Our existing device was not selling well," explains Brown. "We decided to redesign it to incorporate many features preferred by physicians, while at the same time retaining certain features that are unique to the existing device."

Denzil Stacy, retired CIRAS industrial specialist, helped Brown contact the CIRAS engineering team in Ames, which worked with Brown Medical on 'reverse engineering' techniques or a process that analyzes the interrelationships of components in an existing product with the goal of enhancing it through alternate design elements.

"Essentially, we reverse engineered several models and arrived at a drawing. We changed our drawing to fit the objectives we had in mind for the product," says Brown.



Dr. Ivan Brown, President, Brown Medical Industries.

"The result was a hybrid product, incorporating elements that we preferred in our product," he adds.

Using CIRAS' rapid prototyping modeling facilities, the company then developed a physical model of its new walking boot from digital files generated by the reverse engineering process. Subsequently, the product underwent testing and evaluation.

The redesigned walking boot has since been put into mass production with sales, currently, in the U.S. and Canada. The new product compares nicely with similar ones on the market, according to Brown. "We feel very good about the work we did with CIRAS," he adds. Were it not for CIRAS' assistance, Brown speculates, the company would have had to start from scratch and work through several iterations. "Although we could have still accomplished our objectives, it would have taken longer and been more expensive," explains Brown. ■

CCEE Extension integral to Iowa's infrastructure

By Stephen E. Jones, *CCEE Extension*, and James K. Cable, *ISU Department of Civil, Construction, and Environmental Engineering*

The Civil, Construction, and Environmental Engineering (CCEE) Extension program at Iowa State University has provided education and technology transfer assistance to a host of Iowa clients for almost a century. Rooted in ISU's Department of Civil, Construction, and Environmental Engineering, CCEE Extension began in the early 1900s with the outreach and education efforts of Anson Marston, Iowa State's first dean of engineering. Several historical milestones along the way, as well as a strong academic program at Iowa State's CCEE department, have since contributed to its success and lasting benefit to the state of Iowa.

- In 1917, the first conference held by ISU Engineering Extension Service was on water and wastewater operator issues. Subsequently, conferences held throughout the 1920s and 30s focused on civil engineering topics.
- In 1954, a series of basic training courses for water and wastewater operators was taught at several off-campus locations in Iowa. Today, these courses are still being

offered at multiple sites across the state through the Iowa Communications Network.

- The Iowa Department of Transportation got its start as the Iowa Highway Commission, the result of the civil engineering department developing a test site on the current Iowa DOT headquarters. The state of Iowa's highway department is a product of Extension courses, research, and direct involvement by the civil engineering staff.
- The CCEE department has a rich heritage of expertise in basic and applied research in the traditional civil engineering disciplines of transportation, environmental and water resources, structural, and geotechnical studies. The CCEE program in construction engineering, for instance, is rated one of the nation's largest and most successful programs.
- In FY 2003, CCEE began partnering with CIRAS to explore new opportunities for providing assistance to a new set of industrial clients.

Continued on page 8

Clients

With the exception of the electrical and communications utilities, CCEE Extension programs have served individuals responsible for planning, developing, building, managing, and maintaining Iowa's infrastructure. This includes transportation systems (highways and bridges), drinking water and wastewater treatment systems, stormwater management, and other public works. From a long-term perspective, CCEE Extension is striving to provide continuing education opportunities to ISU civil and construction engineering graduates who choose to stay in Iowa to pursue their careers. Primary clients for the CCEE Extension program include several public and private groups in Iowa:

- a. Municipal water and wastewater utilities
- b. County engineers and technicians
- c. Civil engineers in private practice
- d. Land surveyors
- e. Public works personnel in Iowa cities
- f. State agencies: Iowa DOT and Iowa DNR
- g. Portland Cement and Asphaltic Concrete Paving Associations

Since 1966, Iowa's municipal drinking water treatment facilities and wastewater treatment facilities operators have been required to undergo mandatory licensing. While operator training has been offered on an annual basis since 1954, a series of short courses, held since the early 1960s and offered at regional sites around Iowa, have trained in excess of 6,000 operators in the proper operation of these facilities. Similarly, all licensed operators have used these courses to complete their mandatory continuing education requirements, instituted in 1980. Over the years, water facilities operators have also benefited from special purpose workshops organized by CCEE Extension in areas such as disinfection, water distribution systems, pumping systems, and laboratory analysis courses for drinking water and wastewater.

Technical education and licensing

In March 2002, the CCEE department sponsored the 40th Annual American Society of Civil Engineers (ASCE) Environmental and Water Resources conference, which was also attended by CCEE Extension program members. CCEE has maintained a long and successful partnership with the Iowa County Engineers Association (ICEA) for over 50 years. The ICEA schools committee provides an annual assessment of training needs for county engineers and staff, which has led to unique education opportunities for Iowa's county engineers. Recently, CCEE Extension partnered with the Environmental Protection Agency in offering ICN courses in the hazardous spill prevention and mitigation area.

CCEE Extension is a major provider of in-state continuing education programming. All civil engineers and surveyors licensed in Iowa are required to complete a minimum number of professional development hours every two years to renew their professional engineering licenses. In addition, all licensed operators of drinking water treatment facilities, wastewater treatment facilities, and water distribution systems require mandatory continuing education for license renewal every two years. The programs offered by CCEE Extension directly support the continuing education efforts of these client groups.

Partnerships

The CCEE department and the ISU College of Engineering have supported the extension effort over the years. Long-standing cooperation with Iowa's county engineers and the public works directors, fostered by the late Dr. Stan Ring, Professor Emeritus of Civil and Construction Engineering, has resulted not only in collaborative continuing education efforts, but also support in part-time and full-time government and private industry jobs

CCEE EXTENSION

Facts

- As of 2001, Iowa had approximately 1,900 licensed water treatment operators and over 1,700 licensed wastewater operators.
- Beginning in 2001, every municipality with a water distribution system was required to have an individual licensed in water distribution system operations in charge of the system.
- In a typical year, CCEE Extension programming will reach 2,500–3,000 individuals relating to their technical and professional needs.
- For FY 2003, attendance at CCEE Extension programs totaled 2,380 participants, providing 24,000 student contact hours of continuing education and training.

Partners

ASCE, ICEA, the Iowa Concrete Paving Association, the Iowa Public Works Association, the Asphalt Paving Association of Iowa, the American Steel Institute, the American Concrete Paving Association, the Iowa Concrete Pipe Association, the Iowa DOT, the Iowa Ready Mixed Concrete Association, the Trenchless Technology Association, and the National Highway Institute

for graduating engineers in Iowa. Additionally, CCEE Extension programs have also meant monetary support for the department in undergraduate scholarships. Ongoing partnerships with professional organizations in the paving industry and geotechnical sector have led to accomplishing major departmental projects in new labs, including the renovation and updating of an asphalt research laboratory, construction of a new Portland cement concrete research lab, and establishing graduate scholarships.

One of the most successful and largest initiatives ever undertaken by CCEE Extension has been establishing the Portland Cement Concrete Center at the ISU Center for Transportation Research and Education. The Concrete Center brings various entities of the Iowa DOT, Iowa Concrete Paving Association, and ISU together in a single effort that helps enhance CCEE's national presence in concrete paving innovation and research. In less than four years, this effort has gone from zero funding to \$1 million in federal funds and a 20% matching amount from local and industry funds for 2003. These efforts have also led to the creation of a concrete consortium of 10 Midwestern states whose technology transfer activities are having a major impact on the future of concrete paving in the nation. Similar partnerships in the geotechnical area are now underway that will renew the prestige that ISU/CCEE enjoyed in the past due to the long-term support of Extension.

CCEE Extension has forged links between education, government, and industry, a concept that materializes in very few states. Through partnership programs, CCEE Extension staff expertise in the area of structures has extended the life of bridges for local governments. The geotechnical group has assisted in dust control and solving soil stability problems. In the environmental area, Extension staff and the department faculty have had a direct impact on the design, operation, and maintenance of water systems and flood prevention at the state and local levels. The close relationship between Extension and CCEE's transportation research has resulted in major improvements in materials utilization, paving processes, traffic monitoring and flow, and development of public policy on transportation facilities and equipment.

Outreach

While the traditional model for continuing education and training has been in the form of conferences, short courses, and workshops, CCEE Extension has provided on-site training for specific needs at municipal and industrial facilities. Businesses and industries can contact CIRAS or CCEE directly, should they desire on-site training with a current or future project in water and wastewater treatment process control and troubleshooting, environmental engineering, transportation planning, or other special technical assistance. The CCEE Extension mission does not include the provision of full engineering design services. However, it does provide new

CIRAS partners with DOE on water/wastewater project

CIRAS Industrial Specialist Mike Willett and Civil, Construction, and Environmental Engineering (CCEE) engineer Steve Jones are working on an Iowa Industries of the Future (IIOF) project on water/wastewater processes. The IIOF is a U.S. Department of Energy-sponsored program in partnership with the Iowa Department of Natural Resources. Its primary goal is to boost industrial efficiency and productivity by lowering raw material and energy use per unit of output, improving labor and capital productivity, and reducing the generation of wastes and pollutants.

The IIOF project will create a water/wastewater alliance steering committee whose task is to develop a vision and road map, as well as disseminate information on water/wastewater issues through the IIOF Web site. Water use and wastewater treatment are cross-cutting issues that affect different industry sectors and communities.

Currently in Iowa, there is a need to document the treatment process technologies and identify opportunities to implement treatment technologies that will improve energy efficiency, reduce costs to the industry, and provide for overall improvements in effluent quality. It has been estimated that at least 40% of Iowa companies could achieve measurable savings in energy consumption, chemical costs, and overall improvement in effluent quality by implementing the above procedures.

For more information on the IIOF water/wastewater processes, contact Mike Willett, 319-266-3260, mwillett@ciras.iastate.edu.

technological applications for Iowa's cities by partnering with Iowa industry in ways that improve the life-cycle costs of its infrastructure and provide timely and effective employee training programs. ■

For more information on CCEE Extension activities, contact Stephen E. Jones, Extension civil engineer, at 515-294-3957, sejones@iastate.edu; or James K. Cable, CCEE associate professor, at 515-294-2862, jkcable@iastate.edu.

Managing in a “multi-project” environment

By Tim Sullivan, CIRAS, and Jeff Mohr, CIRAS

Small and mid-range suppliers in the U.S. have to operate in fiercely competitive markets where increasingly the threat is coming from low-cost labor markets abroad. To survive, American suppliers must embed themselves into the product development cycles of their larger original equipment manufacturer (OEM) customers and, they must be able to respond very fast with very high quality. This means that American suppliers need to become expert multi-project organizations.

Multi-project organization: What is it and why are its problems different?

Most of Iowa’s diverse manufacturing base serve as suppliers to larger OEMs, or as suppliers to their first-tier suppliers. Typically, Iowa companies deal with several customers and are asked to bid on several components. As a result, most suppliers are involved in multiple development projects, and engineers often have eight or more projects active at the same time.

Planning and delivering a single project on time and on budget using totally dedicated resources is tough enough. When you take those resources and simultaneously give them responsibility for five or even ten other projects, it becomes almost impossible to respond very fast with very high quality. Managers in a multi-project organization are faced with a significant conflict: starting a new project now will slow the rate of progress on existing projects, but delaying the start of the new project will delay its finish.

Is there help?

CIRAS is offering a new workshop titled “Critical Chain Multi-Project Management Methods: Attacking Variation & Waste at the System Level,” which will discuss how to deal with this conflict. CIRAS Industrial Specialists Tim Sullivan and Jeff Mohr were recently certified by the Product Development Institute (PDI) to deliver this workshop. PDI founder Tony Rizzo is one of the world’s most experienced practitioners implementing the TOC “critical chain” methodology in a multi-project environment.

“With this workshop and the ability to implement, CIRAS can now help develop a level of operational excellence that will let you deliver both speed and quality in a multi-project environment,” says Rizzo. ■

For more information contact Tim Sullivan at tsullivan@ciras.iastate.edu, 515-727-0656; or Jeff Mohr at jmohr@ciras.iastate.edu, 515-294-8534, or visit the Theory of Constraints portion of our Web site at www.ciras.iastate.edu/toc.

New TOC Workshops

Presented by CIRAS

Critical Chain Multi-Project Management Methods: Attacking Variation & Waste at the System Level. These all-new, comprehensive two-day workshops are scheduled to take place:

March 3–4, 2004 Cedar Falls
April 5–6, 2004 Urbandale
May 4–5, 2004 Sioux City

Two-day workshop: **\$799/person.**
Additional attendee from the same company: **\$349/person**

Theory of Constraints Methodology. Introductory half-day workshops:

Topic	Cedar Falls	Urbandale	Sioux City
Project Management	January 27	February 19	March 16
Operations/Production	February 24	March 18	TBD
Distribution/Supply Chain	March 30	April 15	TBD
Finance/Measurements	April 27	May 12	TBD

Half-day workshop: **\$49/person**

For details or to register, log on to www.ciras.iastate.edu/events.asp or contact Carol Smith at 515-294-3420. For more information on the Theory of Constraints or to inquire about on-site workshops, contact Tim Sullivan at 515-727-0656, tsullivan@ciras.iastate.edu; or Jeff Mohr at 515-294-8534, jmohr@ciras.iastate.edu.

Graduating seniors with CIRAS work experience



Jennifer Diaz, BS Economics and Political Science;
Jake Strait, BS Aerospace Engineering; William Griebel, BS Aerospace Engineering; Justin Barrett, BS Mechanical Engineering;
Not Pictured: Mohammad Sajjad Haider, BS Management Information Systems.



Jessica Rose, BS Mechanical Engineering; Craig Thompson, BS Health and Human Performance; Matt O'Banion, BS Mechanical Engineering; Eric Thompson, BS Management Information Systems; Jessica Riedl, BS Mechanical Engineering.

Extension Awards

Lloyd Anderson Superior Service Award



ISU Extension Vice Provost Stanley Johnson (left) presents award to Douglas Wood.

Douglas Wood, Engineering Research Laboratory manager in the Department of Civil, Construction, and Environmental Engineering, received this award for his expertise in product and product component testing. Some of his recent test projects include athletic equipment, grain

bins, and trailer hitches. Wood has worked with CIRAS in helping many Iowa companies improve their products and increase profits. He will receive a plaque and \$500. The award honors former CIRAS director Lloyd Anderson, who established a standard of excellence in his service to Iowa industry.

Vice Provost's Special Citation

CIRAS Industrial Specialists Jill Euken and Tim Sullivan were recognized for their exceptional contribution to ISU Extension's educational efforts. Euken and Sullivan partnered with Iowa agricultural production and industrial leaders to develop BIOWA, a U.S. Department of Energy-funded and CIRAS-facilitated non-profit organization rooted in the Agriculture Industries of the Future project (see page 12 for more details about an upcoming conference).



From left: Stanley Johnson, Extension Vice Provost; Bill Kackley, HON Technology, Inc.; Gordon Wassenaar, Prairie City agricultural producer; Tim Sullivan; Jill Euken; Robert Brown, Professor, ISU Department of Mechanical Engineering; Brad Petersburg, Hanlontown agricultural producer. Not pictured: George Anderl, Genencor International, Cedar Rapids; Jeff Stroburg, West Central Cooperative, Ralston; Robert Boeding, Lawler agricultural producer; Ed Williams, Iowa City.

Long-time CIRAS supporter receives Extension recognition



From left: Joe Crookham and Stanley Johnson.

Joe Crookham, president of Musco Lighting in Muscatine, Iowa, received a Friends of Extension citation from Epsilon Sigma Phi, a National Honorary Extension Fraternity. Crookham, along with daughters Beth Crookham and Diane Crookham-

Johnson, were recognized for their leadership and initiative in promoting technology efforts throughout Iowa's counties. Crookham was a CIRAS client during Musco's early years (see *CIRAS News*, Summer 03) and remains a strong CIRAS supporter today. Congratulations, Mr. Crookham!

NAMTAC Award

The National Association of Management and Technical Assistance Centers (NAMTAC) recently bestowed one of the 2003 Outstanding Project of the Year awards for technical assistance to CIRAS for the Mastercraft Plant Layout Simulation Project.



From left: Clay Crandall and John Van Engelenhoven.

The project team included CIRAS Industrial Specialists John Van Engelenhoven and Clay Crandall, and Nick Burns, an ISU industrial engineering student working for CIRAS. The Mastercraft Plant Layout Simulation Project resulted from a request for assistance by the Nadler Brothers Company, which wanted to relocate its newly purchased furniture-manufacturing plant in Omaha to a smaller facility in Council Bluffs.

Mastercraft's move meant 50 new jobs to the Iowa economy and an initial investment of over \$2 million in plant operations and equipment. The CIRAS team worked with Mastercraft owner Barry Nadler on plant simulation and layout processes. NAMTAC is a not-for-profit organization that provides information and a forum for members to recognize excellence in manufacturing practices.

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WebWatch: BioIndustry

The CIRAS bioindustry initiative helps Iowa businesses develop, market, and use agricultural products for biobased goods and energy. On March 7 and 8, 2004, CIRAS, Iowa State University, and BLOWA, a non-profit organization promoting Iowa's bioeconomy, will present a Biobased Industry Outlook Conference at the Scheman Building in Ames.

March 7—Reception at 7 p.m.

Researchers from Iowa State, the University of Iowa, and the University of Northern Iowa will present new biobased technologies in the making.

March 8—Sessions begin at 8:15 a.m.

Session I: Success stories and the future of biobased products and bioenergy. Speakers will include experts from ISU, USDA, DOE, biobased companies, and the USDA biobased certification program. *Session II:* 'Biobasics,' a short course on biobased value chains and opportunities. *Session III:* USDA biobased certification programs, displays, and networking.

Companies and individuals interested in bioindustry ventures are encouraged to attend the conference. For more information and to register, log on to www.ciras.iastate.edu/bioindustry.

www.ciras.iastate.edu



Focus: BioIndustry

CIRAS News is published quarterly by the Center for Industrial Research and Service and edited by the CIRAS publications team. Design and production is by Engineering Communications and Marketing, Iowa State University. Contact John Van Engelenhoven at 515-294-4475 or jve@ciras.iastate.edu with questions and comments regarding the newsletter.

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